Actors, institutions and frames in global energy politics

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If one ought to describe the global political economy—the "who gets what when and how"—of energy in a single word, "fragmentation" would be an appropriate term. The pursuit of wealth and power in energy is driven by a hugely diverse set of actors and institutions, operating across different political scales, geographical spaces, energy sources, and market segments. Interests, power, values and perceptions in global energy are equally splintered. They are also constantly in motion, molded by global shifts in technology, politics, the environment, and the economy. This fragmentation makes the analysis of global energy politics difficult but all the more interesting. The goal of this paper is to lay out the different types of actors, institutions and frames that are active or valid in global energy politics, and to look in particular at the fragmented institutional architecture of global energy governance.

The paper proceeds in the following fashion. First, it provides a deconstruction of the global energy challenge, arguing that the world does not face a singular energy problem but in fact multiple energy-related challenges. Which energy problem merits attention depends very much on the worldviews and values that one subscribes to. Second, the paper argues that effective governance is needed to overcome these challenges and it lays bare the fragmented nature of energy governance at the national, regional and global levels. Third, the paper zooms into some of the relations between elements in this fragmented governance landscape, identifying the most prominent gaps, overlaps and interactions in global energy governance.

1. Deconstructing the energy challenge

1.1. Unsustainable energy trends

Economic growth and prosperity in modern society are unthinkable without the reliable provision of sufficient and affordable units of energy and, thus, some degree of energy security. The energy sector is also key to effective climate change mitigation as it is responsible for no less than two-thirds of global greenhouse gas emissions (IEA, 2015).

Addressing the twin challenges of climate change and energy security is of critical importance but world energy trends are heading in the wrong direction.

To assess the world's energy trends, there is probably no better place to start than the *World Energy Outlook* (WEO). The WEO is the flagship publication of the International Energy Agency (IEA), issued each year in November. With hundreds of pages of analysis and charts, the report's projections are widely seen as the "bible" of the international energy industry. The report projects how energy demand, supply, prices, and technologies will evolve in the ensuing 25 years under business-as-usual and some alternative scenarios. Energy geeks revel in the wealth of data that the outlook contains, but governments and the media also pay a close eye to the messages that the IEA conveys through its report. Those messages have become more grim in recent years.

In its baseline scenario, the IEA projects that energy demand will be 37 per cent higher in 2040 than in 2012, putting us on track for a long-term average global temperature increase of 3.6 degrees Celsius above levels that prevailed at the start of the industrial revolution (IEA, 2014).[1] Almost all of the growth in energy demand comes from non-OECD countries, shifting the center of gravity of energy markets decisively away from the Americas and Europe. Fossil fuels (oil, coal and gas) remain the dominant energy sources, though their share in the overall energy mix falls from 80 to 74 per cent. The IEA estimates that a cumulative investment of 37 trillion US dollars (in year-2011 dollars) is required to expand the world's energy-supply infrastructure to meet expected market demand over the next 25 years (IEA, 2012, p. 73).

Often overlooked in mainstream accounts of global energy trends is the issue of energy poverty—probably because it is more a constant than a trend. About 1 billion people (that is about 15 per cent of the global population) currently have no access to electricity in their homes, and are thus deprived of the useful energy services that electricity delivers, including modern lighting and refrigeration services. An even higher number of people, 2.9 billion, relies on solid biomass fuels – such as wood, agricultural residues and dung – to cook their food or heat their homes (REN21, 2015, p. 103). This has dire consequences for health – the World Health Organization (2012) estimates that approximately 4.3 million people die prematurely, every year, as a result of fumes from household air pollution. This makes it the greatest health risk in the world after high blood pressure, tobacco and alcohol (Lim et al., 2012). Dependence on such solid fuels is also detrimental for more productive activities such

[1] The IEA's baseline scenario is the so-called New Policies Scenario, which takes account of new policy commitments and plans (even if the plans to implement these have yet to be announced).

as farming and education since those people, most often women and children, spend many hours gathering such fuels (Subramanian, 2014). Wood gathering can also lead to deforestation, severely damaging local and global ecosystems (Birol, 2007).

These sobering statistics and trends led the IEA to conclude that "the world's energy system is at a crossroads. Current global trends in energy supply and consumption are patently unsustainable – environmentally, economically and socially. But that can – and must – be altered; *there is still time to change the road we're on*. It is not an exaggeration to claim that the future of human prosperity depends on how successfully we tackle the two central energy challenges facing us today: securing the supply of reliable and affordable energy; and effecting a rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply. What is needed is nothing short of an energy revolution" (IEA, 2008, p. 37). Yet, in practice, many types of energy revolutions are advocated. At best, this reflects disagreement about what the global energy challenge really is. At worst, it reflects rhetorical strategies to cloak private interests in a discourse of the public good. This leads us to discuss the importance of framing in energy policy.

