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Environmental Governance Lab
Working Paper 2019-1

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EGL Working Paper 2019-1
January 2019

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This working paper presents a comparative case study, utilizing Bernstein and Hoffmann's (2016, 2018) theoretical framework, on the varied outputs, trajectories, and system outcomes of two U.S.-initiated climate clubs—the Asia-Pacific Partnership on Clean Development and Climate (APP) and the Clean Energy Ministerial (CEM). Both interventions target multiple subsystems of carbon lock-in, yet their focuses differ. While the APP aimed at downplaying government responsibilities in climate governance, reshaping climate governance practices, and promoting private sector activities on clean technology, the CEM largely focuses on facilitating jurisdictional policymaking and, to a lesser extent, private sector activities. Bernstein and Hoffmann (2016, 2018) stress the determinative roles of three transformative political mechanisms—coalition building, capacity building, and normalization—in the trajectories and system impacts of interventions. Though the APP's capacity building and coalition building efforts have only achieved limited results, the APP did promote several climate governance norms and practices, including minilateralism, equal North-South collaboration, and an extreme interpretation of the liberal environmentalism discourse—one that focused only on facilitating technology upgrading by market actors and downplayed the commitment-based system. As a result, despite its quick termination in 2011, the APP's normalization outputs have generated moderate modular scaling effects and the entrenchment of private sector participation in transnational clean technology collaboration. The APP thus contributed to the improvement of the market component (e.g., clean technology) of carbon lock-in. On the other hand, the CEM's capacity building efforts have produced very positive outcomes. It has gained the support of multiple stakeholders—governments, private sector actors, and nonstate actors. Capacity and coalition building have triggered simple scaling in terms of its size and the range of activities. There is also evidence of entrenchment as the CEM becomes more institutionalized, more interdependent with other climate governors and interventions, and its policy provisions being adopted by multiple countries. The CEM, therefore, generates system improvement and (potentially) transformation effects on two parts of carbon lock-in—jurisdictions and markets. Building on the comparative study, this paper also summarizes some lessons about the determinants of the fate of intergovernmental climate clubs.

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Abbreviations

21 CPP:	21st Century Power Partnership
ABARE:	The Australian Bureau of Agricultural and Resource Economics
APP:	The Asia-Pacific Partnership on Clean Development and Climate
ASEAN:	The Association of Southeast Asian Nations
CBDR-RC:	Common but Differentiated Responsibilities and Respective Capabilities
CCUS:	Carbon Capture, Utilization and Storage
CEM:	The Clean Energy Ministerial
CRPWG:	The Cool Roofs and Pavements Working Group
EMWG:	The Energy Management Working Group
GHG:	Greenhouse Gas
MEF:	Major Economies Forum on Energy and Climate
MEM:	Major Economies Meeting on Energy Security and Climate Change
MSWWG:	Multilateral Solar and Wind Working Group
GHG:	Greenhouse Gases
GSEP:	Global Superior Energy Performance Partnership the International
IEA:	International Energy Agency
IPEEC:	Partnership for Energy Efficiency Cooperation.
IRENA:	International Renewable Energy Agency
ISGAN:	International Smart Grid Action Network
OECD:	The Organization for Economic Co-operation and Development
PIC:	Policy and Implementation Committee
SEAD:	Super-efficient Equipment and Appliance Deployment
UNFCCC:	United Nations Framework Convention on Climate Change

Executive Summary

Promoting the development and diffusion of clean technology through intergovernmental and public-private collaboration in climate clubs has become an important approach to global climate governance. The Asia-Pacific Partnership on Clean Development and Climate (APP) and the Clean Energy Ministerial (CEM) are two such climate clubs. The two interventions differ in their targeted subsystems of the carbon lock-in, their performance in three transformative political mechanisms—normalization, capacity building, coalition building, their development trajectories, and their impacts on the targeted systems.

Theoretical Framework

Decarbonization requires multiple inputs to disrupt carbon lock-in, which is a fractal system with multiple mechanisms and subsystems mutually reinforcing each other (Bernstein and Hoffmann 2018). In their theoretical framework, Bernstein and Hoffmann argue that interventions may generate wider system effects depending on three transformative political mechanisms: normalization (through reframing discourses and building everyday practices), capacity building (through promoting material, institutional, and cognitive changes), and coalition building (through creating new winners and neutralizing losers). With the support of these political mechanisms, the intervention may scale up (which can take the forms of simple scaling, self-organized scaling, and modular scaling), and/or become entrenched (become institutionalized and/or costly to overturn) over time. The scaling and entrenchment of an intervention can, in turn, create three possible trajectories in the subsystems the intervention seeks to influence: reinforced carbon lock-in, system improvement (i.e., efficiency gains), or decarbonization.

