

Introduction to the special issue: energy subsidies at the intersection of climate, energy, and trade governance

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1 Introduction

Subsidies for the production and consumption of energy have come to the forefront of international debates in recent years. The issue of fossil fuel subsidies has captured the global political agenda ever since 2009, when the leaders of the Group of 20 (G20) pledged to phase out ‘inefficient’ subsidies because they ‘encourage wasteful consumption, reduce our energy security, impede investment in clean energy sources, and undermine efforts to deal with the threat of climate change’ (G20 2009). In spite of this commitment, fossil fuel subsidies still amounted to US\$493 billion in 2014, up from US\$300 billion in 2009 and outmatching renewable energy subsidies by a ratio of more than four to one (IEA 2015).¹

Recent insights that up to 80% of fossil fuels must be kept underground to avoid the most catastrophic effects of climate change (McGlade and Ekins 2015), combined with falling oil prices and a growing movement in favour of divestment away from fossil fuels, have strengthened the case for fossil fuel subsidy reform, which is expected to lead to significant cost savings as well as reductions in carbon emissions (Economist 2015; Merrill et al. 2015).

¹ Global subsidies to renewables-based electricity generation amounted to 112 billion dollars in 2014 (IEA 2015, 383).

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While fossil fuel subsidies may be under increasing levels of scrutiny, renewable energy subsidies—e.g., for the deployment of wind or solar technologies, or for the production of biofuels—have similarly moved to the centre of attention of policymakers and academics alike. In the context of the World Trade Organization (WTO), several disputes have arisen, with the challenges—ranging from a proposed feed-in-tariff in the Canadian province Ontario to the Jawaharlal Nehru National Solar Mission in India—mainly aimed at local content requirements that favour domestic producers over imports. In addition, bilateral consultations about renewable energy measures in different countries—involving major players such as China, India, the European Union (EU), and the USA—have taken place in recent years (Kulovesi 2014; Lewis 2014; Ghosh 2016).

Subsidies for nuclear power plants also stir controversy. Nearly all new builds in recent years have taken place in markets where electricity prices are regulated or where government-owned entities build, own, and operate plants. In competitive markets, the risks in constructing new nuclear plants have been too large to attract investment, though some governments have offered subsidies to mitigate these risks (IEA 2014). A case in point is the UK government's support for the expansion of Hinkley Point C, a nuclear power plant. In October 2014, the European Commission decided that aid from the UK government for the nuclear power plant was compatible with EU rules on state aid, but Austria, Luxembourg, and a group of German renewable energy companies are challenging the Commission's clearance decision before the Court of Justice of the EU.

Energy subsidies can be approached from multiple viewpoints, and hence fall under the remit of multiple international institutions (see Table 1). From the perspective of climate change governance, energy subsidies matter as they can impede the achievement of climate objectives (by subsidizing continued fossil fuel extraction and consumption) or facilitate the transition towards a low-carbon economy (by helping to build a renewable energy industry). Energy subsidies also matter from the perspective of trade governance: in addition to the General Agreement on Tariffs and Trade (GATT), the WTO's Agreement on Subsidies and Countervailing Measures (ASCM) specifies the types of subsidies that may be allowed or prohibited. Finally, energy subsidies matter from the perspective of global energy governance. Such subsidies can be used to achieve specific energy policy objectives (e.g., combating energy poverty or securing energy supply).

Yet while it has become increasingly clear which institutions are relevant for addressing energy subsidies (Van de Graaf 2013; van Asselt 2014a), it remains unclear how the regime complex for energy subsidies functions as a whole. Furthermore, while significant advances have been made in scholarship on fossil fuel subsidies and renewable energy subsidies in isolation, there is a need to link these debates to draw broader lessons for energy subsidies as a whole.

This special issue seeks to enhance understanding of the global governance of energy subsidies, bringing together insights and perspectives from international relations and international law, and covering the issue areas of climate change, energy, and international trade. The goal is to examine how international organizations, rules, and regimes shape the policies and outcomes with regard to energy subsidies, both for fossil fuels and renewable energy. Although national-level policies towards these subsidies fall outside of the scope of this special issue, several contributions examine the influence of international institutions at the domestic level.