1.2. Energy frames, values and worldviews

While the energy statistics of the IEA remain largely undisputed, views diverge on what constitutes the key energy problem of today and the most appropriate way to solve it. As frame theorists like Schön and Rein (1994) argue, we do not just make decisions based on hard, cold facts, but also on values, worldviews, paradigms and principled beliefs. Benjamin Sovacool and Marilyn Brown (2015) identify no less than eight different cognitive or epistemic "frames" with regard to energy. A popular frame among physicists and engineers is that of "technological optimism," which states that we can fix practically any energy problem with technological innovation. Economists subscribing to the frame of "free market libertarianism" share this optimism but place their faith in free and open markets as the harbinger of public and private goods. These worldviews are contested by more pessimistic notions that stress the detrimental effects of energy on the environment (the "environmental preservationist" frame), social communities ("justice" or "philanthropist" frames), labor relations ("neo-Marxist" frame), or national security ("national security" frame). The "conscientious consumer" frame, finally, holds that it is individual behavior or consumer demand that must be changed to ensure better energy outcomes.

These energy frames bear close resemblance to four major worldviews of the global political economy of the environment, as identified by Jennifer Clapp and Peter Dauvergne

(2005). One worldview is that of "market liberals," who see globalization and economic growth as positive forces that will improve environmental conditions. They also place great faith in the ability of modern science and technology to help societies slip out of any environmental binds that may occur. Another view is that of "institutionalists," who see a lack of global cooperation as a key source of environmental degradation and emphasize the need for stronger global institutions to harness globalization. Third, there is the view of "bioenvironmentalists," who warn that the earth's carrying capacity is (about to get) overstretched unless we pose limits to economic and population growth. Finally, "social greens" see social and environmental problems as inseparable. Global capitalism feeds exploitation of social groups (workers, women, indigenous peoples, the poor) and of the environment, and should be rejected.

The existence of different energy frames and worldviews are a reminder that there is no such thing as "the" global energy challenge; instead, there are many different energy problems and the prioritization and trade-offs involved reflect different worldviews and values. Energy is merely a prism through which broader issues refract. This helps to understand why "energy security" is such a contested concept, with one account identifying no less than 45 distinct definitions of the concept (Sovacool, 2010). Some observers have even concluded that "energy security is like a Rorschach inkblot test—you can see whatever you want to see in it."[2] Focusing on the underlying values and frames of energy security directs attention to the strategic value of this multitude of definitions: actors advance very different notions of energy security to justify their actions and policies on "energy security" grounds (Sovacool & Mukherjee, 2011).

1.3. Frames and goals of global energy policy

Building on these conceptualizations, we differentiate at least four overarching frames for the field of global energy policy. Each of these frames is marked by one interconnected dimension or prioritized component with regard to energy security. These dimensions are: "availability," relating to the relative independence and diversification of energy fuels and services; "affordability," which does not just mean low prices for energy consumers but also stable prices to increase planning and investment security; "sustainability," referring to both the protection of the natural environment and preventing the full depletion of non-renewable

[2] Participant at the International Workshop on Energy Security Concepts and Indicators for Asia, Lee Kuan Yew School of Public Policy, November 14-16 2009, Singapore, quoted in Sovacool & Mukherjee (2011).

energy sources by making a timely swift to renewable energy sources; and "social acceptability," implies respect for human rights and dignity both in relation to individuals and social groups.

Table 1. Frames and worldviews on the international political economy of energy

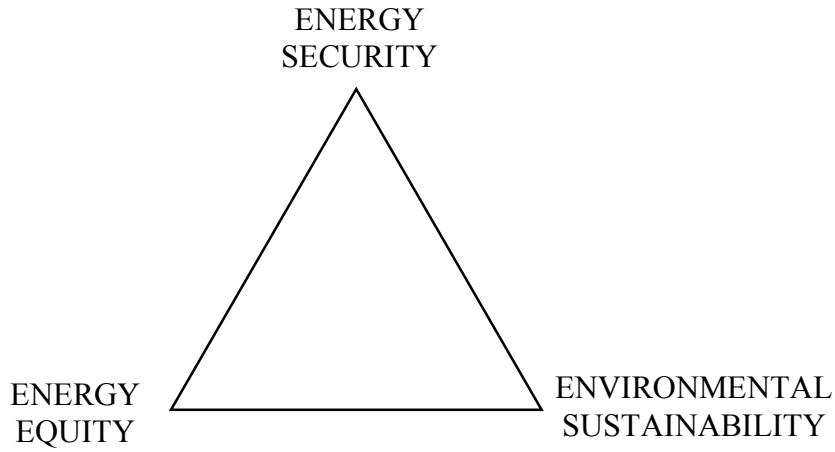
Frame Agents	Dominant worldviews	Prioritized component of energy security	Energy security for whom?	Underlying values and goals
Market liberalists	Technological optimism, free market libertarianism	Economic affordability	Economy	Welfare, freedom
Neo-mercantilists	Defense of national security	Geopolitical availability	State	Political independence and territorial integrity
Environmentalists	Environmental preservationism, conscientious consumption	Environmental sustainability	Earth	Respect for nature
Social greens	Justice, neo-Marxism	Social acceptability	Society	Equity, justice

Table 1 juxtaposes these different frames, worldviews and values on the IPE of energy. It highlights for each type of frame in the left column, depicted here as frame agents, different basic perspectives with regard to global energy security—namely, the dominant worldviews that are at the core of each frame, the key energy problem perceived, the referent object for energy security, and the underlying values of the approach. Although this table provides a useful heuristic to make sense of the importance of framing in relation to any discussion about the global energy challenge, it necessarily represents an over-simplification of reality. There can be considerable variation in views within each of the four categories. Moreover, both these views and their interrelation are subject to remarkable swings over time.