Case One: The APP

The Targets of the APP

Launched in 2006, the APP targeted multiple subsystems. First, it was used by some developed countries (e.g. the United States and Australia) as a way to justify their limited political action in climate governance. Second, it was a community of practice (Adler, 2008, 199), with the general aim of inventing and practicing new climate governance norms (e.g. technology-focused market-liberal discourse, minilateralism, equal North-South collaboration, and public-private partnership). Third, it was an institutional framework that could facilitate the collaboration between public and private sector actors on the development and diffusion of clean technologies and related markets. Because the APP was used by some developed countries (e.g. the United States) to potentially sabotage the Kyoto Protocol (at least initially), the immediate conclusion might be that the APP would reinforce carbon lock-in in the short run by discouraging states' emission reduction activities. However, because it also intended to motivate and facilitate private actors' activities on clean technology development and diffusion, it had the potential (in the long run) to improve the current energy and manufacturing systems, and even to reshape the global clean technology market. Furthermore, by applying and advocating new principles and methods, the APP also sought to construct alternative climate governance norms and practices which had the potential to catalyze effects far beyond the APP.

Transformative Political Mechanisms

The APP has promoted **normative change** in global climate governance. By constructing and advocating a "technology-focused market-liberal discourse," the APP helped to raise the

political status of the clean technology development and diffusion and the sectoral market approaches. However, it failed to de-normalize the government-oriented approach to climate governance as the Bush administration initially intended. Furthermore, the APP's efforts to normalize minilateralism, the public-private partnership working method, and the principle of equal North-South collaboration all have turned out to have had lasting effects.

The APP also helped to **build the capacity** of private sector actors. Its sectoral task forces have built channels (e.g., forums, workshops, site visiting, internet publications etc.) that could link private sector actors from multiple countries, allowing them to enhance their capacity to assess their energy status and obtain information about new technologies. However, the funding shortage not only constrained the APP's capacity to directly support clean technology research but also limited the outputs of the information-focused projects.

The APP was initially built on a preexisting U.S.-Australia **coalition**. Through participating in its projects, private sector actors had gained benefits from the capacity building projects and enjoyed the non-binding and inclusive public-private collaboration working method. They, therefore, were supportive of the APP approach. However, because the APP only offered limited direct assistance (e.g., funding) to private sector actors' technology research activities, the coalitions were very fragile. Furthermore, excluding important climate governors such as NGOs and failing to gain support from the EU, further weakened the APP's coalition of support.

System Effects

Largely because of the capacity-building function of the APP projects, **simple scaling effects** (e.g., APP projects increasing in number) took place in the early stages of the intervention, but this trajectory ended very quickly. After only five years of operation, the APP was terminated by the United States in 2011. A significant number of projects were left incomplete, others were transferred to other interventions such as the CEM. However, by contributing to the normalization of the aforementioned new climate governance norms and practices, the APP inspired other climate clubs such as the Major Economies Meeting on Energy Security and Climate Change (MEM), the Major Economies Forum on Energy and Climate (MEF), the Global Superior Energy Performance Partnership (GSEP) under the CEM and the International Partnership for Energy Efficiency Cooperation (IPEEC). Since these interventions borrow ideas and methods that have been put into practice in the APP, we can argue that the APP generated **modular scaling** effects. The moderate outputs of coalition building and capacity building made it very hard for the APP to become entrenched. However, its networking and information sharing mechanisms that targeted the sectoral market have become **entrenched** over time (thanks mostly to the normalization of those ideas and practices) and have survived beyond the APP.

Since the APP failed to delegitimize the centrality of governmental action and policy in climate governance, the risk of system reinforcement in affected political jurisdictions did not become a reality. However, the APP constructed valuable and innovate ideas and practices that survived beyond its lifetime. The novel practices enlarged the toolkit of global climate governance. In addition, the APP also raised international attention to the private sector and turned transnational collaboration among private sector actors on clean technology and market development into normal practices. Therefore, we can argue that the APP contributed to the transformation of the transitional market on clean technology.

Case Two: The CEM

The Targets of the CEM

Initiated by the United States and launched in 2010, the CEM also prioritizes promoting the development, diffusion, and deployment of clean energy technology. However, in contrast to the APP, which mainly focused on building incentives and capacity among private sector actors, the CEM's key ambition is to alter the policies and regulatory systems of its member states, with only a small number of projects aiming at promoting local and private sector activities. Although the CEM applies several norms and practices that are different from the Kyoto regime, including the "technology-focused market liberal discourse" initially promoted by the APP, minilateralism, equal North-South collaboration, and the public-private partnership approach, the CEM is largely technical and action-focused. There is no evidence showing that the CEM holds any interest in reshaping conventional global climate governance practices.

Transformative Political Mechanisms

The CEM has increased the **capacity** of policymakers to conduct policy-making more efficiently and effectively. It has provided policymakers with (1) information about best policies and practices, (2) direct technical assistance, and (3) training programs on skills of collecting and accessing information. The **coalition** around the CEM is much stronger than that of the APP thanks to the CEM's capacity building efforts, cooperative and action-focused working environment, reward mechanisms, and openness to multiple stakeholders (including IGOs and NGOs). Developing countries, private sector actors, and nonstate actors all participate in CEM initiatives. As the CEM and other interventions and organizations support each other's projects, they have become more interdependent. Although the CEM is productive in its own right, it only occupies a very small position in global climate governance practices and discourse. Therefore, though we can argue that the practices around CEM serve to strengthen several norms and working methods in global climate and energy governance, it is hard to tell the degree to which **normalization** effects can be traced back to the CEM.