Following an overview of the aims and effects of energy subsidies (Sect. 2), the remainder of this introduction is structured along the three main themes of the issue. First, we present an overview of the regime complex governing energy subsidies, indicating which institutions govern energy subsidies, how, and with what effects. Against the backdrop of research on regime complexity, we discuss how the various institutions

Table 1 Key international institutions relevant to energy subsidies. *Source* authors' compilation based on the respective organizational websites

Institution	Type	Members	Mission	Work on/relevance for energy subsidies
Group of 20 (G20)	Intergovernmental organization (IGO)	19 largest economies plus the EU	Global economic governance	Establishes overall goal to phase out 'inefficient' fossil fuel subsidies; organizes country peer reviews of fossil fuel subsidies
World Trade Organization (WTO)	IGO	164 states	Liberalize international trade	Provides definition of 'subsidies', and regulates which subsidies are allowed; several renewable energy subsidies challenged through its dispute settlement mechanism
United Nations Framework Convention on Climate Change (UNFCCC)	IGO	197 states	Address climate change	Allows parties to adopt renewable energy subsidies in pursuit of climate goals; does not provide information on fossil fuel subsidies
Organisation for Economic Co-operation and Development (OECD)	IGO	35 states	Promote policies that improve economic and social well-being	Carries out research on fossil fuel subsidies, and publishes estimates
International Energy Agency (IEA)	IGO	29 states, all drawn from the OECD	Ensure reliable, affordable, and clean energy	Carries out research on energy subsidies, and publishes estimates; operates joint IEA/IRENA database on global renewable energy policies and measures
Organization of the Petroleum-Exporting Countries (OPEC)	IGO	14 states	Raise oil rents for producers	Carries out research on fossil fuel subsidies
World Bank	IGO	189 states	Poverty reduction	Carries out research on fossil fuel subsidies; and works with countries to implement energy subsidy reform
International Monetary Fund (IMF)	IGO	189 states	Monetary and financial stability	Carries out research on fossil fuel subsidies, and publishes estimates; fossil fuel subsidy reform included in lending conditions for individual countries

Table 1 continued

Institution	Type	Members	Mission	Work on/relevance for energy subsidies
Energy Charter Treaty (ECT)	IGO	49 states	Regulate energy trade and investment	Energy subsidy reforms by governments may be challenged by companies under ECT arbitration
United Nations Environment Programme (UNEP)	IGO	58 states	Environmental protection	Carries out research on environmentally harmful subsidies.
Asia–Pacific Economic Cooperation (APEC)	IGO	21 states	Support economic growth in the Asia–Pacific	Establishes overall goal to phase out ‘inefficient’ fossil fuel subsidies; organizes country peer reviews of fossil fuel subsidies.
International Renewable Energy Agency (IRENA)	IGO	150 states	Promote renewable energy	Carries out research on how the elimination of fossil fuel subsidies could help to realize the global goal of doubling the share of renewables by 2030; operates joint IEA/IRENA database on global renewable energy policies and measures.
Global Subsidies Initiative (GSI)	NGO		Analyse subsidies and their impact on sustainable development	Carries out research on impacts of energy subsidies, and publishes estimates; collaborates with countries to implement fossil fuel subsidy reform
Friends of Fossil Fuel Subsidy Reform	informal coalition	9 states	Promote fossil fuel subsidy reform	Campaigns to encourage fossil fuel subsidy reform at national and international levels

overlap, complement, and/or conflict with each other (Sect. 3). Second, we focus particularly on the crucial role of the international trade regime, under which—as noted above—several renewable energy subsidies have been challenged, but which has been inactive on the issue of fossil fuel subsidies (Sect. 4). Third, we explore the future governance of energy subsidies, including a discussion on how a possible division of labour between the various relevant institutions could emerge (Sect. 5). In our conclusions, we outline avenues for further research (Sect. 6).

