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Abstract

This paper explores the opportunities for a 'just transition' to low carbon and sustainable energy systems; one that addresses the current inequities in the distribution of energy benefits and their human and ecological costs. In order to prioritize policies that address energy poverty alleviation and sustainability concerns, national action and higher levels of international cooperation and coordination are required to steer public policy towards a broader range of public interests. This also implies re-directing the vast sums of private energy finance that currently serve a narrow set of interests. This paper considers how national and global energy governance must adapt and change to ensure a just transition to low carbon and sustainable energy systems. Creating a low carbon and sustainable energy transition will face significant challenges in overcoming opposition from a broad array of interest groups. The challenges of guiding a just transition are amplified by the relinquishing of government control over the energy sector in many countries and the current weak and fragmented state of global energy governance. The necessary changes in energy decision making will entail complex trade-offs and rebound effects that make strong, participatory and transparent institutional arrangements essential in order to govern such challenges equitably. In this respect, procedural justice is critical to achieving distributive justice and to creating a simultaneously rapid, sustainable and equitable transition to clean energy futures.

Keywords: Clean Energy, Governance, Equity.

JEL classification: O15, O31

Abbreviations and Acronyms

APP	Asian Pacific Partnership on Clean Development and Climate
CDM	Clean Development Mechanism
CER	Certified Emissions Reduction
CIF	Climate Investment Fund
COP	Conference of Parties
CTF	Clean Technology Fund
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GDR	Greenhouse Development Rights
GEF	Global Environment Facility
GHG	Greenhouse Gas
IEA	International Energy Agency
IGO	International Governmental Organisation
IRENA	International Renewable Energy Agency
JTA	Just Transition Alliance
MDB	Multilateral Development Bank
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
REEEP	Renewable Energy and Energy Efficiency Partnership
REN21	Renewable Energy Policy Network for the 21st Century
SREP	Program to Scale-up Renewable Energy in Low Income Countries
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
US	United States
WWF	World Wildlife Fund

1. Introduction[1]

Energy is central to all aspects of human development. From cooking and heating to transport and lighting, energy makes modern life possible. Yet, people and places unevenly experience the costs and benefits of energy extraction, generation, financing, distribution, and consumption. This is true in terms of the economic and social benefits and harms and risks associated with energy as well as the environmental costs that existing patterns of energy production and consumption generate locally in the short term and globally in the longer term, most notably with respect to climate change.

In today's global economy, energy policy is increasingly interdependent as the choices states make have direct consequences for other countries. These interconnections and the vulnerabilities they create become apparent when energy exporters chose to cut off supplies or regulate them in order to extract more revenue. The oil crises of the 1970s and more the recent interruptions in Europe's gas supply from Russia have heightened concerns about dependence on other countries for energy security. Hence through supply, price and the external effects of pollution generated by energy production, domestic and foreign energy policy are intimately linked.

Pursuing energy security, alleviating energy poverty and addressing climate change objectives simultaneously presents a challenge of staggering proportions, not least because policy goals are often in tension with one another and compete for prominence. Addressing one can undermine efforts to achieve another. Energy security through access to secure supplies of fossil fuels conflicts with reducing dependence on fossil fuels necessary to tackle climate change. Confronting energy poverty, meanwhile, requires providing access to energy

[1] Parts of this paper draw on Mulvaney and Newell (forthcoming), Newell (2011a) and Newell (2011b). The authors are grateful to Alan Fuchs, Adrian Smith and Lucy Baker for comments on an earlier draft of this paper.

to many millions of the world's citizens. But if this need is met through a huge increase in fossil fuel use, climate change objectives may be undermined.

The challenges of addressing energy poverty in an integrated global fossil fuel economy are compounded by the need to tackle climate change. Attempts to balance developing countries' right to develop with the need to de-carbonise the global economy, amid calls upon many developed countries to pay 'carbon debts' and deliver 'climate justice', is generating significant stalemate in the climate change negotiations. Many rapidly industrialising developing countries continue to resist pressures to subject themselves to controls on carbon emissions when, on a per capita basis at least, their contribution is significantly smaller than that of most developed countries.

The question of responsibility is, however, more complex than developed versus developing countries, as responsibilities and impacts are distributed unevenly within nations along the lines of urban/rural, rich/poor as well as cleavages such as gender, race and class (Newell 2005). For example, China's plans for a vast increase in coal-fired electricity generation will help increase energy access to the rural poor, but to the detriment of environmental quality in and around the coal commodity complex. Likewise, the Three Gorges Dam will increase energy access to millions at the expense of those displaced by the mega-project. Inter-generational, inter-national and intra-national trade-offs of this sort strongly characterise the global politics of energy and point to the importance of 'just transitions' (see box 8).

These dilemmas place questions of rights and justice at the forefront of efforts to pursue clean energy equitably. In a carbon constrained world, the challenge is meeting the energy needs that are most pressing in a way which significantly up-scales the role of sustainable energy

rather than relying on climate change accelerating fossil fuels, low carbon nuclear power, or large-scale hydro power. Managing the trade-offs and contradictions, identifying and meeting priority needs means having strong and legitimate institutions in place at all levels of governance that can steer the international community through the mire of entrenched economic and geo-political interests and temptations to privilege short term over longer term needs and priorities. It is only through fundamentally changing *how* energy policy is made and *by* and *for whom* that we can expect some of the distributional inequities in access and exposure to the consequences of unsustainable energy production and use to be addressed.

The distribution of energy is shaped by an array of actors, institutions and interests whose actions affect international flows of energy provision and consumption, determining who gains access to which type of energy and on what terms. In other words, energy governance in the form of policies, initiatives and institutions (or lack thereof) in both the public and private sectors strongly shapes distribution. 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).

Securing *procedural justice* in how decisions about energy are made by key actors in energy governance is, therefore vital. Decisions to allocate, use, and consume energy in particular ways, for particular purposes, by certain social, political and economic groups (and by implication to deny access to others) are mostly made out of the public eye and rarely in democratic forums. For reasons of commercial confidentiality when dealing with private companies, or because of geo-strategic sensitivities about revealing available energy supplies,

public participation and deliberation around questions of energy policy has traditionally been very weak. Consultations that provide limited or incomplete information, do not consider equity and impact assessments, or fail to effectively report the results of consultations, lead to high levels of public dissatisfaction with such processes. Even where public participation or comment is formally invited by the state, it often serves more to legitimate prior choices and decisions than to actually involve stakeholders in shaping policy choices (Lehtonen and Kern 2009; Stirling 2009).

By default, the day to day governance of energy is largely determined by producer or consumer (purchasing and bargaining) power where questions of justice and equitable access and distribution are easily marginalised in the context of market transactions. This is especially the case where, as in large parts of the world, states have either relinquished control over, or been required to liberalise parts of their energy sectors as part of power sector reform programmes supported or overseen by multilateral development banks that leave large elements of energy generation and distribution in private hands. What is particularly alarming is the apparent weakness and under-development 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 justice and injustice handled and resolved (Florini and Sovacool 2009; McGowan 2009). We return to this issue below.

It is against this background that this paper looks at issues of equity and justice in relation to the financing and governance of sustainable or ‘clean’ energy. What counts as ‘clean energy’ is itself a point of some controversy where some include low-carbon energy sources such as nuclear and hydro-electric power, while others reserve the term for renewable energy for biofuels, wind, solar, and small-scale hydro-electric (Box 1). Attention to the financing and

governance of clean energy in the developing world, however, implies a focus on the carbon markets that have been created, most significantly through the Kyoto Protocol's Clean Development Mechanism, as well as new institutions such as the Climate Investment Funds of the World Bank and a range of smaller scale and bilateral programs aimed at promoting and financing 'clean energy'.

Ultimately a clean energy transition requires attention to the way conventional forms of energy and their consequences are governed and un-governed. Policy and financial support to fossil fuels through regulations, subsidies, tax policy, planning permission, the design of transport and building infrastructures, for example, have to be re-thought in a way which explicitly privileges support for, and improves access to, clean energy. In other words providing additional support to clean and renewable energy is to be welcomed; but it will ultimately be ineffective in improving energy security and tackling energy poverty and climate change unless it moves away from a system of energy production and distribution characterized by political instability, volatile commodity prices, uneven access, and which accelerates climate change.

The paper will look then at both the *procedural* and *distributional* elements of equity and justice: who participates, is represented and sets the rules by which governance institutions in this area operate and what impacts this has on who gets access to clean and sustainable energy, how and on what terms. Questions of equity and justice need to be resolved not just in intergovernmental proposals on ways in which to allocate responsibility for tackling climate change or how to deliver action on energy poverty (though this latter issue has received considerably less attention), but also in governments' national level responses: where the burden falls, who pays and who decides. The paper is divided in the following

way. Section 2 looks at distributional issues, focusing in turn on energy access, energy security and then the relationship between energy and climate justice. Section 3 looks at procedural issues in relation to institutions of energy finance and institutions of climate governance. Section 4 concludes and suggests key issues that need to be addressed if the pursuit of clean energy is to occur in an equitable way.

Box 1: What counts as clean energy?

Clean energy tends to refer to non-conventional, non-fossil fuel sources of energy and can include a range of energy sources from nuclear and hydro energy and biofuels to a range of renewable energies such as wind, solar, geothermal, tidal power and biomass. But it can, under some definitions, refer to 'cleaner' fossil fuels such as 'clean coal' or low carbon energy sources such as nuclear power.

Definitions of 'renewable energy' are also often ambiguous. According to the World Bank, 'new renewable energy' applies to energy from biomass, solar, wind, geothermal and small hydro (under 10MW). However, the term 'renewable energy' can include energy efficiency measures and large hydro-electric projects.

For further discussion of definitions see WWF-UK (2008).

2. Distributional issues

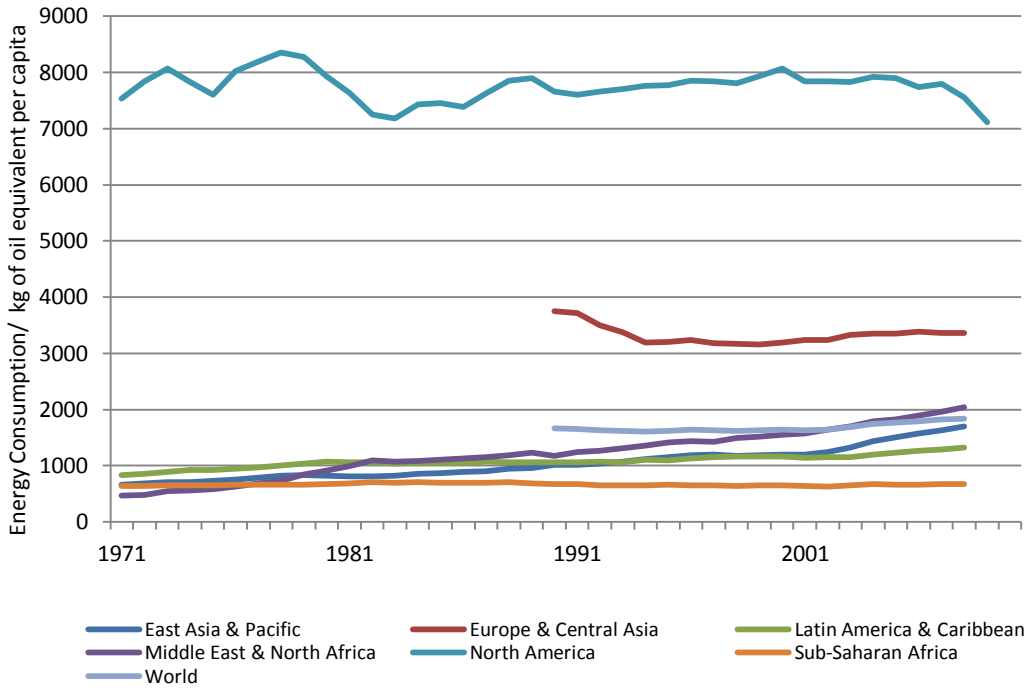
Vast inequalities characterise questions of access and use of energy. These inequalities are apparent between regions and countries but also reveal significant gender, racial and class characteristics such that energy is often a powerful indicator of poverty and social exclusion

in general. As such, the distribution of energy cannot be considered in isolation of other aspects of energy poverty and political and social marginalisation.

