



# How institutional interactions can strengthen effectiveness: The case of multi-stakeholder partnerships for renewable energy

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## ABSTRACT

Sustainable Development Goal 7 and the Paris Agreement reiterate the importance of a worldwide uptake of renewable energy. However, the present growth rate of renewables in the global energy mix is too slow to meet international targets. There exists at present a wide range of institutions with different characteristics that work internationally to promote a steeper increase. Whereas previous studies have examined the institutional landscape for renewable energy and the considerable interactions occurring across institutions, it remains unclear what the implications of these institutional interactions are for effectiveness. This paper assesses how institutional interactions can strengthen effectiveness, by focusing on three multi-stakeholder partnerships for renewable energy. Based on an expert survey and semi-structured interviews, the study provides both theoretical and empirical contributions to understanding institutional interactions in relation to effectiveness. Moreover, it provides insights on how to strengthen the effectiveness of multi-stakeholder partnerships for renewable energy. Results show that different levels and types of institutional interactions may influence effectiveness differently, with the sharing of procedural information and coordination mechanisms being considered most fruitful to increase effectiveness. Importantly, however, such interactions should not harm the autonomy, nor the efficiency of multi-stakeholder partnerships.

## 1. Introduction

Sustainable Development Goal (SDG) 7 and the Paris Agreement have reiterated the importance of a worldwide uptake of renewable energy. However, the current growth rate of renewables in the global energy mix is too slow to meet either of these internationally agreed-on targets (IRENA, 2018; REN21, 2018a; United Nations, 2018).<sup>1</sup> Hence, effective global governance is needed to continue to promote renewables. In particular, international and transnational collaboration is required for technology transfer and policy learning across national borders, and to coordinate international aid for developing countries (Gunningham, 2012; Falkner, 2014; Röhrkasten, 2015).

In this context, the global governance system for renewable energy has become increasingly crowded. There exists a large number of institutions ranging from international organizations and transnational networks, to private initiatives and multi-stakeholder partnerships. Scholars of institutional complexity have highlighted the importance of coordination and

institutional interactions between these multiple institutions to ensure performance and effectiveness (e.g. Dubash and Florini, 2011; Florini and Sovacool, 2011; Abbott, 2012; Meckling, 2019). However, there is a lack of empirical studies that examine the link between institutional interactions and effectiveness. Sanderink (2020) recently provided insights into the considerable institutional interactions across renewable energy institutions. This paper builds on these insights and seeks to understand the implications of these institutional interactions. The paper discusses different dimensions of effectiveness, including output performance, the resulting outcome and eventual impact, to provide insights into how goal attainment of global renewable energy governance can be improved (Tallberg et al., 2016; Underdal, 2002; Bernauer, 1995). To this end, this paper focuses on the following research question: how can institutional interactions strengthen the effectiveness of multi-stakeholder partnerships for renewable energy?

The reasons for focusing on multi-stakeholder partnerships are two-fold. First, since energy issues are traditionally viewed as related to

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<sup>1</sup> I.e. the “substantial increase” of renewables by 2030 as intended by target 7.2 of SDG 7, or the below two degrees temperature target set by the Paris Agreement.

national security, national policy-making continues to dominate in global (renewable) energy governance and international cooperation remains weak (e.g. Karlsson-Vinkhuyzen et al., 2012; Florini and Sovacool, 2011; Röhrkasten, 2015). Consequently, institutions emerged outside the multilateral level, including multi-stakeholder partnerships (Haas, 2004; Börzel and Risse, 2005; Andonova, 2010). Second, such collaborations between a range of actors and not just states are considered key in the uptake of renewable energy (Sovacool, 2013a). Thus, while previous literature has focused on the role of intergovernmental organizations, a greater focus on multi-stakeholder partnerships can provide new insights into the interactions of a broader set of actors.

This paper studies three partnerships in particular: the Renewable Energy and Energy Efficiency Partnership (REEEP), the Renewable Energy Policy Network for the 21st Century (REN21) and Sustainable Energy for All (SEforALL). The study is based on a survey among key stakeholders, including policy-makers, staff at international organizations, and representatives from public and private sector. Furthermore, the data is complemented by semi-structured interviews with staff members of REEEP, REN21 and SEforALL, and with closely associated government officials, and experts from academia and civil society organizations (CSOs). Since the three partnerships are widely acknowledged as global governors among renewable energy practitioners, as well as in the scientific field (Suding and Lempp, 2007; Barnsley and Ahn, 2014; Röhrkasten, 2015), they are expected to yield the most valid and reliable insights, making it more likely to draw lessons for multi-stakeholder partnerships in general. Moreover, this case-selection enables us to relate our findings to previous studies on REEEP, REN21 and SEforALL (e.g. Florini and Sovacool, 2009; Pattberg et al., 2009; Szulecki et al., 2011; Sovacool and Van de Graaf, 2018).

The paper contributes to the burgeoning academic literature on institutional complexity by analyzing perceived impacts of different types of institutional interactions on the effectiveness of multi-stakeholder partnerships. The paper shows that when it comes to institutional interactions, more is not always better and it outlines how institutional interactions can both contribute to and hinder effectiveness. In particular, the paper provides insights on how the effectiveness of multi-stakeholder partnerships for renewable energy can be strengthened. For this purpose, Section 2 sketches out the institutional landscape of global renewable energy governance and introduces the three multi-stakeholder partnerships. Thereafter, Section 3 presents the analytical framework to assess institutional interactions in relation to measures of effectiveness. Subsequently, Section 4 explains the methodology, after which Section 5 describes the results of the study. Finally, Section 6 provides a discussion and Section 7 a set of concluding remarks.

## 2. Literature review

Energy is a political issue-area where nation-states have shown a reluctance to create strong international institutions (Wilson, 2015). A global governance system for renewable energy has nevertheless taken shape, although it took until the turn of the millennium. In 2001 renewables were for the first time discussed at a high political level within the UN, resulting in broad principles on how to promote renewables (Karlsson-Vinkhuyzen et al., 2012; Röhrkasten, 2015). Consequently, despite calls for international collaboration, institutions emerged outside the UN framework. For example, in 2009 the International Renewable Energy Agency (IRENA) was established and the first Clean Energy Ministerial (CEM) took place in 2010. Meanwhile, the International Energy Agency (IEA) broadened its issue portfolio towards renewables and increased its collaboration with IRENA (Van de Graaf, 2012; Heubaum and Biermann, 2015). Successively, renewables rose on the UN agenda: 2012 was declared International Year for Sustainable Energy for All, and Ban Ki-Moon announced the initiative Sustainable Energy for All (SEforALL) (United Nations, 2011). Therewith, the link between sustainable energy and the poverty agenda was recognized, which ultimately led to the inclusion of SDG 7 in Agenda 2030, and more

importantly, target 7.2 to substantially increase the share of renewables by 2030 (United Nations, 2015).