2 The nuts and bolts of energy subsidies

‘Energy subsidy’ is an elusive and contentious concept. There is no universally agreed definition of ‘energy subsidies’, nor is there a consensus on the best methodology to measure them. As a result, estimates of the size of energy subsidies vary tremendously.

Several international organizations, including the International Energy Agency (IEA), the International Monetary Fund (IMF), and the Organisation for Economic Co-operation and Development (OECD), weigh in on the subject of energy subsidies but do so with different definitions, methods, and estimates.

Energy subsidies, in the simplest terms, are government policies to support the producers or consumers of energy. Governments can provide support *directly* through budgetary transfers (e.g., cash payments, grants, loans, or loan guarantees) as well as through tax expenditures (that is, deviations from standard tax rules in the form of tax deductions, reductions, credits, or deferrals). But there are also many *indirect* ways in which a government can stimulate the production or use of a particular fuel or form of energy. Governments could, for example, regulate prices for consumers at below-market rates. Uncollected and under-collected revenue from state-owned assets (sometimes referred to as ‘foregone revenue’) is also sometimes considered a form of subsidy. Finally, whether the value of non-internalized externalities should be included in subsidy accounting is a major bone of contention among environmental economists (IEA 2006; OECD 2010).

Energy subsidies are thus far more than simple cash transfers. In fact, energy subsidies can be visualized as a matryoshka nesting doll (OECD 2010; Gerasimchuk 2014). The most inner core (the smallest of the nesting dolls) is what everyone agrees to be an energy subsidy: direct budgetary and tax expenditure. As the definition expands to include other layers (i.e., indirect market price support, foregone revenue from state-owned assets and externalities), it becomes more controversial. For this reason, the OECD prefers using the concept of ‘support’ over ‘subsidies’ to reflect the more comprehensive understanding of government policies that give rise to public resource transfers (OECD 2010). Cutting across the layers of the matryoshka, energy subsidies are typically also classified in terms of who they target—i.e., whether they benefit producers or consumers.

The most commonly used methods for measuring subsidies are the *price-gap approach*—quantifying the gap between a benchmark price and the price charged to consumers—and the *inventory approach*, which constructs an inventory of government actions benefiting production and consumption of fossil fuels (Kojima and Koplow 2015). The IEA follows the price-gap approach in defining energy subsidies as ‘any government action that concerns primarily the energy sector that lowers the cost of energy production, raises the price received by energy producers or lowers the price paid by energy consumers’ (IEA 2006, 1). The OECD, by contrast, follows the inventory approach and defines energy subsidies (or ‘support’) as: ‘A result of a government action that confers an advantage on consumers or producers [of energy], in order to supplement their income or lower their costs’ (OECD 2005, 191). This definition is based on the WTO’s ASCM, according to which a subsidy only exists when it confers a benefit to a specific party.

The lack of a consensus over the definition of energy subsidies is not merely a technical matter, but a deeply political one. It results in hugely varying estimates of the size of energy subsidies (Table 2). Estimates of fossil fuel subsidies in 2014, for instance, range from US\$493 billion (IEA 2015) to no less than US\$5.3 trillion (IMF 2015). These diverging estimates obviously convey different messages about the magnitude and urgency of the policy issue at hand, and what kind of reforms (if any) are recommended. The disagreement over what should be counted and how is thus an inherently value-laden exercise (Van de Graaf and Zelli 2016). The IEA’s estimate of US\$493 billion covers consumer subsidies, which are especially rampant in non-OECD countries, but leaves out production subsidies, which might actually contribute to the energy security of the IEA’s member governments, still the agency’s primary objective. For the economists at the IMF, energy subsidies have typically been framed in terms of fiscal stability, which is related to

Table 2 Estimates of fossil fuel subsidies by different international organizations

	OECD	IMF	IEA
Size in billion US\$ (years)	160–200 (annually from 2010 to 2014)	4900 (in 2013)	325 (in 2014)
Countries included	34 OECD countries plus six partner countries ^a	153 countries	41 (developing) countries ^b
Producer/consumer subsidies	Producer and consumer	Producer and consumer	Consumer
Source	OECD (2015)	Coady et al. (2015)	IEA (2016)