Global comparisons of per capita energy use allude to the level of inequality in energy use (Figure 1) and several authors have highlighted the relationship between basic energy consumption and human development (e.g. Gaye 2007; Practical Action 2010). Disparities are partly explained by differential coverage of electricity grids and by patterns of energy consumption. North American primary energy consumption for example is around twelve times that of Africa (EIA 2006). Focusing on residential consumption, the IEA draws a comparison between the roughly equal consumption of electricity by the 19.5 million residents of New York state (2,050 kWh per capita per annum) and the 791 million residents of sub-Saharan Africa[2] (52 kWh per capita) (IEA, UNDP & UNIDO 2010).

[2] Excluding South Africa

Figure 1. Regional disparities in energy use[3]



Source: based on IEA Statistics, accessed through World Bank Data (http://data.worldbank.org). Data from Central Asia is unavailable for the period pre-1990.

However, global comparative statistics tell only part of the story of unequal energy access and its impacts. Total energy consumption does not reflect the greater efficiency of energy use in OECD countries, compared to inefficient use of biomass[4], which generates less useful energy for users. Aggregate figures and country comparisons can also mask significant disparities in energy access within countries, which can be as large as those between developing and industrialised nations (Siddiqi 1995). This disparity is most visible between income groups within countries and between urban and rural areas, where settlements are more sparsely populated, electricity grid extension is expensive, energy transport costs are high and few incentives exist for public investment or private investment in energy.

[3] Energy use refers to use of primary energy before transformation to other end-use fuels

[4] It should be noted however that the efficient and sustainable use of biomass has many potential advantages for developing countries, including local accessibility, low carbon emissions over long time frames and potentially labour intensive supply chains capable of job creation (Macqueen & Korhaliller 2011)

Meanwhile poor urban consumers typically spend a greater proportion of their income on fuel and electricity, which can limit their energy consumption.

The impacts of differentiated energy access to energy services are also felt at the household level. Women generally suffer a disproportionate burden from the time and energy spent collecting fuelwood and the detrimental health effects that can result from labour. Because of the time spent on domestic activities, women and children are also at higher risk of suffering the effects of indoor air pollution as a result of inefficient combustion of fuelwood, estimated by the World Health Organisation to be responsible for 1.45 million premature deaths each year (greater than those attributed to tuberculosis and malaria) and set to increase between today and 2030 (WHO 2008; cited in IEA, UNDP & UNISO 2010).

Because of the vast inequalities in energy consumption it is estimated that meeting the basic energy needs outlined in the following section of those without access to modern energy would require around 1.2 per cent of current world total energy consumption (Sanchez 2010: 11).[5]

2.1 Energy Access

Access to energy is a prerequisite for poverty reduction and human development as modern energy services are essential to meet basic and productive needs. Energy is critical for basic needs such as lighting, water procurement, cooking and water heating, space heating and cooling, modern medical services, information and communications and transportation. Modern energy services are also essential to economic development. Without reliable sources

[5] This percentage is derived from estimates for cooking using an average of 35 kg of biomass per capita per year (equivalent to 432 kWh of electricity) which should be sufficient for cooking all meals and about 120 kWh of electricity per capita per year which should be sufficient to provide lighting, access to most basic services and to add value to production (Sanchez 2010:11).

of energy industries cannot develop, vicious cycles of poverty persist, and the health impacts of traditional energy resources linger. It is unsurprising then that confronting the challenge of energy poverty is central to achieving the Millennium Development Goals. 1.4 billion people in the poorest regions of the world still have no access to electricity and under most scenarios 1.2 billion people – mostly in rural areas – will still lack access to electricity in 2030 (IEA, UNDP and UNIDO 2010). Worldwide, 2.7 billion people rely on traditional biomass for cooking and heating and another billion have access only to unreliable electricity networks (IEA, UNDP and UNIDO 2010). According to the report, the Millennium Development Goals in general, and specifically the goal to halve extreme poverty by 2015, cannot be achieved without new policies specifically designed to address energy poverty. The systematic neglect of the issue of global energy poverty by policy-makers (Sanchez 2010) has led activists to use the language of 'injustice' to describe this scenario, even invoking the language of 'apartheid' to highlight the stark inequalities in energy use (Corbyn 2010). This makes the target of the UN Secretary-General's Advisory Group on Energy and Climate Change (AGECC) for universal energy access by 2030 a bold one indeed.

Box 2: 'Smart' and 'Just' Grids

'Smart grid' concepts, systems, and technologies are intended to intelligently integrate electricity generation, transmission, and consumption. The term is meant to contrast with the more crude and unidirectional electricity delivery infrastructure, where there are significant inefficiencies in matching electricity supplies from power plants to uneven and constantly changing consumption patterns. Smart grids can maximise efficiency through the integration of devices that can reduce transmission losses, shift peak demand, and

improve the quality of energy delivered. While smart grids remain in early phases of development, these innovations may make important contributions to alleviating energy poverty and avoiding the uneven outcomes of many electrification policies in developing countries to date by reorienting the organisation of energy systems.

The notion of *Just* Grids has been introduced to reflect the need for power systems to contribute towards equitable and inclusive global, economic and social development. The concept can be a useful design element for an energy policy that provides universal access to reliable, affordable, and sustainable electricity, without marginalising the poor. A key consideration in developing 'smart and just grids' is that it implies decentralisation of storage and generation sources, as well as bidirectional electricity flows. These features make it easier to integrate smaller-scale, intermittent, and sometimes remote renewable energy systems such as solar and wind. It is possible that less centralised systems offer more opportunities for control over energy infrastructure as well.

In contrast, some approaches to electricity modernisation remain highly centralised. An effort in North Africa called the DESERTEC Concept for Energy, Water and Climate Security (DESERTEC 2009), while ostensibly offering some benefits to local communities, plans to use elements of smart grid technologies that increase grid transmission efficiency and stability to export solar energy to Europe. Thus smart grids are not inherently just. But the notion of smart and just grids can be an important concept to consider justice and equity in efforts to tackle energy poverty and climate change.

Source: Bazilian et al. (2011)

2.2 Energy Security

Uneven energy access is also of course a product not just of mal-distribution within countries, but also between them. Energy sources are unevenly distributed globally and some energy flows create important vulnerabilities and pose threats to energy security. Global and domestic energy politics are intimately connected and are often played off against one another. Energy *in*security is a common justification for increased domestic energy production, or outright energy sovereignty to reduce dependence on imports from areas of the world characterised by conflict or political instability. It also justifies securing future energy flows from foreign sources (Sudan's mortgaging of future oil supplies to China is a case in point or use of land grabs to cultivate biofuels).

Energy security is not just about the international relations of geo-political security and competition for influence, though the number of contemporary wars fought over access to oil suggests this continues to be a dominant feature. In/security is also produced by the everyday practices of exploration, extraction and distribution. Clear examples of conflicts and contradictions between energy security and human rights are found throughout the global fossil fuel economy leading some to claim that nations awash in energy and natural sources—particularly those who rely heavily on these exports for foreign exchange earnings—are prone to suffer from a resource curse (Ross 2002). For example, securing Nigerian sweet crude oil often involves dispatching paramilitaries in the Niger Delta to protect oil infrastructure. Local communities often attempt to secure their own energy needs by rupturing pipelines. The injustices of petro-violence and human rights abuses perpetuated by petro-states are well known features of the global oil commodity complex (Watts 2005). Such examples highlight the fact that, in the case of energy, state interests are often poorly aligned

with those of marginalised groups who remain deprived of energy or whose land is home to oil, for example, which places their livelihoods in the path of lucrative state and private revenue. Conflicts between indigenous groups and the state, acting on behalf of state-owned and multinational enterprises, in many parts of the world illustrate this dynamic clearly.

The thirst for affordable and reliable energy resources is also the basis of land grabs for energy. The spatial restructuring of energy supply will be a necessary condition of clean energy transitions, due to the lower power density of renewable energy versus the concentrated energy in fossil fuel deposits (Smil 2005). But the environmental and socioeconomic impacts of new approaches to energy supply will be mediated by the existing power of different groups over resources previously not highly valued by the energy industry. For example, the increased reliance on electric vehicles will set in motion a land grab for territories with newfound value such as the Altiplano in Bolivia, where there are vast deposits of Lithium (Romero 2009). Some have gone so far as to say that foreign oil dependency will simply be replaced with a dependency on other imported materials, producing new forms of energy insecurity.

Efforts to secure energy might include land acquisitions by wealthy countries to meet rising energy demands, with implications for intra-national equity when considering the dependency of the rural poor on primary production for livelihoods. The history of biofuels development provides examples of how attempts to address energy insecurity produce patterns of injustice in their wake. Brazil transformed itself from an oil importer to an exporter, and is self reliant in fuel for passenger cars from sugarcane ethanol. A program implemented in the 1970s increased sugarcane production and mandated that new cars have flex fuel engines to run on ethanol. It was strong and coherent policy that fostered this

technological transformation. But the industry is confronted with accusations of slave and child labour in poor working conditions. The US is trying to mimic this model of energy security by increasing ethanol production mainly from corn, on which approximately 40 per cent of US clean energy subsidies are currently estimated to be spent (New Energy Finance 2010). But some civil society groups—Friends of the Earth, Union of Concerned Scientists, and Greenpeace among others—contend that corn ethanol exacerbates food insecurity (Naylor et al. 2007). In 2008, the demand for biofuels contributed to rising prices for corn, leading to 'tortilla riots' by campesino groups in Mexico for whom the crop is a food staple.

In an integrated but highly unequal global economy, 'boomerang' effects abound in the global politics of energy. The same is true for the externalities generated by the production and consumption of energy, regionally with respect to issues such as air quality and acid rain and globally regarding climate change. This is what makes integrated and multi-dimensional approaches to energy security, of the sort proposed by the World Economic Forum (see Box 3), so crucial.

Box 3: A more useful definition of energy security?

The World Economic Forum Global Agenda Council on Energy Security defines energy security in an inclusive way as:

> *'the **reliable**, stable and **sustainable** supply of energy at **affordable** prices and at an **acceptable social cost**'.*

This does not get round the issue of who defines 'sustainability', 'affordability' or 'social cost' but expanding the conceptualisation of energy security suggests one way of showing

how the goals of tackling energy poverty, improving energy security and responding to climate change are intimately interlinked.

Source: World Economic Forum (2010; emphasis added)

2.3 Energy and climate justice

Drastic changes in energy production and consumption will be required to confront the challenges of climate change and re-orient the global economy on a low carbon footing. But such transitions raise issues of energy and climate justice. Start with the amount of greenhouse gases (GHGs) permitted in the atmosphere. International climate negotiations debate whether to aim for climate stabilisation at 450 parts per million carbon dioxide levels, or 350 parts per million, levels that some climate scientists contend will be necessary to protect the survival of small island nations from sea level rise (but which latest IEA figures suggest we already look set to surpass (IEA, 2011)). Questions of who gets to use what type of energy in a carbon-constrained world 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 placing a different weighting on issues of equity, efficiency, and effectiveness, in terms of the ability to most rapidly reduce greenhouse gas emissions.