Alongside these interstate efforts, many other institutions have emerged; from transnational and private initiatives, to multi-stakeholder partnerships (Sanderink 2020). Particularly the latter are of interest, as they bring together public and private actors with seemingly different interests, to collectively address a public policy objective (Schäferhoff et al., 2009; Pattberg and Widerberg, 2014). Such partnerships generally emerge as a response to a lack of international cooperation (Szulecki et al., 2011, 713), and are argued to address deficits related to implementation and participation (Börzel and Risse, 2005; Haas, 2004). However, several scholars have also expressed criticism with regards to the accountability and neoliberal stance of multi-stakeholder partnerships (Dodds et al., 2002; Ivanova, 2003; Bäckstrand, 2006). Nevertheless, three partnerships in particular have proven to be important for global renewable energy governance: REEEP, REN21 and SEforALL (Suding and Lempp, 2007; Barnsley and Ahn, 2014; Röhrkasten, 2015).

REEEP was one of the first multi-stakeholder partnerships concerned with energy related issues. It was officially announced at the World Summit on Sustainable Development in 2002, after which it formalized into an international NGO located in Vienna (Florini and Sovacool, 2009; Röhrkasten, 2015). REEEP invests in clean energy markets by focusing on small- and medium-sized enterprises to accelerate market-based deployment of renewable energy in low-to middle-income countries (REEEP, 2015, 2018). Currently, REEEP has over 350 members of different public and private entities, and is backed up by donations from various governments, international organizations, NGOs, and foundations. The partnership is governed by a Governing Board and Advisory Board, and the work is conducted by an international team of around twenty staff members. Various studies have recognized REEEP as one of the most effective multi-stakeholder partnerships; it is inclusive and works on a smaller scale, which increases REEEP's accountability, transparency, flexibility and efficiency (Florini and Sovacool, 2009; Pattberg et al., 2009; Newell et al., 2011). However, its reliance on voluntary donations reduces its effectiveness in terms of long-term planning and impacts (Florini and Sovacool, 2009; Newell et al., 2011; Sovacool and Van de Graaf, 2018).

In 2004 the German government announced REN21 at the International Conference for Renewable Energy, which evolved into an international non-profit association (REN21 2005; Röhrkasten, 2015). The partnership aims to facilitate knowledge exchange, policy development and joint actions towards a rapid global transition towards renewables (REN21 2018b). It relies on funding coming from governments, international organizations and other donors, and by the end of 2017, counted 64 members (REN21 2018c). REN21 is governed by a Bureau, General Assembly and a Steering Committee, and the work is conducted by a small secretariat housed at the UN Environment Program in Paris. REN21 has by various scholars been acknowledged as an important advocacy network that successfully links renewable energy policy activities and initiatives at the global level, due to a well-functioning management structure, the inclusion of relevant partners, and a good fit between function and purpose (Suding and Lempp, 2007; Szulecki et al., 2011; Röhrkasten, 2015). However, its limited capacity in terms of staff and resources cannot yet be translated into impacts comparable to other more established institutions such as multilateral development banks (Newell et al., 2011).

Finally, a more recently established multi-stakeholder partnership is SEforALL, which was initially announced as a UN initiative by Ban Ki-moon in 2011 (Röhrkasten, 2015). It is now open to different stakeholders as a non-profit quasi international organization. SEforALL's mission is to ensure universal access to modern energy services, and to double the global rate of improvement in energy efficiency, and the share of renewables in the global energy mix (SEforALL, 2018a). In 2017 the initiative was backed up by more than eighty partners and it is funded through donor contributions, mostly from national governments.

SEforALL is governed by an Administrative Board and a Funder's Council, and conducts its work through a Global Team in Vienna, additionally operating in Washington D.C. As the history of SEforALL is shorter, evaluations of the partnership are only recently taking shape (e.g. Rogelj et al., 2013; Sovacool, 2013b) and have not yet provided insights into the performance of SEforALL.

Clearly, multi-stakeholder partnerships come in different forms and sizes, with varying organizational structures and functions (Andonova and Levi, 2003; Hale and Mauzerall, 2004; Pattberg et al., 2012; Sovacool and Van de Graaf, 2018). More importantly, they vary strongly in terms of effectiveness, which can be explained by several mechanisms, such as level of institutionalization, funding, and realistic and achievable goal-setting (Szulecki et al., 2011). What remains, however, underexplored are the implications of institutional interactions. Recently Sanderink (2020) found an abundance of knowledge transfer, considerable overlaps of targets and commitments, and observable collaborations to pursue shared objectives, between REEEP, REN21 and SEforALL, and with other renewable energy institutions. While these findings provide useful insights into the causal mechanisms behind institutional interactions, it is yet unclear how these influence the effectiveness of multi-stakeholder partnerships.

### 3. Analytical framework

The analytical framework is based on concepts originally drawn from, and applied to, international regimes: institutional interactions and effectiveness. While these concepts have a significant track record of empirical examinations (e.g. Young, 1996; Miles et al., 2001; Oberthür and Gehring, 2006b), they have not yet been employed to study multi-stakeholder partnerships. This paper seeks to show that these conceptualizations are valuable also for understanding multi-stakeholder partnerships, by developing and refining existing concepts. Hence, this section conceptualizes institutional interactions and effectiveness, provides an analytical framework linking the two concepts and highlights a set of expectations to be examined in this paper.

#### 3.1. Institutional interactions

Institutions do not function in isolation, most certainly not in issue areas characterized by a wide array of institutions, such as for climate and (renewable) energy governance. Instead, they institutionally interact,

**Table 1**

Framework for analyzing institutional interactions adapted from Young (1996, 2002), Stokke (2001) and Oberthür and Gehring (2006a).

