

4

Renewable Energy

A Loosely Coupled System or a Well-Connected Web of Institutions?

LISA SANDERINK

4.1 Introduction

Energy is the lifeblood of modern society: it is required to fulfil people's basic needs and everyday activities, and, in the same vein, the world's economic processes heavily rely on energy. However, global energy consumption and production is putting high pressure on the earth system and is arguably the main culprit behind climate change; fossil-fuel combustion accounts for two-thirds of total greenhouse gas (GHG) emissions and 80 per cent of carbon dioxide (IEA/OECD 2017). Therefore, decarbonization of global energy systems is of paramount importance for a sustainable future, and a global uptake of renewable energy plays a key role in this trajectory (e.g. Ki-moon 2011; IRENA 2015; WFC 2016).

While the overall share of renewables in total final energy consumption grew to around 19 per cent and reached a new record in 2017, this growth must accelerate to reach a two-thirds share by 2050 (IRENA 2018a). This is both technically and economically feasible, yet it requires effective global governance to get governments committed, to put regulatory frameworks in place, and to facilitate knowledge exchange and technology transfer (Röhrkasten 2015). As discussed in Chapter 3, the renewable energy subfield is institutionally complex. It is governed by a wide range of different institutions, including international organizations, alongside private institutions and multi-stakeholder partnerships. On top of that, the subfield covers different renewable energy sources, such as solar and wind, and has to navigate three critical challenges, commonly known as energy security, energy access, and environmental sustainability (e.g. Cherp et al. 2011; Florini and Sovacool 2011; Karlsson-Vinkhuyzen et al. 2012). Finally, the renewable energy subfield is still dominated by national policy making as nation states continue to have sovereign control over the energy domain.

Various studies have introduced mappings of the institutional complexes for climate change (e.g. Keohane and Victor 2011; Abbott 2012; Widerberg et al.

2016) and energy (e.g. Sovacool and Florini 2012; Wilson 2015; Sanderink et al. 2018), but only a few zoom in on the institutional complex for renewable energy specifically. This is regrettable, as the subfield is most prominent within the climate-energy nexus and can be characterized as institutionally diverse (see Chapter 3). Furthermore, existing mappings are biased toward public institutions, mostly excluding nongovernmental institutions (e.g. Suding and Lempp 2007; Barnsley and Ahn 2014; Röhrkasten 2015). However, recent literature has argued that the global energy transition is driven by bottom-up and polycentric governance rather than through integrated international cooperation (Aklin and Urpelainen 2018; Meckling 2018). Hence, novel insights are needed into the institutional constellations and dynamics within the renewable energy subfield, to ultimately answer the guiding question: is the institutional complex of renewable energy contributing to the global energy transition in an effective manner?

A first step in the search for an answer to this question is to advance our understanding of the institutional complex and to evaluate coherence and management (as laid out in further detail in Chapter 2). First, coherence is understood as the harmony of institutional features and interactions across institutions toward an overarching purpose. Meso-level coherence, i.e. the level of coherence in the subfield as a whole, is determined based on the following indicators: first, the convergence/divergence among interpretations of the core norm, i.e. to substantially increase the share of renewables; second, the distribution of membership, i.e. a limited or wide range of targeted actors; and third, an (un)balanced allocation of governance functions. Micro-level coherence, i.e. the level of coherence between specific individual institutions, is assessed along the same three dimensions and, more importantly, mechanisms of interactions. These can be distinguished as cognitive (i.e. when knowledge is transferred), normative (i.e. when rules and norms interact), and behavioural (i.e. when impacts of behaviour intersect). Second, management is defined as attempts to deliberately steer interactions between two or more institutions (Zelli 2010), and is merely assessed at the micro level. It is determined based on the levels and agents (e.g. unilaterally or jointly), and consequences of management (e.g. increased harmony of institutional features: core norm, membership, governance functions, interaction mechanisms). Juxtaposing levels of coherence and management enables the characterization of the renewable energy subfield by synergy, coexistence/duplication, or conflict, or rather by division of labour, coordination, or competition (see Chapter 2).

For studying coherence and management at the micro level, three important multi-stakeholder partnerships were selected, since global (renewable) energy governance remains underdeveloped under the umbrella of the United Nations (UN) and in the intergovernmental sphere in general (Karlsson-Vinkhuyzen 2010; Röhrkasten 2015). Moreover, the chapter aims to go beyond dyadic relationships

between intergovernmental institutions and seeks to analyze the plethora of interconnections among different forms of governance. The selected institutions include the Renewable Energy and Energy Efficiency Partnership (REEEP), the Renewable Energy Policy Network for the 21st Century (REN21), and Sustainable Energy for All (SEforALL), all of which can be described as transboundary cooperation efforts between public and private actors that aim at addressing a public policy objective (Schäferhoff et al. 2009; Pattberg and Widerberg 2014).

The analysis builds on three methodological steps: first, a thorough analysis of the institutional constellations, second, a content analysis of official documents and reports of the selected institutions, and third, an analysis of the views of climate and energy experts obtained through semi-structured interviews. The interviewees were staff members of the selected institutions, experts from academia and civil society organizations (CSOs), and government officials, who are closely associated with the respective institutions. Based thereon, this chapter advances our understanding of institutional complexity, specifically for global renewable energy governance. Therewith, it provides insights from which lessons can be drawn for governing the overall climate-energy nexus.

The chapter is structured as follows. Section 4.2 briefly introduces the topic of renewable energy and its centrality. Subsequently, Section 4.3 analyzes the institutional features and measures meso-level coherence for the renewable energy subfield as a whole. Thereafter, Section 4.4 determines micro-level coherence by examining institutional features and interaction mechanisms across the selected partnerships. Finally, Section 4.5 describes attempts to manage these interactions at the micro level, after which Section 4.6 concludes with some final remarks and suggestions for future research.

4.2 Renewable Energy: Providing Sustainable Energy for All

'We all know that renewable energy is limitless and will last forever' is what former UN Secretary-General Ban Ki-Moon stated in 2016 at the International Renewable Energy Agency (IRENA) Debate in Abu Dhabi.¹ This statement mirrors the high importance of the role of renewable energy in the world's trajectory to sustainable development.

Firstly, renewable energy is crucial for satisfying the increasing energy demand. In light of the world's growing population, energy security is a high priority for governments worldwide (Dubash and Florini 2011; Van de Graaf 2013), in the way that they wish to ensure an *'uninterrupted availability of energy sources at an*

¹ For the full statement: www.un.org/sg/en/content/sg/statement/2016-01-17/secretary-generals-remarks-international-renewable-energy-agency.

affordable price'.² At present this is particularly challenging, since finite energy sources are depleted rapidly, while global energy demand is rising sharply. As a consequence, diversification of energy sources is of great necessity, and renewables can play an important role in this. Solar, wind, and other types of renewable energy have the potential to alleviate the increasing scarcity, to decentralize the production of energy, and to diversify energy supply (Röhrkasten 2015).

Secondly, renewables are key to ensuring worldwide energy access. The challenge of energy access is related to the 1.1 billion people who do not have access to electricity and to the 2.8 billion people who continue to rely on biomass, coal, and kerosene for cooking (OECD/IEA 2017). Not only does this deprive this large part of the human population from economic modernization, it also poses urgent health threats and environmental degradation risks (Dubash and Florini 2011). This demonstrates the urgency to tackle the widespread and persistent lack of access to modern energy services, which is predominantly the case in rural areas in the developing world. Switching to renewables does not only reduce the indoor air pollution and improve the population's health, it is also highly suitable for small-scale and decentralized deployment, which is particularly important to address energy access (Röhrkasten 2015).

Thirdly, an increased uptake contributes to tackling the negative environmental externalities that are associated with today's energy systems, and the first and foremost issue related to energy is climate change. Other urgent environmental issues are air pollution, acid rain, contamination of marine environment, nuclear meltdowns, collapsed coal mines, natural gas explosions, dam breaches, and so forth (Dubash and Florini 2011; Florini and Sovacool 2011; and Röhrkasten 2015). This makes the imperative to substitute fossil fuels and further diversify the energy mix even stronger, and renewables have the potential to do so. However, an increased uptake has its own environmental risks. For example, the cultivation of biofuel crops is associated with soil degradation and deforestation; the construction of hydropower dams with disruption of local fish stocks; the use of nuclear energy with the danger of toxic substances; and the production of solar and wind energy with the displacement of food production, interventions in stability of ecosystems, and dangers to bird life (Van de Graaf 2013; Röhrkasten 2015).

4.3 Meso-Level Coherence

Before zooming in on institutions at the micro level, this section describes meso-level coherence for the overall subfield of renewable energy by describing its emergence, the core norm, membership, and governance functions.

² Definition of energy security derived from: www.iea.org/topics/energysecurity/.

4.3.1 Emergence of the Institutional Complex on Renewable Energy

The timeline in Figure 4.1 illustrates the emergence of the institutional complex for renewable energy. As of January 2017, the institutional complex consists of forty-six institutions with different constitutive characteristics. Even though first global environmental concerns were already raised in the 1970s, and the dependence on fossil fuels was already questioned in the Brandt Report (1980), it took until the early 1990s for interest in renewable energy to grow significantly.