^a Brazil, China, India, Indonesia, Russia, and South Africa

^b Based on the IEA's online database at: <http://www.worldenergyoutlook.org/resources/energysubsidies/>. The countries listed in this database are the ones used for the IEA's 2015 World Energy Outlook (IEA 2015). The 2016 World Energy Outlook (IEA 2016) does not specify how many countries it covers

the organization's core tasks, but they also increasingly factor in various externalities such as climate change, air pollution, and traffic congestion. In WTO terms, subsidies are only relevant insofar as they are trade distorting, because that could make them legally actionable. In sum, when actors define energy subsidies differently, they construct different policy problems according to their value stance.

Skovgaard (2017b) provides an explanation for why the OECD and the IMF employ different definitions of fossil fuel subsidies. He finds that the approaches of both organizations towards the issue of fossil fuel subsidies are not shaped by the differences in membership and voting rules. Rather, the IMF's approach is heavily influenced by the bureaucracy's dominant neoclassical economic thinking. The OECD, having been instructed by the G20 to take on the issue, had less autonomy to frame fossil fuel subsidies in environmental terms.

A closer look at the rationales and effects of energy subsidies also reveals their contentious nature. Governments can subsidize energy for a multitude of reasons (Oosterhuis and Umpfenbach 2014). Economically, subsidies can reduce dependence on energy imports or bolster a country's position in the 'clean tech' race. Socially, subsidies may be given to improve energy access at affordable prices (a major concern in developing countries) or the protection of specific industries and jobs (e.g., the protection of coal miners in Germany). Environmentally, subsidies for renewable energy often serve to mitigate climate change or air pollution. Politically, energy subsidies can be seen as a rent provided by the politicians to secure the support of specific interest groups. The latter point goes a long way towards explaining why subsidies are often difficult to reform (Victor 2009).

Energy subsidies may thus be adopted to meet a range of objectives, but it remains unclear to which extent they actually achieve those aims. Moreover, energy subsidies are notorious for leading to other (unintended) adverse effects. Economically, energy subsidies often pose a considerable burden on the public purse. In some Middle Eastern and North African countries, for instance, fuel subsidies take up to 35% of the government budget (Fattouh and El-Katiri 2015). Socially, fuel subsidies tend to be regressive, meaning that they mainly benefit the richer part of the population which consumes more energy anyway (Koplow 2014). Environmentally, energy subsidies can have adverse effects. By increasing

consumption and undermining investments in efficiency and renewables, fossil fuel subsidies contribute to climate change. Renewable subsidies, by contrast, help to reduce emissions but may lead to other adverse environmental impacts (e.g., in the case of bioenergy or large hydro) (van Asselt and Skovgaard 2016).

3 Mapping the regime complex for energy subsidies

Having discussed why governments adopt energy subsidies and to what effect, this section surveys the various international institutions governing energy subsidies. Given the multifaceted nature of energy subsidies—being intimately tied to economic development, energy security, environmental sustainability, and international trade—they fall within the scope of multiple international institutions. Figure 1 depicts some of the key international institutions that are relevant for energy subsidies, and it shows how the energy subsidy regime complex can be situated at the intersection of the energy, trade, development, economic, and environmental governance regimes.

These institutions can be said to constitute a regime complex, following the definition of Orsini et al. (2013, 29): ‘a network of three or more international regimes that relate to a common subject matter; exhibit overlapping membership; and generate substantive, normative, or operative interactions recognized as potentially problematic whether or not they are managed effectively’. The common subject matter is that of ‘energy subsidies’, which is a topic that cuts across various international regimes, including those in the areas of trade (WTO), climate and environment (UNEP, UNFCCC), energy (IEA, IRENA, OPEC, ECT), and economic development (OECD, G20, APEC, World Bank, IMF). The boundaries of the regime complex ultimately lie in the eyes of the beholder, as is the case with definitions

