



# LUND UNIVERSITY

## Global Climate Governance and Energy Choices

Zelli, Fariborz; Pattberg, Philipp; Stephan, Hannes; van Asselt, Harro

*Published in:*  
The Handbook of Global Energy Policy

2013

*Document Version:*  
Version created as part of publication process; publisher's layout; not normally made publicly available

[Link to publication](#)

*Citation for published version (APA):*  
Zelli, F., Pattberg, P., Stephan, H., & van Asselt, H. (2013). Global Climate Governance and Energy Choices. In A. Goldthau (Ed.), *The Handbook of Global Energy Policy* (pp. 340-357). Wiley-Blackwell.

*Total number of authors:*  
4

### General rights

Unless other specific re-use rights are stated the following general rights apply:  
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

### Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117  
221 00 Lund  
+46 46-222 00 00

## Chapter 20

# Global Climate Governance and Energy Choices

Fariborz Zelli, Philipp Pattberg, Hannes Stephan,  
and Harro van Asselt

---

---

### Introduction

This chapter analyzes the increasingly fragmented climate change governance architecture (Biermann *et al.* 2009; Keohane and Victor 2011) and how it relates to global energy choices. When referring to a fragmented governance architecture, we understand different institutional approaches to be situated along a continuum ranging from international and public, to public–private or private interventions. Some are related to international agreements and norms and thus fall under a shadow of hierarchy, while others are situated in the realm of non-hierarchical steering without any overarching authority (Pattberg and Stripple 2008). A complete picture of the climate–energy nexus will therefore require mapping institutions and policies beyond the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, henceforth referred to as the international climate regime. When speaking of energy choices, we largely refer to technological choices. We examine to what extent the global climate regime and other climate-related institutions intend to influence the proliferation and use of clean energy technologies, as a means for countries to transform their energy sectors.

Anthropogenic climate change caused by emissions of greenhouse gases into the Earth's atmosphere is basically a function of population, economic growth (affluence, measured in GDP per person), and technology (carbon dioxide, CO<sub>2</sub>, emitted per unit of GDP). Historic decrease in population growth has been slow but substantial, resulting in an average of 1% increase per year over the past few decades with a further decrease to 0.7% growth over the past few years. While world GDP per person has on average increased by 1–2% per year, technological advances have resulted in an average 1% decline in CO<sub>2</sub> emissions per dollar GDP. The net result has been an average increase of CO<sub>2</sub> emissions of 1% annually over the twentieth century (Dessler and Parson 2010: 126–127). Given the political contestation about far-reaching measures to curb population growth and a broad political consensus about the necessity for further economic growth, reducing emission intensity per unit GDP and CO<sub>2</sub> intensity per unit of energy seem to be the most feasible strategies for mitigating climate change (ignoring for now options to reduce CO<sub>2</sub>

emissions from non-industrial activities and other greenhouse gases such as methane as well as geo-engineering scenarios).

Assuming a political will to limit global mean temperature increase to 2 °C above pre-industrial levels (corresponding with a total future emission budget of 750 Gt CO<sub>2</sub>-eq by 2050) by means of efficiency improvements, and assuming a world population of 9 billion by 2050 with an average income growth of 1.4% per year (an extrapolation of the current growth rate), the carbon intensity of goods and services would have to decrease from currently around 770 g/\$ economic output to 36 g/\$, a 21-fold efficiency improvement over the current level (Hoffmann 2011). While this target is not impossible, compared to historic efficiency gains the scope of the challenge is indeed huge. After a decrease of around 1.5% in 2009 due to the world economic recession, global emissions from fuel combustion have increased by 5.3% in 2010 (IEA 2011) while improvements in carbon intensity of goods and services have been lagging behind the background trend of 1.7% increase by almost 1% in 2009 (Friedlingstein *et al.* 2010). Against these trends, the challenge of decoupling economic growth from energy use while rapidly expanding access to energy services in the non-OECD world is of immense proportions. Close to 90% of increase in global energy demand is expected to occur in these countries and approximately \$25 trillion of investment in energy will be required (IEA 2011) while current financial support for low carbon energy infrastructures covers only a small fraction of the expected additional costs (World Bank 2010).

Against this background, questions of energy policy in the context of climate change mitigation (both reducing the carbon intensity of production and increasing the efficiency of energy production) are paramount. While global energy policy is concerned with a broad range of questions, including supply security, decreasing energy poverty, questions of domestic energy governance, and sustainability (Dubash and Florini 2011), we focus only on the narrow climate–energy nexus in this chapter. We start by discussing the role of the international climate regime in global energy policy, then turn to global climate change governance beyond the international regime, before analyzing the interlinkages between different institutional arrangements, within and beyond the climate change arena, explicitly addressing the intersections with the other three dimensions of this edited volume – markets, security, and development. We conclude with a brief discussion of options for improved management of institutional interlinkages and a number of future research challenges.

### **The International Climate Change Regime and Energy Policy**

This section provides an overview of the role of the international climate regime in global energy policy. After a brief discussion of those provisions of the UNFCCC and Kyoto Protocol that are relevant for countries' energy choices, the section discusses how the international climate regime has sought to promote research, development, and deployment of clean energy technologies. We contend that while the effectiveness of the UNFCCC in promoting clean technology development and transfer can be debated, an elaborate system addressing various aspects of clean technology cooperation has been put in place.

Although the international climate regime was not created specifically with a view to governing energy supply and demand, it is nevertheless of key importance given the fact that about two-thirds of global greenhouse gas emissions stem from energy use. As noted by Dubash and Florini (2011: 14), a “comprehensive global climate agreement organized around explicit national carbon caps would be transformative and become

a de facto global energy governance regime.” However, the Kyoto Protocol’s emission reduction targets only cover developed countries, and thereby do not directly seek to alter the energy policy choices of developing countries. Furthermore, the international climate regime is marked by a continuing transformation toward a “bottom-up” approach to policy-making, leaving the determination of climate change mitigation actions largely up to individual countries. These considerations decrease the relevance of the international climate regime in the development of global energy policy. Nevertheless, the regime comprises several mechanisms relevant from the perspective of energy policy.

### *Promoting Clean Energy Technology Cooperation*

The UNFCCC requires its Parties to “[p]romote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases” (Article 4.1(c)). Furthermore, the UNFCCC contains commitments related to technology transfer, determining that developed countries need to provide new and additional financial resources to developing countries. The Kyoto Protocol expands on these provisions, introducing the term “environmentally sound technologies” to encompass not only the “hardware” (equipment, etc.) but also the “software” (know-how) (Yamin and Depledge 2004: 306–307).

Implementation of the technology provisions received a boost following a UNFCCC decision adopted in 2001. To analyze and identify ways to facilitate and advance technology transfer activities, the decision established the Expert Group on Technology Transfer (EGTT). The EGTT was mandated to focus on five themes: (i) technology needs and needs assessments; (ii) technology information; (iii) enabling environments; (iv) capacity building; and (v) mechanisms for technology transfer (UNFCCC 2002a). It established a work program related to these five themes and regularly analyzed country information provided by parties to the climate treaties. Furthermore, in recent years, the EGTT has also discussed innovative options for financing technology (e.g., UNFCCC 2007).