Institutions that were established prior thereto mostly include intergovernmental cooperation efforts that were initially shaped by energy security concerns as a consequence of the oil crises in the 1970s. For example, the International Energy Agency (IEA), which initially focused on fossil sources of energy, slowly but surely widened its portfolio and extended its analyses to renewable energy (Van de Graaf 2012; Heubaum and Biermann 2015). The emergence of institutions from the early 1990s appears to be linked to the UN Framework Convention on Climate Change (UNFCCC), adopted in 1992, followed by the Kyoto Protocol in 1997. As an illustration, the same year the UNFCCC was adopted the Global Sustainability Electricity Partnership (GSEP) was established to decarbonize the world through sustainable electrification (GSEP 2018), and similar to the Kyoto Protocol, the CarbonNeutral Protocol (CNP) was set up in 1997 to stimulate carbon reductions, for example through renewable energy certificates (CNP 2018).

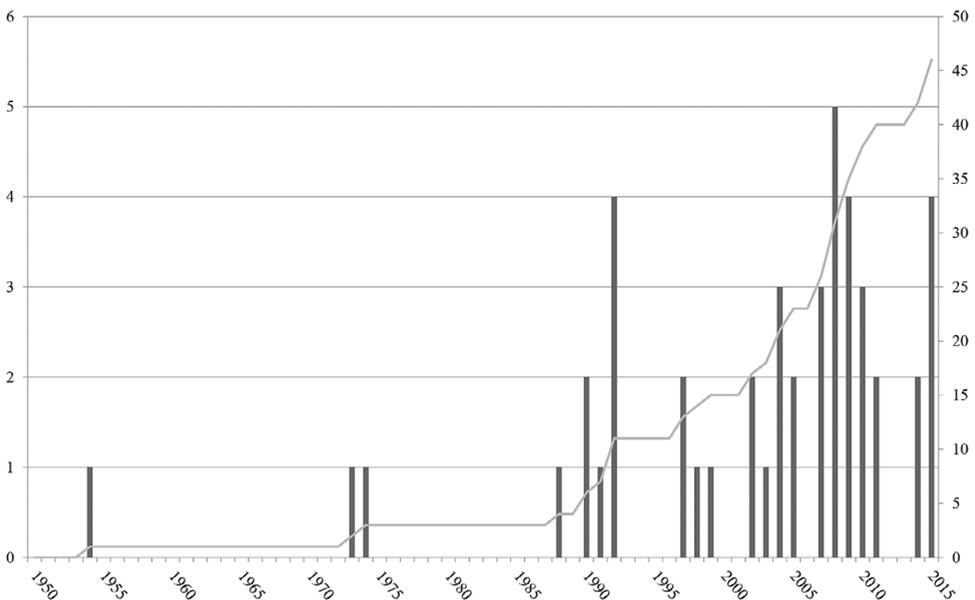


Figure 4.1 Starting years of renewable energy institutions from 1950 to 2015 (Author’s data).

However, it took until the turn of the millennium for institutions to exclusively focus on renewable energy. In 2001 the topic was for the first time discussed at the UN's high political level, at the Ninth Session of the Commission on Sustainable Development (CSD) (Karlsson-Vinkhuyzen et al. 2012), although no substantial agreement was reached (Röhrkasten 2015). Instead, intergovernmental institutions started to emerge outside the UN system. For example, IRENA was established in 2009. It serves as a principal forum for transboundary cooperation and provides a repository of policy, technology, resource, and financial knowledge (IRENA 2018b). That same year, the Clean Energy Ministerial (CEM) was initiated, bringing together ministers with responsibility for clean energy, to promote policies and programmes, and share knowledge and best practices (CEM 2018).

A decade later, in 2015, a growing consensus at the UN level on the strong link between energy and poverty eradication eventually led to the inclusion of Sustainable Development Goal (SDG) 7 in Agenda 2030 to '*ensure access to affordable, reliable, sustainable and modern energy for all*' (United Nations 2015, 19). More importantly, SDG 7 included target 7.2 that commits countries to, '*by 2030, increase substantially the share of renewable energy in the global energy mix*' (United Nations 2015, 19). Along with the Paris Agreement and its target to keep global temperature rise well below 2 degrees Celsius, SDG 7 at least marks the emergence of universal objective for global (renewable) energy governance.

In parallel to this development, a somewhat smaller expansion of institutions took place. In 2011, for instance, the Low-Emissions Development Strategies Global Partnership (LEDS_GP) was established to facilitate learning, technical cooperation, and information exchange supporting low emission development strategies (LEDS_GP 2018). Furthermore, the Africa Renewable Energy Initiative (AREI) was initiated in 2015 to accelerate and harness the African continent's renewable energy potential (AREI 2018). While these two institutions focus primarily on the deployment of renewables to expand energy access, other institutions focus specifically on emissions reductions. For instance, RE100, established in 2014, brings together influential businesses to collectively promote the compelling business case for renewables (RE100 2018). Likewise, the Low Carbon Technology Partnerships initiative (LCTPI) was set up that same year to unite energy and technology companies to scale up renewables (LCTPi 2018). Finally, several other institutions exclusively target solar energy, including the Global Solar Council (GSC) and Global Solar Alliance (GSA).

In sum, the institutional complex for renewable energy comprises a multitude of institutions established within different contexts and with different institutional characteristics. The following subsections will further elaborate on some of these institutional characteristics and the variation across them.

4.3.2 The Core Norm of Renewable Energy

The Paris Agreement and the inclusion of SDG 7 as part of Agenda 2030 arguably constitute the major institutional incentive to ensure access to sustainable energy for all. More specifically, target 7.2 of SDG 7 sets the objective to substantially increase the share of renewable energy in the global energy mix by 2030 (United Nations 2015). Altogether, these institutional targets speak to the three critical challenges for global (renewable) energy governance: energy security, energy access, and environmental sustainability. In sum, the core norm for the renewable energy subfield can be described as: *to substantially increase the share of renewable energy in the global energy mix, in order to ensure access to and availability of clean energy for all*. The normative coherence of the renewable energy subfield depends on the degree to which this core norm is shared or disputed across institutions.

A closer inspection of the institutions' web pages and mission statements shows that, for one-third of the institutions (17 out of 46), this core norm applies literally. These are mostly public institutions, for instance IRENA and CEM, but also three private institutions, including GSEP, EUROSOLAR, and the International Solar Energy Society (ISES), as well as two multi-stakeholder partnerships, the Global Bioenergy Partnership (GBEP) and REN21. This implies that the majority of institutions interpret the core norm more selectively, by prioritising either one or two of the main objectives, i.e. energy security, energy access, and environmental sustainability, rather than approaching them in an integrated manner.

Sixteen institutions put environmental sustainability first, and interpret the core norm as to substantially increase the share of renewables to mitigate environmental externalities, most urgently the effects on the global climate. More specifically, seven of these institutions explicitly refer to the norms and targets set by the UNFCCC and its Kyoto Protocol. For instance, the LCTPI Rescale programme aims to scale up renewables and calls for action to '*stay below 2°C of global warming*' (LCTPI 2018). Most of the institutions with a focus on environmental sustainability are public, such as Regions 20 (R20), which supports subnational governments to develop low-carbon infrastructure projects, and the Climate Investment Fund (CIF), which provides investment programmes to scale up renewable energy in low-income countries (R20 2018; CIF 2018). In addition, there are several private institutions, such as RE100 and CNP, and multi-stakeholder partnerships, namely the Roundtable on Sustainable Biomaterials (RSB), LEADS_GP, and LCTPI.

Five institutions adhere to the core norm to substantially increase the share of renewables to expand access to clean energy sources, for the purpose of improving energy access as well as mitigating climate change. These include two public

institutions, namely UN Energy (UN_EN) and the Clean Energy Solutions Centre (CESC), one private institution, the Gold Standard (GS), and two multi-stakeholder partnerships, namely REEEP and SEforALL. Finally, the remaining eight institutions target either energy security, energy access, or both, or energy security and environmental sustainability simultaneously.

Figure 4.2 provides an overview of the institutions according to the core norm they predominantly adhere to. Altogether, and allowing overlaps, forty-one institutions prioritize climate change mitigation, twenty-seven addressing energy access and twenty-two energy security policy objectives. In other words, the uptake of renewables is predominantly linked to mitigating climate change, while particularly the potential of renewables to address energy security concerns is less institutionalized.

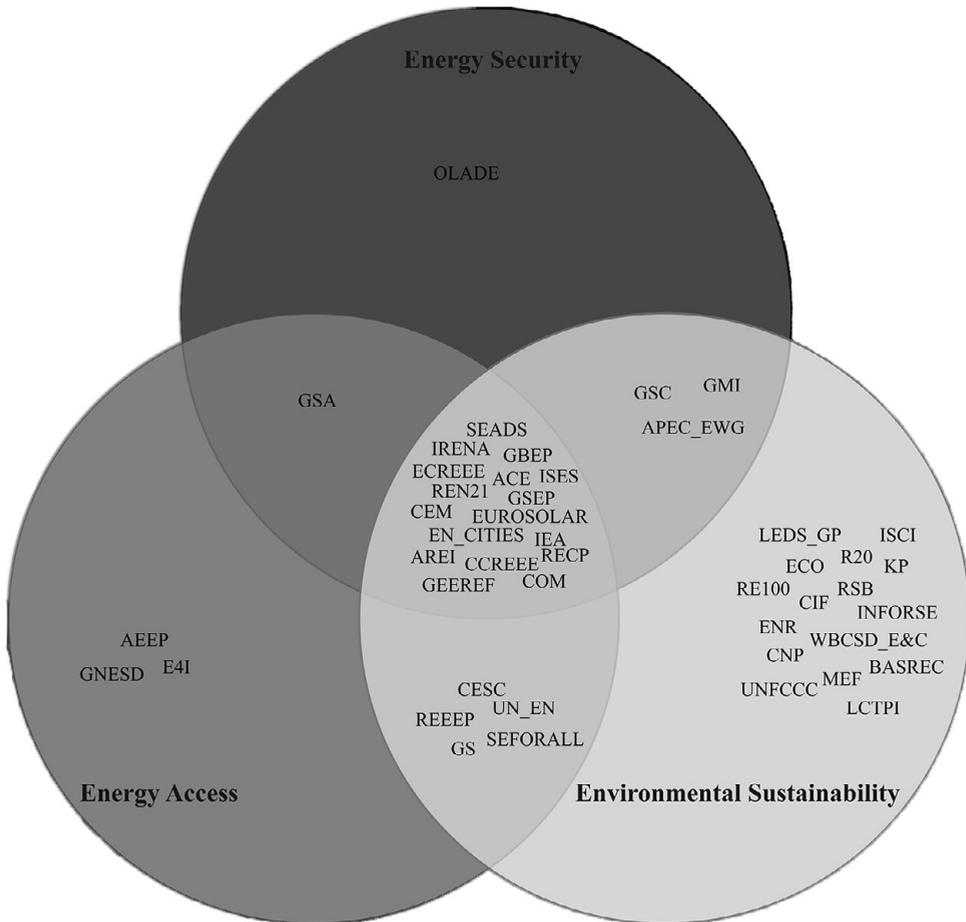


Figure 4.2 Distribution of renewable energy institutions according to their interpretation of the core norm (Author’s data).