The notion of energy security has clearly broadened. Whereas in the 1970s and 1980s, energy security meant stable supply of cheap oil under threats of embargoes and price manipulation by exporters, contemporary views of energy security encompass a much wider range of issues beyond oil supplies. In addition, the understanding has grown that energy is entangled with other global issues such as development and climate change (Cherp & Jewell, 2014).

To be clear, the above four frames, which are based on Clapp and Dauvergne (2005), are but one possibility to distinguish and assign core energy-related worldviews, agents and goals. In an overlapping, but slightly different approach, the goals of global energy policy are routinely presented as a "policy trilemma," as they revolve around the question of how to meet the three demands of securing energy supply, protecting the global climate and (specifically for developing countries) reducing energy poverty (Cherp & Jewell, 2011; Gunningham, 2012). The World Energy Council (WEC), a UN-accredited global energy forum, sees the energy trilemma as balancing between the competing needs of energy security, energy equity (comprising both accessibility and affordability), and environmental sustainability (see Figure 1). The WEC has developed an Energy Trilemma Index that captures and aggregates the energy performances of almost 130 countries on a yearly basis.[3]

Figure 1. Balancing the 'energy trilemma'



Source: World Energy Council.

The basic idea of such a trilemma is that it is often difficult to achieve all three goals simultaneously (e.g., Froggatt & Levi, 2009; Ürge-Vorsatz & Herrero, 2012). For example, off-grid diesel generators have long been the preferred solution for bringing electricity to rural

[3] See: https://www.worldenergy.org/data/trilemma-index/ (last accessed: October 27, 2015).

regions in the developing world, yet they bring further harm to our warming climate. Nuclear energy emits less CO_2 than coal- and gas-fired power plants, but it entails huge security risks, and it presents no solution to rural energy poverty if not accompanied by costly grid extensions. To be sure, synergies and co-benefits can certainly be reaped—e.g., decarbonization policies can lead to improved air quality, thereby reducing energy-related health impacts worldwide, and they can lead to lower import dependencies, thereby bolstering energy security for countries and regions (McCollum et al., 2013). Yet, a comprehensive overview by Sovacool and Saunders (2014) suggests that there are more conflicts than synergies involved. "Energy security," in their view

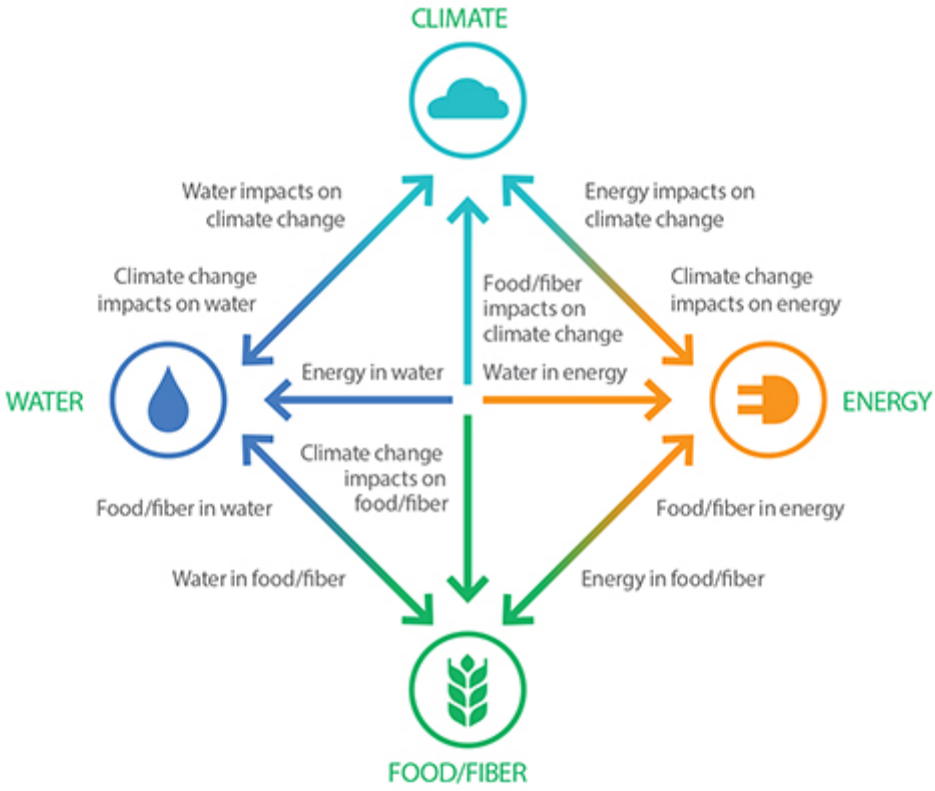
> "can never be truly optimized... Energy security only works by prioritizing some dimensions more than others. Put another way, successfully reducing oil dependence is totally different from a strategy for affordability or sustainability; as such, energy security planning is about managing tradeoffs and risks, it can never truly eliminate them. Therefore, it will never be sufficient to provide policymakers a "laundry list" of policy prescriptions for achieving energy security when this list ignores qualitative differences between technologies and energy security goals. … Energy analysts and policymakers should plan for energy security failure; they should expect that whatever energy gains they accomplish will only come at the expense of losses at some other part of the energy security spectrum" (Sovacool and Saunders, 2014, p. 649)