System Effects

The CEM's accomplishments in capacity building and coalition building generate **simple scaling effects**. The 2015 CEM meeting upgraded the institution to "CEM 2.0", featured by its expanded membership, increased number of initiatives, strengthened existing initiatives (e.g. the Clean Energy Solution Center), and the creation of the CEM Steering Committee. Especially the latter feature suggests that the CEM is becoming **entrenched**. In addition, some CEM initiatives have become entrenched into policies, standards, and regulations in targeted countries. Finally, the network-building between the CEM, IOs, and other interventions further strengthen the CEM's role in global climate and energy governance.

By working closely with national and regional governments on policy-making, the CEM can introduce policies and best practices of energy efficiency or energy transformation, thus reform or reshape policies and regulations in multiple jurisdictions. These efforts in turn either improve or transform (depending on the nature of the projects) targeted political jurisdictions previously characterized by carbon lock-in. Meanwhile, through encouraging governments to "push" technology innovation and building incentives and capacities among private sector actors directly, the CEM also contributes to the transformation of the global clean energy market.

Lessons Learned

The comparative study of the two interventions unravels some key factors affecting the

development of minilateral climate clubs. The different fates of the APP and the CEM suggest that the survival and development of an intergovernmental climate club may depend heavily on the substantial value-added they provide to the most crucial stakeholders—participant governments. Since climate clubs are run by a small number of governments, those who only focus on private sector actors can lose momentum very quickly. Secondly, the story of the CEM tells us that constructing a flexible and activist working environment is important as it can increase the resilience of the climate club. Thirdly, avoiding normative controversy is good for the operation of a climate club, but may simultaneously limit its political influence. The case of the APP shows that by promoting norm innovation and bold governance experimentation, even a failed intervention can catalyze effects far beyond itself.

Introduction

Promoting the development and diffusion of clean energy technologies through North-South and public-private collaboration has become an important approach to global climate governance. Technology-focused climate clubs are central to such efforts. Proponents argue their advantages in tackling climate change and energy issues include fewer members, lower levels of institutionalization, and more efficient decision-making processes than the multilateral climate regime (Weischer, Morgan, and Patel, 2012). The Asia Pacific Partnership on Clean Development and Climate (the APP or the Partnership) and Clean Energy Ministerial (CEM), both initiated by the United States, are two such clubs. The governments of Australia, China, India, Japan, South Korea, and the United States (U.S.)[1] launched the APP on January 12, 2006, in Sydney, Australia. The Partners[2] of the APP "collectively account[ed] for more than half of the world's economy, population, and energy use" (APP, 2008, 2). They designed it as a "minilateral" (Kellow, 2006, 302), "voluntary" framework for intergovernmental and public-private collaboration to address "development, energy, environment, and climate change" issues through facilitating "the development, diffusion, deployment, and transfer of existing, emerging and longer term cost-effective, cleaner, more efficient technologies and practices among the Partners" (APP, 2006a, A2.1.1). It was short-lived and was terminated in 2011.

The CEM, launched on July 19-20, 2010, in Washington D.C., promotes "policies and programs that advance clean energy technology," sharing "lessons learned and best practices," and encouraging "the transition to a global clean energy economy" (CEM, undateda). The CEM's initiatives build on Technology Action Plans that were released by the Major Economies Forum Global Partnership in December 2009 (ibid). The CEM brings together the world's major economies—including old APP members, major economies of the EU (e.g. the United Kingdom, France, Germany), and other major emitters (e.g. Brazil, Russia)—and "smaller countries that are leading in various areas of clean energy"—such as Denmark, Finland, Norway, Sweden, the Netherlands (CEM, undateda). Its 24 members represent "about 75 percent of global greenhouse gas emissions and 90 percent of global clean energy investment" (ibid).

This working paper comparatively studies the trajectories and system impacts of the two similar climate clubs using Bernstein and Hoffmann's (2016; 2018) theoretical framework that clarifies the links between three transformative political mechanisms—normalization, coalition building, and capacity building—and the scaling and entrenchment of interventions,[3] as well as their impacts on the targeted subsystems of wider carbon lock-in.

Both the APP and the CEM target multiple subsystems, though with different foci. The APP simultaneously targeted jurisdictions (Partners), practices of climate governance, and sectoral markets (e.g., carbon dependent and clean technology corporations). Although the APP tended to reinforce carbon lock-in within major jurisdictions of its partner countries—by downplaying the role of the government and allowing its Partners to take minimal political actions, it intended to promote new discourses and practices of climate governance and to improve and transform the transnational clean technology market. The CEM also dedicates itself to promoting the development and diffusion of clean energy technology. However, unlike the APP, the CEM primarily targets changing policies and regulations in jurisdictions, with relatively less attention to direct market engagement. Although the CEM applies some norms and practices different

[1] Canada joined the APP in 2007.
[2] The term "Partner" in this paper refers to "a country" that is a formal member of the APP.
[3] Climate clubs can be seen as one particular form of intervention. In this paper, we use the two terms interchangeably.

from those promoted by the Kyoto Protocol and UNFCCC, there is no evidence that its members intend to use it to challenge conventional global climate governance practices.