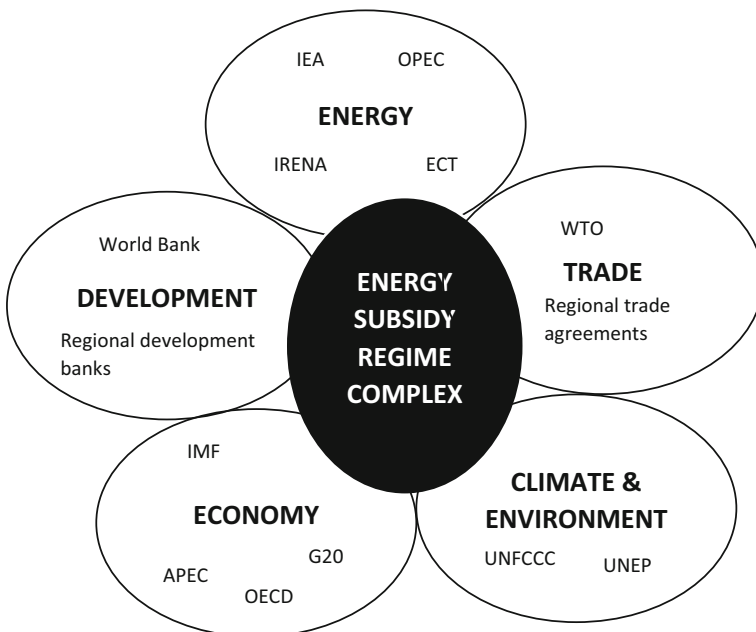


Fig. 1 International energy subsidy regime complex

of issue areas (trade, energy, climate change, biodiversity, security, refugees, etc.). As Keohane (1984, 61) wrote: ‘since issue areas depend on actors’ perceptions and behaviour rather than on inherent qualities of the subject matters, their boundaries change gradually over time’. What should be clear is that energy subsidies (and any effort to reform them) are co-governed by a plethora of international regimes.

At the heart of the definition of Orsini et al. (2013) is the assertion that there are interactions between the elemental regimes and that these interactions are ‘potentially problematic’. This clearly applies to the regime complex for energy subsidies. For example, the widely diverging estimates of fossil fuel subsidies reveal different values and world views (see Sect. 2). While subsidies to renewables may help achieve the goals of environmental regimes (e.g., UNFCCC), they may clash with the norms and rules of the international trade regime. Subsidies for nuclear and fossil energy could help to deliver energy security for the members of the IEA, yet they run counter to the goals and spirit of environmental (and possibly also trade) regimes.

There are significant differences with regard to how these institutions actually govern. Generally speaking, intergovernmental organizations (IGOs) can be geared towards facilitating the negotiation and implementation of agreements (e.g., G20, UNFCCC), resolving disputes (e.g., WTO), carrying out operational activities like technical assistance (e.g., World Bank, OECD), elaborating norms (e.g., G20, UNFCCC, WTO), and providing information (virtually all IGOs), among other functions (Keohane 1984; Abbott and Snidal 1998). Most organizations in the regime complex for energy subsidies perform more than one function, though each carries out its own unique combination of functions.

Smith and Urpelainen (2017) argue that the scope for coercion by IGOs is limited, but that IGOs can play important roles as venues where states can make voluntary commitments on reforming fossil fuel subsidies, thus putting a reputational cost on any possible policy reversal. This reputational cost is but one way through which IGOs can shape domestic debates about energy subsidies. Other pathways of influence include agenda setting, monitoring and reporting, and—in rare cases—legal challenges in case of non-compliance with international obligations (primarily under WTO law; see Sect. 4).

While it is impossible to make definitive statements about the effectiveness of the regime complex for energy subsidies, it is clear that some international institutions have ‘real teeth’ when it comes to energy subsidy policies. For example, the IMF has in some cases made its lending conditional on the implementation of energy pricing reforms, and renewable energy subsidies with local content requirements have been successfully challenged at the WTO. Moreover, through their ongoing engagement with national governments, IGOs such as the OECD and the World Bank can exert some ideational influence (Skovgaard 2017a, b).