However, the energy trilemma is a specific rhetorical device that is prone to criticism. For one thing, different versions of the trilemma exist that stress or collapse certain factors while neglecting others. The central goals of the energy policy of the European Union (EU), are spelled out in the Lisbon Treaty (art. 194) as security of supply, competitiveness, and sustainability. Compared to the WEC's energy trilemma, no mention is made of energy poverty in its global dimensions. The WEC's conceptualization can also be criticized for lumping together affordability and accessibility under the same heading of "energy equity", although they are two different things and may involve trade-offs among themselves (cf. the perspectives of market liberalists and social greens in Table 1).

Moreover, there is increasing recognition that energy systems are inextricably linked to food and water systems, all of which affect and are affected by climate change, constituting a global resource "nexus" (Bazilian et al., 2011). Such a nexus approach, as depicted in Figure 2, introduces many more dimensions into the equation and therefore also involves a multiplication of the dilemmas and trade-offs involved. Compared to the energy trilemma, it is more complex and may therefore be less attractive as a policy planning instrument. Yet,

crucially, it underlines the importance to go beyond a silo approach and attempt to devise energy policies holistically, taking into account multiple dimensions and related trade-offs.

Figure 2. The water-energy-food-climate nexus



Source: World Business Council for Sustainable Development

2. The fragmented landscape of energy governance

Despite the manifold meanings and framings of the term energy security, there is a large consensus that the energy sector needs some form of "governance." The concept of governance became widely used in development policy circles in the 1980s and, from there, also spread among social scientists more generally. The term is now part of the established lexicon of multiple disciplines, including political science, law, public administration, economics, sociology, geography and history (Rhodes, 1996). The emergence and rapid spread of the term is linked to processes of neoliberalism and globalization, which denotes the global shift from the 1970s onwards to financial deregulation, trade liberalization and the consolidation of global production networks (Scholte, 2005). These shifts are said to have eroded the capacity of traditional modes of state-based regulation to steer society, both domestically and internationally (Strange, 1996).

Although the "retreat of the state" is probably overstated in many narratives of globalization, there is plentiful evidence that non-state actors have come to play a more important role in issues of public policy. Where governance was once assumed to be synonymous with the activities of government, today it is understood to also encompass the activities of local and international NGOs and activist groups and the decisions crafted in corporate boardrooms and at global conferences. The key difference between "government" and "governance" is of course that the former exercises formal authority, backed by strong enforcement mechanisms, whereas the latter refers to activities backed by shared goals that may or may not rely on formal authority and coercive power (Rosenau & Czempiel, 1992).

2.1. National energy governance

Despite all the buzz about energy sector deregulation, liberalization and privatization, the role of government in shaping the energy sector remains crucial. The policy and regulatory frameworks established at national levels still largely steer energy investment and consumption decisions. A useful way to grasp the challenges associated with national governance is offered by political geographer Michael Bradshaw (2014), who has examined how the energy dilemmas identified above play out in different regions and countries. In the high-energy societies of the *developed world*, there is a growing tension between the climate-change imperative of decarbonization and the affordability dimension of energy security. For the *emerging economies,* the imperative to secure sufficient energy to continue to fuel economic growth often takes precedence over concerns about emissions. In the *developing world*, finally, issues of energy access take clear priority over the promotion of clean energy. Throughout these different country categories runs the cleavage of energy exporters versus importers, each of which faces a distinct set of dilemmas.[4] In terms of the four frames above, these country strategies reflect a dominance of neo-mercantilist and market-liberalist frames – with obvious tensions between them – while environmentalist and social green frames are less influential.

There are different styles of national energy governance. *State corporatist* countries (e.g., Germany, Japan, and Korea) combine a highly centralized public bureaucracy apparatus with policy networks that include societal groups recognized and legitimized by the state. *Social-corporatist* countries (e.g., Nordic countries) also exhibit interaction among interests

[4] Bradshaw also discusses a fourth category of countries, post-socialist transition states, but concludes that while they share a similar past, their future paths will diverge and these countries will either become developed, emerging or developing.

formally organized by the state, yet the state itself plays a less peremptory role. In *liberal-pluralist* countries (e.g., US, UK, and Australia), the state plays a minimalist role, leaving ample space for private interest groups to influence policies. A final category of countries, the *state nations* (e.g., France, Italy and Belgium), encompass a strong state with close associations to business (Spencer et al., 2005). These categories only capture variation among capitalist, developed countries. More styles exist when non-capitalist, developing countries are taken into consideration.