Proposals include ‘contraction and convergence’, an idea promoted by the Global Commons Institute and supported by many developing nations (Meyer 2000). This framework aims to ‘contract’ overall carbon emission safely below the threshold to avoid runaway climate feedbacks and keep 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 emissions on the basis of a formula which incorporates population, GDP and cumulative emissions contribution (Kartha et al. 2009). Different justice principles are invoked in each. Proposals based on 'grandfathering', favoured by the US, take the status quo as the most legitimate starting point while seeking to maximise the utility of current generations, whereas contraction and convergence and GDR proposals place intra and inter-generational equity principles more centrally and give different weight to the social and economic benefits accrued from historical emissions.

The question, however, is not just how to allocate rights to development in a carbon-constrained world or how to ensure a 'just' transition away from fossil fuels towards cleaner and more sustainable forms of energy production as discussed below (section 3.6). Technological and market-based 'clean energy' solutions to climate change also have the potential to impact upon energy justice. Civil society groups such as Green For All and the Blue-Green Alliance (a coalition between the US Steel Workers Union and the Sierra Club among others) look to promote a clean energy agenda that can create jobs for the urban poor, aiming for a just distribution of benefits from a new green economy. But the burdens of this transition could be uneven as well. For example, the manufacture of solar photovoltaic modules, compact fluorescent lights or biofuels, as we saw above, may reproduce the unequal occupational health and environmental pollution burdens found in analogous industries. There is a tendency to treat all clean energy technologies as homogenously 'green'. Yet, solar photovoltaic technologies rely on semiconductor technologies built out of hazardous industrial 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 80s—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 pursuit of clean energy, such as wind energy, through projects supported by carbon finance under the Kyoto Protocol's Clean Development Mechanism (CDM), has led to struggles over land and the distribution of revenues derived from the carbon credits in India for example (Böhm and Dabhi 2010). In scenarios such as this, new funding streams in support of action on climate change can end up entrenching procedural inequalities in local decision-making around access to land and livelihoods where climate and carbon revenue streams compete with, and sometimes take priority over, other potential uses of land. Similar tensions over land allocation have arisen in developed countries such as the UK, US and Denmark over land allocation for wind turbines and the distribution of financial returns from the sale of electricity, with different levels of support from private companies, government and local communities dependent on their involvement in project and policy design and the distribution of financial returns (Barry et al 2008; Phadke 2011).

In relation to the discussion above, one of the key challenges is how to reconcile efforts to tackle energy poverty and climate change simultaneously. To take a concrete example, 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[6]. The argument was made that the World Bank's mandate to tackle energy poverty meant lending support to large-scale infrastructural projects (rather than off-grid renewables), while supporting cleaner

[6] Once completed, South Africa's 4.8GW Medupi coal fired power station will be one of the largest in the world, generating an estimated 25 million tonnes of carbon dioxide per year. In April 2010, the World Bank approved a $3.75 billion loan to the project based on the use of 'clean' supercritical boiler technology. The USA, UK and, The Netherlands, Italy and Norway registered their opposition to the loan by abstaining on the World Bank vote.

forms of coal ensured this occurred is a less carbon intensive way. The World Bank's ambitions to serve as a key institution of climate finance were certainly damaged by offering such large scale support to conventional fossil fuel projects. Moreover, critics have contested claims that the project will relieve energy poverty, arguing that without a realignment of the priorities of the South African power sector additional coal-based capacity would mainly benefit large-scale industry rather than poor consumers. Similar issues have arisen in other contexts, with debates over the use of climate finance to fund Concentrated Solar Power installations in the Moroccan Atlas Mountains that plan to export a significant proportion of their generation capacity to the European Union.

Debates over financing for the Medupi plant have occurred alongside consultations over the World Bank's new Energy Sector Strategy, which will guide its global energy sector lending for the next decade. Reaction to an April 2011 draft version of the strategy again indicated the tensions in institutional responses to energy poverty and climate concerns and the contested links between procedural and distributional justice. Plans in the draft strategy to end financing for coal-based generation in Middle Income Countries have drawn heavy criticism from the governments of emerging economies, who highlight both the historical responsibility for carbon emissions in nations with the largest representation at the World Bank and the continued financing of new coal generation in those countries. At the same time critics maintain that loopholes in the strategy allow significant further funding for coal in low income countries that risks locking the poorest energy users into a high carbon energy future. So-called "clean coal" technologies such as Carbon Capture and Sequestration (CCS) may eventually allow some sequestering of carbon emissions, but requires 30 per cent more coal use for the same amount of energy (Ansolabehere et al. 2007). It is not clear what increased coal demand will mean for Appalachian communities near mountain top removal

sites for instance, or for those employed along the coal commodity chain at power plants, or in mining. Recent coal mining disasters in West Virginia, New Zealand, China, and Peru illustrate, however, how coal's cheapness comes at a tremendous human cost. Clean coal technology could make more common occurrences of fly ash slurry spills like the one that inundated a community in Tennessee in December 2008 with arsenic, cadmium, lead and mercury (Guarino 2008). Ironically fly ash ponds are a by-product of clean air regulations that require pollution abatement, showing how even good intentions (clean air) simply shifts environmental risks elsewhere (communities downstream of coal power plants). These risk reallocations rarely receive public vetting or necessary scrutiny, sometimes simply because they are unanticipated or unintended.

In the past competing conceptualisations of justice have variously condemned, justified (particularly from utilitarian perspectives) and ignored the geographically and socially differentiated impacts of energy production. What becomes clear is that the transition to a low carbon economy will not be free from a similarly uneven distribution of burdens, particularly if low carbon energy is pursued without attention to energy justice and sustainability. Highlighting the social and environmental externalities and impacts associated with the production of any energy form, whether fossil-fuel based or not, is not grounds for rejecting a role for that energy source as part of a balanced mix. Our point in raising these issues is to emphasise, as we do much more fully in section 3 below, the importance of having adequate decision-making processes in place to ensure that the inevitable trade-offs in terms of energy policy choices (how to balance access and supply with cost and sustainability- and effects- who wins and who loses from different energy pathways and how a transition from one pathway to another) are managed in as equitable and just a manner as possible. It does, however, underline the importance of politics to pursuing clean energy

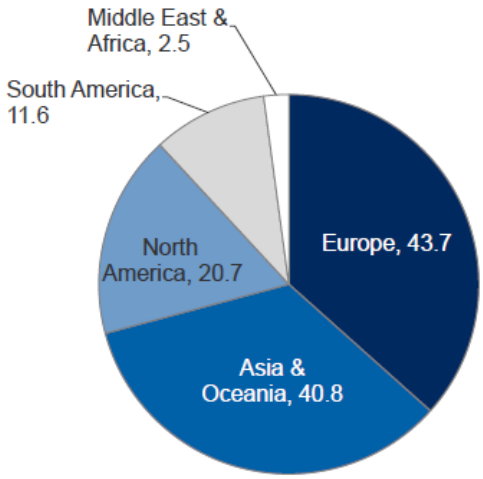
equitably and gives cause for scepticism about the abundance of simple win-win solutions for tackling energy in a highly unequal world.

2.4 Governing Energy Finance

The landscape of energy finance has altered drastically in recent years and continues to face a series of challenges regarding sourcing of and access to finance, predictability of flows and mechanisms of distribution. As the IEA (2009) notes, the financial crisis has made it more uncertain whether the levels of energy investment needed to meet long term energy needs can be mobilised. Finance is clearly central to the energy policy decisions discussed above and could therefore play a key role in redressing existing inequalities. Based on a broad definition of clean energy[7], New Energy Finance estimate that new worldwide clean energy investments in 2010 totalled $243 billion (BNEF 2011), up 30% from the previous year, when capital markets were still experiencing repercussions. However new clean energy investments remain relatively small in relation to the broader economy and financing for new clean power generation remains lower than that for non-renewable sources (including large hydropower) (UNEP SEFI 2010). Clean energy finance is also unevenly distributed across sectors, technologies and countries. The global growth in new energy finance has mostly been focused in China, which saw growth of 30%, and in wind power, which received a 31% increase in investment, mostly due to Chinese onshore and European offshore installations (BNEF 2011). In contrast, energy finance investments in sub-Saharan Africa have been negligible. Figure 2 shows the uneven distribution of new investment during 2009 from the financial sector, which is doing little to overcome existing inequalities in energy access. Of $40.8 billion invested in Asia & Oceania, $33.7 billion took place in China.

[7] Alongside renewable energy sources (bioenergy, geothermal, wind and solar) the BNEF definition of clean energy includes energy efficiency measures as well as nuclear and carbon capture and storage technologies, which are excluded from many other definitions of clean energy.

Figure 2. Financial new investment in renreable energy by region in 2009 ($ billions)



Source: UNEP SEFI (2010)

The capital needed to meet projected energy demand through to 2030 amounts in cumulative terms to US$26 trillion or US$1.1 trillion per year (1.4 per cent of global GDP). Half of this energy investment is needed in non-OECD countries. At the same time, advocates for pro-poor energy policies suggest that the funding needed to provide universal basic energy access is less than three per cent of global energy investment to 2030 and would add little to global carbon emissions (Practical Action 2010). To stabilise concentrations of greenhouse gas emissions at 450 parts per million requires an additional investment of US$10.5 trillion globally in the energy sector in the period 2010-2030. The energy sector in non-OECD countries would need around US$200 billion of additional investment in clean energy and efficiency by 2020. While mitigation costs in developing countries could reach US$140-175 billion a year by 2030, current flows of mitigation finance averaging US$8 billion a year to 2012 pale in comparison (World Bank 2009b). Official Development Assistance (ODA) meanwhile is less than ten per cent the size of foreign direct investment flows in the energy sector. At around $10.7 billion, recent levels of energy-related ODA have been far from

sufficient: with less than half of the total distributed to low-carbon energy (See the HDR Financing paper).The scale of the challenges is immense.

Private financial flows in the energy sector increasingly outstrip those in the public sector. Because some clean energy firms are at the frontiers of innovation, clean technology attracts venture capital investors looking for disruptive technologies. Estimates of annual investments in clean tech wax and wane with larger financial trends, but in recent years has as high as $11.3 billion annually (Pew Environment Group 2010). Venture capital is led by the US, and led by the biofuels, solar energy, energy efficiency, and smart grid industries. Many venture capital-based projects do not make it across the so-called 'valley of death' because they do not have the substantial capital requirements needed to reach scale. One trend to secure clean technology finance has been through merging with or being acquired by multinational energy companies, with easier access to more and cheaper credit. One innovative means of distributing the financial risks of investing in the clean technology space is the US Department of Energy Loan Guarantee Program. This program has provided more than $30 billion for clean energy projects such solar power plants, biomass refineries, and wind farms (DOE 2011). The program is attractive for companies seeking large capital infusions because the government agrees to pay the loan if the company becomes insolvent, and in some cases will pay the costs of administering the loan. While this has led to important clean technology investments, some have questioned the administration and oversight of the program (GAO 2010).

While private finance and investment is to some extent governed by trade and investment rules, it often lies beyond the reach of systems of energy and environmental governance at the international level, such as they exist. For reasons of economic and energy security, ensuring

growth while tackling energy poverty and addressing climate change, it is increasingly important that governments and international institutions are able to shape private financial flows in the energy sector.