Type of interaction	Description of interaction	Operational indicators of interaction
Political interaction	The sharing of a political mechanism, decision or process, under mutual consent, affects the efficiency of interacting institutions in pursuing their common goals.	<ul style="list-style-type: none"> <li>• Collaborative efforts, e.g. co-organizing events, coordinating activities or co-authoring publications;</li> <li>• Collective decisions, e.g. memorandums of understanding or joint statements;</li> <li>• Sharing of resources, e.g. funding or personnel.</li> </ul>
Cognitive interaction	The information, knowledge and ideas of an institution affect the activities of another institution.	<ul style="list-style-type: none"> <li>• Exchange of information, e.g. citing each other's studies or feeding-in each other's data;</li> <li>• Transfer of concepts and methods, e.g. applying each other's measures or calculations.</li> </ul>
Normative interaction	The commitments, norms and principles of an institution affect the implementation of those of another institution.	<ul style="list-style-type: none"> <li>• Interdependence of commitments, norms and principles, e.g. pursuing similar or distinct objectives, interpreting the core challenge harmoniously or differently, or being guided by consistent or incompatible values.</li> <li>• Adjustment of commitments, norms and principles, e.g. aligning targets to pursue a common goal or converging definitions of the central issue.</li> </ul>
Behavioral interaction	The functional and strategic behavior of an institution and its members indirectly affects the performance of another institution.	<ul style="list-style-type: none"> <li>• (Non-)alignment of behavioral change that institutions aim to trigger, e.g. the adoption of synergistic or conflictive incentives, or planning of supportive or contradictory activities, by their members or other actors.</li> </ul> <p><i>Here only potential interaction can be determined, as it is complex to measure behavioral change.</i></p> <ul style="list-style-type: none"> <li>• The interconnectedness of strategic behavior, e.g. monitoring, pressuring or shaming each other's performance.</li> </ul>
Impact level interaction	The ultimate impacts of an institution unintentionally affect the performance of another institution in pursuing its targets.	<ul style="list-style-type: none"> <li>• The interdependence of targeted impacts, e.g. the result of an activity is unintentionally affecting the result of unrelated activities.</li> </ul> <p><i>Here only potential interaction can be determined, as it is complex to measure impact.</i></p>

which can broadly be understood as situations in which the policy processes, knowledge, norms, or functions of two or more institutions are connected, which in turn affects the development and performance of the respective institutions (Oberthür and Gehring, 2006a; Zelli et al., 2012). Institutional interactions have been studied extensively, and as a consequence a variety of typologies has been presented to grasp the causal mechanisms behind such interactions (e.g. Young, 1996; Rosendal, 2001; Stokke, 2001; Oberthür and Gehring, 2006a).

Among the first was Young (1996, 2–6), who distinguished four types of interactions between international regimes: institutions embedded in overarching institutional arrangements, those nested in a broader institutional framework, institutions that are unintentionally clustered, and finally, those that are merely overlapping and affecting each other in the most unintentional manner. Furthermore, Young (2002, 23) differentiated between political and functional interactions, implying that interactions can come into play when institutions intentionally interact to more efficiently pursue a common goal, or if institutions unintentionally intersect at the impact-level. Young emphasized that these typologies were not exhaustive, and subsequently, Stokke (2001, 10) provided a novel typology that included utilitarian, normative and ideational interactions. This typology largely overlaps with the typology provided by Oberthür and Gehring (2006a, 35–42). First, cognitive (or: ideational) interaction refers to information, knowledge and ideas generated under one institution affecting the development of another. Second, normative interaction (or: interaction through commitment) implies that the commitments, norms and principles of two or more institutions are in conflict or overlap. Third, behavioral interaction directs towards behavioral change triggered by an institution unintentionally affecting the development of another. Finally, impact-level (or: utilitarian or functional) interaction is based on unintentional intersection of the institutions' activities.

Interestingly, applications of the aforementioned typologies mostly focus on dyadic interactions between international regimes, such as for the UN climate regime and the World Trade Organization (e.g. Brewer, 2003; Charnovitz, 2003; Zelli and Van Asselt, 2010). However, it is widely acknowledged that most global governance domains, in addition to state authority and international treaties, also consist of bottom-up initiatives, voluntary standard-setting and public-private arrangements. Even though scholars have recently started to expand institutional interaction research (e.g. Eberlein et al., 2014; Sun, 2017), a clear analytical framework to empirically assess and operationalize institutional interactions for diverse

governance forms is yet lacking. Therefore, this paper departs from a reconsidered and refined typology, and specific indicators, based on the previously described concepts (see Table 1).

It is proposed that this framework can be applied to assess a multitude of interactions among a diverse set of institutions, which are in this paper defined as “*persistent and connected sets of rules (formal and informal) that prescribe behavioral roles, constrain activity, and shape expectations*” (Keohane, 1989: 3). This definition remains generic and serves to include, more specifically, institutions at the international and transnational level, which aim to globally steer behavior of their members and perform identifiable governance functions, towards a common governance goal (Widerberg et al., 2016; Sanderink 2020), such as to promote a worldwide uptake of renewables.

### 3.2. Effectiveness

The concept of effectiveness is multifaceted but can generally be understood as the level of goal attainment by an institution (Bernauer, 1995). A typical operationalization of effectiveness in the fields of International Relations and Comparative Politics includes the output, outcome or impact of institutions (Tallberg et al., 2016; Underdal, 2002). Output refers to what the institution produces in terms of, for example, issuing regulations, producing reports, conducting research, organizing meetings, providing funding or training (Szulecki et al., 2011). Output is thus typically referred to as performance, as it refers to the work of an institution in terms of what is produced by the institution (Gutner and Thompson, 2010). Outcome encompasses the political result or behavioral change that the institution triggers, for example in terms of an increased level of cooperation and compliance amongst members, for instance by improving learning and modifying incentives (Gutner and Thompson, 2010; Underdal, 2002). Impact is concerned with whether the institution solves the issue it was designed for, i.e. the extent to which the institution contributes to alleviating the problem that it was tasked to resolve (Underdal, 2002).

Intuitively, strong outputs should lead to strong outcomes, and ultimately to strong impacts. However, different factors, such as the degree of malignancy of the problem to be solved, means that this relationship may not hold (Underdal, 2002). In that sense, output is only a measure of potential effectiveness, since effectiveness depends on the outputs having an impact. This is why effectiveness is difficult to measure as it involves issues of causation. This is even more demanding under institutional complexity, as the existence of multiple institutions that address similar problems gives rise to the problem of attribution (Nasiritousi et al. 2020).

In terms of the three multi-stakeholder partnerships examined in this paper, they have in common the broader governance goal of promoting a worldwide uptake of renewable energy. While being mindful that the focus of their work differs (for example, REEEP focuses on market readiness for clean energy services in low- and middle-income coun-

development toward a global transition to renewable energy<sup>3</sup>), this paper conceptualizes their effectiveness as achieving a rapid uptake of renewable energy in line with international targets. It should be noted that this conceptualization does not assume that these three multi-stakeholder partnerships are the sole, or even the main actors in achieving this goal. The three partnerships, together with a myriad of other institutions, work towards achieving this goal. This conceptualization is appropriate for the purposes of this paper, as this paper does not measure the actual effectiveness of multi-stakeholder partnerships for renewable energy, but rather contributes to understanding how institutional interactions influence effectiveness. Thus, it is important to keep in mind that the paper does not refer to effectiveness in absolute terms, but in comparative terms as it focuses on a relative increase or decrease in the level of effectiveness. The next section therefore seeks to link institutional interactions to effectiveness.