These cross-national differences in governance styles can be juxtaposed with differences in how energy governance is organized institutionally and what types of policy instruments are favored. In terms of institutions, there are huge differences across countries. For example, control over India's energy policy and planning has long been spread over five fuel-based ministries: coal, power, petroleum and natural gas, new and renewable energy, and atomic energy (Dubash, 2011). China, by contrast, does not even have an energy ministry tasked with coordinating government policy in this sphere (Kong, 2011). Under Margaret Thatcher's conservative government in the 1980s, Britain also abolished its energy ministry, applying the same set of competition and liberalization rules to energy as to any other sector, yet the government nevertheless remained heavily involved in the regulation of the sector (Buchan, 2002; Helm, 2002). The EU Commission did not have an energy directorate until recently—energy had been conjoined with transport. Since 2010 it has a directorate-general (DG) for energy, but also for climate action (which was previously included in the remit of the DG environment).

In terms of favored policy instruments—for example, whether the state resorts to taxes, subsidies, or regulations—choices appear to be influenced by the distributional effects of policies on important energy-related industries, public sentiment, and the institutional capacity of governments (Hughes and Urpelainen, 2015). The *political* effects of a given policy instrument were deemed the most important. As Hughes and Urpelainen (2015, p. 61) explain: "feed-in-tariffs, for example, are effective both because they increase the share of renewable energy in the electricity generation mix *and* because they increase the political influence of industries that support the retention and expansion of energy-related climate policies."

Although political preferences matter a great deal in explaining national energy trajectories and policies, state preferences in the international political economy of energy are of course also shaped by more structural factors. Geography matters a great deal, as countries

have strongly varying degrees of resource endowment. The extractive industries (e.g., coal, oil, gas, uranium) differ much from those of manufacturing or services because the energy resources are either there or not there. Unlike factories, they cannot be created elsewhere (Mitchell & Mitchell, 2015, p. 18). Like geography, climate matters too. Colder regions (e.g., UK or Denmark compared to Spain or Portugal) usually have higher heating loads—that is, the energy required to maintain interior temperatures in buildings at comfortable levels. This largely accounts for higher per capita energy consumption.

2.2. Multilateral energy governance

At present, the energy sector is still primarily addressed at the national level of government. Due to the increasing globalization of energy markets and externalities, however, there is an increasing number of energy issues that require collective action at the regional or global levels. Some energy-related challenges such as global warming or nuclear proliferation are global public "bads" that require international cooperation to avoid the dilemmas of collective action, such as free-riding, the prisoner's dilemma, or the tragedy of the commons (Olson, 1965; Hardin, 1968; Ostrom, 1990). Others, such as the urgent need to research and diffuse breakthrough energy technologies as widely as possible require the production of global public goods such as knowledge, finance, and standards (Barrett, 2007). Even for seemingly pure local issues, such as electricity deprivation in the Global South or corruption in the upstream oil sector, which are actually quite ubiquitous, benefits could be reaped from international cooperative action, complementary to regional and domestic action. For example, the dissemination of information, best practices, technology and capital are functions, relevant to energy that states often delegate to international organizations (Van de Graaf, 2013b). The political and economic sensitivities associated with the energy sector have made nation states reluctant to cede control over energy policy to global bodies or through international agreements. The result is what McGowan (2009) has called a "paradox of sovereignty," whereby states have less control over energy policy but remain largely unwilling to act jointly.

The dispersion of state interests and power is one of the major reasons why the energy sector has not given way to a coherent international regime. There is no single, overarching global institution for governing energy. Instead, energy is governed by a Byzantine architecture of parallel, nested and overlapping institutions, forming what Raustiala and Victor (2004) have called a "regime complex" (see also: Colgan et al., 2012; Van de Graaf, 2013b). It consists of a host of intergovernmental organizations, including the Organization of

Petroleum-Exporting Countries (OPEC), established in 1960 and now assembling twelve oil-exporting countries that collectively account for 40 percent of the world's oil supply.[5] There is also the Paris-based International Energy Agency (IEA), created in the wake of the first oil shock at the initiative of the American Secretary of State Henry Kissinger. While formerly antagonistic, OPEC and the IEA are now on speaking terms and even stage joint press conferences and informally coordinate in times of oil crises. The rapprochement between both organizations has given way to the establishment of a new international organization, the International Energy Forum (IEF), a biannual gathering of energy ministers that is supported since 2001 by small secretariat in Riyadh, Saudi Arabia.

Other intergovernmental energy organizations include: the International Atomic Energy Agency (IAEA), created in 1957 with a mandate to promote the peaceful and safe use of nuclear energy; the Energy Charter Treaty (ECT), which emerged in the early 1990s—the heyday of post-Cold War euphoria—as a means to create a secure investment climate for developing the energy sector, and particularly the natural gas sector, in the Former Soviet Union; the Gas-Exporting Countries Forum (GECF), which tries to emulate the OPEC model in the gas sector, so far to little avail; the International Partnership for Energy Efficiency Cooperation (IPEEC), housed at the IEA's headquarters since 2009 but with a global membership; and the International Renewable Energy Agency (IRENA), set up in 2009 by a number of member states of the IEA—notably Germany, Denmark and Spain—who were dissatisfied with what they saw as the IEA's lack of enthusiasm for renewable energy (Van de Graaf, 2013a).

Table 2. Selected intergovernmental energy organizations

	Mission	*Year of inception*	*Member states*	*Seat of the secretariat*
International Atomic Energy Agency (IAEA)	Promote nuclear safety and security	1957	165	Vienna
Organization of Petroleum-Exporting Countries (OPEC)	Raise oil rents for producers	1960	12	Vienna

[5] In September 2015, former member Indonesia submitted an official request to OPEC to reactivate its membership. See: OPEC press release, http://www.opec.org/opec_web/en/press_room/3146.htm, last accessed October 19, 2015.