One way that governments already shape energy investment is through energy subsidies for producers and consumers. Recent renewed attention to the environmental damage and economic cost of fossil fuel subsidies has lead to commitments from G20 countries to work towards fossil fuel subsidy reform. The IEA has estimated that direct subsidies encouraging wasteful consumption totalled $312 billion in 2009 (IEA 2010). Including indirect subsidies such as tax credits and deductions or the transfer of risk to governments inflates the estimated figure to $557 billion, although in most cases indirect subsidies are so diverse and lacking in transparency that it is highly challenging to make meaningful estimations. The IEA also estimates that elimination of fossil fuel subsidies by 2020 could cut expected growth in energy demand by over five per cent and various estimates suggest that energy related GHG emissions could be reduced by 6% by 2020 or as much as 13 per cent by 2050 (see Ellis 2010; IEA 2010). But with most of the increase in energy demand projected to occur in non-OECD countries, the equity impacts of subsidy reform are likely to be significant.

Yet fossil fuel subsidies have survived against a strong macroeconomic case for their removal for some time (IEA, OECD and World Bank 2010). Once created, energy subsidies are notoriously difficult to change due to the investments and interest groups that form around them. Victor (2009) argues that fossil fuel subsidies are so pervasive not only because of the demand from well organised interest groups, but also because they provide governments a readily available mechanism of supply; one that requires very little in the way of administrative capacity or long term planning. Governments face challenges of coordination

across parts of governments that may have power over energy subsidies and those that may administer potential redistribution, equity-focused or clean energy policies, each subject to differing political forces and influences.

However, in contrast to the environmental and economic case for fossil fuel subsidy reform, the trade-offs involved in the political redistribution of end-user subsidies are more complex and less well understood (Ellis 2010). While many consumer subsidies are poorly targeted and subject to capture by non-poor groups, there will be inevitable trade-offs and socially differentiated effects of any subsidy reform. For example, consumer subsidies for diesel fuel in India were originally designed to supply farmers with low cost fuel for agricultural production but have more recently benefited owners of four wheel drive vehicles, subsidising luxury consumption at the expense of very real needs for below cost-price energy of much of the rural population (Bandyopadhyay 2010). Many calls for fossil fuel subsidy reform however are not driven by concerns for equity in energy access, and the distribution of economic, environmental and social outcomes of reforms are likely to reflect the balance of power in decision making. These issues could also be expected to influence discussions and negotiations over appropriate governance arrangements for international institutional leadership and coordination of long term subsidy reform (Lang et al. 2010). To make energy subsidies work for the public interest, energy access and equity must be central to reforms of fuel subsidies. This means not only creating appropriate, time-bound subsidies to nurture clean technologies but also emphasising the social impact of fossil fuel subsidy reform and the possibility of just outcomes.

Critics of the CDM also highlight the large sums of carbon finance that have been transferred to fossil fuel projects and industrial gas projects under the new carbon finance mechanisms –

effectively subsidising fossil fuel and commercially viable large hydroelectric power projects and diverting funds from clean energy projects (Haya 2007). Design problems and industrial lobbying in the European Union Emissions Trading Scheme has also resulted in windfall profits for major European emitters following the free allocation of emissions permits based on historical emissions (Gilbertson and Reyes 2009). Nor are subsidies for 'clean energy' equal. Debates over which clean energy technologies to prioritise and support are shaped by diverse policy environments and domestic framings of energy, but particularly notable is the renewed attention in some countries to nuclear power as a potentially 'clean' source of energy with which to replace existing baseload electricity generation from coal. Nuclear power (as well as hydroelectricity) has required significant advanced investment and consistent public subsidies over several decades in order to become an established technology, whereas clean technologies approaching commercial status at a time of broadly market-orientated energy policy face significant challenges to compete on equal terms (Stirling 2009). OECD data suggests that significant sums of energy-related ODA also support hydroelectric power, followed by nuclear and solar sources (see the HDR Financing Paper).

2.5 Distribution of carbon market finance

In comparison to the volume of finance required for such transformative change in global energy systems, the current level of finance for clean energy projects in the developing world generated by carbon markets is relatively small, but is significant nonetheless. CDM revenues constitute the largest source of mitigation finance to developing countries to date (World Bank 2009b). However, to date there is a weak poor relationship between the incidence of energy poverty and the flows of carbon finance, which make it highly questionable whether carbon markets have made a significant contribution to the alleviation of energy poverty. The

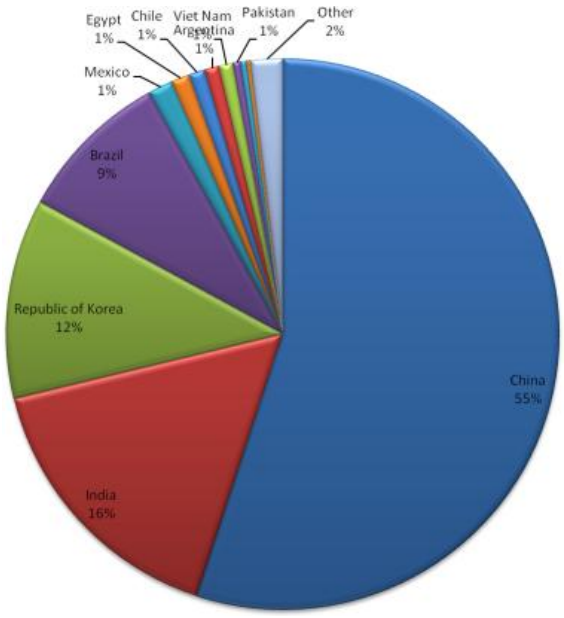
value of the Clean Development Mechanism by 2009 is estimated at $2.6 billion (Kossoy and Ambrosi 2010), but rather than funding clean energy projects, around three quarters of carbon credits had gone to the elimination of industrial gases by large manufacturing firms, mostly in China (figure 3).

Although they have received fewer funds, renewable energy projects make up around sixty per cent of CDM projects. However, the distribution of carbon finance for renewable energy has been highly uneven. Perhaps unsurprisingly, CDM investment has flowed to countries with a low risk investment and regulatory landscape, a favourable economic environment and with existing institutional links and social relations among investors that have also played a role in shaping the growth of the market (Pulver and Benney 2010). As such, carbon finance has tended to shadow flows of foreign direct investment to middle income countries such as China and India, which between them have received over 70 per cent of CDM revenues (figure 4), although the level of local financing in Indian and Chinese projects suggests the national financing capacity of these countries is also a significant driver of projects. In contrast, only one per cent of CDM investment has gone to sub-Saharan African countries. Notwithstanding efforts to index CDM project distribution to factors such as economy size and emissions mitigation potential (Lütken 2011), the CDM has thus far failed to direct notable energy investment to the poorest countries.

Although a middle income country, India also has significant internal inequalities, with over 400 million people without access to electricity and over 850 million people relying on biomass for cooking (OECD/IEA 2010). The distribution of carbon finance for clean energy within countries such as India – and to a lesser extent China – has also been highly uneven

(figure 5) and appears to reflect more complex local and national governance factors than simple state/province income or the sub-national flow of FDI (Newell et al., 2011).

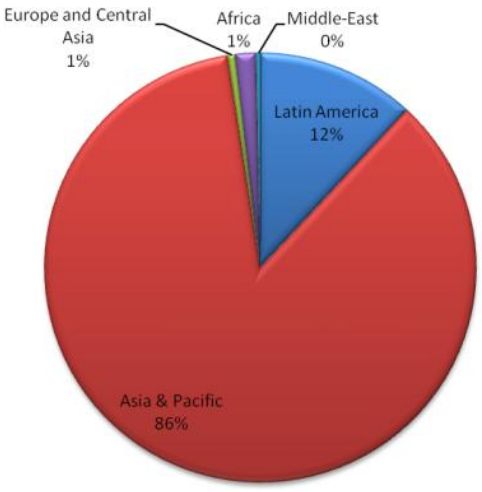
Figure 3. CDM Carbon Credits (CERs) by host country



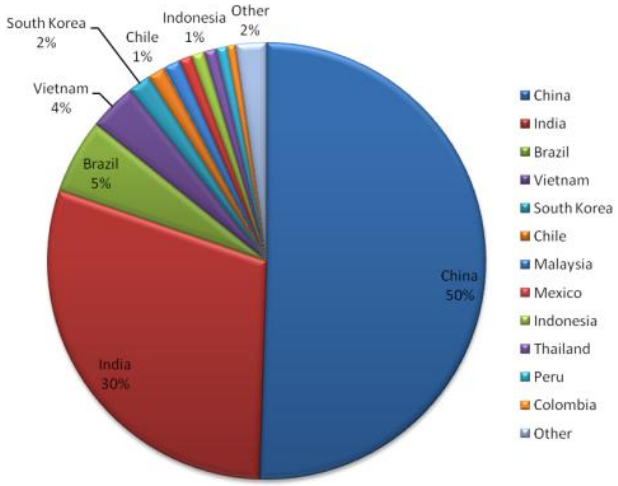
Source: Compiled from data in UNEP Risø (2011a)

Figure 4: The global distribution of carbon finance for renewable energy has been concentrated in a few Asian countries, mostly China and India.

a) CDM renewable energy projects by host region



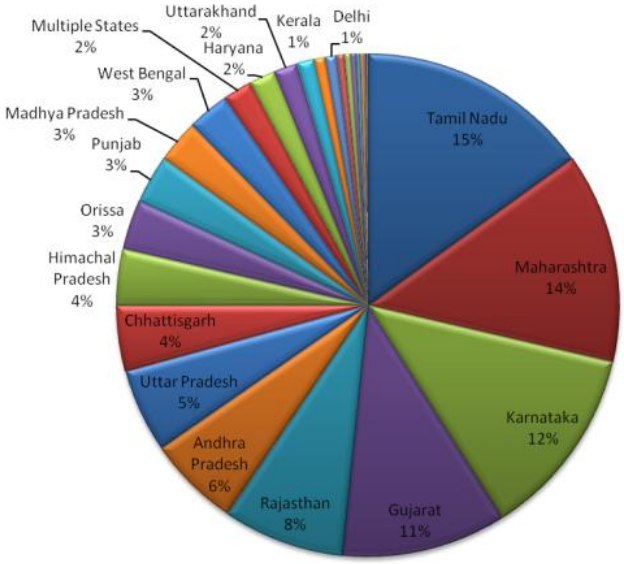
b) CDM renewable energy projects by host country



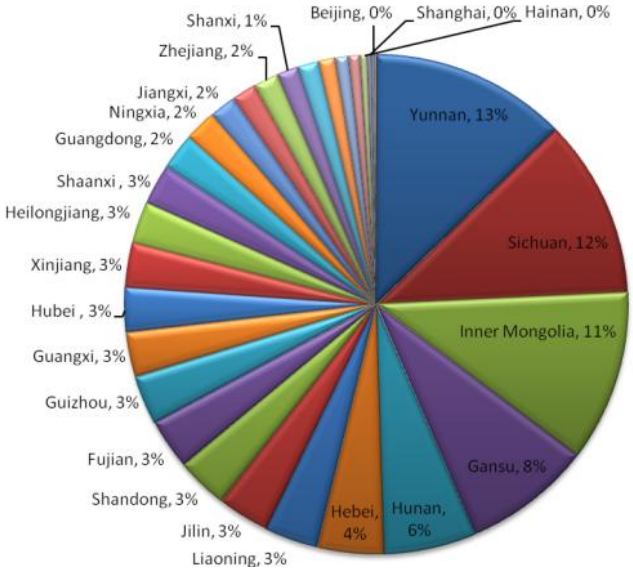
Source: Compiled from data in UNEP Risø (2011a)

Figure 5: The distribution of clean energy carbon finance has also been uneven within host countries

a) Indian CDM renewable energy projects by state



b) Chinese CDM renewable energy projects by province



Source: Compiled from data in UNEP Risø (2011b)