As a consequence of these diversified priorities, there is much room for trade-offs and potential conflicts. Institutions prioritising energy security and access may, in addition to renewables, turn to the more affordable energy sources that might have a negative impact on the environment (Röhrkasten 2015).³ Additionally, expanding energy access implies increased energy demand, which in turn puts those institutions under pressure that seek to ensure energy security and environmental sustainability (Newell et al. 2011). On top of this, the subfield lacks a clear definition of what constitutes a renewable source of energy, resulting in frequent controversies on bioenergy, hydropower, and nuclear energy (e.g. Elliott 2000; Frey et al. 2002; Adamantiades and Kessides 2009).⁴ While solar and wind are widely acknowledged as renewable energy sources within the renewable energy subfield, twenty-five institutions include bioenergy, seventeen (small-scale) hydropower, and three nuclear power.

These diverging views have entailed conflicts of interests and competition over resources, visibility, and media attention across institutions targeting these different energy sources.⁵ As long as the potential of renewable energy to address energy security is not fully institutionalized, and as long as there is no consensus on what constitutes a renewable energy source, full substitution of fossil fuels by renewables, particularly in industrialized countries, may remain unattainable.

4.3.3 Membership

The governance triangle introduced in Chapter 3 distinguishes different types of institutions and actors that are involved in promoting the uptake of renewables globally. Figure 4.3 additionally summarizes the respective figures in a table.

The largest share of renewable energy institutions (28) are public. These include international organizations, such as IRENA and the IEA, as well as regional alliances, such as the Latin American Energy Organization (OLADE), the Asia-Pacific Economic Cooperation Energy Working Group (APEC_EWG), the Association of South East Asian Nations (ASEAN) Centre for Energy, and the Baltic Sea Region Energy Cooperation (BASREC). Besides these intergovernmental efforts, a number of institutions unite cities and regions in their search for

³ Interview with Professor Thijs Van de Graaf, Ghent Institute for International Studies, Ghent University, 13 July 2018.

⁴ Interview with Professor Thijs Van de Graaf, Ghent Institute for International Studies, Ghent University, 13 July 2018.

⁵ Interview with Stefan Gsänger, Secretary-General, the World Wind Energy Association, and Vice Chair, Renewable Energy Policy Network for the 21st Century (REN21), 9 May 2018; interview with Benjamin Sovacool, Professor of Energy Policy, Science Policy Research Unit, University of Sussex, 10 May 2018; and interview with Stephan Singer, Senior Advisor Global Energy Policies at Climate Action Network International, 10 May 2018.

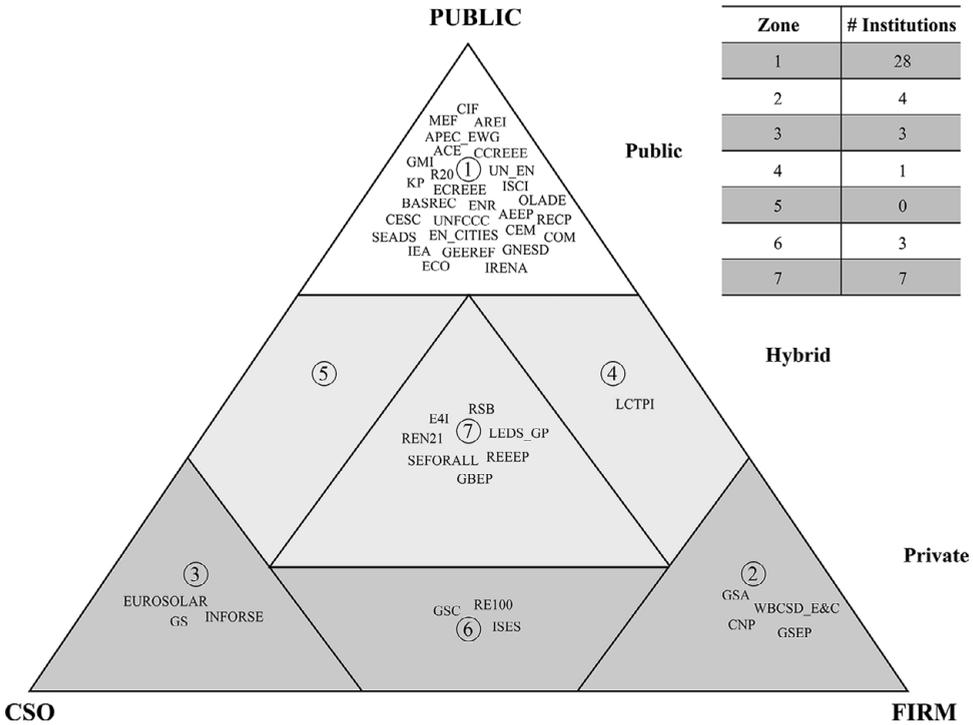


Figure 4.3 Distribution institutions per zone in the governance triangle (Author’s data; see also Chapter 3).

appropriate strategies toward an energy transition, such as the International Solar Cities Initiative (ISCI), Energy Cities (EN_CITIES), the Covenant of Mayors (COM), and R20. While the influence of these different institutions is limited to their respective members, several other public institutions aim at assisting developing countries in increasing their share of renewables. Such institutions include, for example, the Africa-European Union Energy Partnership (AEEP) and the Global Energy Efficiency and Renewable Energy Fund (GEEREF).

In addition to public institutions, there are ten private institutions, of which four exclusively bring together firms, industry associations, and investors. One of these is the Energy and Climate Cluster of the World Business Council on Sustainable Development (WBCSD_E&C), which unites companies from different sectors to scale up climate and renewable energy solutions globally (WBCSD 2018). In addition, there are three institutions that exclusively include nongovernmental organizations (NGOs) and other organizations representing civil society. These include the Gold Standard (GS), set up by the World Wide Fund for Nature (WWF) and two other NGOs, which provides a standard for climate and development projects under the UNFCCC Clean Development Mechanism (Gold Standard

2018). Furthermore, three institutions include firms, industry associations, and investors, as well as NGOs and other civil society actors, e.g. GSC and ISES.

Finally, there are eight hybrid institutions, or multi-stakeholder partnerships, which represent collaborations across societal sectors. The LCPTI is the only institution restricting its membership to public actors and firms, industry associations, and investors, while the other seven bring together all three main types of actors. Three out of these seven partnerships have been selected for further analysis in Section 4.4 on micro-level coherence: REEEP, which develops financing mechanisms to strengthen markets for clean energy in low- and middle-income countries; REN21, which connects stakeholders to facilitate knowledge exchange and policy development toward a transition to renewable energy; and SEforALL, which marshals evidence, benchmarks progress, and connects stakeholders toward achieving SDG 7 and the Paris Agreement.

While the majority of renewable energy institutions are public, private and multi-stakeholder institutions have started to play a significant role in promoting a worldwide uptake of renewable energy. In other words, there is a wide variety of actors involved, ranging from governments, international organizations, cities, and subnational authorities, to companies, financial institutions, and not-for-profit organizations. Mapping and understanding these variations is an important step toward assessing not only the coherence but also the effectiveness of the institutional complex of this subfield, since collaborations between these actors are considered key for a successful global governance of renewables (e.g. Sovacool 2013).

4.3.4 Governance Functions

Renewable energy institutions perform different governance functions, which can be distinguished as setting ‘standards and commitments’, ‘operational’ activities, sharing ‘information and networking’, and ‘financing’ (see Chapter 2). Ideally, all of these governance functions are performed in a complementary manner, in accordance to the core norm, and without functional gaps or duplications.

The largest share of institutions in the sample (17 out of 46) governs renewable energy through ‘information and networking’, in combination with ‘operational’ activities. This implies that most institutions combine evaluation activities, as well as collecting and publishing information, with pilot projects, technical assistance, and capacity building. For example, Energy for Impact (E4I) assists local businesses and project developers in East and West Africa to expand energy access and publishes reports on related topics (E4I 2018). In addition, fifteen institutions exclusively govern through ‘information and networking’. A well-known example is IRENA as an international organization, which claims to serve as a centre of

excellence, and a repository of knowledge (IRENA 2018b). This said, several multi-stakeholder partnerships also fulfil such a role, for instance REN21, which connects key stakeholders to facilitate knowledge exchange (REN21 2018c).