Assessing the effectiveness of the UNFCCC in achieving the transfer of clean energy technologies on the whole is fraught with difficulties. A recent report by the UNFCCC Secretariat provides some insights, noting that the overall technology transfer framework can be deemed effective, but remarking that private sector engagement needs to be improved, and that the level of financial support for the development and transfer of technologies is inadequate (UNFCCC 2010: 47–48).

Technology plays a prominent part in the ongoing negotiations on an international climate agreement beyond 2012. In 2007, “enhanced action on technology development and transfer” became one of the four building blocks under the Bali Action Plan (UNFCCC 2007). An initial agreement on a new Technology Mechanism was part of the 2009 Copenhagen Accord and was fleshed out a year later in the Cancún Agreements. The Cancún decision on technology development and transfer specified that the mechanism is to consist of a Technology Executive Committee and a Climate Technology Centre and Network (UNFCCC 2011). The Committee’s broad mandate includes the identification of technology needs, addressing barriers to technology development and transfer, cooperation with international technology initiatives, and providing guidance and recommendations to enhance the effectiveness of technology development and transfer. The Climate Technology Centre’s purpose is to facilitate and coordinate a wider network of technology initiatives at different levels of governance. The centre and the network are intended to provide a flexible framework to support technology development and

deployment, especially in developing countries. The mandate of the centre and the network includes the provision of assistance for identifying technology needs, implementing technologies, and capacity building. In addition, the centre and the network are expected to foster cooperation between public and private institutions on technology development and transfer. With the introduction of the Technology Mechanism, the EGTT ceased to exist.

### *The Clean Development Mechanism and Clean Energy Technologies*

The transfer of clean energy technologies also plays an indirect, yet very important role in the Clean Development Mechanism (CDM). Under the CDM, developed countries can form voluntary partnerships with developing countries to undertake greenhouse gas emission reduction projects, with the dual purpose of achieving sustainable development in the host country while contributing to cost-effective mitigation targets for the developed countries. The Kyoto Protocol does not explicitly mention clean energy technology transfer as a goal of the CDM, but a follow-up decision does so (UNFCCC 2002b: preamble).

Although a majority of CDM projects operate in the area of renewable energy, most of the credits are generated through projects that reduce emissions of industrial greenhouse gases with high global warming potential, such as hydrofluorocarbons (HFCs) and nitrous oxide (N<sub>2</sub>O). For instance, while in March 2012 67% of the CDM projects were in the area of renewable energy, compared to 1.7% for large-scale industrial gas projects, the latter accounted for 68% of the credits issued, compared to only 18% for renewables. Energy efficiency – both in terms of absolute numbers and in terms of credits issued – scores even less (Fenhann 2012). We observe a number of barriers to widespread use of the CDM in the promotion of renewable energy and energy efficiency. First, the CDM's “additionality” requirement, which means that a project has to go beyond business-as-usual, acts as a barrier. Since energy efficiency projects often pay for themselves through reduced energy costs over time, and both (small-scale) renewable energy and energy efficiency projects typically generate few credits, this makes it difficult to prove that these projects would not have happened without the CDM (Driesen 2006). In contrast, it is quite easy to prove additionality for end-of-pipe projects involving industrial gases such as HFCs and N<sub>2</sub>O, especially when there are no national regulations on these gases and when CDM credits deliver the only return on investment. A second barrier to renewable energy and energy efficiency projects is that, in general, these projects require more investment per generated carbon credit than alternative projects (Matschoss 2007: 119). As a result, renewable energy and energy efficiency projects are largely “crowded out” by the low-cost, high-credit projects.

Recent years have seen a burgeoning literature on the (potential) contribution of the CDM to technology transfer, fueled in part by the claim that it “is currently the strongest mechanism for technology transfer under the UNFCCC” (Schneider *et al.* 2008: 2936). The findings of these studies depend on the data sources used (e.g., project design documents drafted by CDM project developers, or independently collected data) and the definition of technology transfer (e.g., equipment only, and/or associated know-how). While studies using a wide definition of technology transfer (including also the transfer of hardware only) tend to provide cautiously optimistic assessments of the CDM's potential (e.g., Coninck *et al.* 2007: 455; Haites *et al.* 2006: 346), a more comprehensive definition of technology transfer (including software) led to the conclusion that the CDM's contribution “can at best be regarded as minimal” (Das 2011: 28). What the

various studies have in common, however, is that they show that the CDM works better for some clean technologies than for others, and that there are differences in the rates of technology transfer among developing countries (Dechezleprêtre *et al.* 2009: 710; Seres *et al.* 2009: 4924).

### *Dealing with Fossil Fuel Producers*

Another way in which the international climate regime is of relevance for global energy policy is in how it accounts for the position of fossil fuel producing countries. The UNFCCC itself acknowledges the special circumstances of countries “whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels” (Article 4.8(h)). Similarly, the Kyoto Protocol seeks to ensure that the “adverse effects” of climate policies and measures implemented in developed countries are minimized (Articles 2.3 and 3.14). These provisions have formed the basis for claims by fossil fuel producing countries to receive compensation for expected losses in export revenues due to climate change mitigation measures. Several countries belonging to the Organization of Petroleum Exporting Countries (OPEC), in particular Saudi Arabia, have been notorious for their obstructive role in the climate negotiations, either seeking to delay the implementation of new policies, or to link such policies to the compensation discussion (Depledge 2008). Not surprisingly, such compensation has faced heavy opposition from developed countries, and, as a result, no compensation mechanism to support fossil fuel producers in their economic diversification has been put in place.

### **Climate Governance Beyond the International Climate Regime**

In this section, we first analyze the role of international organizations and UN institutions outside the international climate regime, which – through their funding practices, programmatic activities, and ideational leadership – have a significant impact on energy choices around the world. In addition, the section summarizes the activities, related to global energy and sustainability, of major UN institutions such as the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and multilateral financial institutions such as the World Bank. Second, we discuss in more detail the role and relevance of so-called club arrangements for global climate and energy governance. Specific attention is paid to informal clubs such as the G8 and G20. Third, this section analyzes the contribution of public–private partnerships to global energy policy, e.g., the more than 350 public–private partnerships for sustainable development that have emerged as a result of the 2002 World Summit on Sustainable Development in Johannesburg. Finally, we briefly discuss the relevance of transnational governance arrangements for global energy policy.

### *Formal Organizations*

International organizations play a crucial role in supporting the global trend toward low carbon economic development, particularly by promoting the construction of sustainable energy infrastructures and by helping countries to exploit untapped potentials for energy efficiency. The expectation of growing flows of energy and climate-related funding has attracted interest from many international organizations (Newell 2011: 97), ranging from long-established UN bodies to energy-related organizations and multilateral development banks.