The APP and the CEM also differ in their outputs, their development trajectories, and their impacts on systems of carbon lock-in. While the APP's capacity building and coalition building efforts have achieved few substantial results, its voluntarism principle and technology-focused approach has contributed to the reinforcement of the "technology-focused market-liberal discourse" (McGee and Taplin, 2014, 353), which is an extreme interpretation of the underlying norms of "liberal environmentalism" in the UNFCCC and Kyoto Protocol (Bernstein 2001). It has also brought minilateralism, the public-private collaboration working method, and the principle of equal North-South collaboration to the mainstream of global climate governance. While the former was particularly innovative, and potentially a direct challenge to the model of large-scale multilateralism to address global climate change, the latter two features also reflected broader trends becoming entrenched at the time in related global governance processes. For example, the 2002 World Summit on Sustainable Development in Johannesburg promoted public-private (or "Type 2") partnerships as a primary means of implementing sustainable development, an idea that also reflected the growing support and use of public-private partnerships in the UN development system, practices of multilateral development banks including the World Bank, and in other international organizations during this period.[4]

As a result of these normalization attempts, the APP had generated substantial system effects despite its quick termination in 2011. The governance model developed, operationalized, and promoted by APP inspired other climate governance interventions that tried to foster public-private and North-South collaboration on clean technology, thus contributing to the transformation of global climate governance practices. Meanwhile, by raising the political status of private sector actors and normalizing the practice of transnational networking and collaboration among them, the APP accelerated the development of the transnational clean technology market.

On the other hand, the CEM provides many valuable tools for both governmental policy-making and technology innovation for private sector actors. Its capacity-building efforts thus have gained political support from multiple actors. In addition, the CEM also promotes private sector actors' efforts in clean technology development by granting pioneers high-profile rewards in ministerial meetings. The CEM's capacity building and coalition building efforts have triggered scaling in terms of its size and the range of activities. There is also evidence of entrenchment as the CEM becomes more institutionalized and its policy provisions adopted by multiple countries. Moreover, a complex network is emerging among the CEM and other International Organizations and minilateral interventions, making it an important component of the global climate governance regime complex. The CEM, therefore, generates system improvement and transformation effects on two parts of carbon lock-in—jurisdictions (by helping governments adopt more pro-clean technology policies) and markets (by encouraging activities of market pioneers).

Theoretical Framework

[4] See Bernstein (2015) generally on the evolution and institutionalization of norms and practices of liberal environmentalism, including support for partnerships and other transnational climate governance arrangements, and Broadwater and Kaul (2005) and Kaul (2006) specifically on global public-private partnerships, in this period.

This paper uses Bernstein and Hoffmann's (2016; 2018) theoretical framework on the politics of decarbonization. This framework is designed to understand the varied trajectories of the development of climate interventions and their impacts on carbon lock-in.

Bernstein and Hoffman (2016, 2018) argue that carbon lock-in is a system that contains multiple subsystems mutually reinforcing each other. In each level of the system, "there are institutional and normative processes, and structures (political factors) contributing to carbon lock-in" (Bernstein Hoffmann, 2018, 194). Conceptualizing the system in this way, they can use a common analytical framework to make sense of the political logic behind efforts to disrupt carbon lock-in across different system levels. In addition, because "the multiple levels of carbon lock-in are interdependent", "moves toward decarbonization in multiple specific subnational experiments can and should be analyzed for *both* their specific effects on targeted jurisdictions and practices and their potential to catalyze broader transformation elsewhere" (Bernstein and Hoffmann, 2018, 195).

In their theoretical framework, Bernstein and Hoffmann argue that an "experimental intervention…is political, and it contributes to changing the trajectory of the target by creating and/or contributing to political mechanisms of *normalization*, *capacity building*, and *coalition building*" (2018, 195). Interventions' "potential for altering the target's trajectory"—reinforcing carbon lock-in, improving carbon lock-in, or decarbonization— "is found in the feedback between the experiment and the political mechanisms that it catalyzes" (Bernstein and Hoffmann, 2018, 195).

When interventions contribute to normalization (through reframing discourses and building new everyday practices), capacity building (promoting material, institutional, and cognitive changes through funding, education, training, assistance, demonstrations etc.), and coalition building (through identifying and linking winners and neutralizing losers), "the policies and practices they support have the potential to" scale up and/or become entrenched (Bernstein and Hoffmann, 2018, 201). Scaling can take the form of simple scaling (i.e. expansion of intervention's size and activities), self-organized scaling (i.e. "intervention begets intervention in important ways"), and modular scaling (i.e. intervention inspire others) (Bernstein and Hoffmann, 2018, 201). The intervention and/or its components may also become entrenched as they become locked into legal systems, generate new cost-benefit dynamics, and/or attract new members (Bernstein and Hoffmann, 2018, 202).