4 The political economy of trade disputes related to energy subsidies

Backed by a strong dispute settlement system, the WTO plays a pivotal role in the regime complex for energy subsidies. Although the complex characteristics of energy make it unlike other goods regulated by the international trading system (Ghosh 2011), the WTO rules are in principle also applicable to energy subsidies (Marceau 2012).

The main WTO rules on subsidies can be found in the ASCM, which prohibits subsidies that are contingent upon export performance or upon the use of domestic over imported goods. Other subsidies that are deemed to be ‘specific’ (i.e., aimed at certain enterprises or

industries) and lead to ‘adverse effects’ on the interests of other members are ‘actionable’, meaning they are subject to a challenge. The ASCM also requires WTO members to notify their subsidies.

While these rules do not differentiate between types of energy subsidies, there are some striking differences in their application: no fossil fuel subsidy has ever been challenged before the WTO dispute settlement body, yet the number of challenges of renewable energy support measures is steadily increasing. The first case, *Canada-Renewable Energy*, concerned a feed-in tariff system for renewables in Ontario, in which the provincial government had stipulated local content requirements. Although the measure was not deemed a ‘subsidy’ under the ASCM, it was nevertheless struck down by the WTO’s Appellate Body (WTO 2013). Other disputes followed—with several still ongoing—involving some of the world’s major trading nations and blocs, including China, the EU, India, and the USA. This raises the question: why is renewable energy support being challenged, whereas measures to support the consumption and production of fossil fuels are seemingly let off the hook? This special issue offers several complementary answers to this question.

De Bièvre et al. (2017) take the legal explanation that has been put forward elsewhere (Asmelash 2015; Wold et al. 2012) as their starting point. This explanation—which is premised on the assumption that a government’s decision to initiate a challenge is based on the likelihood of success for the WTO dispute settlement mechanism—underscores the challenge of establishing that a fossil fuel subsidy will have ‘adverse effects’ and result in injury of other WTO members (Wold et al. 2012). Moreover, for fossil fuel consumer subsidies a key challenge is to prove that such subsidies are ‘specific’, given that the benefits of such subsidies generally accrue to a broad group of producers and/or consumers (Lang et al. 2010). Conversely, the adverse trade effects of renewable energy subsidies are usually more straightforward to demonstrate. Moreover, since many renewable energy support measures employ local content requirements, they are more likely to be considered incompatible with WTO rules.

Where De Bièvre et al. depart from this more standard explanation is in their focus not only on actual disputes but also on *potential* disputes. Examining information on potential cases brought to the attention of the European Commission and the US Trade Representative, they examine the plausibility of alternative explanations for the difference in challenges, including domestic lobbying efforts, the level of transparency surrounding energy subsidies, the size of economies of complainants and respondents, the relative power of parties to the dispute, and the complainant’s retaliatory power. They conclude, however, that the explanatory power of these factors is not stronger than the legal explanation outlined above.

Meyer (2017), in contrast to De Bièvre and colleagues, challenges the standard legal explanation by drawing attention to two alternative hypotheses that are based on the extent to which energy-producing nations have diversified their economies. First, he argues that states are more likely to challenge measures in countries with diversified economies, with countries producing renewable energy technologies usually falling into this category and countries producing fossil fuels usually not. Second, he contends that states are more likely to challenge *new* trade restrictions rather than measures that have been in place for a long time. As countries that are economically diverse tend to innovate more, including in the area of renewables, Meyer contends it is more likely that such measures are subject to a challenge.

What the contributions by De Bièvre et al. and Meyer underline is that there are multiple factors that may explain the discrepancy in challenges of renewable energy and

fossil fuel subsidies. Although the structure and substance of WTO law may be part of the equation, alternative explanations focusing on the political economy of WTO dispute settlement merit further attention. In addition, the contributions highlight the fact that support measures for fossil fuels and renewable energy may have more in common than is usually thought. Local content requirements, for instance, are not limited to renewable energy subsidies. Moreover, notification rates of both types of subsidies have been low.² Such insights offer a basis for a discussion of the prospective role of the WTO in the international governance of energy subsidies, as will be discussed next.