UNEP lists the implementation of renewable energy systems among its six sub-programs. Given funding constraints, UNEP's operational activities in the energy arena have centered on creating public-private networks (see below for more details), such as the "Renewable Energy Policy Network for the 21st Century" (REN 21). UNEP's vision of spearheading the global transition toward the "Green Economy" highlights renewable energy, energy efficiency, and cleaner transport as most critical areas for long-term investment (UNEP 2011). This message chimes with its annual publication of *Global Trends in Renewable Energy Investment* which documents the rapidly growing scale of investments and seeks to galvanize the interest of the financial sector.

UNEP's larger sister agency, UNDP, sees energy primarily through the prism of sustainable development. In 2010, UNDP supported 14 energy-efficiency and 30 renewable energy projects and spent \$508 million (approx. 11% of its total expenditure) on "managing energy and the environment for sustainable development" (UNDP 2011: 6).

While sustainable energy has only recently moved to the centre of the policy debate on climate change, the International Energy Agency (IEA) has sought to mainstream its relevant expertise since the mid-1990s. Founded in 1974 as an OECD response to the oil crisis, the IEA's agenda has significantly broadened over time. Since the early 1990s, the organization has muted its erstwhile endorsement of fossil fuels and nuclear power and, by 2005, the issues of energy security and sustainability had been declared top priorities (Van de Graaf and Lesage 2009). This means that the IEA's traditional functions of policy advice, information sharing, and technology transfer are now also supporting the worldwide uptake of renewable energy and energy efficiency. Furthermore, the regular participation of the IEA's Executive Director in G8 summits has translated into an enhanced status, greater policy influence, and additional funds. The decision to engage in more capacity-building and to expand its publications on technology-specific road maps will cement the IEA's position as a major font of expertise for the low carbon energy transition (Florini 2011).

However, the establishment of the International Renewable Energy Agency (IRENA) in 2009, with now 88 member countries (as of April 2012), signifies that being a global coordinator of sustainable energy will not be an exclusive competence. With staff numbers and budgets evenly matched (at around \$25 million per year) and overlapping functions, much depends on whether a recently signed partnership agreement between IRENA and the IEA ensures a fruitful division of labor (Van de Graaf 2013). Early indications are that IRENA is actively pursuing its goal of becoming the global authority on renewable energy and that it is building alliances with the major public-private networks in this area (e.g., REN 21, REEEP).

Whatever the important facilitative and catalytic functions of the above institutions, they arguably compare modestly with the influence on energy choices exerted by the World Bank and regional multilateral development banks. First, countries and private investors seeking to access their funds are subject to particular ideas and guidelines regarding appropriate technologies, regulations, policies, and methods of service delivery (Nakhouda 2011). As Ferrey (2010: 113) puts it, "[w]hat the World Bank does and supports is a critical starting point." The World Bank not only shapes the lending practices of other regional multilateral development banks, but also those of national export banks and private banks in the industrialized world. Second, in terms of funding, the Bank's Climate Investments Funds (CIFs) established in 2008 represent "more public finance than has ever before been dedicated to climate change" (Newell 2011: 97). The Clean Technology Fund (\$4.5 billion) offers concessional loans for both transfer and deployment of low carbon technologies. It is expected to leverage another \$36 billion in

co-financing. The Strategic Climate Fund (\$2 billion) supports pilot programs on forestry, climate resilience, and the scaling-up of renewable energy (World Bank 2011).

At the same time, the Bank is not so much an independent organization as a “financial aid conduit” for projects deemed appropriate by its member states (Ferrey 2010: 112). Under pressure from civil society organizations and some governments, the Bank is clearly trying to integrate climate mitigation objectives more systematically in its projects, but – in the context of the increasing weight of emerging economies in the Bank’s voting arrangements – there has been limited success in assimilating these concerns into mainstream energy finance lending (Nakhouda 2011: 127), which accounted for \$5.8 billion in 2011.

### *Club Arrangements*

Since the mid-2000s, various club arrangements have become engaged in governing the climate–energy nexus. Club arrangements generally refer to governance initiatives involving a “small groups of pivotal nations” (Victor 2009: 342). This raises questions about *how many* countries should be involved and *which* countries should be included (Eckersley 2012). Countries have generally been considered pivotal because of their greenhouse gas emissions profile or their economic power, meaning that most clubs have at least included the US, China, and India, although membership of the clubs is variegated. The rationale behind club arrangements is presumably that it is generally easier to get to an effective agreement by including only a limited number of players compared to the multilateral process under the international climate regime that is considered to be cumbersome (Naím 2009; Victor 2009). Various examples of such a mini-lateral approach already exist.

The Group of Eight (G8) was not established in 1975 with a view to addressing climate change, but following the 2005 G8 summit in Gleneagles, Scotland, climate change has been a recurring issue on its agenda. The Gleneagles summit produced the Gleneagles Plan of Action on Climate Change, Clean Energy and Sustainable Development, which invigorated the G8’s activities on energy, and kick-started its involvement in climate change issues. The renewed focus on energy and climate change resulted in various pledges and actions (Van de Graaf and Westphal 2011). Notable pledges were the goal to reduce global emissions by at least half by 2050 (at the G8 summit in Hokkaido, Japan in 2008); the specification to on achieve 80% or more of these reductions in developed countries; and acknowledgment of the goal to keep the global temperature increase below 2 °C above pre-industrial levels (both at the G8 summit in L’Aquila, Italy in 2009). In addition to these broad (and rather symbolic) pledges, the G8 has also established more practical initiatives, notably the International Partnership for Energy Efficiency Cooperation at the Hokkaido summit (Lesage *et al.* 2010).

At the Heiligendamm summit in 2007, the G8 also established a (mainly informal) dialogue with five other countries – China, India, Brazil, Mexico, and South Africa – known as the G8+5. While energy, and in particular energy efficiency, were on the agenda of this dialogue, the momentum behind the initiative has waned after the UNFCCC Copenhagen conference in 2009 (Bausch and Mehling 2011: 28–30), and with the emergence of the Group of 20 (G20). The G20 is a coalition of large economies (including both developed and developing countries), primarily focused on international finance and economic development, which is increasingly looking to take over the role of the G8 in coordinating international economic policy. From a climate change perspective, the most notable development in this forum has been that political leaders pledged to phase out



fossil fuel subsidies in the medium term at the 2009 Pittsburgh summit (Van de Graaf and Westphal 2011).

Another mini-lateral initiative is the Major Economies Process on Energy Security and Climate Change launched by US President George W. Bush in 2007, which has continued as the Major Economies Forum (MEF) by President Obama. The MEF, brings together 17 major economies from the developed and developing world, operating rather like the G20 but with a focus solely on climate change and energy issues. Although initially seen as a diversion from the UNFCCC process, it later was explicitly stated to be supportive of the international climate regime. The MEF has focused primarily on technology cooperation, with one of its main actions being the establishment of a Global Partnership to advance the development and deployment of climate-friendly technologies. As part of the MEF, activities to advance the use of clean energy technologies were also pursued through several Clean Energy Ministerials. Whether and how the MEF (and the Clean Energy Ministerials) will be continued remains to be seen: the initiatives are mainly driven by the US, and given the lack of domestic progress there, the momentum behind the initiatives seems to be waning (Bausch and Mehling 2011: 23–25).