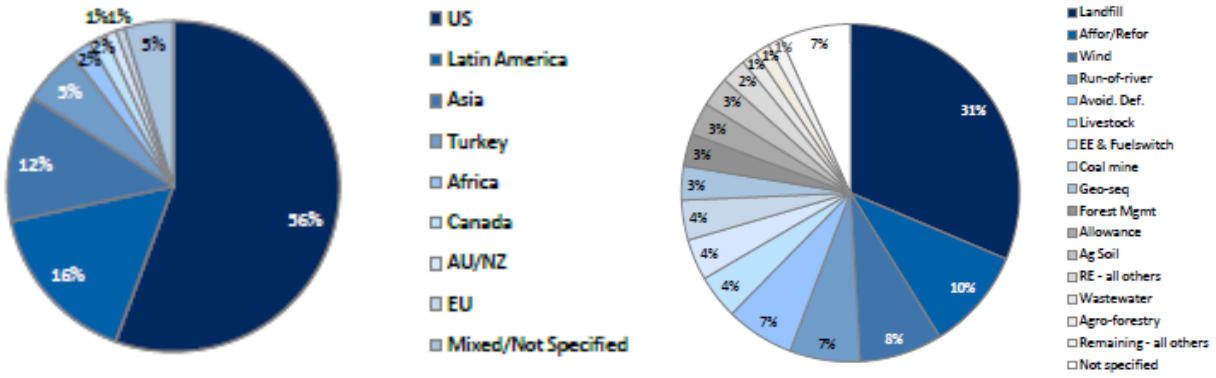
The voluntary carbon market remains modest in size despite remarkably rapid initial growth. At $387 million, the volume of transactions constitutes around one per cent of the volume of regulated carbon markets (predominantly the EU Emissions Trading Scheme) (Hamilton et al 2010; Kossoy and Ambrosi 2010). Despite their limited size, voluntary carbon markets are often promoted as a space for development-focused market innovation that is not possible under the restricted conditions of the regulated markets.

However, the effects of the recent global financial crash highlight just some of the dangers of relying on voluntary emissions reductions and market mechanisms as a means to generate and distribute clean energy finance. During 2009 the voluntary market saw a 47 per cent drop in value as well as a significant redistribution of finance away from the developing world towards the US, and a shift from renewable energy projects towards methane destruction projects (Hamilton et al. 2010). The US market share of voluntary carbon projects doubled from 28 per cent to 56 per cent during 2009, driven by anticipation of compliance legislation, while the global market share of renewable energy projects decreased from 53 per cent in 2009 to 17 per cent (figure 6). During the same period methane destruction projects roughly doubled in market share to 41 per cent, lending credence to fears of a 'race to the bottom' in carbon markets as companies reduce discretionary spending and abandon the 'development premium' of renewable energy projects in favour of cheaper sources of carbon credits (Hamilton et al. 2010). Methane destruction projects cannot provide the local benefits that potentially arise from renewable energy projects and in some cases quite the opposite has been true; landfill gas projects have been actively opposed by local residents who argue that carbon finance is giving a new lease of financial life to hazardous waste dumps that generate significant environmental health risks for the local population, predominantly marginalised citizens (Bond 2010).

Proposed reform of carbon markets will not address inbuilt issues of inequity and justice issues that arise from the displacement of emissions from industrialised countries to the developing world. But whether there is potential to redirect carbon finance to those with the greatest energy needs will largely be a product of the ability of institutions to address the governance challenges of redistribution. We return to this issue below.

Figure 6: Voluntary carbon markets provide limited, irregular funding streams for renewable energy

a) Host countries of all voluntary carbon market projects (2009) b) Voluntary carbon market projects by type (2009)



Source: Hamilton et al. (2010)

Box 4: Inequality in Energy Distribution – In Brief

- International aggregate figures can hide the significant disparities in energy access within countries, which can be as large as those between developing and industrialised nations. These inequalities also reveal significant gender, racial and class characteristics such that energy is often a powerful indicator of poverty and social exclusion in general.
- The Millennium Development Goals in general, and specifically the goal to halve extreme poverty by 2015, cannot be achieved without new policies specifically designed to address

energy poverty.

- Uneven energy access is a product not just of mal-distribution within countries, but also between them. Energy sources are unevenly distributed globally and some energy flows create important vulnerabilities and pose threats to energy security. Global and domestic energy politics are intimately connected and are often played off against one another.
- Energy security is not just about the international relations of geo-political security and competition for influence. In/security is also produced by the everyday practices of exploration, extraction and distribution. Clear examples of conflicts and contradictions between energy security and human rights are found throughout the global fossil fuel economy.
- Questions of who gets to use what type of energy in a carbon-constrained world 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 placing a different weighting on issues of equity, efficiency, and effectiveness, in terms of the ability to most rapidly reduce greenhouse gas emissions.
- Technological and market-based 'clean energy' solutions to climate change also have the potential to impact upon energy justice whether it is the manufacture of solar photovoltaic modules or CDM projects which lead to struggles over land and the distribution of revenues derived from carbon credits.
- Energy finance is currently highly unevenly distributed across sectors, technologies and countries.
- Private financial flows in the energy sector increasingly outstrip those in the public sector. Yet while private finance and investment is to some extent governed by trade and investment rules, it often lies beyond the reach of systems of energy and environmental governance at the international level, such as they exist.
- One way that governments already shape energy investment is through energy subsidies.

Recent renewed attention to the environmental damage and economic cost of fossil fuel subsidies has led to commitments from G20 countries to work towards fossil fuel subsidy reform.

- CDM revenues constitute the largest source of mitigation finance to developing countries to date. However, to date there has been a poor relationship between the incidence of energy poverty and the flows of carbon finance, which make it highly questionable whether carbon markets have made a significant contribution to the alleviation of energy poverty. CDM investment has flowed to countries with a low risk investment and regulatory landscape, a favourable economic environment and with existing institutional links and social relations among investors. The distribution of carbon finance for clean energy within countries has also been highly uneven.
- Whether there is potential to redirection carbon finance to those with the greatest energy needs will largely be a product of the ability of institutions to address the governance challenges of redistribution.

3. Procedural issues

Distributional inequities in access to energy and exposure to the positive and negative effects of energy production and distribution do not happen by accident. Though it is undoubtedly the case that some countries, peoples and regions of the world are endowed with valuable energy resources and others are not, it is organised political and economic entities (states and corporations) that have the power to extract, distribute and consume energy. If energy inequities are to be addressed in ways which might be considered fair and which seek to address the interconnected triple challenges of energy security, energy poverty and climate change, fundamental shifts are required in how we make energy policy, in the ways existing actors, institutions and policy-making processes function, and on whose behalf.

Below we look in turn at the role of institutions active in the area of energy governance, those which govern carbon markets, (considered to be a potentially important lever of finance for clean energy), and institutions of climate finance whose distribution of money for climate mitigation may have an important effect on energy policy strategies in the developing world in particular.

3.1 Institutions of Energy Governance

Strong and effective systems of governance are required to steer energy finance towards the fulfilment of policy goals around energy security, energy poverty and sustainability. It is widely recognised, however, that the weak, fragmented and poorly coordinated institutions we currently have are not up to this task (Florini and Sovacool 2009; Hirschl 2009). Weakness in this sense refers not to innate and latent potential of the institutions discussed below to perform key roles in realising energy policy goals, which could be quite considerable, but rather describes the levels of resources invested in them for the scale of the task that we face, and the low levels of political will to change institutional mandates and modes of operating to address the current reality of energy policy in a carbon (and eventually an oil) constrained world.

Those institutions we do have, have been primarily focused on stabilising prices for fossil fuels or governing access to them. OPEC, for example, had the comparatively limited task of organising collective action on oil output and pricing among oil producing countries. Yet OPEC has historically demonstrated a limited ability to represent regional rivals and promote a unified political direction in the face of general market movements of boom and bust (Goldthau and Witte 2010).

The IEA was founded by major oil consuming countries in response to the governance challenges of the oil crises of the 1970s in which OPEC first took on its symbolic role as a representative of producer power, but has more recently expanded its agenda in response to climate change and especially with respect to energy efficiency measures, taking on a significant governance role through the provision of technical energy data. Yet claims of the IEA's generous interpretation of remaining global oil reserves and a perceived inadequacy of IEA work on renewable energy was instrumental in governmental efforts to create a new institution for the promotion of renewable energy, the International Renewable Energy Agency (IRENA) with more open global membership criteria (IRENA 2009; Florini 2010).

While the G8, G20 and UN-Energy have clearer mandates to integrate energy poverty and climate change agendas into policy, the former meet infrequently and priorities of security and economy restrict their ability to promote a wider energy policy, while the UN-Energy holds a fairly weak position within the UN system and has struggled to exert influence over energy policy (UN-Energy 2011). UN-Energy was created in 2004 in the wake of the World Summit on Sustainable Development (WSSD) under the auspices of the UN Chief Executives' Board. It is a permanent inter-agency mechanism open to all organisations in the UN system, including the Bretton Woods institutions, and about 20 agencies, programmes and organisations have joined. UN-Energy meets four to five times per year and its mandate includes: collaborative action in policy development, implementation in the area of energy, the maintenance of an overview of major initiatives within the system, and the promotion of the interaction with non-UN stakeholders in implementing energy related decisions made at the WSSD (Karlsson-Vinkhuyzen 2010). It is, therefore, more of a facilitating than an implementing agency.

Since the main focus of this paper is clean energy, this section will look firstly at energy financing and those bodies with a mandate to promote clean energy.

A governance analysis of the contemporary landscape of energy finance reveals several trends with implications for energy equity (Newell 2011a). First, there is a huge imbalance between the expectations of what private energy finance should deliver in terms of tackling energy poverty and climate change in particular, and the weak governance systems in place to mobilise, channel and distribute that finance to where it is most needed. Second, the architecture of global energy governance has evolved in such a way that the roles and mandates of many institutions active in this area overlap and require greater degrees of coordination. We observe this challenge most acutely with regard the proliferation of bodies aiming to support the uptake of renewable energy. Tensions around the appropriate roles of the World Bank and the climate regime with regard to delivery of climate finance also highlight competition among actors to secure key roles in the governance of finance. Third, the fact that different streams of energy finance are governed by a plurality of actors with diverse and often competing mandates creates severe problems of policy incoherence where the objectives of one institution (tackling climate change) are often undermined by those of another (increasing energy use without regard to its carbon intensity). This suggests strongly overall that the ensemble of actors and initiatives currently active in the area of energy finance are not fit for purpose from the point of view of simultaneously providing the public goods of action to tackle climate change and energy poverty and measures to enhance energy security.

Many Intergovernmental Organisations (IGOs) struggle with reconciling their role as institutions set up to tackle (energy) poverty and the role they now seek to secure for

themselves as climate finance institutions. We see this most clearly in the case of the World Bank where, despite some of the rhetoric in its emerging Energy Strategy Paper, there is a lack of evidence of systematic mainstreaming of climate criteria into its Country Assistance Strategies and other lending portfolios (Nakoodha 2008). In governance terms this raises the issue of policy incoherence when the activities of one part of the World Bank undermine those of another. Civil society activists have been quick to highlight examples of seeming inconsistency in policy objectives such as the World Bank-supported US$4.14 bn coal-powered 'Ultra Mega' 4,000 megawatt power plant in Gujarat India that will emit more carbon dioxide annually than the nation of Tunisia according to the US Department of Energy (Swan 2008). The failure to integrate climate change objectives into mainstream energy finance lending results in contradictory policy, even within the same organisation. A World Resources Institute (WRI) report found that, during the past three years, less than 30 per cent of the World Bank's lending to the energy sector has integrated climate considerations into project decision-making. As late as 2007, more than 50 per cent of the Bank's US$1.8 bn energy-sector portfolio did not include climate-change considerations at all (Nakhooda 2008).

