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Climate Change Negotiations in a Changing Global Energy Landscape: A Wicked Problem

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Since the establishment of the current climate change regime two decades ago, the politico-economic context of the regime has changed considerably. In this *Reflection*, we focus on salient developments in the global energy sector and consider how they have altered the context of climate change negotiations and might impact a future climate change regime.

Conceptualizing climate change

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 1997 Kyoto Protocol (KP) established a regime which seeks to address climate change mitigation in a top-down fashion by assigning emission reduction quotas to industrialized states. It regulates the issue at stake primarily as an environmental problem and secondarily as a developmental problem. Without distinguishing between their origins, the reduction of greenhouse gas emissions is central, supplemented by aid for developing states to help them address climate change. Unfortunately, this dual approach has prevented climate change negotiations from staying in touch with developments in the energy sector. The debate instead revolves around cost distribution, historical contribution to the problem, and the fear of free riders – without an agreed context for these concerns.

Climate change can be conceptualized as a set of wicked problems¹ – and the climate change-energy relationship as one of those problems. Wicked problems are characterized by intricate interdependencies and changing contexts. Furthermore, one's perspective on a wicked problem determines both its definition and solution. Various approaches to the problem are thus likely to co-exist. Possibly located at different levels

¹ Depending on what one's focus is, one can frame climate change as an environmental, poverty, economic, South-North, technological problem, or as a human rights and migration problem. See for the conceptualization of climate change as a "super wicked problem," Lazarus, Richard, "Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future," *Cornell Law Review* 94, no. 5 (2009): 1153–233.

of governance, these approaches may interact with each other and help address aspects of the climate change problem, but will not constitute a comprehensive solution. Wicked problems are “re-solved over and over again,”² and require continued regulatory and institutional adjustments. With respect to climate change mitigation, this realization implies that the current focus on top-down emission reductions may not be the only or most preferable solution.

The regime treats climate change as a universal pollution problem, by regulating and limiting the entry of substances into the environment. However, most gases that cause human-induced climate change are emitted while producing energy from fossil fuels. Accordingly, climate change mitigation is better characterized as an enviro-socio-economic problem that permeates our carbon-based economy. Thus, climate measures must dovetail with energy policy and the regulation of the energy sector if they are to have any effect.

The regulation of climate change as a pollution problem was inspired by earlier multilateral environmental agreements, in particular the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer to the 1985 Vienna Convention for the Protection of the Ozone Layer (Montreal Protocol). The Montreal Protocol was highly successful, as economically viable alternatives were available for removing ozone-depleting gases from a limited number of products and production processes. The ozone problem, then, was a relatively benign problem. In a rather linear process of regime evolution³ the regulatory framework helped to find and, subsequently, implement a generally accepted solution.

Climate change does not fit the parameters of the ozone problem. Thus far, there are no generally accepted solutions let alone implementation paths. Moreover, replacements for fossil fuels can only partly meet demand for energy. Undoubtedly, the debate about global warming and the climate change regime itself inspired technological advancements that are changing the way energy is produced. Yet, new technologies and energy markets occasionally reverse these trends and lead to “backward” fuel choices, because of falling prices for coal and the availability of oil and natural gas from previously inaccessible rock formations, such as shale gas, at low prices. The regulatory measures of the climate change regime are unresponsive to such developments.

We suggest that energy policy has to be a starting point if we wish to mitigate climate change. Given the wickedness of the problem, this will be no easy task. Unforeseen global economic circumstances, new technologies, and the need for societal support and cooperation with all stakeholders result in the need for an ongoing process of improving and updating the legal framework. Thus, in contrast with the ozone regime

² Rittel, Horst W. J., and Melvin M. Webber, “Dilemmas in a General Theory of Planning,” *Policy Sciences* 4, no. 2 (1973): 155–69, at 160.

³ Oberthür, Sebastian, “Die Reflexivität internationaler Regime: Erkenntnisse aus der Untersuchung von drei umweltpolitischen Problemfeldern” [The reflexivity of international regimes: Findings from research on three environmental policy fields], *Zeitschrift für Internationale Beziehungen* 3, no. 1 (1996): 27–32.

the evolution of the climate change regime cannot follow a linear path. In the following paragraphs, we illustrate this observation and show how fundamental shifts in the global energy landscape since the early 1990s have increased interdependencies and changed the context of the negotiations over climate change mitigation.