### *Public–Private Partnerships on Climate Change and Energy*

Scholars observe that intergovernmental attempts to address the multiple challenges of global climate change have been gradually complemented by transnational – border-crossing and non-state-based – forms of governance. In this context, authors have argued that transnational governance goes beyond more established forms of transnational relations, as it is geared toward authoritative steering toward public goals (Abbott 2012; Andonova *et al.* 2009; Pattberg 2010; Pattberg and Stripple 2008).

As one concrete manifestation of this broader trend, public–private partnerships – that is, networks of different societal actors, including governments, international organizations, corporations, research institutions, and civil society organizations – have become a cornerstone of the current global environmental order, both in discursive and material terms. At the United Nations level, partnerships have been endorsed by the former Secretary-General Kofi Annan through the establishment of the Global Compact, a voluntary partnership between corporations and the UN, as well as through the so-called type-2 outcomes concluded by governments at the UN World Summit on Sustainable Development (WSSD) in Johannesburg in 2002 that institutionalizes public–private partnerships in issues areas ranging from biodiversity to energy (Pattberg *et al.* 2012).

Out of the 340 partnerships registered with the UNCSD in early 2012, 46 have a primary focus on energy issues. An in-depth study of these energy partnerships (Szulecki *et al.* 2011) concludes that the majority is not fulfilling the high expectations that were placed on them in terms of effectiveness. While many partnerships are non-operational or have very little traceable output, those that are assessed to be effective resemble international organizations in terms of organizational structure. While this line of research has painted a rather gloomy picture of the overall sample of WSSD partnerships in terms of contributing to the much needed sustainability transition, it also acknowledges that individual partnerships can make a distinct contribution to sustainable development. In answering the question why some partnerships perform better than others, Pattberg *et al.* (2012) highlight the importance of organizational structure, resources, and powerful actors. In more detail, the authors conclude that in terms of problem-solving effectiveness, there is something like an ideal model or best practice of partnerships for sustainable development (2012: 106–109).

The Renewable Energy and Energy Efficiency Partnership (REEEP) is a prime example of the larger universe of public-private partnerships devised and established around the 2002 summit and the ideal model referred to above. As an open-ended initiative to facilitate multi-stakeholder cooperation in the renewable energy, climate change, and sustainable development sector, REEEP is a cooperative platform for more than 3500 members and 250 registered partners, among them 45 governmental actors (both national and subnational), including all of the G7 states (the international finance group consisting of the finance ministers from Canada, France, Germany, Italy, Japan, the UK, and the US), 180 private entities, and 6 international organizations. With an annual budget of just over \$7,800,000, and \$16,450,000 of available funds, it is one of the largest public-private partnerships for sustainable development. REEEP has an international secretariat (administrative office), eight regional secretariats, and two additional local focal points (North Africa and West Africa). REEEP is implementing activities and programs in 57 countries.

REEEP represents a market-oriented group of actors working for sustainable development. Its intention is to facilitate the exchange of technologies, identify and remove policy and regulatory barriers in the renewable energy market (and also create such markets in the first place if they do not exist), and provide information for various stakeholders, including the general public. The partnership is foremost a platform for communication between the partners, and a means to streamline the idea of renewable energy into efforts of informing and educating the wider public. It is therefore both a deregulatory and regulatory enterprise, aimed at the removal of state and regional barriers for the renewable energy market, yet at the same time devoted to regulation within this relatively new and rapidly growing sector. The membership remains open, and the number of partners is constantly growing. In 2012 more than 33% of the governmental partners were European, 31% were from Asia (with 6 separate regional governments in India), 18% were American states, and 11% were from Africa, along with Australia and New Zealand.

In addition, a number of multilateral public-private arrangements on sustainable energy technologies were planned or launched in the early 2000s, seeking to provide complementary or alternative institutional routes to the UNFCCC, especially given the uncertainty, at the time, on whether the Kyoto Protocol would ever enter into force (van Asselt and Karlsson-Vinkhuyzen 2009). Some of these forums focus on a limited range of technologies, e.g., on carbon sequestration or bioenergy. These include, for instance, the Carbon Sequestration Leadership Forum, established in June 2003, and the Global Methane Initiative (November 2004). Other initiatives cover multiple technologies, e.g., the the Asia-Pacific Partnership on Clean Development and Climate (APP), which started in January 2006 (McGee and Taplin 2006).

All of these initiatives are mini-lateral and come close to the club-style composition of the G20 or the MEF. With few exceptions they include members from the Umbrella Group (a US-led loose coalition of non-EU developed countries, often acting as laggards in the UN climate regime), the EU, and emerging economies like China or India, while small-island developing states and least developed countries are excluded. Additionally, the initiatives envisage an important role for business actors, primarily through the implementation of specific projects.

### *Transnational Climate Governance by Disclosure*

In addition to a wide range of firm- and industry-level emissions reduction schemes and market-building approaches, a number of transnational networks have emerged

that only indirectly aim at the reduction of greenhouse gas emissions, but rather focus on creating the necessary information and transparency for societal actors to assess corporate responses to climate change and thereby induce lasting behavioral change. Often these schemes are supported by institutional investors that have begun to include sustainability in their investment decisions. These benchmarking processes create a global competition among business actors to address climate change as a serious limitation to their profit-making activities. The emerging information-based governance schemes effectively institutionalize new norms at the transnational level, for example the norm to disclose corporate carbon emissions (in addition to the country-based reporting of the climate convention) (Florini and Saleem 2011: 144–145).

For instance, the Investors Network on Climate Risk is a case of investor-driven governance that may impact on energy and climate-related business development through internalizing climate change externalities (INCR 2008). Other examples include the Joint Oil Data Initiative, the Global Reporting Initiative, the Electricity Governance Initiative, and the Extractive Industries Transparency Initiative (see Quiroz and Bauer, this volume).

### **Interlinkages Between the Global Climate Regime and Other Global Governance Institutions**

Building on the previous sections and their mapping of international energy-related institutions within and beyond the international climate change regime, this section focuses on the relations between these institutions. An emerging strand of literature has come to address the institutional patchwork of global energy governance (cf. Dubash and Florini 2011), describing it as “chaotic, incoherent, fragmented, incomplete, illogical or inefficient” (Cherp *et al.* 2011: 76). A more systematic, concept-driven approach to inter-institutional relations on energy is largely missing, with a few exceptions (Bradshaw 2010; Cherp *et al.* 2011; Colgan *et al.* 2011; Goldthau, Introduction, this volume). The literature on global environmental governance is more advanced in this regard, establishing concepts like institutional interaction (Oberthür and Gehring 2006), fragmentation (Biermann *et al.* 2009; Zelli 2011a), and complexes (Keohane and Victor 2011; Oberthür and Stokke 2011). One concept that may lend itself to the analysis of global energy policy is a three-fold typology by Stokke (2001: 10–23) who distinguishes: utilitarian interlinkages where one institution alters the costs or benefits of another institution; ideational interlinkages where one institution influences another through learning processes; and normative interlinkages where one institution affects compliance with the norms of another institution (cf. McGee and Taplin 2006: 180). We employ Stokke’s typology to briefly characterize some of the interlinkages between the climate regime and other institutions in the four dimensions of global energy policy that structure this handbook (Cherp *et al.* 2011; Dubash and Florini 2011; Goldthau, Introduction, this volume): sustainability, markets, security, and development.