International Energy Agency (IEA)	Energy security for consumers	1973	29	Paris
Energy Charter Treaty (ECT)	Govern Eurasian gas markets	1994	46	Brussels
International Energy Forum (IEF)	Global producer-consumer dialogue	2001	76	Riyadh
Gas-Exporting Countries Forum (GECF)	Raise gas rents for producers	2001	12	Doha
International Partnership for Energy Efficiency Cooperation (IPEEC)	Promote energy efficiency globally	2009	16	Paris
International Renewable Energy Agency (IRENA)	Promote renewable energy	2009	143	Masdar

The principal energy-specific intergovernmental organizations are listed in Table 2. However, this table offers an incomplete picture of the global energy architecture. To begin with, it omits the international organizations that were not primarily created to govern the energy sector, but whose activities nevertheless impinge on energy outcomes. Examples include the World Bank and other multilateral development banks, whose loans impact on energy infrastructure development in the Global South (Martinot, 2001; Tirpak & Adams, 2008; Nakhooda, 2011; Kim & Urpelainen, 2013); government clubs like the G8 and G20, which have turned to the energy sector from time to time in their attempt to manage the global economy (Lesage et al., 2009; Van de Graaf & Westphal, 2011); the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) with their support for public-private energy networks, energy-efficiency and renewable energy projects; and various international environmental regimes that impact on the energy sector—for example, the United Nations Framework Convention on Climate Change (UNFCCC) or the international regime that controls oil pollution at sea (Mitchell, 1994).

There are also a host of regional institutions that are relevant to the energy sector, including the European Union (EU), the North Atlantic Free Trade Agreement (NAFTA) (Selivanova, 2011), the Center for Renewable Energy and Energy Efficiency of the Economic Community Of West African States (ECOWAS) (Hancock, 2015), and the Organización Latinoamericana de Energía (OLADE).

Coming back to the two main framings of world energy politics introduced above: in terms of the trilemma of energy goals, Table 2 shows a clear dominance of securing energy supply among the missions of key intergovernmental energy organizations. The two other main goals, mitigating climate change and enhancing energy equity, rather play the role of side-products or are addressed by organizations with a non-energy-focused mandate, like the UNFCCC, UNDP, UNEP or the World Bank. In the same vein, these other organizations also show a stronger influence of environmentalist and social green frames, while the energy institutions listed above largely reflect a market-liberalist view.

2.3. Transnational energy governance

Table 2 also fails to acknowledge the growing role played by non-state actors, such as business, civil society and science organizations in global energy governance. Alongside the growth of civil society organizations domestically, the number of international NGOs has increased consistently since the Second World War, and most notably since the 1990s. In 2014, a total of 4186 NGOs were registered as groups with consultative status with the UN Economic and Social Council (ECOSOC).[6] A lot of them focus on energy, climate or sustainable development. Business actors have always played a crucial role in the international energy sector, as is illustrated by the pivotal role that the international oil majors played in governing the petroleum market before the "OPEC revolution" of the 1970s.

These non-state actors sometimes participate in intergovernmental processes. For example, oil companies with business operations in IEA member countries are directly involved in the IEA's oil emergency mechanisms (Badger, 1988; Van de Graaf & Lesage, 2009). Both civil society and business groups attend international climate negotiations and try to influence the intergovernmental processes. Apart from participating in interstate negotiations, non-state actors have also created transnational networks around global policy objectives. While such networks may involve governmental actors, their defining characteristic is independence from state approval or support. Where transnational networks assume a more institutionalized form and begin to set broader norms and rules, they become transnational governance networks in their own right (Falkner, 2011). Such networks make up a central steering mechanism in contemporary global governance, including in the energy sphere.

[6] List available from: http://csonet.org, last accessed September 22, 2015.

Such transnational governance regimes come in various forms. Some are structured as "public-private partnerships," bringing together business actors, societal groups, and governmental actors in joint efforts to address specific public policy problems. At the United Nations level, partnerships have been endorsed through the establishment of the Global Compact, a voluntary partnership between corporations and the UN, as well as through the so-called type-2 outcomes concluded by governments at the UN World Summit on Sustainable Development (WSSD) in Johannesburg in 2002 that institutionalizes public-private partnerships in issue areas ranging from biodiversity to energy. Out of the 340 partnerships that were registered with the United Nations Commission on Sustainable Development (UNCSD) in early 2012, 46 have a primary focus on energy issues (Pattberg et al, 2012).

The Renewable Energy and Energy Efficiency Partnership (REEEP) is a prime example of the larger universe of public-private partnerships devised and established around the 2002 summit. As an open-ended initiative to facilitate multistakeholder cooperation in the renewable energy, climate change, and sustainable development sector, REEEP is a cooperative platform for more than 3,500 members and 250 registered partners, among them over 40 governmental actors (both national and subnational), including all of the G7 states, and several international organizations.