5 The international governance of energy subsidies: proposals for reform

The repeated call by the G20 to phase out fossil fuel subsidies and suggestions for energy subsidy reform in general, raise the question of which international institution(s) should play a role in helping realize such efforts, and what that role should entail.

Given its capacity to develop rules backed up by a strong dispute settlement mechanism, the WTO is an obvious candidate. Two types of proposals can be distinguished in this regard: proposals that seek to carve out a niche for (certain types of) renewable energy subsidies on the one hand, and proposals that seek to strengthen the hand of the WTO in addressing fossil fuel subsidies on the other.

Regarding the former suggestion, reforming rules for renewable energy support under the WTO is by no means uncontroversial. Although renewable energy subsidies can be an important part of a country's green industrial policy (Rodrik 2014), the jury is still out on the effectiveness of some of these measures—and particularly measures employing local content requirements (Cosbey and Rubini 2013). Nonetheless, several options for WTO reform have been put forward. Such suggestions include: making renewable energy subsidies non-actionable³; creating exceptions for renewable energy subsidies or applying existing environmental exceptions—notably Article XX of the GATT—to subsidies; adopting an interpretative understanding clarifying unclear terms of the ASCM; and negotiating a time-limited 'waiver' for specific renewable energy subsidies that would not be challenged in this period (e.g., Howse 2010; 2013; Rubini 2012; Cosbey and Mavroidis 2014; Espa and Rolland 2015).

Turning to WTO reform in the context of fossil fuel subsidies, De Bièvre et al. (2017), building on their findings outlined in Sect. 4, suggest that the most environmentally harmful fossil fuel subsidies should be prohibited, whereas other, less harmful, subsidies could be made actionable. In pursuing this reform, inspiration could be drawn from the precedent of fisheries subsidies, which is examined in more detail by Young (2017).

Young starts by comparing the similarities and differences between fisheries and fossil fuel subsidies. Although both are sizeable and known to have detrimental environmental effects, the focus in fisheries thus far has been mainly on production subsidies, whereas for fossil fuels, the spotlight has mainly been on subsidies for consumption. From a trade law perspective, however, the challenge for both types of subsidies is to separate 'good' from

² This is a broader problem for the ASCM, which may be due to a lack of commitment, a lack of clarity about which subsidies need to be reported, and the inherent difficulties of estimating them (Casier et al. 2014).

³ Initially, Article 8.2 of the ASCM made certain environmental subsidies non-actionable for a time-limited period, which expired in 2000. Simply reviving this provision may not suffice, however (Cosbey and Mavroidis 2014).

'bad' subsidies. Young discusses developments at the multilateral level, where following some initial progress efforts to reform fisheries subsidies, instigated by a small group of countries called the 'Friends of Fish', got caught up in the broader deadlock in the Doha Development Round under the WTO.

Young's contribution also draws attention to the innovative provisions on fisheries subsidies in the recent Trans-Pacific Partnership, a 'mega-regional' agreement bringing together Australia, Canada, Japan, and the USA, among others (though the latter is unlikely to ratify the treaty). Regional trade agreements may also assume increasing importance in the future governance of energy subsidies. For instance, the recent EU-Singapore Free Trade Agreement included a provision on fossil fuel subsidies. The same agreement also specifies rules for renewable energy subsidies, with the use of local content requirements being prohibited. This example shows that in the absence of progress at the multilateral level—or as a parallel effort—energy subsidy reform may well be driven by regional efforts. This finding is particularly relevant given the inherent challenges of achieving multilateral agreement, and the current stalemate in the Doha Round.