The relations between the UNFCCC and formal organizations in the realm of sustainability and renewable energy could generally be portrayed as an ideational interlinkage. Even the relation with the IEA has changed from strong tensions, due to the agency’s original bias toward fossil and nuclear industries, to one of mutual learning. After its telling absence in the early stages of climate negotiations, the IEA has eventually come to feed its expertise on energy technologies into climate summits. Likewise, the agency has broadened its climate-related work since 2005, albeit primarily incentivized by the G8 summit in Gleneagles (Van de Graaf and Lesage 2009: 304–305). Nonetheless, there is still a conflictive utilitarian side to this interlinkage. After all, the climate regime architecture

was designed to profoundly restructure energy choices around the world through its restrictions on carbon emissions and concomitant price increase for traditional energy carriers. Some of the European countries that advocate this role for the climate regime consequently pushed for the creation of IRENA as a renewables counterpart to the IEA.

Likewise, interlinkages between the international climate regime and club or public-private arrangements over energy issues are characterized by both synergistic and conflictive features. There are supportive utilitarian and ideational overlaps wherever such arrangements have provided their members with additional incentives and awareness to advance their low carbon development paths. The G8+5 with the Gleneagles Process and G20 are cases in point here. Recent summit declarations in Heiligendamm 2007, L'Aquila 2009, and Pittsburgh 2009 endorsed the UNFCCC process and included soft commitments for phasing out inefficient fossil energy subsidies, and for avoiding an average global temperature rise of more than 2 °C above pre-industrial levels. Similar stimuli toward global energy transition – and respective financing efforts – came from the Clean Energy Ministerial at the 2009 Copenhagen climate summit, the Major Economies Forum Global Partnership, and from several new public-private partnerships on specific technologies like methane, hydrogen, and carbon sequestration (Florini and Dubash 2011).

On the other hand, observers cautioned against disruptive effects of these various clubs: their non-binding approaches may undermine the climate negotiations' drive toward hard law development (Vihma 2009), and their lack of inclusiveness leaves behind the energy concerns of the majority of developing countries (Biermann *et al.* 2009). This also goes for some of the public-private technology partnerships that evolved in the early 2000s. The now defunct Asia-Pacific Partnership on Clean Development and Climate has drawn particular attention from scholars (cf. Karlsson-Vinkhuyzen and van Asselt 2009). In terms of a negative utilitarian interlinkage, the APP's approach with non-binding nationally determined intensity targets may reduce the enthusiasm for the more ambitious multilateral objectives of the UN process. This might also entail disruptive normative effects on the compulsion of core UNFCCC features like the principle of common but differentiated responsibilities (McGee and Taplin 2006; van Asselt 2007).

The relationship between the international climate regime and transnational initiatives can largely be described as synergistic. In normative terms, such initiatives “often fill perceived gaps in the provision of energy governance, which meet specific regulatory needs” (Newell 2011: 102). Moreover, information-based governance schemes like INCR and CDP not only institutionalize new norms like carbon disclosure (Florini and Saleem 2011: 149–150), but also induce energy-related behavioral changes of private actors, thus creating a positive utilitarian interlinkage with the UNFCCC process. Still, many critical voices remain as to potential disruptive effects of “climate capitalism,” especially a preference for low-hanging fruits paired with an aversion for potentially risky investments for renewables in poorer developing countries. This criticism however also includes the climate regime itself, in particular, as discussed above, the CDM (Paterson and Newell 2010: 129–140).

As for the dimension of markets, we briefly address three potentially disruptive normative interlinkages between the UNFCCC process and international trade agreements. A highly controversial issue regards carbon border adjustments. A number of actors, including the US Congress and the European Commission, have considered offsetting requirements against carbon-intensive imported goods. Some legal experts hold that such steps could violate WTO law (cf. van Asselt and Brewer 2010), while international

relations scholars argue that this very fear might have kept parties from elaborating more ambitious trade- and energy-relevant measures under the international climate regime (Eckersley 2004; Zelli 2011b). A second potential normative conflict regards intellectual property rights (IPRs). In recent climate summits, developing countries led by India and OPEC members called for relaxing provisions of the WTO's TRIPS agreement, as these might render the acquisition of renewable energy technologies more costly. Industrialized countries, which host the vast majority of patent-holding companies, rejected this idea, arguing that IPR systems protect innovators and may therefore induce technological research development (Littleton 2008). Third, the climate regime's CDM may collide with some of the hundreds of bilateral investment treaties, and also with regional trade agreements that contain investment provisions. With its restrictions to certain parties and procedures, the CDM could violate the liberal regulations for investors under some of these treaties (Brewer 2004: 7–8). Several agreements meanwhile took steps toward more normative coherence with the climate regime, by including certain environmental safeguards for energy-related investments and activities (Ghosh 2011).

We already touched upon some institutions and alliances that play a role in the realm of energy security, including the IEA and the G8. Unlike these two, OPEC has kept a consistently strenuous relationship with the UNFCCC process. While the ideational clash over values and knowledge has slightly eased (OPEC delegates at least no longer question climate change *per se*), the issue of adverse impacts of climate policies or response measures is at the core of an ongoing utilitarian conflict over interests. "In essence, OPEC's strategy towards climate policies centers on two main goals: compensation and assistance [...] to diversify away from a natural resource economy" (Goldthau and Witte 2011: 36). From the onset, OPEC countries, regularly advised by the US fossil fuel lobby, made their support for the UNFCCC dependent upon the inclusion of respective clauses. Skillful in positioning themselves as central actors in the G77, they held the issue of response measures "hostage for many years" (Dessai 2004: 25), sidelining non-oil related interests of other group members. While OPEC's dominance in the group has shrunk over the last few years, it still presents a considerable stumbling block for the energy-related development of the climate regime, most recently with its stern opposition to the regulation of emissions from aviation.

Beyond IEA, G8, and OPEC, it becomes difficult to assess the regime's interlinkages with other institutions over energy security, since this governance arena "continues to be deeply entrenched in national political economies" (Florini and Dubash 2011: 2). Over the next years, the growing role of regional agreements like ASEAN might entail closer links to the international climate regime over energy security matters, similar to the observed rapprochement on energy market and investment issues.