Beyond the role of international institutions in facilitating and financing clean energy, *partnerships* between public and private actors form an increasingly prominent part of the energy governance landscape. REEEP (Renewable Energy and Energy Efficiency Partnership), for example, is an international public-private partnership funded by governments, businesses and development banks, aimed at identifying barriers and opportunities to the up-take of renewable energy and energy efficiency opportunities. This is explicit in the organisation's mission 'to contribute to the expansion of the global market for renewable energy and energy efficiency… [through a] concerted effort to create a level playing field for sustainable energy'. REEEP is focused on the development of market

conditions that foster sustainable energy and energy efficiency, and works to structure policy and regulatory initiatives for clean energy. Hence it both seeks to improve the existing legal and political frameworks that govern clean energy and finance projects that can attract investors and financiers who can develop and deploy clean energy technologies in other markets. It has supported around 130 clean energy projects in developing countries to date (REEEP 2011)

Because REEEP is smaller it can be more flexible and quicker in decision-making than many IGOs. Because of the scale of funding that it oversees, REEEP also requires less oversight and process requirements than Multilateral Development Bank (MDB) project financing, for example. Lower levels of institutionalisation may, however, mean that it is easier to hold actors to account for their actions in such an environment (Florini and Sovacool 2009). It is easier to be inclusive and transparent when fewer actors are involved in making fewer decisions about less money and where implementation is largely left to partners on the ground in the countries where it works. Nevertheless, it relies on voluntary funding from several governments (mainly UK and Norway) whose stability and predictability may reduce the organisations effectiveness compared with other actors in the governance of energy finance, particularly in terms of planning of future activities. Donors also have a role in steering funds towards their priorities, the energy intensive emerging economies of Brazil, China, India, Indonesia and South Africa.

Alongside REEEP there is REN21 which describes itself as ‘a global policy network that provides a forum for international leadership on renewable energy’. Its goal is to bolster policy development for the rapid expansion of renewable energies in developing and industrialised economies. Open to a wide variety of dedicated stakeholders, REN21 ‘connects

governments, international institutions, non-governmental organisations, industry associations, and other partnerships and initiatives' (REN21 2008). The stakeholder approach of REN21 is reflected in the governance structure whereby a steering committee of approximately 30 individuals representing different parties interested in renewable energy shape a strategy which is then implemented by the REN21 secretariat (6 staff), a small outfit overseeing a budget of around US$1 million. In the case of both REEEP and REN21, therefore, they are small organisations with limited capacity in terms of staff and resources, heavily reliant on collaboration and partnership with other organisations and not yet able to shape energy finance on anything like the scale of other institutions such as regional or multilateral development banks.

The *Asia Pacific Partnership on Clean Development and Climate* (APP) meanwhile is a public-private partnership that brings together the governments and private sectors of Australia, China, India, Japan, Korea, the United States and, since October 2007, Canada – countries that collectively account for more than half the world's economy, population and energy use (APP 2008). Though the APP is voluntary and not legally binding, it is intended to be 'politically binding'. The APP aims to facilitate investment in clean technologies, goods and services, accelerate the sharing of energy-efficient best practices, and identify policy barriers to the diffusion of clean energy technologies. The US-based Policy and Implementation Committee, comprising representatives from the partners, governs the overall framework, policies and procedures, guides the Task Forces and periodically reviews the progress of the Partnership.

The Partnership is based on a highly decentralised structure, whereby a project or activity involving any two or more partners that contributes to the objectives of the partnership is

eligible for inclusion. Though it is too early to comment on delivery of tangible benefits, supporters emphasise the delivery of new finance and the removal of barriers to the transfer of technologies and the uptake of clean energy options. For example, the 'Barriers to Clean Technology Investment Development and Deployment between Australia and India' project, with a total budget of approximately $250,000, aims to identify the market and policy barriers to enhanced collaboration between Australia and India in the investment, development and deployment of clean technologies defined as clean coal technologies, renewable energy and distributed generation. It is claimed that 'The findings of the project will serve to develop practical solutions to climate change by accelerating the development, transfer and deployment of clean technological solutions between the two countries' (APP 2008). Given that carbon capture and storage is one of the central technological options for the Partnership, some critics view the APP as a 'coal pact', suggesting that it is more about selling coal than addressing climate change. Whilst partnership members recognise that renewable energy and nuclear power will represent an increasing share of global energy supply, they stress that fossil fuels underpin their economies now and for the predictable future. The continued economic use of (cleaner) fossil fuels is consequently at the core of the Partnership's policy.

3.2 Carbon Market Institutions

Carbon finance is often viewed as an important source of revenue for renewable and clean energies and a potentially important driver of action on climate change. For example, Certified Emissions Reductions amounting to more than 2.7 billion tonnes of carbon dioxide (CO_2) equivalent are expected to be produced in the first commitment period of the Kyoto Protocol (2008–2012) through its Clean Development Mechanism (UNFCCC 2011). Over the 2001 to 2012 period, CDM projects could raise US$15-$24 billion in direct carbon revenues for developing countries (World Bank 2009a)

Nevertheless procedural issues have been at the heart of concerns about the uneven distribution of CDM projects and claims and counter-claims about the efficiency and effectiveness of its project approval and decision-making procedures. The CDM and the voluntary carbon offset market that has emerged alongside it have faced accusations of 'climate fraud'; corruption in the claims made about saved (additional) emissions and about whether projects supported through the CDM and voluntary market would have happened anyway without additional financing (Bachram 2004). The Executive Board is the main governing body of the CDM. It reports to the Meeting of the Parties. The Executive Board is comprised of ten representatives of Parties to the Protocol—five members and five alternates—who may serve for a total of four consecutive years. There is one representative from each of the five UN regions, two additional representatives from both Annex I and Non-Annex I nations, and one representative from Small Island Developing States. Executive Board members must sign a written oath declaring that they have no financial interests at stake in the CDM, and are obligated not to disclose confidential or proprietary information both during and after their tenure as Board members. There have also been claims, however, of conflicts of interest involving members of CDM Executive Board who are involved in proposing projects and methodologies which they have the authority to approve as members of the Executive Board.

Jessica Green in her study concludes:

> Although many of the oversight procedures in place appear to be functioning well, there are some fundamental structural issues that may contribute to agents acting in rent-seeking ways, to the detriment of the principals. Specifically, the small number of firms qualified to carry out monitoring and verification raises concerns of monopoly

> and collusion… Finally, there is little evidence that the "police patrol" oversight mechanisms are functioning well. In sum, the data indicate that though the CDM was designed in a way to maximise the Executive Board's control over the Designated Operational Entities, in practice, we cannot be assured that these private agents are not pursuing their own goals, at the cost of those delegated to them (Green 2008:2).

Effective regulation of Designated Operating Entities who provide the front line quality control checks on whether CDM projects are truly additional and have produced the volume of emissions claimed (in order that they can be issued with CERs), is very difficult. There have been temporary suspensions of some firms from the approved list of service providers, but the incentives for project developers and auditors to exaggerate emissions reductions remain high.

Beyond the 'good governance' of the CDM in terms of improving the transparency and quality control of the mechanism, there is a broader set of issues about increasing incentives through further moves towards programmatic and sectoral approaches as well as attempts, initiated at the Nairobi meetings, to reduce transaction costs of project approval and delivery for smaller-scale projects and those from the poorest regions of the world (Figueres and Streck 2009) to ensure that offset finance makes the greatest contribution it can to financing clean energy (Box 5).

Box 5: The links between procedural and distributional justice in alleviating energy poverty: carbon finance for rural development and climate co-benefits

Through carbon markets and multilateral investment programs, clean cookstoves are one of a limited number of technologies that are being used to access climate finance for explicit rural development objectives. But early studies of the use of carbon finance for scaling-up cookstove projects suggest that a more nuanced view of 'win-win' scenarios for climate and development benefits is needed in order to address equity in clean energy deployment.

For example, carbon finance may create financial incentives for addressing longstanding challenges of longevity in cookstove programmes, by requiring ongoing project monitoring and institutional support in order to continue the flow of carbon credits based on continued carbon emissions reductions.

On the other hand, the necessary degree of standardisation required of carbon financed cookstove projects could lead to systematic neglect of the diversity of household energy needs. In order to scale-up small initiatives to a level at which GHG emissions become significant (and therefore to demonstrate the value-added by carbon finance), adaptive programme design and attention to the numerous variables that influence household adoption of clean technologies are not possible. Experience suggests that one-size-fits-all approaches do not work for income- and energy-poor groups, leading to poor project sustainability.

In contrast to the presiding view in the design of some climate finance programs (e.g. the

SREP, see Box 6), there are no technologies for which social benefits will 'automatically' result. Scaling up decentralised energy generation through carbon finance faces numerous governance challenges, notably the need to meet the requirements of emissions accounting while designing programs to be adaptive to diverse household needs.

Source: Simon, Bumpus and Mann (2010), World Bank (2009a), Practical Action (2010)

3.3 Climate Change Institutions

Since how the international community addresses climate change could have a huge bearing on energy equity, it is worth briefly considering the extent to which and the ways in which poorer groups and developing countries can represent their interests in the institutions charged with responding to climate change, most notably the UNFCCC.

Poorer developing countries have traditionally sought strength in numbers in the climate negotiations by developing common positions within the G77 + China grouping (Bulkeley and Newell 2010), but the cohesiveness of this group has fragmented over time reflecting the contributions many leading developing countries make to the problem as well as the uneven exposure to the effects of climate change of many of the world's poorest countries (Najam et al. 2003; Barnett 2008). Added to this are a series of generic procedural barriers to effective participation that reduce the likelihood that developing countries can increase the responsiveness of the climate change negotiations to their core concerns. Inequities in capacity and participation mean most governments from developing countries are not able even to be continuously present throughout the entire negotiation process, let alone

adequately represent their citizens' interests in arenas where demands for legal and scientific expertise are high.

Issues of access, representation, transparency in the climate negotiations came to the fore at the time of the Copenhagen Conference of Parties (COP) summit in December 2009 and continue to enjoy a high profile in post Copenhagen debates about the tenability of mega-processes and how to improve the voice of developing countries in particular (beyond the BASIC countries[8]). While a remarkable 194 countries attended the Copenhagen summit in 2010, this number still masks disparities in effective negotiating capability and influence, which came to a head with the negotiations of the Copenhagen Accord by a small number of powerful states (UNFCCC 2009). For example, the top five polluting countries were able to field more than three times the number of delegates than the five countries considered to be most affected by climate change[9]. Because the delegations of many developing countries lack capacity, they have difficulty effectively participating in the many meetings that are held simultaneously and ensuring their voice is heard. Neither do they have access to 'informal' meetings held before and during COP meetings, where the major players and contributors to the problem come together to advance progress, but from which most smaller and less influential countries are excluded (Newell 2000). This has not reduced demands for participation, a situation which produced a crisis during the Copenhagen summit when the premises could not accommodate a record 900 observer organisations and the security entourage of 196 heads of states that joined the talks (UNFCCC 2009)

Disparities in effective representation between industrialised and developing countries do not only affect state parties, they are also evident among observer organisations. During the

[8] The group of BASIC countries comprises Brazil, South Africa, India and China

[9] Transparency International calculations based on COP 15 documentation, pollution data from 2006 (http://unstats.un.org/unsd/environment/air_co2_emissions.htm), and Climate Risk Index 2010 by Germanwatch (http://www.germanwatch.org/klima/cri2010.pdf).