Another instance of transnational governance are "private regimes," which involve non-state actors willing to commit to self-regulatory norms, standards and certification schemes in a given issue area. The Global Sustainable Electricity Partnership, an association of electricity companies, promotes sustainable energy projects and capacity-building (Abbott, 2012; Green, 2013). These instances of transnational energy governance are mostly voluntary in nature and tend to rely on disclosure. The Extractive Industries Transparency Initiative (EITI) aims to tackle corruption in the upstream oil and gas sectors by facilitating voluntary reporting on payments made by major firms.

In addition, a number of transnational networks have emerged that only indirectly aim at the reduction of greenhouse gas emissions, but rather focus on creating the necessary information and transparency for societal actors to assess corporate responses to climate change and thereby induce lasting behavioral change, e.g. the Carbon Disclosure Project. Often these schemes are supported by institutional investors that have begun to include sustainability in their investments decision. These benchmarking processes create a global competition among business actors to address climate change as a serious limitation to their profit-making activities. The emerging information-based governance schemes effectively

institutionalize new norms at the transnational level, for example the norm to disclose corporate carbon emissions, in addition to the country-based reporting of the UNFCCC (Florini & Saleem, 2011).

Given the enormous diversity in such transnational governance networks, it need not come as a surprise that there is equally much divergence in the effectiveness of such networks. Research by Heleen de Coninck et al. (2008) have concluded that international technology-oriented agreements to address climate change can be effective, especially if they set standards and mandates for specific sectors, not for specific technologies. Another analysis concurs that the internal structures and institutional design enhances the effectiveness of transnational energy partnerships, although the involvement of powerful actors (industrialized countries and major corporations) may further enhance effectiveness. These causal connections notwithstanding, Szulecki et al. (2011) also found that, so far, the majority of private-public energy partnerships have not been fulfilling the high expectations placed on their effectiveness.

In terms of dominant frames, most of the transnational energy initiatives seek to marry energy security concerns with environmental sustainability, i.e. mitigating climate change. In the same vein, they combine market liberalist and environmentalist framings, pursuing the vision of a green economy, thus – and unlike major intergovernmental energy organizations – reflecting the focus of different United Nations institutions that have facilitated the creation of many transnational initiatives.

3. Gaps, overlaps and interactions in global energy governance

An emerging strand of literature has come to address the institutional patchwork of global energy governance, describing it as "chaotic, incoherent, fragmented, incomplete, illogical or inefficient" (Cherp et al., 2011, p. 76). Yet, a more systematic, concept-driven approach to inter-institutional relations on energy is largely missing—with but a few exceptions (Bradshaw, 2014; Cherp et al., 2011; Colgan et al., 2012; Florini and Sovacool, 2011; Zelli et al., 2013). In the following we characterize the interactions between the different institutions by assessing the gaps, synergies and tensions they reflect with regard to the three major goals of the aforementioned energy trilemma: securing energy supply, reducing energy poverty, and mitigating climate change.

With respect to dominant frames and gaps, we already made a series of observations in the previous section:

- national energy politics in the industrialized world is marked by a partly conflictive, partly synergistic dynamic between environmental sustainability / climate change mitigation and securing energy supply;
- domestic energy politics in emerging economies is dominated by energy security concerns;
- national energy governance in low and middle income developing countries, by contrast, exhibits a clear dominance of energy access and the related poverty reduction goal;
- the major intergovernmental energy institutions focus on questions of securing energy supply;
- the two goals of energy equity and environmental sustainability, by contrast, play a stronger role in energy-related international institutions with a broader or different mandate, such as the World Bank or the UNFCCC;
- finally, most transnational energy governance initiatives seek to combine mitigation and energy security goals.

These insights suggest that energy equity enjoys the least institutional backup among the three major energy goals, being mostly promoted by governments of poorer countries and international development institutions. We can therefore expect that most institutional interactions in global energy governance reflect synergies and tensions between the goals of environmental sustainability, i.e. climate change mitigation, and securing energy supply. Our following look at some of the key institutional overlaps confirms this expectation, however with some notable exceptions.

When it comes to interactions involving major energy organizations and UN agencies, there is a certain trend towards synergy between mitigation and energy security. Even the relationship between the IEA and the UNFCCC has changed from strong tensions, due to the IEA's original bias towards fossil and nuclear industries, to one of mutual learning. After its telling absence in the early stages of climate negotiations, the IEA has eventually come to feed its expertise on energy technologies into climate summits. Likewise, the agency has broadened its climate-related work since 2005, albeit primarily incentivized by the G8 summit in Gleneagles (Van de Graaf & Lesage, 2009). Nonetheless, there is still a conflictive side to this interaction. After all, the climate regime architecture was designed to profoundly restructure energy choices around the world through its restrictions on carbon emissions and concomitant price increase for traditional energy carriers. Some of the European countries that

advocate this role for the climate regime consequently pushed for the creation of IRENA as a renewables counterpart to the IEA (Van de Graaf, 2013a).