The following sections of this paper use this framework to analyze the development and system effects of two interventions: the APP and the CEM. In each of the cases, the paper clarifies the initial missions of the intervention (the mitigation and cooperation goals it hoped to achieve, the system it targeted at), then studies its underlying political mechanisms, and finally discusses its system effects. For evidence, we rely on official documents, project reports, and event news available on the public websites of the APP and the CEM. Academic literature about the two interventions is also used as complementary material.

The APP: Targets, Outputs, and System Effects

The Targets of the APP

As an alternative framework of global climate and energy governance, the APP had three general missions. First, some developed countries (e.g., the United States and Australia) used it to justify their limited political action in climate governance. Second, it was a community of practices, with the goal of inventing and spreading new climate governance norms among its members through common practice (Adler 2008, 199). Third, it was an institutional framework

that could facilitate the collaboration between public and private sector actors on the development and diffusion of clean technologies and related markets. By excusing developed Partners from taking substantial political actions on economic transformation and GHG emissions reduction, the APP had the potential to reinforce jurisdictional carbon lock-in. However, because it also intended to promote several innovative governance approaches, it had the potential to improve and transform other systems of carbon lock-in—especially the market.

Downplaying the Roles of Governments (Jurisdiction)

The APP downplayed the role of governments in climate governance. Emphasizing the balance between economic growth and environment and energy governance, the Partners agreed that "challenges of climate change, energy security and air pollution" should be addressed "in a way that strives to encourage economic development and reduce poverty" (Australian Minister for Foreign Affairs, 2005). As a result, "nonbinding" and "voluntary" became brands of the APP. The key purpose of the Partnership, stated in the APP Charter, was "to create a voluntary, non-legally binding framework for international cooperation" on clean technology (APP, 2006a, A2.1.1). The APP did not contain any mandatory timetables, GHG emissions reduction targets, or compliance mechanisms. Its requirements of the substantial political actions and policy changes for the Partners were thus very modest from the beginning.

An influential report prepared by the Australian Bureau of Agricultural and Resource Economics (ABARE), which was treated as the intellectual base of the APP, argued that the development and deployment of clean technologies in the APP and "the diffusion of the technologies to other regions could reduce global emissions by about 23 percent in 2050 compared with what would otherwise have been the case" (Fisher et al., 2006, 3, 34). The actual meaning of such expectation, however, is that "global emissions would still increase by over 100 percent from current levels" (Eckersley, 2007, 316). In addition, from this report, one can hardly find any reference to the role of governments (except for facilitating market development).

Although the APP documents did lay out some purposes that link to government actions, such as promoting the exchange of national policies and practices (APP, 2006a, A2.1.4) and creating "an enabling environment" (APP, 2006a, A2.1.2) for technology diffusion, the design of the projects did not reflect those purposes. Instead, projects focused solely on information provision and market facilitation (APP, 2006b; McGee & Taplin, 2014, 347, 349). "The Partners clearly indicated in the Work Plan their intention to utilize the power of the private sector to maximize the potential for the Partnership to be successful and to effect change in selected sectors" (APP, 2008, 7). Since some Partners (e.g. the United States, Australia) intended to use only the APP goals to guide their climate governance actions, those goals provided an excuse for them to minimize their governmental actions. In this sense, the APP's initial influence on decarbonization efforts of national governments was negative.

New Principles and New Practices (Practice)

During the APP's preparation stage, its two key founders—the United States and Australia—expressed their willingness to make the APP a more effective and innovative "alternative" to the Kyoto Protocol, a "failure in terms of saving the climate" (See Australian Senator Ian Campbell's comments on the APP, quoted in McGee and Taplin, 2006, 174-175). According to the then US Deputy Secretary of State, Robert Zoellick, the technology-focused approach applied by the APP was seen by the United States as a "better way" to address the climate issue, "than the requirements of the Kyoto Treaty" (U.S. Department of State Office of

the Spokesman, 2005). Although by the time of the APP's formal establishment, some Partners such as Australia, Japan, and China sought to reduce the new intervention's normative controversy by framing it as a "complement" to the UUNFCCC and the Kyoto Protocol (McGee and Taplin, 2006, 175-176) the APP's norm-shaping function had remained. On the one hand, evidence shows that the emphasis on "complementarity" was a political maneuver to encourage the participation of key Partners such as Japan (see Australian Foreign Minister Alexander Downer's comment on "complementarity", quoted in McGee and Taplin, 2006, 176).