To structure the complex energy-related interlinkages of the international climate regime in the realm of development, we distinguish between the closely related issues of low carbon development, climate finance, and adaptation to climate change. Although sustainable development is one of the UNFCCC's core principles (Article 3.4), ideational tensions between development (or rather energy consumption) and sustainability objectives frequently emerged in climate negotiations, most prominently in the ongoing deadlock over burden sharing for limiting greenhouse gas emissions (Dubash and Florini 2011: 9). These tensions somehow resurfaced as turf wars between the UNFCCC and its UN sister agencies over the imprint of climate change on the development agenda. Climate issues were largely subsumed under the "energy" heading at the 2002 World Summit on Sustainable Development, and the UNFCCC secretariat at best played a modest role in

the preparations for the Rio+20 summit in 2012. But aside from these rivalries, UNEP, UNDP, and UNFCCC created considerable ideational synergy as norm entrepreneurs for renewable energies and energy efficiency since the late 1990s. Jointly with the CSD, they facilitated interaction and learning processes, providing a “fertile ground for states that wanted to strengthen energy on the UN agenda” (Karlsson-Vinkhuyzen 2010: 191). Further convergence on these matters is reflected in the vibrant cross-institutional rhetoric of a “green economy,” notwithstanding the lack of concrete strategies to tackle underlying drivers of energy poverty (Bruggink 2012: 6).

The World Bank’s Climate Investment Funds significantly enhanced incentives and opportunities for developing countries to limit their greenhouse gas emissions, thus creating a synergistic utilitarian relationship with the international climate regime. But there are also conflictive aspects to this utilitarian interlinkage, as the Bank largely goes for the commercially most attractive projects that do not show a particular pro-poor focus (Michaelowa and Michaelowa 2011). The donor-oriented voting structure (as opposed to the climate regime’s one country-one vote system) further adds to this bias in the Bank’s low carbon project portfolio. The new Green Climate Fund is expected to avoid such prioritization and be more in line with energy choices and adaptation goals promoted by the UNFCCC; but this will ultimately depend on its governance structure and allocation criteria.

Finally, adaptation to climate change needs to be factored more appropriately into the nexus between mitigation and energy development. The current ambition of a triple-win solution through mainstreaming has proved unrealistic. In fact, the compromises around “low carbon development” and “green economy” have partly sidelined adaptation concerns. To address this negative utilitarian interlinkage among multilateral climate funds and official development assistance for energy security and access, a sensible division of labor is needed, implying, in the words of Bruggink (2012: 6), “a clear distinction between pro-growth development strategies incorporating mitigation objectives and pro-poor development strategies incorporating adaptation objectives.”

In sum, we find considerable variation for the interlinkages involving the climate regime across the four dimensions of global energy policy. This is no surprise given the different actor constellations, objectives, and logics that mark these dimensions, and the relatively feeble ties among them. In the realm of sustainability, the climate regime is largely involved in ideational overlaps on the common goal to tackle climate change through novel energy choices; yet, especially with newcomer institutions, the regime faces competitive utilitarian interlinkages over how exactly this goal shall be achieved. In the fields of markets and security, we find a nearly reversed situation: being originally marked by ideational or normative tensions, some of these interlinkages now bear potential for limited utilitarian convergence and complementarity, e.g., with the IEA and regional trade agreements. The dimension of development offers the most complex picture with both synergistic and conflictive overlaps along several fault lines. This complexity very well reflects the international climate regime’s inner balancing act between its sustainability and development features.

## Conclusion

This contribution has carefully mapped and assessed current climate change governance and its relation to global energy policy. After a brief discussion of the climate–energy nexus and current emission trends, we have analyzed the global climate governance architecture, including international and transnational institutions, organizations, and

arenas. Subsequently, we have discussed the energy-related interlinkages between climate change and other issue areas, namely sustainability, markets, security, and development. This concluding section will provide short suggestions on managing interlinkages before outlining some possible future avenues of research.

At present, an overarching institutional framework like a global energy regime neither seems feasible, given the underlying constellations of interests and power (Newell 2011: 103), nor desirable, as it could never appropriately reflect and harmonize the different objectives and ideas (Cherp *et al.* 2011). A more realistic, albeit ambitious multilateral option would be “joint interplay management” (Oberthür 2009: 375–376), through enhanced inter-institutional cooperation. For instance, in the realm of climate change and energy aid, one could increase earmarking by dividing more clearly between publicly financed poverty prevention aid and carbon market-based green growth aid (Bruggink 2012: 32–35). Such better divisions of labor might lead to a polycentric governance system, “providing stronger interlinkages while preserving the unique and important characteristics of each [governance arena]” (Cherp *et al.* 2011: 86).

Meanwhile, efforts of “unilateral interplay management” taken by individual institutions are more likely to succeed (Oberthür 2009: 375–376). The climate regime could play the role of an “orchestrator” (Abbott *et al.* 2010) within the institutional patchwork: it could help connect the dots by serving as a clearing-house or coordinating implementation assistance to support country-level transitions toward low carbon societies (Dubash and Florini 2011: 15; van Asselt and Zelli 2012). Likewise, the IEA and the World Bank could do a much better job of integrating climate change and other energy concerns into their work to influence national energy policies (Karlsson-Vinkhuyzen and Kok 2011). As a result, viable options to manage existing conflictive fragmentation should include streamlining the energy policies of various international institutions on the ground.

Based on our mapping of international and transnational climate governance and its implications for global energy policy, we provide some suggestions for future avenues of research on the climate–energy nexus. First, while scholars have started to conceptualize and map the overlap between the climate change and energy governance architectures (e.g., Cherp *et al.* 2011; Colgan *et al.* 2011; Goldthau 2012), more theory-guided and systematic efforts are needed to address the underlying causes of this institutional complexity as well as its consequences, e.g., for institutional effectiveness or equity. Second, while much discussion has focused on the climate regime, and recently also on transnational climate governance, comparatively little is known about the relevance of club governance within the climate–energy nexus. Here, we call for more systematic research on the intricate connections between G8/G20 policy-making, the international climate regime (UNFCCC), and the broad landscape of transnational governance initiatives.

Third, following our discussion of interlinkages, we add an important qualification: our analysis has concentrated on horizontal interlinkages among multilateral institutions (cf. Young 2002). However, in light of the dominance of domestic politics in energy governance, interlinkages of the UN climate regime with national and sub-national levels merit much more attention and would render the above overview even more complex. Analyzing these vertical interlinkages is “crucial to understanding what accounts for existing outcomes and where and how reforms may be possible” (Florini and Dubash 2011: 3). In sum, we urgently need more research on the causes and consequences of interlinkages across scales, between climate and energy, and within the energy governance arena.

To conclude, the current climate governance architecture has not been designed to implement a transition toward more sustainable energy. However, given the right strategies and incentives, we believe that climate governance, both international and transnational, can provide an important impetus for the global energy transition.