Fossil fuel-fired globalization

Combusting fossil fuels to produce energy is responsible for about 70% of all global greenhouse gas emissions and 68% of all carbon dioxide (CO₂) emissions, which is the main contributor to human-induced climate change.⁴ In past negotiations, this linkage had a less prominent place, as no one could have predicted both the rapid economic growth of some big developing states and the predominance of coal in their industrialization process.⁵ In the early 1990s – at the outset of their industrialization – there were no alternatives to fossil-fuelled economic development or viable low-carbon policies. Today, China not only consumes as much coal as the rest of the world combined but is also the biggest emitter of CO₂.⁶ Based on already installed facilities and growth scenarios, emerging market powers will be responsible for most increases in global CO₂ emissions.

Despite the fact that emerging market powers now participate in the world economy, their economic rise is not matched by comparable transformations in global politics. Since they often find it hard to align their interests, their responses to global problems, including climate change, are in flux. Their energy policies derive from domestic socio-economic considerations, rather than a collective wish for a global power shift or, more specifically, for adjustments in international energy and climate governance. Their economic rise, however, increases the number of influential stakeholders that gain from the unrestricted use of fossil fuels, which complicates the process of defining global climate measures.

⁴ See, United States Environmental Protection Agency - Global Greenhouse Gas Emissions Data; International Energy Agency (IEA), *CO₂ Emissions from Fuel Combustion: Highlights* (Paris: IEA, 2011), 67.

⁵ On average, the annual increase of CO₂ emissions from fossil fuel burning was only 1% in the 1990s, but from 2000 onwards these emissions grew on average by 3% annually from 24,150 million metric tonnes to 32,579 million metric tonnes in 2011, mainly because of the resumption of energy-intensive and carbon-intensive growth in developing states. From 1990 to 2012, China's coal consumption almost quadrupled, with a steep increase in the first decade of this century. India's coal consumption almost tripled from 1990 to 2012. Coal burning makes up 43% of all emissions from fossil fuel combustion and was mainly responsible for the growth in global CO₂ emissions in recent years. CO₂ emissions from coal combustion increased from 9,060 million metric tonnes in 2000 to 14,416 million metric tonnes in 2011. See, U.S. Energy Information Administration – International Energy Statistics; IEA, *CO₂ Emissions from Fuel Combustion: Highlights* (Paris: IEA, 2012), 8.

⁶ China's coal consumption reached 1,761 million tonnes oil equivalent in 2011 compared to the 3,629 million tonnes consumed by the rest of the world. In the same year, China's energy-related CO₂ emissions reached 8,715 million metric tonnes. The United States came second with 5,490 million metric tonnes. China's CO₂ emissions per capita (7.2 tonnes in 2011) are already on par with those of the EU27 (7.5 tonnes). See, BP, "BP Statistical Review of World Energy," June 2013; PBL Netherlands Environmental Assessment Agency, "Trends in Global CO₂ Emissions: 2012 Report," 18 July 2012.

The current structure of the energy sector also affects negotiations. During the 1990s, concepts such as cost effectiveness and efficiency induced reform of the sector, both in developed and developing states. The privatization of many assets altered the incentive structure; and energy companies in all parts of the world adjusted their day-to-day business dealings to resemble those of big publicly traded corporations that operate in global markets. Hence, market mechanisms dominate the global energy business today, which leaves many developments beyond the control of the state and complicates the implementation of low-carbon measures.

Furthermore, advancements in communication and transport technologies have enabled global trade in oil, coal, and natural gas on a previously unimaginable scale. Consequently, developments in big domestic or regional economies affect prices everywhere. Currently, relatively low prices for imported coal and liquefied natural gas place European electricity producers in a difficult position and derail EU climate policies. First, the recent shale gas boom and air-pollution legislation in the United States led to a shift towards natural gas in the US power sector and to increased coal exports to Europe. Second, previously the construction of generally more climate-friendly gas-fuelled power plants had been stimulated in the EU as an efficient means to reduce emissions. However, these plants can no longer operate competitively compared to cheaper coal-fuelled plants and subsidized electricity from renewables, especially as European electricity companies pay more for gas than necessary, due to long-term contracts with the Russian gas producer and exporter Gazprom.⁷