### 3.3. Institutional interactions and effectiveness

It is broadly agreed upon that institutional interactions can result in conflictive, synergistic, neutral or indeterminate effects (Oberthür and Gehring, 2006a, 46), though the exact notion thereof remains unclear (Hickmann et al. 2020), let alone how this relates to effectiveness. Therefore, it is necessary to theorize about how the different types of institutional interactions relate to the diverse measures of effectiveness. More importantly, it is helpful to draw out expectations based thereon. For a more systematic analysis, our scope centers on interactions that can be purposefully initiated by institutions, i.e. those that are deliberate rather than resulting from unintended interactions. These are restricted to political, cognitive and normative interactions (see Table 2).

First, the notion of a political interaction is partly based on the definition of a political interdependence provided by Young (2002). It refers to institutions formally being linked through a political mechanism, decision or process, for example when two institutions decide to share resources or form alliances to more efficiently pursue common goals. The shared mechanism, decision or process resulting from a political interaction can be related to the output level of effectiveness, and the increased capacity to pursue common goals is expected to affect the outcome and impact levels of effectiveness. For instance, two or more institutions can pool resources for new or stronger outputs, and greater outreach and increased impacts of their joint activities. Such joint activities presumably do not emerge based on the desire to thwart the activities of other institutions. Hence, the first expectation that arises is that *political interactions positively influence the effectiveness of institutions in the form of complementary output and increased outcome and impact*.

Second, a cognitive interaction refers to the exchange of information, knowledge and ideas, and rests on the assumption that this exchange strengthens or further substantiates the activities of the respective institutions (Stokke, 2001; Oberthür and Gehring, 2006a). The interaction comes about, for instance, when new and useful technological insights

**Table 2**

Expectations about the implications of institutional interactions for the differentiated measures of effectiveness (Own assessment: October 2018).

Type of interaction	Implications for effectiveness
Political interaction	<b>Output, outcome &amp; impact:</b> a politically induced collaborative effort (output) leads to increased capacity to achieve common goals (outcome and impact).
Cognitive interaction	<b>Output, outcome &amp; impact:</b> the exchange of information and transfer of ideas leads to increased accuracy and/or efficiency of regulations, research and project activities. This may in turn positively impact on the credibility of the institution and thereby contribute to increased outcome and possibly impact.
Normative interaction	<b>Outcome &amp; impact:</b> the intersection of commitments, norms and principles affects the implementation (outcome) and targeted results (impact), either positively or negatively.

tries<sup>2</sup> and REN21 facilitates knowledge exchange and policy

<sup>2</sup> <https://www.reEEP.org/about-reEEP> (accessed: January 15, 2019).

<sup>3</sup> <http://www.ren21.net/about-ren21/about-us/> (accessed: January 15, 2019).

shared by one institution result in a change in strategy of another institution, or when an innovative methodology of one institution is applied by another. Similar to the political type of interaction, one can assume that information, knowledge and ideas are exchanged with the aim to achieve mutual benefits. Consequently, the second expectation is that *cognitive interactions positively influence the effectiveness of institutions by increasing the accuracy and/or efficiency of output. This could in turn positively affect the credibility of the institution and thereby contribute to increased outcome and possibly impact.*

Third, a normative interaction refers to situations in which the institutions' commitments, norms and principles are either contradictory or confirmative (Stokke, 2001; Oberthür and Gehring, 2006a). Oberthür and Gehring (2006a) argue that for this interaction to occur the commitments, norms and principles should be legally binding and that there should be an overlap of members. However, it is plausible that even if the members do not overlap and there is no binding force, commitments, norms and principles can still show overlap or conflict, or voluntarily be adopted or aligned. Hence, a broader view is considered here, which can also be applied to voluntary certification schemes and private standard setting. When commitments, norms and principles of institutions intersect, be they conflictive or synergistic, this will corollary influence the level of implementation of the respective institutions, and whether results are achieved or not. Thus, the third expectation that arises is that *normative interactions influence the effectiveness of institutions, by either positively (in the synergistic case) or negatively (in the conflictive case) affecting the outcome and level of impact.*

It is important to note that in practice these three types of institutional interactions can be interrelated. To illustrate, adopting a methodology developed by a different institution to measure the share of renewables in the global energy mix indicates a cognitive interaction. However, simultaneously, the definitions on which this methodology is based are transferred (normative interaction) and the exchange may be part of an underlying political process (political interaction). Nonetheless, for the sake of clarity and the risk of endless connections, this paper distinguishes institutional interactions based on the actual observable exchange, excluding underlying factors. Finally, it is important to consider that establishing institutional interactions requires resources, and that the magnitude of the costs as well as benefits of institutional interactions may vary. In particular, some institutions may benefit more from interactions than others. The aim of the analysis below is not to measure such effects however; rather it serves to illustrate how different types of interactions are perceived to affect the effectiveness of multi-stakeholder partnerships and of three specifically. The analysis can thereby guide future research into the overall effects of institutional interactions on different institutions.

### 3.4. Data and measures

The empirical material for this research consists of an expert survey as well as semi-structured interviews with key stakeholders. In other words, this paper employs a mixed method research approach involving quantitative and qualitative data (see Teddlie and Tashakkori, 2011; Creswell, 2011). Moreover, the research design comprises an iterative approach including both deductive and inductive logic as the aim is not merely to test predictions, but to also provide a rich understanding of effects that are context-dependent (Teddlie and Tashakkori, 2011).

Renewable energy governance lies at the intersection of climate and energy governance (Zelli et al. 2020 forthcoming). Hence, climate and energy governance stakeholders were defined as the special population to be sampled for the expert survey (Sudman, 1983). The respondents thus include representatives from national governments, intergovernmental organizations, businesses, NGOs, sub-national governments and academic institutions. By surveying participants in official side events during the 23rd UNFCCC Conference of the Parties (2017) and the 48th session of the UNFCCC Subsidiary Bodies, and at the 9th Clean Energy Ministerial and 3rd Mission Innovation Ministerial taking place during

the Nordic Clean Energy Week (2018), we obtained 262 filled out questionnaires from a sample of experts with diverse backgrounds. The survey sought to gauge the perceptions of climate and energy experts on questions pertaining to the extent to which renewable energy institutions interact, the nature of these interactions, and how these can best be strengthened (see Appendix A for the expert survey format).<sup>4</sup> The survey thus offers unique insights into how climate and energy experts view institutional interactions between renewable energy institutions and which of these they believe could be strengthened to improve effectiveness.