Furthermore, there are eight institutions that set ‘standards and commitments’, and more specifically develop rule-making processes, mandatory or voluntary commitments, or schemes for implementation and enforcement. This governance function is not merely reserved for public institutions, since various private and multi-stakeholder institutions provide certifications and standards to which different actors can voluntarily commit. For instance, whereas the Kyoto Protocol sets binding emission-reduction targets (United Nations 1998), the Roundtable on Sustainable Biomaterials (RSB) sets principles and criteria to help operators, brand owners, and investors to identify and manage sustainability issues (RSB 2018). Finally, five institutions are involved in ‘financing’ to promote a global uptake of renewables, for instance through funding projects or developing aid programmes. These solely include public institutions, with one exception: REEEP, which ‘invests in clean energy markets in developing countries to reduce CO₂ emissions and build prosperity’ (REEEP 2018b).

Summarizing this and the previous subsection, Table 4.1 provides an overview of the individual renewable energy institutions based on their governance functions and membership. Altogether, there is not a clear division of labour in terms of governance functions across the public, private, and hybrid institutions in the renewable energy subfield. Yet, while private and hybrid institutions play a role in all governance functions, the distribution of institutions in Table 4.1 clearly conveys the dominance of public institutions. Moreover, the table shows that there is a certain profusion of information-sharing and networking opportunities, while standards and commitments, and financing mechanisms, are limited to a few institutions. This suggests that, within the renewable energy subfield, soft measures prevail over hard ones.

4.3.5 Summary: Coherence at the Meso Level

The renewable energy subfield is institutionally complex in various ways. It includes a high number of institutions with different constitutive characteristics, covers several sources of energy and distinctive technologies, and targets no less than three critical challenges. The question remains, however, whether this plurality of institutions and objectives affects the normative, functional, and membership-related coherence in this subfield.

Altogether, this meso-level coherence, i.e. the level of coherence in the subfield as a whole, can be determined as low to medium, based on three conclusions. First, while there exists a core norm to substantially increase the share of renewables, the

Table 4.1 *Overview of governance functions across different types of institutions (public, hybrid, private) for renewable energy (Author's data).*

	Public	Hybrid	Private
Standards & Commitments	CoM, KP, UNFCCC	RSB, SEforALL	CNP, GS, RE100
Operational	BASREC		
Information & Networking	IRENA, ISCI, MEF, ACE, APEC_EWG, ECO, EnR, SEADS, CESC	LCTPi, REN21, LEDS_GP	GSA, INFORSE, ISES
Financing	CIF, GEEREF	REEEP	
Standards & Commitments; Operational			
Operational; Information & Networking	CEM, GMI, R20, AEEP, CCREEE, ECREEE, EN_CITIES, GNESD, IEA, OLADE, UN_EN	GBEP, E4I	GSEP, WBCSD_EC, EUROSOLAR, GSC
Information & Networking; Financing	RECP		
Standards & Commitments; Information & Networking			
Standards & Commitments; Financing			
Operational; Financing	AREI		

majority of institutions have diverging views on which objectives to prioritize. Most of these focus on promoting renewables for the purpose of mitigating climate change, or, to a lesser extent, to expand energy access, while a minority of institutions targets the potential of renewable energy to ensure energy security. As a consequence of this divergence, there is much room for trade-offs, controversies, and potential conflicts among institutions and actors across them, suggesting that normative coherence is low.

Second, the renewable energy subfield is currently dominated by public institutions, including international organizations as well as regional and subnational

institutions. At the same time, the number of private institutions and multi-stakeholder partnerships has been steadily growing. The range of actors involved in the sample of this study thus increasingly stretches from public to private, implying medium membership-based coherence.

Third, all governance functions are covered by one or more institutions: most govern renewables through information-sharing and networking, and a fair share of institutions are involved in operational activities. By contrast, standards and commitments are mostly set in the form of voluntary standards and certification schemes, and financing schemes are provided by only a few institutions. In other words, there appears to be a profusion of informal activities at the expense of other important governance functions, which suggests medium functional coherence.

4.4 Micro-Level Coherence

As explained in Chapter 2, the assessments of the subfields do not stop at looking at the core norms, membership, and governance functions across the subfields as a whole. Additionally, the case studies in this volume scrutinize relations between individual institutions, i.e. at the micro-level. Whereas previous studies mostly focus on dyadic relationships between intergovernmental institutions (e.g. Charnovitz 2003; Oberthür and Gehring 2006b; Zelli and van Asselt 2010), this study analyzes a plethora of interconnections among different types of institutions. This allows for a much more encompassing assessment of an entire subfield, especially one so densely populated as renewable energy.

The subfield comprises no less than forty-six institutions, and three specific ones were selected for the in-depth analysis presented in this chapter. The following subsections describe the institutions under scrutiny, and determine micro-level coherence based on core norm, membership, and governance functions, and more importantly, by identifying mechanisms of interaction among the selected institutions.

4.4.1 *Institutions under Scrutiny*

Even though the majority of renewable energy institutions are public, private and multi-stakeholder institutions play an important role in governing renewables. This is particularly true for multi-stakeholder partnerships, which bring together public and private actors to collectively contribute to a public policy goal. Such partnerships generally emerge as a response to a lack of intergovernmental cooperation (Szulecki et al. 2011, 713). As national policy-making continues to dominate when it comes to energy issues, international energy governance is weakly developed, and especially so for renewable energy. Furthermore, cooperation between public

and private actors is considered of great importance for increasing the share of renewables in the global energy mix (Sovacool 2013). Whereas previous literature focused predominantly on international organizations for energy (e.g. Colgan et al. 2012; Leal-Arcas and Filis 2013; Wilson 2015), a shift toward multi-stakeholder partnerships can provide novel insights on the interactional dynamics within the overall institutional complex for renewable energy.

The Renewable Energy and Energy Efficiency Partnership (REEEP) was one of the first multi-stakeholder partnerships on energy-related issues. Led by the British government, a group of regulators, businesses, and NGOs announced REEEP in 2002 at the World Summit on Sustainable Development in Johannesburg (Florini and Sovacool 2009; Röhrkasten 2015). Two years later the partnership was formally established as an international NGO based in Vienna. By investing in clean markets and targeting small- and medium-sized enterprises, REEEP aims to accelerate market-based deployment of renewable energy and energy-efficient systems in low- and middle-income countries (REEEP 2018b). The partnership relies on donors, which include governments, multilateral and international organizations, NGOs, and foundations. More than 350 members currently back up REEEP, including businesses, NGOs, national governments, research institutes, and many other entities. The partnership is governed by a Governing Board and an Advisory Board and is steered by an international team with more than twenty staff members and consultants. REEEP is seen as an important multi-stakeholder partnership with a clear purpose, significant output, and strong institutional formality (Pattberg et al. 2009; Szulecki et al. 2011; Sovacool and Van de Graaf 2018).

Besides REEEP, the Renewable Energy Policy Network for the 21st Century (REN21) forms an important coalition of different stakeholders to advance renewable energy policy. The German government initiated REN21 at the International Conference for Renewable Energies in 2004 in Bonn, after which it was formally launched in Copenhagen in June 2005 (REN21 2005; Röhrkasten 2015). The partnership brings together different stakeholders to facilitate knowledge exchange, policy development, and joint action toward a rapid global transition to renewable energy (REN21 2018c). Its existence depends on grants offered by governments, international organizations, and other donors, and by the end of 2017, REN21 counted sixty-four members, including industry associations, international organizations, NGOs, national governments, and research entities. The partnership is governed by its Bureau, General Assembly, and Steering Committee and has a small secretariat housed at the UN Environment Programme (UNEP) in Paris. It is considered as an important advocacy network and global governor for renewable energy (Szulecki et al. 2011; Röhrkasten 2015).

A more recently established multi-stakeholder partnership is Sustainable Energy for All (SEforALL). It was initially launched as a UN initiative by former UN

Secretary-General Ban Ki-Moon in 2011, and thereafter formalized as a non-profit quasi-international organization (Röhrkasten 2015). While SEforALL inherited close ties to various UN agencies, it is now open to different stakeholders including governments, businesses, financiers, development banks, communities, and others. SEforALL's mission is threefold: to ensure universal access to modern energy services; to double the global rate of improvement in energy efficiency; and to double the share of renewable energy in the global energy mix (SEforALL 2018a). The partnership relies on donor contributions mostly coming from national governments, and in 2017 SEforALL counted more than eighty partners. These can be distinguished among funding partners, delivery partners (partners that commit to contribute quantifiable results and to report on progress), proud partners (partners that support SEforALL's objectives, and use the name and platform to amplify meaningful work), and those participating in SEforALL's regional and thematic hubs, and accelerators (SEforALL 2018b). The partnership is governed by an Administrative Board and a Funder's Council, which guide SEforALL's Global Team that is headquartered in Vienna and partly operating in Washington, DC. With this, SEforALL has a unique standing in the institutional complex, since it is an important multi-stakeholder partnership and major UN initiative at the same time (Röhrkasten and Westphal 2013).

4.4.2 *Interlinkages*

The three selected multi-stakeholder partnerships show differences as well as commonalities with regard to their institutional features.