Kyoto negotiations only a fourth of the organisations in attendance came from the global South, and many of these could only afford to send one or two observers. And although by summer 2009 more than 1,000 organisations from 80 countries had obtained observer status, a closer look reveals the majority are based in Europe and North America. More than 210 organisations from the US, for example, are registered as observers, alongside 100 groups from Britain and 92 from Canada. Meanwhile, no developing country except for Brazil, China and India managed to bring more than 10 observer organisations to the table (Dombrowski 2009). As one assessment puts it:

> Mending the current disjuncture between those involved in the policy formation, negotiating and decision making process, and the citizens who are most vulnerable to climate change is thus to a significant extent a matter of closing the accountability gap in global climate governance. Accountability on its own will not be sufficient to adequately address the climate change challenge. It is however a fundamental and necessary condition for building a socially and environmentally effective global climate governance system that delivers for people (One World Trust 2009).

3.4 Climate Finance Institutions

Procedural concerns also pertain to the funds set up to manage climate finance, including for energy sector mitigation: who pays how much and which institution gets to set priorities and distribute funds. The *Global Environment Facility* (GEF), for example, which until recently was the main body responsible for overseeing flows of finance and technology under the climate regime, is formally accountable to, and functions under, the authority of the Conference of the Parties (COP) to the climate agreements. However, in practice, the conventions have limited voice in the day-to-day governance and decision-making process of

the GEF (Müller 2009). Many developing countries have also felt very little if any ownership over the GEF, which they see as dominated by donor concerns (Young 2002; Ballesteros et al. 2009), and disregarding guidance by the UNFCCC Conference of Parties. This dissatisfaction led, in a first instance, to the adoption of a *one-country-one-vote* rule and majority representation for developing countries on the governing body. This was a fundamental departure from the previous arrangements for climate change funds, where donors had an implicit veto (Müller and Winkler 2008).

It is the *Climate Investment Funds* of the World Bank, however, which are attracting most attention since they represent more public finance than has ever before been dedicated to climate change. The governance of the various CIFs is noteworthy because there are an equal number of representatives from donor governments and developing country governments on the governing committees for each of the trust funds, with decisions made by consensus. All the governments contributing funds to the Clean Technology Fund (CTF), for example, are represented on its governing trust fund committee through a process of self selection amongst interested developed countries. Direct participation does not of course necessarily imply greater influence over outcomes, especially as donor countries tend to be represented by ministries of finance and development while developing countries are more likely to be represented by less powerful ministries of environment (Ballesteros et al. 2009). The fact that observers from organisations such as the Global Environment Facility and UNFCCC Secretariat (also active in the area of climate-energy finance) are excluded from investment plan discussions makes it difficult to ensure that programs supported by multilateral institutions are complementary.

Because of their public mandates, however, high levels of transparency and accountability are expected of public institutions, creating openings for reform for those actors seeking to influence the way they govern energy (Box 6). The World Bank's CTF claims to 'ensure full transparency and openness in governance, oversight and evaluation processes' through the operation of a Trust Fund Committee. One way in which this transparency is to be achieved is through the Partnership Forum to the CIFs, which includes civil society representatives, recipient governments and the UN to 'discuss the strategic direction' of the funds. However, it is not conferred formal decision-making power and while some committee meetings are open to observers, CIF deliberations over budgets and work programmes and CTF discussions of investment plans are presently closed 'executive sessions', citing sensitive national issues as the reason for excluding some observers (Nakhooda 2010). Likewise, clean technology investment plans have not been publicly disclosed prior to deliberations by the trust fund committee and there were few opportunities for stakeholders to debate or influence the design parameters of the body (Ballesteros et al. 2009). Nakhooda (2009) also finds that there is limited evidence to date of engagement with stakeholders outside of government in the design of their Clean Technology Investment plans, missing an opportunity for international public finance to introduce greater government accountability to citizens.

Box 6. Transparency and Accountability in the World Bank Program for Scaling Up Renewable Energy in Low Income Countries (SREP): implications for equity

The Scaling up Renewable Energy Programme is the youngest and least developed of the World Bank's Climate Investment Funds, having been launched at the Copenhagen climate summit in 2009 with the aim to catalyse new economic opportunities for private sector

investment in renewable energy production in low income countries.

With a specific objective to increase energy access, the SREP design document includes the requirement for country investment plans to be

> ... designed and implemented with the full and effective participation and involvement of, and with respect for the rights of, indigenous peoples and local communities, building on existing mechanisms for collaboration and consultation (World Bank 2009a: 5)

Notwithstanding criticisms of restricted consultation in other CIF design processes to date, there remains a tension between the speed at which investment plans are set up and the possibility for host country ownership of the process. Perhaps more important is the issue of meaningful participation from all stakeholders in consultations, particularly where visions of the best interventions for equitable outcomes differ starkly from those of the donor, for example on the appropriate level of foreign direct investment in investment plans.

The World Bank's own assessment notes that directing SREP financing to small scale renewable energy services would provide greater opportunities for social co-benefits, especially for women (World Bank 2010a). These modes of energy delivery have largely been sidelined in the middle income country-focused Clean Technology Fund in favour of large scale on-grid renewable energy and transportation projects. The distinction of the SREP from the CTF has also been questioned following the selection of two middle income countries for the six-country pilot phase of the SREP, a selection process that observers have criticised as non-transparent.

Sources: World Bank (2009a, 2010); Nakoodha (2010); Bretton Woods Project (2011)

However important the role of global and regional institutions in energy governance might be, including those with responsibility for indirect energy finance through for carbon and climate finance, we have seen already that governments guard jealously their right to determine their own energy futures in line with domestic and foreign policy objectives. Yet national governance is often sidelined in international finance mechanisms such as the CIFs in favour of programme design based on the notion that finance, technology and markets are largely sufficient to catalyse global energy transitions. For example, it was not until late 2010 that consideration of national institutions, policies and regulatory context were included in the CTF results management framework (Nakhooda 2010). This means that improving levels of procedural justice in international institutions has to be complimented by efforts to improve the processes by which decisions are made by states that look set to remain the key actors in energy governance. It is to this that we turn in section 3.6 of the paper.

3.5 Energy Governance for whom?

Looking across the above initiatives it is possible to discern cross-cutting trends. Firstly, *for whom* (for other governments, businesses) and *for what* finance is intended (e.g as aid or investment) makes a big difference to *how* it is governed and *who benefits*. The way the different institutions and organisations surveyed here govern energy finance clearly reflects their mandates and who they consider to be their main clients or constituencies. Grants and concessional finance often comes with donor conditions and the need for guarantees about how money will be spent since public money has to be accounted for. With market based mechanisms such as the CDM, governance systems reflect the fact that the aim is to facilitate

the market and ensure environmental integrity, whereas the governance of sustainable development benefits is much weaker. Likewise since REN21 and REEEP are reliant on high levels of engagement and interest from the private sector if they are to achieve their goals, they need to show that they occupy and can effectively fill an important market niche.

Secondly, the degree of 'public-ness' of the governing institution seems to make a big difference to expectations and procedures regarding accountability (to whom, about what and how) and participation (who participates and on whose terms). The UN can claim 'universality of participation, openness to non-state observers and relative transparency in proceedings' (Karlsson-Vinkhuyzen 2010:192); however, counter-intuitively public-ness is not necessarily a good indicator of strong enforceability and implementation. Despite having access to the power, resources and authority of states, many public IGOs do not seem to wield significant direct power, perhaps because even their own members resist this in an area as sensitive as energy and because of the difficulty of directly regulating powerful private energy providers. The experience of strong member control within OPEC would bear this out. Direct control of finance (and the ability to grant or withhold it) and a more permanent institutional presence (such as in the case of the MDBs) means direct enforcement may be easier to achieve should the political will exist.

Box 7: Key messages on energy governance

- There has been a tremendous proliferation in actors and institutions involved in the governance of energy finance in a variety of ways. This has created significant challenges of coordination and policy coherence.

- States and international institutions have made significant use of their powers to steer energy finance through investment and trade regimes and through re-structuring the energy sector in many parts of the developing world. They have thus far not made extensive use of these to mobilise or direct energy finance towards tackling energy poverty or climate change.
- Levering private finance to address energy poverty, energy security and climate change is critical, but needs to be balanced with significant disincentives for business as usual investments in energy that undermine the achievement of these policy objectives.

3.6 Just Transitions?

How governments make energy policy has a huge impact on energy equity: who has access to energy and on what terms. Some of these choices are constrained by trade and investment treaties or affected by deliberations in international institutions in the area of energy, carbon and climate. But governments remain key actors in energy policy. From research to extraction to distribution and consumption, states and public institutions are heavily involved in governing public energy finance. The public sector provides capital for large infrastructure projects. Hence although governments account for less than 15 per cent of global economy wide investment, they largely control the underlying infrastructure investments that affect opportunities for providing support to clean energy (World Bank, 2009b).

The sensitivity around issues of energy supply and access and its geopolitical and strategic importance mean most states prefer to maintain autonomy and control over energy pathways. It is no surprise, therefore, that chapters in regional and bilateral trade and investment

agreements dealing with energy, for example, have proven to be among the most sensitive. The effect of this is that few global institutions exercise direct authority over energy resources. It is the case though that where energy features in trade and investment agreements, and when key decisions about energy access and security are taken in arenas to which broader publics are excluded, those affected, such as poorer consumers and indigenous peoples, 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) (Newell 2007).

Governments will have to play a key enabling and steering role, therefore, 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. In this regard, there was some discussion in Cancún around the idea of 'just transitions': how to ensure moves towards a low carbon economy are equitable, sustainable and legitimate in the eyes of their citizens. This raises a whole series of process issues about how decisions are taken, options assessed and trade-offs made between different energy futures. It builds on interventions such as that by the government of Argentina in the *Ad Hoc Working Group on Long-term Cooperative Action* which called for mechanisms to ensure a fair transition for workers that might suffer socio-economic impacts of measures taken to effect climate mitigation. This implies both 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).

Aside from calls for 'just transitions' in international arenas, there have been movements mobilising around this, 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 (Box 8).[10] Getting the support of a broad range of actors behind difficult policy choices and engaging with local initiatives which share similar goals will clearly be key to their success. 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, seeking to bring together a coalition of actors to provide and finance 'just energy' (Box 9) or, as in cases in Nepal and Brazil, involving poorer people directly in the management of their own energy systems (Box 10).

[10] One of the earliest formulations of the concept of a 'just transition' was developed in the 1980s by the trades union movement in the US in response to the introduction of regulation to prevent air and water pollution, which resulted in the closure of industries that contributed to the pollution. 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 (TUC 2008).

Box 8: Defining a Just Transition

A just transition would aim firstly 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, it would provide adequate support for those people and sectors that stand to lose out as a result of decarbonising the economy. It would also ensure that new jobs created in low carbon growth areas are 'decent' jobs (which pay a decent wage, provide decent working conditions, are accessible to the right people and offer decent career progression opportunities)

Source: Bird and Lawton 2009

Box 9: Mobilising from Below for Just Transitions

The Just Transition Alliance

The Just Transition Alliance is a coalition of environmental justice and labour organisations. Together with frontline workers, and community members who live alongside polluting industries, it seeks to create healthy workplaces and communities. It focuses on contaminated sites that should be cleaned up, 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 detrimental environmental impacts of mining on local landscapes and water use.