Other difficulties with energy regulation in the EU show that implementing climate policies poses serious challenges to policymakers, industry, and society. In the past decades, the EU began to establish a single electricity market to promote cross-border trade in addition to the unbundling of big utilities. However, thus far it has been a knotty task to coordinate EU climate measures with national energy policies. For example, after decades of protests and in reaction to the catastrophe in Fukushima the German government reversed its policy and decided in March 2011 to phase out nuclear energy by 2021 without informing other member states or Brussels. Now, because of heavy subsidies for renewables big changes in power production and transmission patterns in Europe's largest economy profoundly affect grids and tariffs in neighbouring member states and lead to instances of dangerous capacity overload and disruptions to cross-border electricity trading. Hence, national political agendas as well as a lack of consensus and coordination between all levels of governance leave EU climate change policy in disarray and raise doubts about the EU leadership role in climate change negotiations.

The complex interplay between markets and shifting policy objectives outlined above necessitates continuous realignment of climate and energy policies. The reorganization of the energy sector in the 1990s, in particular the privatization and unbundling of big utilities, has increased the number of actors and the diversity of interests that are affected by new regulations. In a situation of economic, financial, and political volatility,

⁷ Gas prices in these contracts are related to the price of crude oil. Oil prices remained high in recent years, at about US\$100 per barrel.

private energy companies are increasingly reluctant to commit to investments in long-term engagements. Given the dominance of fossil fuels, the implementation of bold climate measures will cause severe financial and economic disruptions, as fossil-fuel based facilities worth hundreds of billions would become “stranded assets” and the use of renewables involves much higher costs. Thus, government policies towards the energy sector have great impact on the future global energy landscape and international climate governance.

Outlook

How can the conceptualization of climate change as wicked problem help us identify possible ways of addressing the problem, at least for the near future? This brief reflection suggests that government involvement and regulation based on input from society and industry may be an important factor in guiding a transition to a low-carbon economy, in both industrialized and emerging economies. Policies will have to engage with the needs of society and industry, because wide acceptance and economic feasibility of measures that alter fundamental structures of our economy will be key to addressing climate change mitigation. The legal framework at all levels of governance must accommodate market forces and global interdependencies. Regulation is necessary to facilitate local green-energy initiatives and to stimulate cleaner fossil-fuel technologies worldwide, possibly by linking emission-trading schemes across continents. In addition, cooperation is needed to promote energy efficiency and decouple economic growth from rising carbon emissions. Attaining these ends will not be achieved through linear processes. Instead, policymakers and other actors involved in mitigating climate change will have to constantly re-assess the problem, while accounting for cost distribution, historical and present contributions to the problem, and tackling free riders.

Considering the next rounds of climate change negotiations, it seems that the future of any regime lies in the hands of China and the United States, as biggest global economies and emitters of CO₂. Internal disagreements are likely to complicate EU efforts to push for new climate measures at the international level. The positions of other actors remain unclear. Since neither China, as a developing state, nor the US are bound by the Kyoto process, they might not have top-down emission reductions on their agendas. Furthermore, they seem to have teamed up to coordinate their international climate change efforts.

It remains to be seen whether climate change negotiators will be able to fulfil the 2012 Doha agreement, to replace the KP by 2015, with effect from 2020. We suggest that chances are that a successor to the KP may well – instead of emphasizing internationally negotiated emission reductions – be framed in terms of nationally determined commitments, related to domestic energy policies.

As is characteristic of attempts to re-define and re-solve a wicked problem, the implementation of climate measures is an ongoing process that leads to spillover effects – such as market disruptions and stranded fossil fuel assets – that must also be

addressed. International law initially can only play a limited role, by facilitating a consultative process in which national approaches may inspire each other and incrementally lead to new international agreements. Implementing these agreements will require an unprecedented level of cooperation and coordination, especially between the industrialized world and emerging market powers. These efforts will have to go far beyond the current stalemated negotiations between developed and developing states. Novel approaches will be necessary to expedite the interaction between all stakeholders, in particular the energy sector, and lawmakers at various loci. Despite the realization that the climate change problem is here to stay, international lawyers need to continue to engage with climate change negotiations. Their contribution to the process inevitably involves a relentless re-exploring and re-determining of the legal context of climate change mitigation in an unsteady global energy landscape – a task that is far from straightforward.