On the other hand, the APP did not rule out the possibility of being "inconsistent" with the Kyoto Protocol by linking "consistency" only to the UNFCCC and "complementarity" to Kyoto Protocol in its Vision Statement: "the partnership will be consistent with and contribute to our efforts under the UNFCCC and will complement, but not replace, the Kyoto Protocol" (APP, 2005; See also the interpretation of McGee and Taplin, 2006, 176-177). Therefore, it is reasonable to interpret the APP's distinct governance approaches - including technology-orientation, voluntarism, minilateralism, reduced North-South dichotomy, and public-private collaboration (U.S Congress, 2006, 12; McGee and Taplin, 2014) - as having the political purpose of setting a "new [climate governance] model" to replace the "unhealthy" Kyoto Protocol (Kellow, 2006, 300).

Developing Clean Technology Transnationally (Market)

Besides the highly political targets discussed above, the APP had one substantial and technical task to pursue: promoting the development and diffusion of clean technology and the related transnational market. The APP emphasized facilitating and encouraging (rather than coercing) private sector efforts on clean technology innovation, deployment, and diffusion (McGee and Taplin, 2006, 174; Lawrence, 2007, 201-202; See also APP, 2006a). As James Connaughton, the then chairman of the White House Council on Environmental Quality testified in a 2006 congressional hearing, the APP's main focus was "on voluntary practical measures to create new investment opportunities, build local capacity, and remove barriers to the introduction of cleaner, more efficient technologies" (U.S Congress, 2006, 10). Put differently, while the Kyoto Protocol addressed climate change through "waving sticks", the APP adopted a "carrot-based approach" (Kellow, 2006, 296; See also Zoellick's comments, U.S. Department of State Office of the Spokesman, 2005).

The APP's activities were organized around eight public-private task forces, managed and monitored by the Policy and Implementation Committee (PIC), and were in one-on-one correspondence with eight key market sectors. The task forces were comprised of three energy supply sectors, namely cleaner fossil energy, power generation and transmission, and renewable energy and distributed generation. The remaining task forces focused on five energy-intensive industrial sectors: aluminum; buildings and appliances; cement; coal mining; and steel (APP, 2008, 2, 7). The functions of the task forces were to:

> "review the current status of their sector with regard to clean development and climate; share knowledge, experience, and good practice examples…; identify specific opportunities for cooperation…; define the current state of the technology in terms of cost, performance, market share and barriers; identify cost and performance objectives and the actions needed…; and identify…ambitious and realistic goals" (APP, 2006c)

In general, the APP's projects in those task forces had "a noticeable emphasis on activities such as sectoral assessments, capacity building, and identifying best practices and technology research and demonstration" (APP, 2008, 9), all targeted at enhancing the transnational clean technology

market. This focus gave the APP the potential to improve carbon lock-in in energy and energy-intensive industrial sectors.

Transformative Political Mechanisms

Normalization

The most significant output of the APP was its norm creation and promotion efforts. While some of these norms were not entirely new, it articulated a particular version of the liberal environmentalism that already underpinned global climate governance, linking it with an attempt to normalize minilateralism and shift the discourse to focus primarily on technology and markets, and partnerships as opposed to intergovernmental action. Developed countries in the APP (e.g., the United States and Australia) were the most active norm entrepreneurs. They tried both to reframe climate governance discourses and to reshape developing Partners' identity and their understanding of the appropriate way of participating in global climate governance. Although not all the APP's discourses and practices have been adopted by the international community, several of them, including part of the "technology-focused market-liberal discourse," minilateralism, public-private partnership working method, and equal North-South collaboration, are now in the mainstream of global climate governance norms and practices.

Whereas the APP helped to normalize and spread a "technology-focused market-liberal discourse," it failed to de-normalize the government-driven approach to climate governance. To justify the liberal discourse, the ABARE report made the point that "[although] [both] technology 'push' (for example, research and development policies) and 'pull' (for example, emissions trading) will be required in the long term…it will be important to ensure that…the necessary technologies to substantially reduce emissions actually exist and are capable of deployment before technology 'pull' policies are adopted" (Fisher et al., 2006, 4). The APP brought increased international attention to the development and diffusion of clean technology and the construction of a sectoral market. Some Partners began to use discourses similar to the APP Charter in other climate negotiation fields. For instance, "Japan has applied the APP…discourse" at the UNFCCC COP 13 meeting in Bali in 2007, "in arguing for bottom-up sector-based approaches for technology diffusion and sector-based intensity targets as an alternative to binding emissions reduction targets for both developed and developing countries" (McGee and Taplin, 2009, 232). In addition, "since 2005, sectoral approaches have received increased attention from intergovernmental organizations such as OECD, G8, and IEA and is also specifically mentioned in the Bali Action Plan" (Skodvin and Andresen, 2009, 276). The taking up of this discourse beyond the Partners and diffusion within influential international institutions suggests the APP has helped raise global attention to the clean technology-oriented approach and the sectoral approach. However, it is hard to say that these discourses have already become "the" central discourse or the "pillars" of global climate governance. Nor can we easily attribute the cause of these discourse changes only to the APP.