Just Energy

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 companies (McKinsey and Marmanie). Based in South Africa it aims to enable low-income communities to develop renewable energy enterprises as a means of generating revenue and employment opportunities. The overall goal is to provide 'a fair return on renewable energy for local people and investors alike'. As part of this it has set itself 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
- Reduce carbon emissions by 1.8 million tonnes per year
- Create jobs and transfer new business and technology skills to local people
- Transform RE markets in developing countries so that low-income communities receive fair value for what they bring to the project

City Retrofit Los Angeles

A grassroots coalition of community-based organisations, trades unions and environmental groups (the LA Apollo Alliance) campaigned to ensure that programmes by the city

council to improve energy efficiency and the use of 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.

Gelsenkirchen Germany

This city was a renowned 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 took on a voluntary carbon reduction target aimed at transforming it from a 'city of a thousand furnaces to a city of a thousand suns'.

Australia's Hunter Valley

In Australia's Hunter Valley, community distress about the cumulative local ecological and human health impacts of 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. Key aspects of a just transition to an ecological economy that protects vulnerable communities include the critical role of boosting resilience and adaptive capacity, public investment in the industries of the future, and of alliances between the climate justice, environment and labour movements.

Sources: Bird and Lawton (2009), Evans (2010), JTA (2011), Just Energy (2011).

Box 10: The Right to Energy?

Access to energy is not just conferred from above; poorer people often mobilise around fuel prices, subsidies and demands over the right to energy, sometimes with successful results. India's Centre for Science and Environment describes how people without access to modern energy are seeking to increase their influence over its distribution:

People of Nepal are exercising their right to energy, granted through a notification of the government. This programme, in which communities pay certain charges for grid connectivity and take over the management (including billing) is reshaping the ways in which electricity is distributed and managed across rural Nepal — all the way from a mother's group in North Pokhra to a forest users' group in Bangesal to a Thame Bijli Company that has trained 11 Sherpas as linesmen and meter readers (Yadav 2010).

In Brazil, local farmers have been driven by limited electricity supply, poor reliability and high prices to take control of the previously dysfunctional and undemocratic CRERAL electricity cooperative. Taking advantage of low local capital costs, an existing distribution network, the availability of commercial loans and more recently carbon credits, CRERAL has been able to finance and manage two mini hydro plants that now supply around a quarter of local electricity needs to its membership of around 6000 families.

Local meetings on decisions are held in all of the cooperative's municipalities, giving all members the opportunity to express local priorities and suggest appropriate uses for

CRERAL annual income at the General Assembly. More localised decision making allows for greater adaptability in governing local issues, such as the local allocation of electricity or individual families that face financial difficulties.

Source: Ashden Awards (2008), Yadav (2010)

There are also tools and measures governments can use to engage publics in deliberations about energy futures which to some extent seek to bridge the elite and closed world of government and businesses decision-making on energy policy and the sorts of bottom-up initiatives described above. Box 11 provides a summary of one such effort by the Dutch government.

Box 11: Restructuring Energy Systems for Sustainability? Lessons from the Dutch government experience

The Goal: To achieve a sustainable energy system by pursuing three major goals: security of supply, environmental quality and economic efficiency.

How did it work?

- The energy transition project (ET) is mainly based on the activities of **transition platforms** in which individuals from the private and the public sector come together to develop a common ambition for particular areas (**transition themes**), develop **pathways** and suggest **transition experiments.**
- The initial selection of **transition themes** was based on stakeholder consultations as

well as an intensive scenario study[11]. Its intention was to stimulate discussions about the energy supply in the Netherlands in 2050. It focused on devising a portfolio of **strategies for investment** decisions, **sustainability** and **R&D** which result in minimum regrets

- After developing strategic visions for the selected themes, the task of the platforms is to work out possible **transition pathways** along which an energy transition can be achieved.
- The pathways are explored further by **transition experiments** carried out by coalitions of stakeholders. The experiments propose ways to travel along the suggested transition paths
- The transition platforms were complemented by a **taskforce energy transition** (TFE) of high level members mainly from industry and the public sector. This advisory group was charged with the task to oversee the transition process and identify strategic directions.
- The ET project is funded through public subsidies and investments by companies**.**

Reflections and Limitations

- Though energy R&D policy is synchronised with the energy transitions priorities, linkages with other areas of policy – such as on renewables – has been weak.
- There has been a neglect of behavioural change, demand reduction and non-technological aspects of transitions and core energy policy issues such as security of supply, liberalisation and affordable prices have not been affected by the ET.
- There has been a dominance of business actors over civil society organisations and of larger companies rather than small and medium enterprises.
- A lack of close oversight from the executive branch of government and the

[11] The Long-Term Energy Supply Strategy (LTVE) project

parliament has been observed.

- Other methods of sustainability appraisal such as multi-criteria evaluation might enable a broader range of sustainability issues to be taken into account and allow for deeper stakeholder engagement given that the ET taskforces are not accountable for their actions and offer limited representations of societal interests.

Source: Kern and Smith (2008)

4. Conclusion: **Towards global energy justice?**

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'? To cope 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. Pursuing a 'just transition' to a low-carbon economy may provide one foundation upon which to build energy justice in a carbon-constrained world. Some of the examples above suggest tentative and exploratory moves in this direction, but clearly there is a long way to go.

Energy injustices in access, security, and around climate change, as well as being a product of the organisation of a particular type of global fossil fuel economy, also reflect weak and incoherent global energy governance. International institutions with missions related to energy issues including the International Energy Agency, OPEC, UN-Energy and 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. There is little evidence to date of initiatives at the international level that seek to regulate energy to ensure it meets specific goals of sustainability or energy poverty for example. This is in spite of calls from the Vienna Energy Conference for energy development goals for energy access in 2030 or for a stronger role for UN-Energy to drive an integrated and coordinated energy agenda internationally and across the UN system (Karlsson-Vinkhuyzen 2010).

Levering new investments in clean energy is one thing, but who will regulate existing energy financing which contributes neither to tackling energy poverty, energy security or improving environmental sustainability? A transition to a more effective system of global energy governance surely requires us to both increase support for clean energy and reduce dependence on 'dirty' energy. We currently have a situation in which institutions bequeathed formal roles and mandates in relation to energy are not necessarily those that wield most direct power over energy finance; the lack of governance of private energy investment is a case in point. A robust system of global energy governance needs not just to facilitate and enable clean energy for all, but seek to shift resources and political support from forms of energy production and distribution which do not have a long term future in providing energy security and climate change, even if in the short term they may have a role to play in alleviating the energy poverty of the poorest.

As pressure grows to recognise energy as one of the Millennium Development Goals and as calls for universal access intensify, it is possible that pressures for stronger forms of institutionalisation of energy governance will intensify. Energy's relationship to security and the environment, particularly climate change, has long been a feature of the G8 agenda and

more recently of the G20. There is a potential complementary nexus between energy, poverty, and climate change (Box 12; 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. Hence the pursuit of energy justice 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 systems of energy production and consumption.

Box 12: International Governance for Energy Security?

The case for:

- Energy demand is expected to double over the next 30 years, mostly in developing countries. Collective efforts to meet this are required
- Fossil fuels will continue to provide the vast majority of energy in spite of their contribution to climate change
- These are unevenly distributed giving rise to a global trade in energy which requires rules and governance
- That trade is conducted on an uneven playing field with unequal bargaining power which can distort markets and prices and increase volatility

Potential roles:

- Establish universal pricing of carbon
- Collective management of remaining oil reserves
- Collective management of nuclear fuel cycles
- Encouraging higher investment in energy R&D relevant to energy security and

climate change goals

Source: Yueh (2010)

It is also clear that addressing multiple inequities, facilitating 'just transitions' through more transparent and inclusive decision-making and targeting the cultural aspects of (energy) consumption cannot be done from above, even if a more effective enabling environment can be created regionally and globally. Calling for more effective coordination of global responses to energy policy dilemmas is not the same as advocating one-size-fits all approaches to energy governance which would likely be ineffective in addressing the multitude of political, economic and social contexts in which day to day decision-making on energy occurs. The question is whether the different sites of energy governance can be enrolled and engaged in collective endeavours to tackle energy poverty and climate change and to enhance energy security.

Strong levels of alignment and coherence around a limited number of policy goals may not be possible given the number of competing actors and policy goals at play, or desirable, since it would imply that power is being exercised to marginalise consideration of other objectives and interests. It is notable, however, that stronger and more robust systems of governance are in place *for* energy finance than *of* energy finance. Many trade and investment treaties seek to liberalise energy sectors and protect investor rights, even over those of governments. Sweeping reform of the energy sector has been overseen by international financial institutions in many parts of the world with a view to opening up markets. States have made considerable use of their powers to mobilise and attract private investment in the energy sector. Yet they have not gone so far, to date at least, in using such powers to steer energy finance towards tackling energy poverty (Sanchez 2010) or climate change. For this to happen, we need much

higher levels of political will, ambition and leadership, since only then will the necessary changes take place in the global governance of energy that enable us to pursue clean energy equitably.

Pursuing Clean Energy Equitably – In Brief

1. Energy does not currently flow to where it is needed most or to those that most need it. It is also not, on the whole, produced by actors with an interest in addressing either energy poverty or climate change.

2. Though there is hope that carbon markets and climate finance for mitigation might provide an impetus for low carbon energy for the poor, the current scale and scope of such finance is unlikely to leave much impression on the vast flows of energy finance which continue to be invested in fossil fuels in most parts of the world.

3. There are currently vast inequities in energy distribution and in the local and global exposure to the effects of current patterns of energy production and consumption. Whether it is petro-violence, local air pollution or longer term climate change, poorer people the world over bear a disproportionate share of the human and ecological costs of the fossil fuel economy, while receiving few of its benefits.

4. Though governments themselves are often implicated in creating such problems, there remains a central role for governments and international institutions to ensure that policy objectives around energy poverty and climate change are addressed and to use a mix of regulation and incentives to create an enabling environment for energy options which are simultaneously able to improve energy security and relieve energy poverty in a less carbon intensive fashion.

5. In the context of a global economy in which many governments have relinquished direct control over parts of their energy systems this presents key challenges that need to be addressed since efficiency of delivery in an open market may not be the best way to ensure energy security while tackling energy poverty and climate change.

6. If the vast financial and political resources that are currently committed to fossil fuels were re-directed towards sustainable forms of energy generation and distribution, climate compatible clean energy could move from ambition to reality.

7. Such a shift is and will continue to encounter strong opposition from actors that greatly profit from, and are extremely dependent upon, high levels of fossil fuel use. This resistance is not just confined to highly industrialised countries and large users and producers of energy, but also comes from poorer consumers who are reliant upon affordable (often subsidised) access to energy and need to be protected from measures which internalise the environmental costs of energy production but generate unequal social impacts.

8. This raises the critical question of just transitions: how to manage the shifts in industry, transportation, infrastructure and housing for example that are required to ensure patterns of energy use that are compatible with avoiding the worst effects of climate change.

9. There are complex trade-offs and rebound effects associated with energy policy decision-making. Strong, participatory and transparent institutions are required to facilitate deliberation about policy choices and alternatives among a range of groups

with interests in distinct energy policy futures. This is why procedural justice is critical to enabling distributive justice.

10. This is true not just at the national level where control over energy policy has traditionally resided, but also at the regional and international level where energy governance is either weak or non-existent. Where the energy choices of one country so strongly impact upon the ability of other countries to secure their own policy goals, higher levels of cooperation and coordination are required to meet collective energy needs. This includes efforts not only to steer public energy policy towards the fulfilment of public goods, but also to lever the vast amount of private finance that will be necessary to support low carbon energy infrastructures.

11. The fragmented nature of global energy governance, such as it currently exists, is more geared towards addressing energy security in relation to price and provision of market information than it is towards tackling energy poverty in a sustainable way or enabling a shift from a fossil fuel driven global economy to one in which clean energy plays a much larger role. This has to change as a matter of priority.

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