Given the short format of the survey that limits broader elaboration of why respondents hold the perceptions that they do, we also conducted a set of semi-structured interviews to gain additional insights (see Creswell, 2007). The interviewees were selected based on a stratified purposeful sampling strategy to obtain insights from different subgroups of climate and energy governance stakeholders (Miles and Huberman, 1994: 28). In total, twelve interviews were conducted with government officials, NGOs, staff from case-study multi-stakeholder partnerships and research institutes (see Appendix A for the list of interviews).<sup>5</sup> The aim of these interviews was to obtain more detailed views on institutional interactions, and the effects thereof on the effectiveness across multi-stakeholder partnerships. For this purpose, the interviewees were first asked to provide their view on what contributes to the effectiveness of multi-stakeholder partnerships, before delving into the perceived impacts of institutional interactions. The interview questions also explored respondents' views on opportunities to strengthen institutional interactions and effectiveness across the case-studies. Specifically, the interview questions were formulated based on guidelines by Patton (1990) to ensure open-ended, singular and clear questions without presuppositions (see Appendix A for the interview guide). The retrieved insights were qualitatively interpreted in relation to existing literature.

It is worth highlighting that the above methodology allows us to tap into expert assessments of the influence of institutional interactions on effectiveness. The focus of the analysis is thus on perceptions rather than on objective measurements of institutional interactions or effectiveness, the latter of which lie outside the scope for this paper. Given the lack of previous systematic attempts to understand how institutional interactions affect effectiveness, the analysis below thus generates novel insights that can be used to improve the effectiveness of multi-stakeholder partnerships. And, while these are not generalizable, they provide insightful conjectures that could guide further research on this burgeoning topic.

## 4. Results

This section outlines the perceived relationship between institutional interactions and effectiveness for multi-stakeholder partnerships and the three case-studies in particular. It begins with outlining the survey results, which target renewable energy institutions more broadly, and thereby provide context for understanding the more in-depth findings from the interviews.

### 4.1. Renewable energy institutions

The survey posed a number of questions to understand perceptions about the extent to which institutional interactions already occur across renewable energy institutions and the nature of these interactions. To

<sup>4</sup> Please note that the questions are also described in further detail when outlining the results in Section 5.

<sup>5</sup> Despite significant efforts to achieve a fair geographical representation, the list of interviewees is slightly biased towards the Global North. However, since this list of interviewees simultaneously resembles the geographical distribution of global renewable energy governance, this bias is not expected to distort the results of this research.

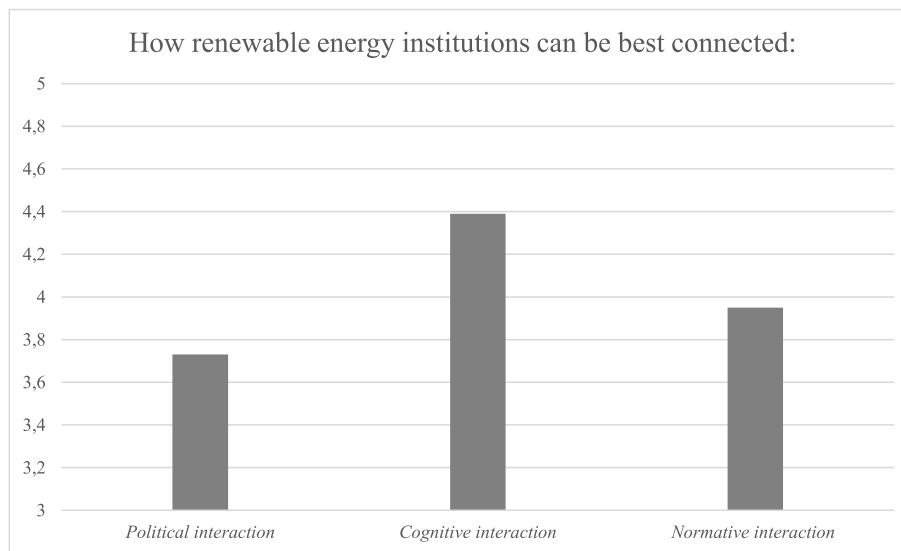


Fig. 1. Survey response on question about best way to create connections among renewable energy institutions.

provide context, the expert survey first introduced renewable energy institutions to the respondents as “*all different types of governance arrangements, ranging from international organizations and collaborations between private businesses and NGOs, as well as public-private partnerships*” (see Appendix A). Subsequently, the survey listed a number of institutions, such as IRENA, CEM, the Global Bioenergy Partnership, REN21, REEEP and SEforALL, as examples. The survey included thirteen questions, of which five acquired insights that proved useful for answering the research question.<sup>6</sup>

The first question asked about the extent to which these institutions are closely connected. On a five-point scale where 1 is hardly connected and 5 closely connected, respondents answered an average of 2.75. Thus, our survey results show that climate and energy experts do not view such institutions as currently closely connected. The next two questions asked how the respondents would characterize existing institutional interactions. First, respondents were asked to evaluate existing connections between renewable energy institutions on a five-point scale, where 1 is primarily conflictive and 5 primarily reinforcing. Respondents answered with an average of 3.15, implying that current connections are neither viewed as conflictive, nor reinforcing. Second, they were asked to provide examples of connections between renewable energy institutions. The most frequently mentioned answers were joint research and reports, joint conferences and events, and joint advocacy efforts and projects.

The question that arises then is which types of interactions are expected to contribute to effectiveness? Here, the survey first asked if the respondents agree that stimulating connections among renewable energy institutions will increase their effectiveness in the first place. The result shows an average of 4.33 on a five-point scale where 1 is strongly disagree and 5 strongly agree, indicating a strong perception that greater connectedness can increase effectiveness. Thereafter, respondents were asked to indicate their level of agreement on the statement that the best

<sup>6</sup> Please note that the expert survey was prepared for a broader research project ([www.climengo.eu](http://www.climengo.eu)) and included two parts, of which one pertaining to a separate study and different research question. Specifically, the first seven questions targeted legitimacy and the next six institutional interactions and effectiveness across renewable energy institutions. Of the latter six questions one was eventually excluded from the results despite a substantial number of answers, due to limited added value and a restricted word count. This question targeted the experts' view on the way in which renewable energy institutions are currently connected (see question 8). For more information, please contact the authors to gain access to the data.

way to create connections among renewable energy institutions is through: sharing political mechanisms; exchanging information, knowledge and ideas; or streamlining commitments, norms and principles (congruent with Table 2). The general view among respondents is that cognitive interaction, i.e. exchanging information, knowledge and ideas, has most potential to strengthen the effectiveness of renewable energy institutions. Although normative and political interactions are also viewed as important (see Fig. 1).

In sum, the survey results show that, in the view of climate and energy experts, renewable energy institutions are presently not closely connected. The connections that do exist result in various types of exchange (political, cognitive and normative), although appear not to be easily characterized as either conflictive or reinforcing. Yet climate and energy experts strongly believe that stimulating interactions among these institutions will increase their effectiveness, and the cognitive type of interaction in particular.