First, the interpretations of the core norm for renewable energy among the three multi-stakeholder partnerships largely overlap. Particularly the partnerships REEEP and SEforALL commonly adhere to a core norm strongly influenced by targets set by the UNFCCC regime and SDG 7: to substantially increase the share of renewables for universal energy access and to limit global warming to 2 degrees Celsius. For example, REEEP repeatedly stresses the importance to connect its goals, targets, and metrics to the Paris Agreement (REEEP 2016a), and celebrates the inclusion of SDG 7 as a validation of REEEP's work over the years to expand energy access (REEEP 2016a, 11). Similarly, SEforALL's objectives include to ensure universal access to energy, double the global rate of energy efficiency, and double the share of renewables, which were formulated in the run-up to SDG 7. In addition, SEforALL reiterates that actions to achieve these objectives should be in line with the 2 degrees target agreed upon in the Paris Agreement (SEforALL 2018c). By contrast, REN21 takes on a broader approach to the core norm. REN21's flagship publication, the Renewable Energy Global Status Report (GSR) 2018, acknowledges that scaling up renewables is crucial for limiting

temperature rise below 2 degrees and for meeting the aspirations of SDG 7 (REN21 2018b). However, the partnership additionally takes into consideration the policy objective to boost national energy security (REN21 2018b).

Second, the membership directories of the three partnerships partly overlap. For instance, REEEP and REN21 share sixteen members. These include international organizations, such as the European Commission and the UNEP, and national governments such as Brazil, Germany, and the United Kingdom. In addition, REEEP and REN21 share various NGOs as members, e.g. the WWF and The Energy and Resources Institute (TERI). As SEforALL is essentially a partnership between the UN and the World Bank, there are no shared members with REEEP and REN21. However, some of the funding and delivery partners of SEforALL are members to REEEP (9), including respectively Austria, the European Commission, and Germany, as well as Johnson Control, UNEP, and the UN Foundation (SEforALL 2018b). Similarly, a set of funding and delivery partners are members to REN21 (6), including respectively Germany, the European Commission, Norway, and the United Kingdom, as well as the Global Association for Off-grid Solar Energy Industry (GOGLA) and UNEP (SEforALL 2018b). Among approximately 500 members spread across the three partnerships, there are only five actors all three have in common: the European Commission, UNEP, Germany, Norway, and the United Kingdom.

Third, when it comes to governance functions, the selected partnerships do not overlap, but rather complement each other. However, it is important to note that the three partnerships were also selected according to their variations in governance functions. Whereas REEEP develops and provides financing mechanisms to advance market readiness for clean energy services in low- and middle-countries (financing) (REEEP 2018b), REN21 connects different stakeholders to facilitate knowledge exchange toward a rapid transition to renewable energy (information and networking) (REN21 2018c). Finally, SEforALL connects leadership to mobilize action on SDG 7 specifically (standards and commitments) (SEforALL 2018c). Consequently, the three partnerships also target different entities; while SEforALL speaks to government leaders and REN21 to policy makers more broadly, REEEP targets small- and medium-sized enterprises.

4.4.3 Mechanisms

Institutional interactions can be broadly understood as situations in which the policy processes, knowledge, norms, or functions of two or more institutions are connected, and affect the development, performance, and impact of these institutions (Oberthür and Gehring 2006a; Zelli et al. 2012). Hence, in addition to drawing parallels based on core norm, membership, and governance function, it is

key to examine the underlying interaction mechanisms between and beyond the selected partnerships. The following subsections distinguish and describe these as cognitive, normative, and behavioural (see Chapter 2; Stokke 2001; Oberthür and Gehring 2006a).

4.4.3.1 Cognitive

A cognitive interaction is driven by the power of knowledge and persuasion, and can be seen as cross-institutional learning (Stokke 2001; Oberthür and Gehring 2006a). In other words, a cognitive interaction can be determined when knowledge and information are exchanged, or certain practices and methodologies are transferred from one to the other institution. As there is a large share of institutions that govern renewable energy through information and networking, there is presumably a high degree of cognitive interaction across the institutional complex.

For REEEP, various instances of cognitive interactions were found. First, REEEP applies a framework developed by the World Bank in 2015 for SEforALL to define the concept and measures of energy access (World Bank 2015; REEEP 2018a). Second, REEEP's regionally focused report on Powering India is informed by the IEA's India World Energy Outlook (WEO) 2015, and REEEP's report supporting a transition to inclusive green economies in African countries is influenced by IRENA's Africa 2030 report (REEEP 2016b, 2017). Vice versa, REEEP's publications have informed SEforALL and IRENA. For instance, the 'Making the Case' report published by REEEP influenced the Water-Energy-Food Nexus High Impact Opportunity (HIO) set up by SEforALL (REEEP 2015). The SEforALL HIOs serve as platforms that bring together stakeholders working on initiatives for the purpose of highly relevant topics related to clean energy, such as mini-grids and sustainable bioenergy. Additionally, REEEP's publication 'Making the Case' contributed to IRENA's report on 'Renewable Energy in the Water, Energy and Food Nexus' (REEEP 2015).

Cognitive interactions are found in larger numbers for REN21, since it is this institution's primary role to share information and set up networking opportunities. It is especially the work of IRENA and the IEA that is regularly cited in REN21's flagship GSRs (e.g. REN21 2017a; REN21 2018b). For instance, REN21's latest GSR features 85 pages of endnotes including no less than 386 references to the IEA's World Energy Outlooks, statistical reports, regional market analyses, and energy and CO₂ reports, and 161 references to IRENA's calculations and thematic reports (REN21 2018b). Similarly, REN21's regional status reports, such as those focused on the East African Community and the regions of the UN Economic Commission for Europe (UNECE), are influenced by SEforALL's data and information (REN21 2016a; REN21 2017b).

Besides, many more regionally focused and energy access-oriented institutions inform REN21's regional reports, for instance the Economic Community of West African States (ECOWAS) Centre for Renewable Energy and Energy Efficiency (ECREEE), the Africa-EU Renewable Energy Cooperation Program (RECP), CIF, and E4I. Vice versa, the information REN21 shares through its GSRs is widely acknowledged,⁶ and regularly shared at key events. For example, a preview of GSR 2015 was presented at the IRENA Council that same year, GSR 2016 was launched at CEM 7 in San Francisco, and the Global Futures Report of 2017 was introduced at the 2017 SEforALL Forum (REN21 2018a).

Finally, SEforALL shows similar cognitive interactions, although to a lesser extent. Besides the SEforALL HIO being informed by REEEP, the statistics, data, and country profiles of the IEA and IRENA feed into SEforALL's Heat Maps. These inform the international community about which regions should be prioritized to close the energy access gap (SEforALL 2018b). Similarly, knowledge of ECREEE, AREI, CIF, WBCSD, and the Global Network on Energy for Sustainable Development (GNESD) has been included in SEforALL's publication on the state of electricity access worldwide (SEforALL 2017).

4.4.3.2 Normative

The normative type of interaction (or: interaction through commitment) occurs when the commitments, norms, and principles upheld by one institution confirm or contradict those of other institutions (Stokke 2001; Oberthür and Gehring 2006a). On the one hand, a low degree of normative interaction can be expected for the entire institutional complex, as the majority of institutions interpret the core norm more selectively by prioritizing either one or two of the core objectives, i.e. energy security, energy access, and environmental sustainability. On the other hand, Section 4.4.2 has shown that the selected partnerships are rather consentient in this regard, thus the normative interactions between REEEP, REN21, and SEforALL are considerable.

It is an enormous task to carefully compare the commitments, norms, and principles of REEEP, REN21, and SEforALL with those of all other institutions for renewable energy. However, some overlaps are expected based on the above broad evaluation of the institutions' core norm (see Section 4.3.2). First and foremost, all three partnerships show strong normative interaction with the

⁶ Interview with Stefan Gsänger, Secretary-General, the World Wind Energy Association, and Vice Chair, Renewable Energy Policy Network for the 21st Century (REN21), 9 May 2018; interview with Stephan Singer, Senior Advisor Global Energy Policies at Climate Action Network International, 10 May 2018; and interview with Frank Van der Vleuten, Senior Energy Expert of the Climate Team at the Ministry of Foreign Affairs, the Netherlands, 5 June 2018.

UNFCCC regime. As described earlier, REEEP and REN21 as well as SEforALL stress the importance of aligning their commitments, norms, and principles with the 2 degrees target set by the Paris Agreement under the UNFCCC regime. In addition, the commitments, norms, and principles of REEEP and SEforALL necessarily overlap with those institutions similarly prioritizing renewable energy for environmental sustainability and energy access, including CESC, UN Energy, and the Gold Standard (GS). Likewise, REN21's commitments, norms, and principles presumably overlap with such institutions that are similarly inclusive toward energy security objectives, such as CEM, IRENA, and AREI.

4.4.3.3 Behavioural

A behavioural interaction refers to situations in which the actions undertaken by one institution, or members thereof, are supportive or disruptive for the performance of other institutions (Stokke 2001; Oberthür and Gehring 2006a). For instance, if an institution aims to expand access to energy services in rural areas by providing clean cooking appliances, these activities inherently support actions undertaken by institutions to foster emission reductions. In contrast, carbon offsetting programmes developed by an institution may undermine the efforts of institutions aiming at 100 per cent renewable energy. Thus, behavioural interactions can be driven by matching objectives (Gehring and Oberthür 2009), but also include, for instance, shaming, pressure, brand management, or monitoring each other's performances (see Chapter 2). For the scope of this study, it would lead too far to measure the actual impact of behaviours and activities, so the following analysis suffices with distinguishing and illustrating major behavioural interactions.

It is REEEP's main objective to advance clean energy services in low- and middle-income countries. Similarly, it is SEforALL's priority to secure affordable and reliable clean energy for all by 2030. Thus, synergistic behavioural interactions of REEEP and SEforALL most likely occur with institutions with matching objectives at the intersection of energy access and environmental sustainability. These include UN Energy, Gold Standard (GS), and CESC (see Section 4.3.2). The synergies are supposedly strong: first, since the membership directories of these institutions only partly overlap, so that the matching objectives apply to a wider range of actors, second, as these institutions pursue these objectives through different means of governance, i.e. governance functions, complementary to those of REEEP and SEforALL.