Unlike the IEA, OPEC has kept a consistently strenuous relationship with the UNFCCC process – and hence the goal of mitigating climate change – until present. While the ideational clash over values and knowledge has slightly eased (OPEC delegates at least no longer question climate change *per se*), the issue of adverse impacts of climate policies or response measures is at the core of an ongoing conflict. "In essence, OPEC's strategy towards climate policies centers on two main goals: compensation and assistance" (Goldthau & Witte, 2011). As it becomes increasingly clear that a large share of all fossil fuels, including crude oil reserves, needs to stay in the ground to avoid average global warming to exceed 2 degrees Celsius (McGlade & Ekins, 2014), OPEC's options are gradually limited. Faced with the risk that oil deposits become "stranded assets," OPEC's only real option is to diversify its economy away from oil (Van de Graaf & Verbruggen, 2015).

Interactions between club or public-private energy arrangements and UN institutions over energy issues are characterized by both synergistic and conflictive features. There are supportive overlaps wherever club arrangements have provided their members with additional incentives and awareness to advance their low-carbon development paths. The G8+5 with the Gleneagles Process and G20 are cases in point here. Summit declarations in Heiligendamm 2007, L'Aquila 2009, or Brisbane 2014 endorsed the UNFCCC process and included soft commitments for phasing out inefficient fossil energy subsidies (Van de Graaf and Westphal, 2011; Zelli, 2011; Zelli et al., 2013). But also the third major energy goal of equity was highlighted in these G20 declarations: stressing the importance of improved energy access for the global poor, the G20 and other clubs offer at least rhetorical synergies with similar objectives of UNDP and the World Bank.

On the other hand, observers cautioned against disruptive effects of various government clubs: their non-binding approaches may undermine the climate negotiations' drive towards hard law development on energy efficiency and the mitigation goal in general (Vihma, 2009), and their lack of inclusiveness leaves behind the energy concerns of the majority of developing countries – and particularly the poorer countries, thus rather paying lip service to the goal of energy access than pursuing it as a key priority. This indirect goal conflict is also evident for some of the public-private technology partnerships that evolved in the early 2000s, such as the now defunct Asia Pacific Partnership on Clean Development and Climate (Karlsson-Vinkhuyzen & van Asselt, 2009).

While government clubs have ambivalent overlaps with other institutions on the goals of environmental sustainability and energy equity, transnational initiatives engage in largely synergistic interactions on all three energy goals. When it comes to mitigation and energy access, information-based governance schemes not only institutionalize new norms like carbon disclosure, but also induce energy-related behavioral changes of private actors towards these goals (Florini & Saleem, 2011). Still, many critical voices remain as to potential disruptive effects of "climate capitalism," especially a preference for low-hanging fruits paired with an aversion for potentially risky investments for renewables in poorer developing countries (Paterson & Newell, 2010).

We so far looked at overlaps between energy-focused institutions, intergovernmental or transnational, on the one side and energy-related institutions like UNFCCC, UNDP or the World Bank on the other side. This perspective provided various examples of the expected dominance of energy security concerns and their synergies or tensions with the mitigation goal, with the objective of energy access still playing a secondary role.

In a final step, we briefly want to look at interactions amongst energy-related UN institutions, which, as we characterized them above, rather promote the goals of environmental sustainability and energy equity. One might assume a largely synergistic picture here, but this expectation is not always met. Although sustainable development is one of the UNFCCC's core principles (Article 3.4), ideational tensions between development (or rather: energy consumption) and sustainability objectives frequently emerged in climate negotiations—most prominently in the ongoing deadlock over burden sharing for limiting greenhouse gas emissions (Dubash & Florini, 2011). These tensions somehow resurfaced as turf wars between the UNFCCC and its UN sister agencies over the imprint of climate change on the energy and development agendas. Climate issues were largely subsumed under the 'energy' heading at the 2002 World Summit on Sustainable Development, and the UNFCCC secretariat at best played a modest role in the preparations for the Rio+20 summit in 2012.

But aside from these rivalries, UNEP, UNDP and UNFCCC created considerable ideational synergy as norm entrepreneurs for renewable energies, energy efficiency and reducing energy poverty since the late 1990s. Further convergence on these matters is reflected in the vibrant cross-institutional rhetoric of a 'green economy', notwithstanding the lack of concrete strategies to tackle underlying drivers of energy poverty (Bruggink, 2012).

Likewise, the World Bank's Climate Investment Funds significantly enhanced incentives and opportunities for developing countries to limit their greenhouse gas emissions,

thus creating a synergistic relationship with the international climate regime. But there are also conflictive aspects to this interaction, as the Bank largely goes for the commercially most attractive projects that do not show a particular pro-poor focus (Michaelowa & Michaelowa, 2011). The donor-oriented voting structure further adds to this bias in the Bank's low-carbon project portfolio. The new Green Climate Fund is expected to avoid such prioritization—and be more in line with energy choices promoted by the UNFCCC; but this will ultimately depend on its final governance structure and allocation criteria. In the same vein, for pursuing a pro-poor energy agenda more comprehensively, adaptation to climate change needs to be factored more strongly into the nexus between sustainability and energy equity across these institutions.

In sum, we find considerable variation at the global level for the overlaps between energy-focused organizations, both intergovernmental and non-governmental, and energy-related UN institutions. This is no surprise given the different actor constellations, objectives and logics that mark these institutions—and the relatively feeble ties among them. The institutional complexity hence very much reflects the material complexity – with dominance patterns, synergies and conflicts – between the three key goals of energy security, environmental sustainability and energy equity.

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