However, the component of the discourse that challenged the necessity of government political actions and policy changes were constantly contested by NGOs, climate governance researchers, and other actors like the EU. Firstly, as analyzed above, under the pressure from both within (e.g., developing countries' preference toward the UNFCCC and the Kyoto process) and outside the Partnership (e.g., the EU, NGOs), the United States and Australia had to back down from their initial hostility toward the Kyoto Protocol and state, publicly, although somewhat vaguely, that the APP was a "complement" to Kyoto (McGee and Taplin, 2006, 175-177). By this token, the United States and Australia grudgingly acknowledged the legitimacy of

some key climate governance principles such as the emphasis on government actions, the respect to differentiated responsibilities, and the commitment to emissions reduction goals. Secondly, since its establishment, the APP had been criticized for the lack of ambition of taking political actions and making policy changes. Critics pointed out that the APP was a "distraction" to the Kyoto Protocol. They argued that focusing only on technology development and diffusion and avoiding government actions would worsen the situation (Friends of the Earth, 2006). Thirdly, as there was "scant information as to whether the partnerships attain the soft goals they aspire to" (Bäckstrand, 2008, 97), the negative record of the APP's actual outputs further confirmed the "distraction" argument and undermined the legitimacy of the APP's discourses.

Compared with the mixed result of the APP's promotion of the "technology-focused market-liberal discourse," its efforts to normalize two novel climate governance practices—minilateralism and the public-private partnership working method—have turned out to have lasting effects. On the one hand, the so-called "exclusive minilateralism" approach began to see its reflections in multiple climate clubs, such as the APEC Sydney Leaders Declaration 2007 and the US-led Major Economies Process 2007-2008 (McGee, 2011). However, it is worth noting that the EU maintained its opposition to the "attempts of the United States to dislocate talks into smaller forums, such as the" APP (Van Schaik and Schunz, 2012, 180). On the other hand, the APP operationalized the public-private partnership working method which aimed at changing the role of private sector actors from "decision taker" (de Sépibus and Holzer, 2014, 26) to deeply involved stakeholders. While the APP built on the increasing focus on public-private partnerships as a primary means to implement international initiatives already picking up steam in global governance practice in the early 2000s, it took the idea even further in elevating the role of the private sector. In the APP's public-private task forces, private sector actors work closely together with governments to identify priorities of the APP, to develop action plans, and to implement specific projects (Ibid, 29). As the 2006 Task Force Action Plans stated: "virtually all of the actions identified will involve business, and a number of the activities will be undertaken primarily or exclusively by companies and associations representing commercial enterprises" (APP, 2006b). This working method has been adopted by other interventions in global climate governance such as the CEM.

Finally, the APP's documents show a clear intention to downplay the idea of North-South differentiation. The APP's discourse, meetings, task forces, and projects were all designed to weaken "the idea of formally differentiating between developed and developing countries in deciding on levels of emission reduction" (Karlsson-Vinkhuyzen and McGee, 2013, 70). It avoided any reference to North-South dichotomies in the framing of the Charter or to the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC). Instead, the APP was a "horizontal" partnership wherein "[k]nowledge or technology transfer could take place in both directions" (Fujiwara, 2012, 5). It provided a platform for the developed countries to "engage China, India, and South Korea…in an arena where the building of trust and confidence contribute to future negotiations" (Kellow, 2010, 13). Although we lack direct evidence to draw the causal link between participation in the APP and the change of normative beliefs and practices of the developing countries, we do observe that at least some developing countries' participation in climate clubs have increased. For instance, participation in APP arguably paved the way for China to join interventions with similar tasks, principles, and working methods. Although China did not join the Global Superior Energy Performance Partnership (GSEP), the direct successor of the APP (Fujiwara, 3), it does participate actively in three initiatives of the CEM, a climate club that shares with the APP

multiple features. China' attitude toward minilateral climate cooperation frameworks remains positive, with more emphasis on South-North cooperation's climate effects and less on the importance of differential responsibility sharing.[5]

Capacity Building

One of the key tasks of the APP was to facilitate the construction and functioning of the global clean technology market. To do so, it sought to build the capacity of private sector actors to (1) assess their energy status, (2) to achieve information about new technologies, and (3) to conduct technology research and deployment.

The APP's projects allowed the Partners to share their know-how about the measurement of key energy data (Fujiwara, 2012, 7). For instance, the Cement Task Force set several projects (e.g., project CMT-06-01-"Status Report", CMT-06-02-"Benchmark Development", CMT-06-05-"Centre of Excellence") focusing on improving the data collection capacities of the private sector actors in the developing Partners, as well as introducing best practices and technologies (APP, undateda). As a Flagship Project, the Centre of Excellence project provided "technical seminars, scholarships and skilled worker exchanges" that helped to build local data measurement capacities in especially the Chinese cement industry (APP, 2011a). However, although the activities under this project had attracted many participants (over 1500 researchers and engineers) from all over the world, its substantial effects on the cement industry were limited. The project's final report showed that the major outputs were all related to training and workshop events. There was no follow-up evaluation on how much capacity improvement companies had actually made through participating in those events. In addition, the report also showed that many substantial goals of this project, such as "fill data gaps", remained uncompleted until its conclusion (APP, 2011a).