In addition, behavioural interactions through monitoring and potentially influencing the performance of other institutions take place between REEEP and SEforALL on the one hand, and the UNFCCC, IRENA, and CEM on the other. First, REEEP visits and actively participates in IRENA's General Assemblies, the

yearly SEforALL Forum, and the UNFCCC COPs.⁷ Second, SEforALL similarly performs sustainable energy diplomacy at the General Assemblies of IRENA, the UNFCCC COPs, and at the Clean Energy Ministerials (CEM) (SEforALL 2018b). Moreover, SEforALL is heavily involved in the UNFCCC process, particularly through Rachel Kyte, CEO of SEforALL and Special Representative of the UN secretary-general, and through organizing Energy Days jointly with IRENA at COP21 and 22, and presumably future COPs (SEforALL 2018d).

As mentioned earlier, it is REN21's mission to ensure a global transition to renewable energy, to limit temperature rise below 2 degrees, to meet the targets set by SDG 7, and to boost energy security. Hence, synergistic behavioural interactions of REN21 are expected with the sixteen remaining institutions with matching objectives at the intersection of energy security, energy access, and environmental sustainability (see Section 4.3.2). Similar to the interactions of REEEP and SEforALL with other institutions, these interactions of REN21 likely yield considerable benefits for both sides, since they expand the range of actors to which these objectives apply and cover complementary governance functions.

In addition, REN21 monitors and potentially influences the performance of the UNFCCC, IEA, IRENA, and SEforALL. The partnership actively participates in the UNFCCC COPs. For instance, in the run-up to COP21 in Paris, REN21 joined forces with the Covenant of Mayors (COM) to set up the Paris Process on Mobility and Climate (PPMC), and organized a series of events on 're-energising the future' together with IRENA (REN21 2015). Also at the following COPs in Marrakech and Bonn, REN21 hosted and participated in several renewable energy events. On top of that, REN21 regularly attends IRENA's General Assemblies, and SEforALL's yearly Forum, and is a member to the IEA's Renewables Industry Advisory Board and IRENA's Coalition for Action (IRENA 2018c; REN21 2015, 2016b).

4.4.4 Summary: Coherence at the Micro Level

While having in common that they are key governing institutions for renewable energy, the three selected multi-stakeholder partnerships are different in a variety of ways. Whereas REEEP is backed up by more than 350 members, REN21 and SEforALL 'only' have 64 and 86 members, respectively. In addition, while SEforALL speaks to government leaders and REN21 to policy makers more broadly, REEEP targets small- and medium-sized enterprises. Finally, REN21 provides policy-relevant information to support a global transition toward

⁷ Interview with Katrin Harvey, Senior Manager, the Renewable Energy and Energy Efficiency Partnership (REEEP), 9 May 2018.

renewables, whereas SEforALL connects leadership to mobilize action on SDG 7, and REEEP mobilizes funding to accelerate market-based deployment of renewables.

In addition to these more obvious differences, a closer analysis of the institutional features and interaction mechanisms helped determine further aspects of micro-level coherence. First, the three institutions largely share their interpretations of the core norm, and the governance functions they perform are complementary, whereas the membership directories show little overlap. In other words, the normative, functional, and membership-based coherence and complementarity across the selected institutions is high.

Second, there is an abundance of cognitive interactions between the selected institutions and beyond, which substantiate the dominance of information and networking activities within the renewable energy subfield. In addition, there are considerable normative and behavioural interactions, resulting in various synergies while, at the same time, clustering different sets of institutions around certain priorities. The interaction mechanisms therefore appear to contribute to a functional imbalance and normative divergence in the subfield as a whole. In summary, despite the fact that the institutional features between the selected institutions are highly coherent, micro-level coherence as a whole should rather be qualified as medium.

4.5 Micro-Level Management

Finally, this section zooms in on deliberate attempts to manage institutional interactions among the renewable energy institutions analyzed in the previous section. These are deliberate attempts that seek to improve institutional interaction and its consequences, so as to prevent or strengthen the influence of one institution on the performance of another (Stokke 2001; Oberthür 2009). Typical examples are the provision of guiding principles by an overarching institution, joint coordination of activities across institutions, or unilateral management by individual institutions, for the purpose of more efficient goal-attainment (Oberthür 2009, 375–376). Such management attempts may lead to stronger coherence in terms of institutional features, for instance increased convergence among interpretations of the core norm, or novel interaction mechanisms for improved exchange processes.

First, the UNFCCC regime and Agenda 2030 come forward as important overarching frameworks for the three selected partnerships. As shown in Section 4.4.2, REEEP, REN21, and SEforALL ensure that their activities match the 2 degrees target of the Paris Agreement and SDG 7. For the subfield in general, these overarching goals provide ‘international agreement’, or at least a high degree

of consensus, to globally phase out fossil fuels and foster a transition toward renewables.⁸ This said, besides the three partnerships ‘only’ thirteen other institutions explicitly link their activities to the UNFCCC and SDG 7. This suggests that this overarching framework has not yet fully made its way to all renewable energy institutions.

Second, three examples were found of how interactions have been managed jointly by the three partnerships put under scrutiny here. First, REEEP and REN21 collectively operate reegee.info, which is a publicly recognized information portal on renewables, energy efficiency, and climate change.⁹ The portal provides country energy profiles, energy statistics and research, and a directory of relevant stakeholders (REEEP 2018c). Second, REEEP worked with IRENA to create and launch the Renewables Tagger in 2016, which is a specialized version of the Climate Tagger and automatically scans and sorts data and documents holding renewable energy content to support knowledge-driven organizations to streamline their information (Climate Tagger 2018). Third, REN21, IEA, and IRENA have recently partnered up and published a report together on ‘Renewable Energy Policies in a Time of Transition’ (IRENA, OECD/IEA, and REN21 2018).

Finally, REN21 and SEforALL unilaterally manage institutional interactions with third institutions. First, REN21 and its flagship GSR, more specifically, facilitate numerous cognitive interactions.¹⁰ All members to REN21 can contribute to the publication, and various institutions provide authors, contributors, and reviewers, such as IRENA and the IEA (REN21 2017a; REN21 2018b). Second, SEforALL provides an important overarching platform for various institutional interactions, particularly through its thematic and regional hubs and accelerators.¹¹ For instance, IRENA hosts the SEforALL thematic hub on renewable energy; REN21, CESC, and ECREEE take part in SEforALL’s People-Centred Accelerator; and OLADE is an important player in SEforALL’s regional hub for Latin America and the Caribbean. On top of that, SEforALL’s Global Tracking

⁸ Interview with Frank Van der Vleuten, Senior Energy Expert of the Climate Team at the Ministry of Foreign Affairs, the Netherlands, 5 June 2018; interview with Professor Thijs Van de Graaf, Ghent Institute for International Studies, Ghent University, 13 July 2018; and interview with Benedikt Hoskuldsson, Lead Partnership Specialist, Sustainable Energy for All (SEforALL), 21 September 2018.

⁹ Interview with Stephan Singer, Senior Advisor Global Energy Policies at Climate Action Network International, 10 May 2018.

¹⁰ Interview with Stefan Gsänger, Secretary-General, the World Wind Energy Association, and Vice Chair, Renewable Energy Policy Network for the 21st Century (REN21), 9 May 2018; interview with Stephan Singer, Senior Advisor, Global Energy Policies at Climate Action Network International, 10 May 2018; interview with Dr. Sybille Röhrkasten, Scientific Project Lead, Pathways to Sustainable Energy at the Institute for Advanced Sustainability Studies (IASS), 17 May 2018; and interview with Professor Thijs Van de Graaf, Ghent Institute for International Studies, Ghent University, 13 July 2018; and interview with Laura Williamson, Outreach and Communication Manager, Renewable Energy Policy Network for the 21st Century (REN21), 27 September 2018.

¹¹ Interview with Benedikt Hoskuldsson, Lead Partnership Specialist, Sustainable Energy for All (SEforALL), 21 September 2018.

Framework reports of 2015 and 2017, which measured progress on SDG 7, were coordinated by the IEA (World Bank and IEA/OECD 2015; World Bank and OECD/IEA 2017).

In sum, the renewable energy subfield is characterized by managed relationships, which, most significantly, provide an overarching normative framework and address cognitive interactions – and therewith, the potential overflow of information in the renewable energy subfield.

4.6 Conclusions

A global uptake of renewable energy is of paramount importance for a sustainable energy future, and while the share in the global energy mix is increasing, the growth rate is not sufficient to reach the targets set by SDG 7 in Agenda 2030 (United Nations 2018). Hence, effective global governance continues to play an important role in promoting renewables. As Chapter 3 has shown, global renewable energy governance is characterized by considerable institutional complexity. However, it is yet unclear whether this complexity significantly qualifies the institutional complex's impact on the global energy transition. To this end, this chapter scrutinized coherence and management within the renewable energy subfield, examining institutional features at the meso level, and interaction mechanisms and management attempts at the micro level.