### References

- Abbott, Kenneth. 2012. Engaging the Public and the Private in Global Environmental Governance. *International Affairs* 88, 3: 543–564.
- Abbott, Kenneth, Philipp Genschel, Duncan Snidal, and Bernhard Zangl. 2010. International Organizations as Orchestrators. Unpublished paper presented at the 7th Pan-European International Relations Conference of the European Consortium for Political Research / Standing Group on International Relations, Stockholm, September 9–11.
- Andonova, Liliana B., Michele M. Betsill, and Harriet Bulkeley. 2009. *Transnational Climate Governance*. *Global Environmental Politics* 9, 2: 52–73.
- Bausch, Camilla, and Michael Mehling. 2011. *Addressing the Challenge of Global Climate Mitigation – An Assessment of Existing Venues and Institutions*. Berlin: Friedrich-Ebert Stiftung.
- Biermann, Frank, Philipp Pattberg, Harro van Asselt, and Fariborz Zelli. 2009. The Fragmentation of Global Governance Architectures: A Framework for Analysis. *Global Environmental Politics* 9, 4: 14–40.
- Bradshaw, Michael J. 2010. Global Energy Dilemmas: A Geographical Perspective. *The Geographical Journal* 176: 275–290.
- Brewer, Thomas L. 2004. The WTO and the Kyoto Protocol: Interaction Issues. *Climate Policy* 4: 3–12.
- Bruggink, Jos. 2012. *Energy Aid in Times of Climate Change: Designing Climate Compatible Development Strategies*. Publication No. 12-006. Petten: ECN.
- Cherp, Aleh, Jessica Jewell, and Andreas Goldthau. 2011. Governing Global Energy: Systems, Transitions, Complexity. *Global Policy* 2: 75–88.
- Colgan, Jeff D., Robert O. Keohane, and Thijs Van de Graaf. 2011. Punctuated Equilibrium in the Energy Regime Complex. *The Review of International Organizations* 7, 2: 117–143.
- Coninck, Heleen de, Frauke Haake, and Nico van der Linden. 2007. Technology Transfer in the Clean Development Mechanism” *Climate Policy* 7: 444–456.
- Das, Katsuri. 2011. *Technology Transfer under the Clean Development Mechanism: An Empirical Study of 1000 CDM Projects*. The Governance of Clean Development Working Paper 014. Norwich, UK: University of East Anglia.
- Dechezleprêtre, Antoine, Matthie Glachant, and Yann Ménière. 2009. Technology Transfer by CDM Projects: A Comparison of Brazil, China, India and Mexico. *Energy Policy* 37: 703–711.
- Depledge, Joanna. 2008. Striving for No: Saudi Arabia in the Climate Change Regime. *Global Environmental Politics* 8: 9–35.
- Dessai, Suraje. 2004. An Analysis of the Role of OPEC as a G77 Member at the UNFCCC. Report for WWF. <http://assets.panda.org/downloads/opecfullreportpublic.pdf>, accessed March 21, 2012.
- Dessler, Andrew, and Edward A. Parson. 2010. *The Science and Politics of Global Climate Change. A Guide to the Debate*. Cambridge: Cambridge University Press.
- Driesen, David M. 2006. Links between European Emissions Trading and CDM Credits for Renewable Energy and Energy Efficiency Projects. <http://ssrn.com/abstract=881830>, accessed April 3, 2012.
- Dubash, Navroz K., and Ann Florini. 2011. Mapping Global Energy Governance. *Global Policy* 2(SI): 6–18.
- Eckersley, Robyn. 2004. The Big Chill: The WTO and Multilateral Environmental Agreements. *Global Environmental Politics* 4, 2: 24–40.



- Eckersley, Robyn. 2012. Moving Forward in the Climate Negotiations: Multilateralism or Minilateralism? *Global Environmental Politics* 12, 2: 24–42.
- Fenhann, Jørgen. 2012. CDM Pipeline Overview. <http://www.cdmpipeline.org/>, accessed April 3, 2012.
- Ferrey, Steven. 2010. The Failure of International Global Warming Regulation to Promote Needed Renewable Energy. *Boston College Environmental Affairs Law Review* 37: 67–126.
- Florini, Ann. 2011. The International Energy Agency in Global Energy Governance. *Global Policy* 2: 40–50.
- Florini, Ann, and Navroz K. Dubash. 2011. Introduction to the Special Issue: Governing Energy in a Fragmented World. *Global Policy* 2(SI): 1–5.
- Florini, Ann, and Saleena Saleem. 2011. Information Disclosure in Global Energy Governance. *Global Policy* 2(SI): 144–154.
- Friedlingstein, P., R. A. Houghton, G. Marland, et al. 2010. Update on CO<sub>2</sub> Emissions. *Nature Geoscience* 3: 811–812.
- Ghosh, Arunabha. 2011. Seeking Coherence in Complexity? The Governance of Energy by Trade and Investment Institutions. *Global Policy* 2(SI): 106–119.
- Goldthau, Andreas. 2012. From the State to the Market and Back. Policy Implications of Changing Energy Paradigms. *Global Policy* 3, 2: 198–210.
- Goldthau, Andreas, and Jan Martin Witte. 2011. Assessing OPEC's Performance in Global Energy. *Global Policy* 2(SI): 31–39.
- Haite, Erik, Duan Maosheng, and Stephen Seres. 2006. Technology Transfer by CDM Projects. *Climate Policy* 6: 327–344.
- Hoffmann, Ulrich. 2011. *Some Reflections on Climate Change, Green Growth Illusions and Development Space*. UNCTAD Discussion Paper 205. Geneva: UNCTAD.
- IEA. 2011. *World Energy Outlook 2011*. Paris: International Energy Agency.
- INCR. 2008. *Investor Progress on Climate Risks and Opportunities: Results Achieved since the 2005 Investor Summit on Climate Risk at the United Nations*. Boston: CERES.
- Karlsson-Vinkhuyzen, Sylvia I. 2010. The United Nations and Global Energy Governance: Past Challenges, Future Choices? *Global Change, Peace & Security* 2: 175–195.
- Karlsson-Vinkhuyzen, S. I., and M. Kok. 2011. Interplay Management in the Climate, Energy and Development Nexus. In Sebastian Oberthür and Olav Schram Stokke, eds. *Managing Institutional Complexity: Regime Interplay and Global Environmental Change*. Cambridge, MA: MIT Press, pp. 285–312.
- Karlsson-Vinkhuyzen, Sylvia I., and Harro van Asselt. 2009. Introduction: Exploring and Explaining the Asia-Pacific Partnership on Clean Development and Climate. *International Environmental Agreements* 9: 195–211.
- Keohane, Robert O., and David G. Victor. 2011. The Regime Complex for Climate Change. *Perspectives on Politics* 9: 7–23.
- Lesage, Dries, Thijs Van de Graaf, and Kirsten Westphal. 2010. G8+5 Collaboration on Energy Efficiency and IPEEC: Shortcut to a Sustainable Future? *Energy Policy* 38: 6419–6427.
- Littleton, Matthew. 2008. *The TRIPS Agreement and Transfer of Climate-Change-Related Technologies to Developing Countries*. UN-Doc. No. ST/ESA/2008/DWP/71. New York: UN DESA. [http://www.un.org/esa/desa/papers/2008/wp71\\_2008.pdf](http://www.un.org/esa/desa/papers/2008/wp71_2008.pdf), accessed March 20, 2012.
- Matschoss, Patrick. 2007. The Programmatic Approach to CDM: Benefits for Energy Efficiency Projects. *Carbon and Climate Law Review* 1: 117–126.
- McGee, Jeffrey, and Ros Taplin. 2006. The Asia-Pacific Partnership on Clean Development and Climate. A Complement or Competitor to the Kyoto Protocol? *Global Change, Peace & Security* 18: 173–192.
- Michaelowa, Axel, and Katharina Michaelowa. 2011. Climate Business for Poverty Reduction? The Role of the World Bank. *The Review of International Organizations* 6: 259–286.
- Náim, Moisés. 2009. Minilateralism. The Magic Number to Get Real International Action. *Foreign Policy* July/August: 5–8.