#### 4.2. Multi-stakeholder partnerships

Interviews were conducted to obtain more detailed perceptions on how interactions may improve effectiveness of multi-stakeholder partnerships. The interviewees were first asked to share their view on the effectiveness of multi-stakeholder partnerships. In general, the interviewees highlighted that it stems from their comparative advantage in a number of aspects. First, multi-stakeholder partnerships are considered effective in sharing first-hand information on renewable energy sources and technologies (Interviews 2, 4, 5, 6 and 9). Second, they are seen as important for active public outreach contributing to a growing awareness and education about the urgency of renewables (Interviews 2, 4, 3 and 5). Third, climate and energy experts consider those partnerships effective that are technology agnostic, and provide a comprehensive and unbiased approach towards different renewable energy sources and technologies (Interview 2, 6, 9 and 10). Fourth, it is seen as key that partnerships have an impact on the issue they are designed to address (Interviews 2, 7, 8 and 9). Finally, to be effective they should set clear targets from the onset (Interviews 6, 7 and 9). It is, however, important to note that a lower level of absolute effectiveness is expected from multi-stakeholder partnerships in the first place, due to their limited resources and often a limited timespan (Interviews 4, 5 and 7).

The interviewees were then asked to share how institutional interactions can, in their view, enhance effectiveness. First, cognitive interactions are seen as important, more specifically in the way of

exchanging information and publicly sharing knowledge at events (Interviews 2, 3 and 10). This is expected to contribute to an unbiased, complete and accurate knowledgebase, based on which multi-stakeholder partnerships can adjust their outputs and operations. Second, political interactions ranging from official collaborations to formal meetings are considered key, to retrieve feedback from other institutions on the impact and added value of partnerships (Interview 3, 6, 7, 9 and 11). Additionally, multi-stakeholder partnerships are advised to be embedded in multilateral frameworks for the sake of institutionalization and continuous funding (Interviews 5 and 8). Third, normative interactions are acknowledged. More specifically, various interviewees highlight that the targets of multi-stakeholder partnerships should be formulated in line with the UNFCCC and SDG 7 (Interviews 4 and 9).

Finally and on a general level, the experts expressed that multi-stakeholder partnerships should extend institutional interactions towards institutions that are not natural allies, to broaden their outreach and spread the conviction that the uptake of renewables is urgent. For instance, interactions should extend towards those focusing on fossil fuels and finance (Interviews 5 and 7), those active in different sectors including transportation, agriculture and heating (Interviews 6 and 7), and those that work on energy efficiency (Interview 4 and 5). Simultaneously, interviewees remarked that multi-stakeholder partnerships should not be too closely connected; interactions should not reduce their autonomy, nor increase the level of bureaucracy at the expense of their efficiency (Interviews 10 and 12).

#### 4.3. REEEP, REN21 and SEforALL

This section zooms in on the three case-study multi-stakeholder partnerships and answers three questions for each: what contributes to the effectiveness of REEEP, REN21 and SEforALL, how do institutional interactions influence effectiveness, and finally, how can effectiveness be strengthened by means of institutional interactions and other measures?

##### 4.3.1. REEEP

Various aspects are perceived to contribute to the effectiveness of REEEP. First, its flexibility and efficiency as a lean organization that is highly inclusive and engages in a transparent feedback process (Interview 1; see also Section 2). Second, REEEP conducts regular needs assessments to ensure that projects in place are in line with local market needs (Interview 1). Third, the information REEEP shares on its projects has proven helpful for national governments to decide what types of projects to invest in (Interview 6 and 7). Simultaneously, the partnership's effectiveness is criticized: the partnership's outreach and visibility are insufficient (Interview 4) and the lack of continuous funding hinders effectiveness in terms of long-term strategic planning and impact (Interview 1; see also Section 2).

Institutional interactions are recognized to contribute to the effectiveness of REEEP in several ways. First, political interactions have resulted in new and comprehensive output in the form of increasingly accurate knowledge. For instance, REEEP and REN21 collaboratively operate reegle.info, which is a publicly acknowledged portal providing comprehensive information on renewable energy (Interview 4; Sanderink 2020). Additionally, REEEP worked with IRENA on the Renewables Tagger, which sorts data and documents holding renewable energy content and supports organizations to streamline their information sources (ClimateTagger, 2018). Political interactions are also important for retrieving regular feedback to review if certain projects of REEEP can be improved (Interview 1). Political interactions are thus seen as helpful to determine the impact and added value of REEEP's work, and may thereby lead to increased effectiveness. Second, cognitive interactions are considered important for REEEP to stay informed of technology and business innovations in clean energy, particularly of developments in data and digitalization (Interview 1). For instance, REEEP's publications are strongly informed by the World Energy Outlooks (WEO) of IEA and

various reports of IRENA, and the partnership actively participates in various knowledge-sharing and networking events organized by IRENA, UNFCCC and SEforALL (Interview 1; Sanderink 2020).

The effectiveness of REEEP could be strengthened by the means of institutional interactions and other measures. Simply adding another conference or (online) forum is not considered desirable (Interview 1); currently there already exists an abundance of knowledge-sharing and networking opportunities (Interviews 7, 9 and 11). Instead, political interactions are found important for REEEP to coordinate regional and sub-national projects across renewable energy institutions to prevent duplication of work. Many institutions unknowingly conduct similar work in the same specific regions, and it currently takes a lot of effort and time to learn about and accommodate these parallel activities (Interview 1). Additionally, REEEP's effectiveness could benefit from more cognitive interaction in the way of sharing more information on its projects to settle with the expressed critiques on visibility. Moreover, a more continuous stream of resources and sufficient operational core funding would strengthen REEEP's effectiveness (Interview 1 and 4). More specifically, it is necessary to develop a more realistic understanding of the financial needs of REEEP and other multi-stakeholder partnerships, beyond project implementation, and including operational staff and fund-raising activities (Interview 1).

##### 4.3.2. REN21

REN21 has gained a reputation for linking renewable energy policy activities at the global level, first of all, through its well-functioning management structure, the inclusion of relevant partners and a good fit between function and purpose (see Section 2). Second, the accuracy of REN21's expertise is widely acknowledged, and mostly of its flagship publication: the Renewables Global Status Report (Interview 2, 3, 4, 7 and 8). The impact of this yearly report is considered high, particularly when taking into account the smaller-sized secretariat and organization of REN21 (Interview 8 and 12). Third, REN21 is seen to significantly contribute to a growing awareness through its technology neutral publications (Interviews 4 and 12). Finally, REN21's participatory approach is widely appreciated (Interview 3, 4 and 5), as all members of REN21 can contribute to its publications. Although this is simultaneously being criticized: being a coalition of like-minded stakeholders benefits quick decision-making, but also limits REN21's outreach. In other words, the work of REN21 meets the ends of those who are already aware of the importance of renewables, while it is even more important to reach out to those who have yet to be convinced (Interview 5).