Given their greenhouse gas emissions implications, the UNFCCC is another forum that could promote energy subsidy reform. The role of this institution in governing fossil fuel subsidies is examined by van Asselt and Kulovesi (2017). They show that historically, parties to the UNFCCC have tended to eschew the link between climate change and fossil fuels altogether, mainly at the insistence of oil-producing nations. However, the bottom-up nature of the 2015 Paris Agreement offers an opportunity for proactive parties to put fossil fuel subsidy reform on the international agenda in various ways, such as including fossil fuel subsidy reform in the five-yearly 'nationally determined contributions' submitted to the UNFCCC, reporting on the results achieved through national efforts, and steering financial investments away from fossil fuels. However, van Asselt and Kulovesi also point out that it is unrealistic to expect the UNFCCC to set standards to phase out or reform fossil fuel subsidies.

As both Skovgaard (2017b) and Smith and Urpelainen (2017) underscore, other IGOs can play an important complementary role in the governance of energy subsidies, by building a knowledge base on the size and consequences of energy subsidies that is necessary for reform proposal to work, by enhancing transparency around the subsidies adopted by different governments, and by working with those governments as well as other stakeholders to implement energy subsidy reform at the national level.

Finally, institutions such as the G20, APEC, and the UNFCCC can play a crucial role in signalling the need for energy subsidy reform. Although the G20 statements have been criticized for their 'cut-and-paste' nature (e.g., Whitley 2016), they have also marked the start of follow-up processes in other IGOs, and by members, culminating in the first governmental peer reviews of fossil fuel subsidies being published in 2016.⁴ And although the Paris Agreement does not call for the phasing out or reform of fossil fuel subsidies, it offers an important signal that the world is moving towards a low-carbon future (van Asselt and Kulovesi, 2017).

In short, there is scope for several institutions to play a more prominent role in reforming energy subsidies. In addition, proposals have been put forward to ensure better alignment of the objectives and activities of different regimes.⁵ Kalimo et al. (2017) offer one such proposal, focusing on the role of the WTO's dispute settlement mechanism. They critique the approach adopted by the Appellate Body in *Canada-Renewable Energy*,

⁴ The peer reviews can be found at: <http://www.oecd.org/site/tadffss/publication/>.

⁵ This can be characterized as a form of 'interplay management' (Oberthür 2009; van Asselt 2014b).

namely the definition of ‘relevant markets’ for renewable and non-renewable energy, to reconcile diverging environmental and economic values. Kalimo et al. show that the test developed by the Appellate Body would run into difficulties if applied to the issue area of biofuel subsidies—which are increasingly being challenged under the WTO—and argue that rather than leaving value reconciliation to the WTO judiciary, WTO members should develop rules to balance economic and environmental values under the ASCM (as also discussed at the beginning of this section).

6 Conclusions

Energy subsidies are usually established by national or sub-national governments, yet they raise important questions for international trade, climate change, energy security, and economic development. As such, they fall under the remit of several international organizations, which can be said to constitute an energy subsidy regime complex. As more and more IGOs have become active on the issue, the regime complex has expanded in recent years, creating interesting horizontal (i.e., between IGOs) and vertical (i.e., IGO-state) interactions. The international governance of energy subsidies has hitherto only received scant attention in the literature. This special issue is intended to help bridge this gap.

Yet, several important questions warrant further inquiry. Here, we highlight five promising avenues for further research. First, the politics of defining energy subsidies calls for further scrutiny. Why is it so difficult to come to a consensus definition like there exists for agricultural or fisheries subsidies? Second, how do (and can) non-state actors such as the Global Subsidies Initiative and small country coalitions such as the Friends of Fossil Fuel Subsidy Reform complement and/or influence the intergovernmental policy processes discussed in this issue? Third, what is the (potential) role of (mega-)regional trade agreements in governing energy subsidies, and how can regional efforts influence multi-lateral progress, and vice versa? Fourth, with regard to fossil fuel subsidies, what effects will the recently launched G20 peer review process have on national efforts to phase out such subsidies? And lastly, are existing fossil fuel subsidies—as identified, for instance, by the G20 peer review reports and the OECD’s ongoing inventory—compatible with WTO law, or could they—just like renewable energy support measures—run afoul of trade rules?

These questions show that this issue is merely scratching the surface of a promising area for governance researchers. We hope the contributions in this issue offer a solid foundation for such inquiries.

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