- Nakhooda, Smita. 2011. Asia, the Multilateral Development Banks and Energy Governance. *Global Policy* 2: 120–132.
- Newell, Peter. 2011. The Governance of Energy Finance: The Public, the Private, and the Hybrid. *Global Policy* 2: 94–105.
- Oberthür, S. 2009. Interplay Management: Enhancing Environmental Policy Integration Among International Institutions. *International Environmental Agreements: Politics, Law and Economics* 9, 4: 371–391.
- Oberthür, Sebastian, and Thomas Gehring, eds. 2006. *Institutional Interaction in Global Environmental Governance: Synergy and Conflict among International and EU Policies*. Cambridge, MA: MIT Press.
- Oberthür, Sebastian, and Olav S. Stokke, eds. 2011. *Managing Institutional Complexity. Regime Interplay and Global Environmental Change*. Cambridge, MA: MIT Press.
- Paterson, Matthew, and Peter Newell. 2010. *Climate Capitalism: Global Warming and the Transformation of the Global Economy*. Cambridge: Cambridge University Press.
- Pattberg, Philipp. 2010. Public–Private Partnerships in Global Climate Governance. *Wiley Interdisciplinary Review: Climate Change* 1, 2: 279–287.
- Pattberg, Philipp, and Johannes Stripple. 2008. Beyond the Public and Private Divide: Remapping Transnational Climate Governance in the 21st Century. *International Environmental Agreements* 8, 4: 367–388.
- Pattberg, Philipp, Frank Biermann, Ayşem Mert, and Sander Chan, eds. 2012. *Public–Private Partnerships for Sustainable Development. Emergence, Influence, and Legitimacy*. Cheltenham, UK: Edward Elgar.
- Schneider, Malte, Andreas Holzer, and Volker Hoffmann. 2008. Understanding the CDM’s Contribution to Technology Transfer. *Energy Policy* 36: 2930–2938.
- Seres, Stephen, Erik Haites, and Kevin Murphy. 2009. Analysis of Technology Transfer in CDM Projects: An Update. *Energy Policy* 37: 4919–4926.
- Stokke, Olav S. 2001. *The Interplay of International Regimes: Putting Effectiveness Theory to Work*. Report No. 14/2001. Lysaker, Norway: The Fridtjof Nansen Institute.
- Szulecki, Kacper, Philipp Pattberg, and Frank Biermann. 2011. Explaining Variation in the Performance of Energy Partnerships. *Governance: An International Journal of Policy, Administration, and Institutions* 24, 4: 713–736.
- UNDP. 2011. *UNDP in Action – Annual Report 2010/2011*. New York: United Nations Development Programme.
- UNEP. 2011. *Towards a Green Economy*. Nairobi: United Nations Environment Programme.
- UNFCCC. 2002a. Decision 4/CP.7, Development and Transfer of Technologies (Decisions 4/CP.4 and 9/CP.5), UN Doc. FCCC/CP/2001/13/Add.1 (21 January 2002).
- UNFCCC. 2002b. Decision 17/CP.7, Modalities and Procedures for a Clean Development Mechanism, as Defined in Article 12 of the Kyoto Protocol, UN Doc. FCCC/CP/2001/13/Add.2 (21 January 2002).
- UNFCCC. 2007. *Innovative Options for Financing the Development and Transfer of Technologies*. Bonn: UNFCCC.
- UNFCCC. 2010. Report on the Review and Assessment of the Effectiveness of the Implementation of Article 4, Paragraphs 1(c) and 5, of the Convention. Note by the Secretariat. UN Doc. FCCC/SBI/2010/INF.4 (26 May 2010).
- UNFCCC. 2011. Decision 1/CP.16, Outcome of the Work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention, UN Doc. FCCC/CP/2010/7/Add.1 (15 March 2011).
- van Asselt, Harro. 2007. From UN-ity to Diversity? The UNFCCC, the Asia-Pacific Partnership, and the Future of International Law on Climate Change. *Carbon and Climate Law Review* 1, 1: 17–28.
- van Asselt, Harro, and Thomas L. Brewer. 2010. Addressing Competitiveness and Leakage Concerns in Climate Policy: An Analysis of Border Adjustment Measures in the US and the EU. *Energy Policy* 38: 42–51.

- van Asselt, Harro, and Sylvia Karlsson-Vinkhuyzen, eds. 2009. *Exploring and Explaining the Asia-Pacific Partnership on Clean Development and Climate*. Special Issue of *International Environmental Agreements* 9(3). Dordrecht: Springer.
- van Asselt, Harro, and Fariborz Zelli. 2012. Connecting the Dots: the Challenge of Integrating Global Climate Governance. Paper prepared for the Lund Conference on Earth System Governance, April 18–20.
- Van de Graaf, Thijs. 2013. Fragmentation in Global Energy Governance: Explaining the Creation of IRENA. *Global Environmental Politics* (forthcoming).
- Van de Graaf, Thijs, and Dries Lesage. 2009. The International Energy Agency After 35 years: Reform Needs and Institutional Adaptability. *Review of International Organizations* 4: 293–317.
- Van de Graaf, Thijs, and Kirsten Westphal. 2011. The G8 and G20 as Global Steering Committees for Energy: Opportunities and Constraints. *Global Policy* 2(SI): 19–30.
- Victor, David. 2009. Plan B for Copenhagen. *Nature* 461: 342–344.
- Vihma, Antto. 2009. Friendly Neighbor or Trojan Horse? Assessing the Interaction of Soft Law Initiatives and the UN Climate Regime. *International Environmental Agreements* 9: 239–262.
- World Bank. 2010. *World Development Report: Development and Climate Change*. Washington, DC: World Bank.
- World Bank. 2011. *Annual Report 2011*. Washington, DC: World Bank.
- Yamin, Farhana, and Joanna Depledge. 2004. *The International Climate Change Regime: A Guide to Rules, Institutions and Procedures*. Cambridge: Cambridge University Press.
- Young, Oran R. 2002. *The Institutional Dimensions of Environmental Change. Fit, Interplay, and Scale*. Cambridge, MA: MIT Press.
- Zelli, Fariborz. 2011a. The Fragmentation of the Climate Governance Architecture. *Wiley Interdisciplinary Reviews: Climate Change* 2: 255–270.
- Zelli, Fariborz. 2011b. Regime Conflict and Interplay Management in Global Environmental Governance. In Sebastian Oberthür and Olav S. Stokke, eds. *Managing Institutional Complexity. Regime Interplay and Global Environmental Change*. Cambridge, MA: MIT Press, pp. 199–226.