With the participatory approach comes a wide range of institutional interactions contributing to the partnership's effectiveness. First, REN21 politically interacts with a number of key global governors for renewable energy, such as IRENA, IEA and SEforALL, who as members contribute and feed into REN21's publications (Sanderink 2020). Without these interactions, publishing its key output - the Global Status Report - would not have been possible (Interview 8). The political interactions coincide with cognitive interactions, as throughout the process of publishing the report, knowledge is exchanged extensively. Taken together, the interactions result in comprehensive and accurate expertise on renewable energy from a variety of perspectives (Interview 2 and 12). Finally, the interactions as such help to multiply the impact of this output towards reaching the Paris Agreement targets (Interview 12).

Thus, institutional interactions could help to increase REN21's effectiveness. As alluded to above, the participatory approach of REN21 is both successful and at the same time a pitfall: among a coalition of like-minded stakeholders there is expectedly not much controversy (Interview 5). Thus, for REN21 it is crucial to constitute interactions, be it political, cognitive or normative, with institutions that are not natural allies, to widen the reach and impact of REN21's work. Greater interactions are therefore called for with the fossil fuel industry and the financial community, as well as institutions representing different sectors such as transportation and heating (Interviews 4, 5 and 12). Finally, and similar to REEEP, REN21 would benefit from more continuous

funding to become more systematic, enable long-term strategic planning and impact, and to expand its activities towards energy efficiency (Interview 4 and 12).

#### 4.3.3. SEforALL

SEforALL is seen as an important global platform for overarching goals with strong stakeholder engagement (Interview 11). Particularly the strong ties to various UN agencies are considered to contribute to the effectiveness of SEforALL (Interview 4, 5, 6 and 11). Interestingly, its effectiveness is also attributed to Rachel Kyte as CEO and Special Representative of the UN Secretary General (Interview 4), due to her strong personality and extensive experience as Special Envoy for Climate Change at the World Bank until 2015. All in all, SEforALL is seen as a big player in terms of agenda-setting and the dissemination of information (Interview 5 and 6). However, it is important to note the confusion surrounding SEforALL (Interview 3 and 7). At first SEforALL was announced as an initiative in 2011, after which 2012 was declared the International Year for SEforALL, and subsequently, 2014–2024 the Decade for SEforALL. Moreover, while the partnership played an important part in the run-up to Agenda 2030 to set international commitments on energy, the question that arises now is if there is still a role to play by SEforALL or if SDG 7 has supplanted the partnership (Interviews 3 and 7).

Irrespectively, institutional interactions are considered an integral part of the functioning of SEforALL (Interview 11). First, through its role to promote SDG 7 as the foundation for its work, SEforALL creates normative interactions with and among institutions that are partners, to make sure all activities are directed towards a common goal (Interviews 5 and 11). Second, being politically connected to various UN agencies contributes to the legitimacy of SEforALL (Interviews 4 and 5), which may in turn attract resources and new partners. Finally, a wide range of political and cognitive interactions, take shape through the SEforALL thematic and regional hubs, and accelerators. These bring together, respectively, coalitions of institutions based on specific themes and regions, and gather institutions to accelerate action “*where walking together may have a galvanizing effect*” (Sanderink, 2020; SEforALL, 2018b). These include key global governors, such as IRENA, IEA, UN Energy and REN21, but also unconventional partners, ranging from oil and gas corporates to financial institutions and energy efficiency organizations (Interview 5). Therewith, SEforALL appears to expand its outreach and contribute significantly to knowledge dissemination that is considered influential for national governments (Interview 6). However, such interactions can also be seen as contentious and problematic in terms of efficiency (Interview 4 and 5).

SEforALL appears to engage in a wide range of institutional interactions already and comes forward as an important facilitator of such interactions for other renewable energy institutions. It is thus difficult to determine how increased interaction can further strengthen effectiveness. What has been recognized, however, is that there is no need for more sharing of information and output at conferences and meetings, but rather a shift of focus from reinventing the wheel to enhancing the work that is already being done (Interview 11). In other words, SEforALL’s effectiveness may hinge on increasingly marshalling the evidence and setting up benchmarks to achieve faster results.

## 5. Discussion

This section discusses lessons learned for multi-stakeholder partnerships who seek to improve their effectiveness. Moreover, it provides a conceptual discussion on the typology for institutional interactions and addresses the expectations set in Section 3. Though first, this section provides context to this discussion by critically reflecting on the position of multi-stakeholder partnerships in the wider institutional landscape of global renewable energy governance.

The results of the expert survey make it appear as if renewable energy institutions are not closely connected. Following Biermann and

colleagues (2009), this is potentially an indicator that global renewable energy governance is characterized by conflictive fragmentation. Conflictive fragmentation of global governance appears to “*bring more harm than positive effects, and can generally be seen as a burden on the overall performance of the system*” (Biermann et al., 2009: 31). Simultaneously, the existence of (a high number of) multi-stakeholder partnerships for renewable energy governance can be seen as a signal of ineffective international governance (Pattberg and Widerberg, 2014; Börzel and Risse, 2005). Hence, the question arises what to expect from multi-stakeholder partnerships as “second best” option of global governance. The interview results showed that a lower level of effectiveness is expected, due to limited resources and timespan of multi-stakeholder partnerships compared to for instance intergovernmental organizations. To quote, “*we should not be too demanding in terms of outcomes or deliverables*” (Interview 5). This creates a somewhat pessimistic view towards the absolute effectiveness of multi-stakeholder partnerships, although institutional interactions may nevertheless improve the comparative effectiveness of such initiatives. Bottom up, networked and polycentric governance is seen as key in global renewable energy governance (Meckling, 2019; Aklin and Urpelainen, 2018; Sovacool, 2013a), yet it is important to keep in mind this critical perspective of multi-stakeholder partnerships given the problem of limited resources.

The comparative effectiveness of multi-stakeholder partnerships appears to mostly hinge on output in the form of accurate expertise, a comprehensive approach and clear goal-setting. This should contribute to active public outreach, growing awareness and education at the outcome-level, and to strong impacts on the uptake of renewables. Institutional interactions should therefore serve to find synergies between multi-stakeholder partnerships and other renewable energy institutions that can strengthen these aspects. Based on the expert survey and the semi-structured interviews the following recommendations can be formulated.

First, political interactions to more efficiently pursue common goals should go beyond organizing conferences and networks: “*we need more work on the ground, as opposed to conferences or meetings out and about*” (Interview 11). Instead, they should facilitate coordination to prevent duplication of work and increasingly steer towards a joint end-product. Additionally, political interactions could set up feedback processes to (re)evaluate the impact and added value of multi-stakeholder partnerships. This is important “*especially in a relatively fast moving area like renewables*” (Interview 1). Second, there appears to be an abundance of cognitive interactions, resulting in an overflow of knowledge on the topic of renewables. Instead, cognitive interactions could target information on undertaken activities to help find synergies across multi-stakeholder partnerships; they should “*enhance work on the ground where it is needed, as opposed to just sharing knowledge and common outputs*” (Interview 11). Third, while normative interaction was not mentioned in relation to the three case-studies, it is considered essential for multi-stakeholder partnerships in general to have clear targets from the onset, preferably overlapping with the Paris Agreement and SDG 7. Not only to improve the fit between purpose and function of partnerships, and to prevent greenwashing among their members, but also to provide benchmarks for feedback mechanisms. More generally, it is advised that these different types of interactions are extended “*to those that are maybe not natural allies*” (Interview 5); paradoxically, the effectiveness of multi-stakeholder partnerships will only improve when addressing conflict and controversy.