The analysis of the subfield, comprising forty-six institutions, shed light on various important connections across institutions and their properties. First, while one-third of renewable energy institutions share the core norm to increase the proportion of renewables for energy security, energy access, and environmental sustainability, the majority of institutions interpret the core norm more selectively and prioritize either one or two of these objectives. Second, the subfield is dominated by public institutions, complemented by various private institutions and multi-stakeholder partnerships. Third, whereas most institutions facilitate information exchange and networking and, to some extent, implement projects on the ground, a significantly smaller set of institutions develops standards and commitments and financing mechanisms. Hence, the renewable energy subfield is characterized by diversified priorities – with a wide variety of institutions and actors, and with governance functions unevenly performed. The degree of meso-level coherence is therefore low to medium.

The selected multi-stakeholder partnerships, REEEP, REN21, and SEforALL, provided more detailed insights on interactional specifics at the micro-level. While these partnerships largely share the core norm for renewable energy, their membership directories hardly overlap, and governance functions are mostly complementary. Furthermore, cognitive interaction is the predominant mechanism

involving the three partnerships put under scrutiny, notwithstanding the relevance of certain normative and behavioural interactions. Since these interaction mechanisms seem to aggravate the normative divergence and functional imbalance in the subfield, micro-level coherence can be determined as medium.

Besides interaction mechanisms, various management attempts were found to steer institutional interactions and foster synergies across renewable energy institutions. These mostly provide an overarching normative framework and manage the potential overflow of information within the subfield. Hence, this chapter concludes that, with a medium degree of coherence and management mechanisms in place, the renewable energy subfield is largely characterized by coordination (see Table 2.1, Chapter 2). However, such a densely populated subfield dealing with several critical energy challenges may require more than ad-hoc coordination to iron out controversies, trade-offs, and potential conflicts.

For the subfield to move toward a stronger division of labour, i.e. deliberate and continuous sharing of governance functions and norms for complementary membership (see Chapter 2), the following measures are recommended. First, the role of renewable energy to address energy security, energy access, and environmental sustainability in an integrated manner needs to be fully institutionalized. A reframing of the global energy challenge and the role of renewables may contribute to such a development (Sanderink 2019), as well as an expansion of membership of institutions toward those actors that are concerned with energy security. Second, the subfield would benefit from a track record or clearinghouse of the activities performed by existing renewable energy institutions, so that duplication and conflictive impacts can be resolved or prevented. Finally, it is necessary for institutions to strive for more cognitive alignment and some common understanding when it comes to defining renewable sources of energy. These three measures may require one coordinating institution, with IRENA being the likely choice: it advocates for a widespread adoption of renewables for energy security, energy access, and environmental sustainability; is closest to universal membership of all institutions in the subfield; and already positions itself as a principle platform for cooperation and repository of expertise (IRENA 2018b). Chapter 8 substantiates these policy recommendations in further detail.

Finally, this chapter gives rise to new questions that open important research opportunities. For example, how does the level of coherence and management relate to the effectiveness and legitimacy of individual institutions and the institutional complex for renewable energy as a whole? Or, what recommendations can be provided to specific public, civil society, or business actors that are trying to navigate the institutional complex? While this chapter provided a novel contribution on questions of coherence and management in renewable energy governance, these further questions will be revisited in Chapters 7 and 8.

4.7 References

- Abbott, K. W. 2012. The Transnational Regime Complex for Climate Change. *Environment and Planning C: Government and Policy* 30(4), 571–590. <https://doi.org/10.1068/c11127>.
- Ademantiades, A. and Kessides, I. 2009. Nuclear Power for Sustainable Development: Current Status and Future Prospects. *Energy Policy* 37(12), 5149–5166. <https://doi.org/10.1016/j.enpol.2009.07.052>.
- Aklin, M. J. and Urpelainen, J. 2018. *Renewables: The Politics of a Global Energy Transition*. Cambridge, MA: MIT Press.
- AREI (Africa Renewable Energy Initiative). 2018. About AREI. Available at www.arei.org/#about.
- Barnsley, I. and Ahn, S. 2014. *Mapping Multilateral Collaboration on Low-Carbon Energy Technologies*. Paris: IEA.
- CEM (Clean Energy Ministerial). 2018. About the Clean Energy Ministerial. Available at www.cleanenergyministerial.org/about-clean-energy-ministerial.
- Charnovitz, S. 2003. Trade and Climate: Potential Conflicts and Synergies. In *Beyond Kyoto: Advancing the International Effort against Climate Change*, edited by J. A. Aldy, J. Ashton, R. Baron, D. Bodansky, S. Charnovitz, E. Diringer, T. C. Heller, et al. Arlington, VA: Pew Center on Global Climate Change.
- Cherp, A., Jewell, J., and Goldthau, A. 2011. Governing Global Energy: Systems, Transitions, Complexity. *Global Policy* 2(1), 75–88. <https://doi.org/10.1111/j.1758-5899.2010.00059.x>.
- CIF (Climate Investment Funds). 2018. Energy Access. Available at www.climateinvestmentfunds.org/topics/energy-access.
- Climate Tagger. 2018. Renewables Tagger. Available at www.climatetagger.net/climate-tagger-tools/renewabletagger/.
- CNP (CarbonNeutral Protocol). 2018. Carbon Neutral. Available at www.carbonneutral.com.
- Colgan, J. D., Keohane, R. O., and Van de Graaf, T. 2012. Punctuated Equilibrium in the Energy Regime Complex. *The Review of International Organizations* 7(2), 117–143. <https://doi.org/10.1007/s11558-011-9130-9>.
- Dubash, N. K. and Florini, A. 2011. Mapping Global Energy Governance. *Global Policy* 2, 6–18. <https://doi.org/10.1111/j.1758-5899.2011.00119.x>.
- E4I (Energy 4 Impact). 2018. Energy for Impact: Accelerating Access to Energy. Available at www.energy4impact.org/.
- Elliott, D. 2000. Renewable Energy and Sustainable Futures. *Futures* 32(3–4), 261–274. [https://doi.org/10.1016/S0016-3287\(99\)00096-8](https://doi.org/10.1016/S0016-3287(99)00096-8).
- Florini, A. and Sovacool, B. K. 2009. Who Governs Energy? The Challenges Facing Global Energy Governance. *Energy Policy* 37(12), 5239–5248. <https://doi.org/10.1016/j.enpol.2009.07.039>.
- Florini, A. and Sovacool, B. K. 2011. Bridging the Gaps in Global Energy Governance. *Global Governance* 17(1), 57–74. <https://doi.org/10.5555/ggov.2011.17.1.57>.
- Frey, G. W. and Linke, D. M. 2002. Hydropower as a Renewable and Sustainable Energy Resource Meeting Global Energy Challenges in a Reasonable Way. *Energy Policy* 30(14), 1261–1265. [https://doi.org/10.1016/S0301-4215\(02\)00086-1](https://doi.org/10.1016/S0301-4215(02)00086-1).
- Gehring, T. and Oberthür, S. 2009. The Causal Mechanisms of Interaction between International Institutions. *European Journal of International Relations* 15(1), 125–156. <https://doi.org/https://doi.org/10.1177/1354066108100055>.

- Gold Standard. 2018. Our Purpose. Available at www.goldstandard.org/our-story/who-we-are.
- GSEP (Global Sustainable Electricity Partnership). 2018. Global Sustainable Electricity Partnership. Available at <https://globalelectricity.org>.
- Heubbaum, H. and Biermann, F. 2015. Integrating Global Energy and Climate Governance: The Changing Role of the International Energy Agency. *Energy Policy* 87, 229–239. <https://doi.org/10.1016/j.enpol.2015.09.009>.
- IEA/OECD (International Energy Agency/ Organisation for Economic Co-operation and Development). 2017. *Statistics: CO2 Emissions from Fuel Combustion - Highlights*. Paris: IEA/OECD.
- IRENA (International Renewable Energy Agency). 2015. *REthinking Energy: Renewable Energy and Climate Change*. Abu Dhabi: IRENA.
- IRENA (International Renewable Energy Agency). 2018a. *Global Energy Transformation: A Roadmap to 2050*. Abu Dhabi: IRENA.
- IRENA (International Renewable Energy Agency). 2018b. About IRENA. Available at irena.org/aboutirena.
- IRENA (International Renewable Energy Agency). 2018c. IRENA Coalition for Action About Us. Available at coalition.irena.org/#AboutUs.
- IRENA, OECD/IEA, and REN21. 2018. *Renewable Energy Policies in a Time of Transition*. IRENA, OECD/IEA, and REN21.
- Karlsson-Vinkhuyzen, S. I. 2010. The United Nations and Global Energy Governance: Past Challenges, Future Choices. *Global Change, Peace & Security* 22(2), 175–195.
- Karlsson-Vinkhuyzen, S. I, Jollands, N., and Staudt, L. 2012. Global Governance for Sustainable Energy: The Contribution of a Global Public Goods Approach. *Ecological Economics* 83, 11–18. <https://doi.org/10.1016/j.ecolecon.2012.08.009>.
- Keohane, R. O. and Victor, D. G. 2011. The Regime Complex for Climate Change. *Perspectives on Politics* 9(1), 7–23. <https://doi.org/10.1017/S1537592710004068>.
- Ki-moon, B. 2011. *Sustainable Energy for All: A Vision Statement by Ban Ki-moon, Secretary General of the United Nations*. Washington, DC: SEforALL.
- LCTPi (Low Carbon Technology Partnerships initiative). 2018. The Challenge. Available at <https://lctpi.wbcsd.org/thechallenge/>.
- Leal-Arcas, R. and Filis, A. 2013. The Fragmented Governance of the Global Energy Economy: A Legal-Institutional Analysis. *The Journal of World Energy Law & Business* 6(4), 348–405. Available at SSRN: <https://ssrn.com/abstract=2296311>.
- LEDS_GP (Low Emission Development Strategies Global Partnership). 2018. About. Available at ledsgp.org/about/?loclang=en_gb.
- Meckling, J. 2018. Governing Renewables: Policy Feedback in a Global Energy Transition. *Environment and Planning C: Politics and Space* 0(0), 1–21.
- Newell, P., Phillips, J., and Mulvaney, D. 2011. *Pursuing Clean Energy Equitably Human Development Research Paper 2011/03*. New York: UNDP.
- Oberthür, S. 2009. Interplay Management: Enhancing Environmental Policy Integration among International Institutions. *International Environmental Agreements: Politics, Law and Economics* 9(4), 371–391.
- Oberthür, S. and Gehring, T. 2006a. *Conceptual Foundations of Institutional Interaction. In Institutional Interaction in Global Environmental Governance: Synergy and Conflict among International and EU Policies*. Cambridge, MA: MIT Press.
- Oberthür, S. and Gehring, T. 2006b. Institutional Interaction in Global Environmental Governance: The Case of the Cartagena Protocol and the World Trade Organization. *Global Environmental Politics* 6(2), 1–31.