This discussion provides additional insights on and contextualizes the conceptual typology for institutional interactions. What comes to the fore, most importantly, is that the typology presented in Section 3.1 provides broad descriptions and captures a range of variations for each type of interaction (see Table 1). First, while survey respondents viewed cognitive interactions as having most potential to increase effectiveness, interviewees stressed the abundance of cognitive exchange. This shows that cognitive interactions should be differentiated based on the type of



information being shared, be it informative about the central topic of renewable energy or be it procedural on the projects and activities that are in place. It is important to make these distinctions as one type of interaction may contribute more to increasing effectiveness than others. Second, we found that political interactions take shape at different levels of connectedness, from visiting similar conferences and collaboratively organizing events, to coordinating activities across multi-stakeholder partnerships. Also these are key to distinguish, as different levels and types of political interactions may influence effectiveness differently. Finally, it can be concluded that when multi-stakeholder partnerships operate within the realms of strong international norms and goals, such as those enshrined in SDG 7 and the Paris Agreement, normative interactions are less important, as long as the partnerships' activities are in line with the public policy goal that the public and private actors collectively aim to address.

How then do the results relate to the expectations described in Section 3 on how institutional interactions can strengthen effectiveness (see Table 2)? First, the results confirm that political interactions can strengthen the effectiveness of multi-stakeholder partnerships by complementing and improving output, but more importantly, through coordinating and evaluating output, which in turn increases the capacity to achieve common goals. Second, cognitive interactions are indeed found to increase the accuracy and/or efficiency of regulations, research and project activities, and additionally, to enable the search for synergies between partnerships based on procedural information. The latter particularly may positively impact the visibility and credibility of partnerships, and contribute to increased outcome and possibly impact. Finally, in the case of multi-stakeholder partnerships for renewable energy, it is not necessarily normative interactions but rather normative alignment to internationally agreed commitments that supports effectiveness. This in turn eases the search for appropriate benchmarks based on which the impact and added value of multi-stakeholder partnerships can be assessed.

Finally, it is important to reflect upon the costs of institutional interactions; these appear not only linked to resources, but could also be in the form of loss in autonomy or disadvantageous bureaucratization that may hamper overall effectiveness. While this finding may not be surprising, it is seldom highlighted in the literature on institutional interactions and may be well worth further research.

## 6. Conclusions and policy implications

It is commonly agreed that institutional interactions can result in conflictive, synergistic, neutral or indeterminate effects (Oberthür and Gehring, 2006a, 46), but the links between different types of institutional interactions and various measures of effectiveness have previously not been studied in detail. Based on an expert survey complemented with semi-structured interviews, this paper sought to understand the implications of institutional interactions for the comparative effectiveness of three multi-stakeholder partnerships in particular: REEEP, REN21 and SEforALL. Such partnerships are of interest in the context of traditionally weak international cooperation when it comes to energy issues.

The results have provided novel insights into the relationship between institutional interactions and effectiveness. First, both interviewees and survey respondents agree that institutional interactions can help to increase the effectiveness of institutions for renewable energy in general, which is in line with previous literature on managing institutional complexity (Oberthür and Stokke, 2011; Van Asselt, 2014). Moreover, the expert survey showed that cognitive interactions have most potential to do so, which implies the exchange of knowledge and information. For REEEP specifically, it is found that the partnership would benefit from cognitive interactions in the way of sharing more information on its operations. In contrast, REN21 practically embodies the cognitive type of interaction, and instead would benefit from more cognitive and political interactions with institutions outside the

renewable energy realm. Finally, being backed by the UN, SEforALL has proven to be a unique case in point as an important platform for institutional interactions. Hence, the partnership is advised to take advantage of this unique role and expand it towards coordinative tasks in a crowded institutional landscape.

Based on these findings, a number of key lessons were drawn for multi-stakeholder partnerships. While there is already an abundance of cognitive interactions, certain types of cognitive interactions appear to still be in demand – specifically those that involve procedural information. Multi-stakeholder partnerships will also benefit from strengthening certain types of political and normative interactions. Political interactions should go beyond organizing additional platforms, and rather focus on feedback mechanisms and coordination of existing activities to ensure a joint end-product: the worldwide uptake of renewables. Normative interactions, i.e. normative alignment with internationally agreed-on targets, can support these by providing benchmarks to steer such feedback processes and coordinating efforts. Finally, it is important that these institutional interactions will extend towards unconventional partners, while not impairing the independence or efficiency of multi-stakeholder partnerships. While these recommendations appear relevant and feasible, one should take into account that the impact on the overall performance and effectiveness of global renewable energy governance may be limited, considering the nature of multi-stakeholder partnerships.

This paper thereby confirms the link between institutional interactions and effectiveness, while at the same time nuancing and providing context to this relationship. The results indicate that the relationship between institutional interaction and effectiveness varies depending on the types and existing levels of institutional interactions. Importantly, stimulating and maintaining institutional interactions use up valuable resources and must therefore be done purposefully and strategically.

With these findings, this paper contributes to the academic literature on institutional complexity and institutional interactions, and its implications for effectiveness. In particular, the paper provides novel recommendations on how multi-stakeholder partnerships for renewable energy can strengthen their comparative effectiveness. Since our sample is not generalizable, however, future research can test and develop the framework presented in this paper and apply it to other types of institutions. Moreover, future research could build on these findings to also look at the quality and quantity of interactions, the dynamics and directions of interactions, and under what conditions interactions may be possible in the first place. In addition, whereas this study delves into the causal relationship between interactions and effectiveness, it is of interest to study more in-depth the link to performance. Institutional interactions clearly affect the process of achieving effectiveness, including clear goal-setting, mobilizing resources, adopting formal structures, making operations more efficient, and exhibiting resilience (Sovacool and Van de Graaf, 2018; Poocharoen and Sovacool, 2012). Finally, it is important to continue the search for methods to measure the actual effectiveness of renewable energy institutions and of global renewable energy governance more broadly. While this remains challenging in the context of institutional complexity, one should remember that every case-study is one piece to the puzzle.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## CRediT authorship contribution statement

**Lisa Sanderink:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Visualization, Project

administration. **Naghme Nasiritousi**: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Visualization.

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## Appendix A. Supplementary data

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