- OECD/IEA (Organisation for Economic Co-operation and Development/ International Energy Agency). 2017. *World Energy Outlook 2017 Executive Summary*. Paris: OECD/IEA.
- Pattberg, P., Szulecki, K., Chan, S., and Mert, A. 2009. Assessing the Role and Relevance of the Renewable Energy and Energy Efficiency Partnership in Global Sustainability Governance. In *Enhancing the Effectiveness of Sustainability Partnerships*, edited by D. Vollmer. Washington, DC: U.S. National Academies Press.
- Pattberg, P. and Widerberg, O. 2014. *Transnational Multi-Stakeholder Partnerships for Sustainable Development – Building Blocks for Success. IVM Report; No. R-14/31*. Amsterdam: Institute for Environmental Studies.
- R20 (R20 – Regions of Climate Action). 2018. Our Mission. Available at <https://regions20.org/about-us-2/>.
- RE100. 2018. RE100. Available at there100.org/re100.
- REEEP (Renewable Energy and Energy Efficiency Partnership). 2015. *A New Normal for Green Growth – Annual Report 2014/15*. Vienna: REEEP.
- REEEP (Renewable Energy and Energy Efficiency Partnership). 2016a. *Beyond Energy – Annual Report 2016*. Vienna: REEEP.
- REEEP (Renewable Energy and Energy Efficiency Partnership). 2016b. *Sustainable Energy Consumption and Production (SECP) in Agriculture and Integrated Waste Management: Research and Training 2016*. Vienna: REEEP.
- REEEP (Renewable Energy and Energy Efficiency Partnership). 2017. *Scale and Sustainability – Toward a Public-Private Paradigm in Powering India*. Vienna: REEEP.
- REEEP (Renewable Energy and Energy Efficiency Partnership). 2018a. *REEEP Powering Prosperity Beyond the Grid – Annual Report 2018*. Vienna: REEEP.
- REEEP (Renewable Energy and Energy Efficiency Partnership). 2018b. About REEEP. Available at www.reeep.org/about-reeep.
- REEEP (Renewable Energy and Energy Efficiency Partnership). 2018c. Reegle.Info. Available at www.reeep.org/reegleinfo.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2005. *Renewables 2005 Global Status Report*. Washington, DC: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2015. *REN21 Annual Report 2015: Providing High Quality Information*. Paris: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2016a. *East African Community Renewable Energy and Energy Efficiency Regional Status Report 2016*. Paris: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2016b. *REN21 Annual Report 2–16 – Connecting the Dots: Convening Multi-Stakeholders on Renewable Energy*. Paris: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2017a. *Renewables 2017 Global Status Report*. Paris: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2017b. *UNECE Renewable Energy Status Report 2017*. Paris: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2018a. *REN21 Annual Report 2017*. Paris: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2018b. *Renewables 2018 Global Status Report*. Paris: REN21.
- REN21 (Renewable Energy Policy Network for the 21st Century). 2018c. About Us. Available at www.ren21.net/about-ren21/about-us/.
- Röhrkasten, S. 2015. *Global Governance on Renewable Energy – Contrasting the Ideas of the German and Brazilian Governments*. Wiesbaden: Springer VS.

- Röhrkasten, S. and Westphal, K. 2013. *IRENA and Germany's Foreign Renewable Energy Policy – Aiming at Multilevel Governance and an Internationalization of the Energiewende?* Berlin: SWP.
- RSB. 2018. Certification. Available at <https://rsb.org/certification/>.
- Sanderink, L. 2019. Governing Renewables Globally: Facing the Frames. Unpublished manuscript.
- Sanderink, L., Kristensen, K., Widerberg, O., and Pattberg, P. 2018. *Mapping the Institutional Architecture of Global Energy Governance*. Amsterdam. <https://doi.org/10.13140/RG.2.2.22530.38085>.
- Schäferhoff, M., Campe, S., and Kaan, C. 2009. Transnational Public-Private Partnerships in International Relations: Making Sense of Concepts, Research Frameworks, and Results. *International Studies Review* 11(3), 451–474.
- SEforALL (Sustainable Energy for All). 2017. *State of Electricity Access Report 2017*. Washington, DC: SEforALL.
- SEforALL (Sustainable Energy for All). 2018a. Mission. Available at www.seforall.org/mission.
- SEforALL (Sustainable Energy for All). 2018b. Sustainable Energy for All. Going Further, Faster – Together. 2017 Annual Report. Vienna: SEforALL.
- SEforALL (Sustainable Energy for All). 2018c. About Us. Available at www.seforall.org/about-us.
- SEforALL (Sustainable Energy for All). 2018d. CEO of SEforALL. Available at www.seforall.org/about-us_ceo-srsg.
- Sovacool, B. K. 2013. Expanding Renewable Energy Access with Pro-Poor Public Private Partnerships in the Developing World. *Energy Strategy Reviews* 1(3), 181–192.
- Sovacool, B. K. and Florini, A. 2012. Examining the Complications of Global Energy Governance. *Journal of Energy and Natural Resources Law* 30(3), 235–263.
- Sovacool, B. K. and Van de Graaf T. 2018. Building or Stumbling blocks? Assessing the Performance of Polycentric Energy and Climate Governance Networks. *Energy Policy* 118, 317–324.
- Stokke, O. S. 2001. *The Interplay of International Regimes: Putting Effectiveness Theory to Work*. FNI Report 14/2001. Lysaker: The Fridtjof Nansen Institute.
- Suding, P. H. and Lempp, P. 2007. The Multifaceted Institutional Landscape and Processes of International Renewable Energy Policy. International Association for Energy Economics Newsletter Second Quarter: 4–9. Available at www.iaee.org/documents/newsletterarticles/Suding.pdf.
- Szulecki, K., Pattberg, P., and Biermann, F. 2011. Explaining Variation in the Effectiveness of Transnational Energy Partnerships. *Governance* 24(4), 713–736.
- The Independent Commission on International Development Issues. 1980. *North-South: A Programme for Survival*. London: Pan books.
- United Nations. 1998. Kyoto Protocol to the United Nations Framework Convention on Climate Change.
- United Nations. 2015. General Assembly Resolution 70/1. Transforming Our World: The 2030 Agenda for Sustainable Development (October 21, 2015).
- United Nations 2018. *The Sustainable Development Goals Report 2018*. New York: United Nations. <https://doi.org/10.18356/3405d09f-en>.
- Van de Graaf, T. 2012. Obsolete or Resurgent? The International Energy Agency in a Changing Global Landscape. *Energy Policy* 48, 233–241.
- Van de Graaf, T. 2013. *The Politics and Institutions of Global Energy Governance*. Hampshire & New York: Palgrave Macmillan.

- WBCSD (World Business Council for Sustainable Development). 2018. Climate & Energy. Available at www.wbcsd.org/Programs/Climate-and-Energy.
- WFC (World Futures Council). 2016. *Renewable Energy and Sustainable Development. Accounting for Impacts on the Path to 100% RE*. Hamburg: WFC.
- Widerberg, O., Pattberg, P., and Kristensen, K. 2016. *Mapping the Institutional Architecture of Global Climate Change Governance V.2*. Amsterdam: Institute for Environmental Studies.
- Wilson, J. D. 2015. Multilateral Organisations and the Limits to International Energy Cooperation. *New Political Economy* 20(1), 85–106.
- World Bank. 2015. *Beyond Connections: Energy Access Redefined*. Washington, DC: World Bank.
- World Bank and IEA/OECD. 2015. *Sustainable Energy for All. Progress towards Sustainable Energy 2015. Global Tracking Framework*. Washington, DC: World Bank and IEA/OECD.
- World Bank and OECD/IEA. 2017. *Sustainable Energy for All. Global Tracking Framework. Progress toward Sustainable Energy 2017*. Washington, DC: World Bank and IEA/OECD.
- Zelli, F. 2010. *Conflicts among International Regimes on Environmental Issues. A Theory-Driven Analysis*. PhD Dissertation. Tübingen: Eberhard-Karls University.
- Zelli, F. and van Asselt, H. 2010. The Overlap between the UN Climate Regime and the World Trade Organization: Lessons for Post-2012 Climate Governance. In *Global Climate Governance beyond 2012: Architecture, Agency and Adaptation*, edited by F. Biermann, P. Pattberg, and F. Zelli. Cambridge: Cambridge University Press.
- Zelli, F., Gupta, A., and van Asselt, H. 2012. Horizontal Institutional Interlinkages. In *Global Environmental Governance Reconsidered*, edited by F. Biermann and P. Pattberg. Cambridge, MA & London: MIT Press.