The APP did a good job of providing Partners with easier access to information about existing technologies and best practices. Task forces published several technology-focused reports/handbooks that shared information on new technologies, such as the Cement Task Force's *Energy Efficiency and Resource Saving Technologies in Cement Industry Booklet*; Steel Task Force's *State-of-the-Art Clean Technologies Handbook*; Power Generation and Transmission Task Force's *Green Handbook* (APP, undatedb). Meanwhile, task forces organized performance assessment projects on industrial activities. In such projects, experts from the advanced Partners visited factories in the less advanced Partners to conduct "performance diagnosis and provide recommendations on how factories can introduce optimal technologies and operational approaches" (APP, undateda). For example, in the Cement Task Force's Performance Diagnosis project (CMT-07-10), experts in environmental management and cement production in the Japanese cement industry had offered technical advice to cement factories in China and India. Similarly, as a Flagship Project, the Steel Task Force's Performance Diagnosis project (STF-06-04) had organized 6 performance diagnoses in China and India (APP, 2011b).

However, the APP offered very moderate direct support to research on clean technologies. McGee and Taplin's (2014) analysis of the APP Project Roster shows that "[t]he bulk of the Task Force projects were…directed at easing informational failures in markets for cleaner technologies and management practices"(344). McGee and Taplin note:

[5] This new position is most clearly reflected in its joint announcement with the United States in the Obama era, See White House, Office of the Press Secretary, "U.S.-China Joint Announcement on Climate Change," November 12, 2014, https://www.whitehouse.gov/the-press-office/2014/11/11/ us-china-joint-announcement-climate-change.

> Across all Task Forces only 5 percent of the initial projects were devoted to the deployment of technology, demonstration projects or technology-based research. The initial batch of Task Force projects was primarily directed at gathering information about practices within industry sectors, dispersing information about 'best practice' and building expertise and knowledge within target markets to encourage trade in cleaner technologies and practices... A further seventy projects were approved after 2006 and showed a similar pattern of preference for projects based on information exchange, standard setting and capacity building. (McGee and Taplin, 2014, 344)

In addition, APP projects generally lacked funding, which constrained their capacity building efforts. "The level of government funding committed to the Asia Pacific Partnership was very modest, with the US providing US$65 million out of a total of US$200 million committed by the seven Asia-Pacific Partnership countries" (McGee and Taplin, 2014, 344-345). Even for Flagship Projects, funding shortages were a major barrier. In this regard, the *Independent Review of Asia-Pacific Partnership Flagship Projects* stated that "attracting more funding to complete an existing Flagship Project and to secure new financing for expansion of a Flagship Project [was] a major barrier" (Atkinson, Castellas, and Curnow, 2009, 10).

Coalition Building

Building political coalitions is necessary for the survival and development of a climate intervention. The APP was based on several pre-existing political coalitions. The APP reflected the Bush administration's preferred model of domestic climate governance. It also served as a response to the criticism of the U.S.'s inactive participation in global emissions reduction and the Kyoto impasse (Skodvin and Andresen, 2009, 264, 267-269). Australia supported this idea for a similar reason. The U.S.-Australia coalition thus became the foundation of the APP. In the meantime, the APP's focus on GHG intensity and technology was "neatly aligned with developing country interests in which economic growth and access to new technologies were core issues" (Skodvin and Andresen, 2009, 268).

Evidence shows limited coalition building outputs in the APP. Private sector actors who participated in APP activities had gained benefits from the capacity building projects and enjoyed the non-binding and inclusive public-private collaboration working method. They were therefore supportive of the APP approach. As a result, a survey about private sector actors' views on the APP that was conducted in 2011 showed that "a majority of participants viewed information exchange and networking in APP activities as valuable in themselves and access to existing technologies and know-how as beneficial" (Fujiwara, 1). In addition, the APP's task forces had provided valuable platforms for the private sector actors to make policy inputs. For this reason, "the Japanese private sector made APP activities the center of international cooperation on climate change and took as many opportunities as possible to be heard, making an active international contribution" (Ministry of Economy, Trade and Industry, Japan, 2012, 9).

However, coalition building in the APP was also limited and contested. First, because the APP only offered limited direct assistance (e.g., funding) to the private sector actors' technology research activities, the companies "did not find convincing incentives in terms of direct or short-term advantages" (Fujiwara, 7). Therefore, the aforementioned projects, although viewed as beneficial, only offered marginal benefits to the participants. This made the coalitions with private sector actors very fragile. As much as private sector actors saw the APP as a nice addition to their work, their involvement was passive and opportunistic at best. Secondly, the APP

excluded some important climate governors. Although PIC meetings and task force activities were open to industry stakeholders, there "[was] no public evidence that environmental NGOs have been included in any of the APP PIC and task force meetings" (McGee and Taplin, 2009, 230). Thirdly, though there was no counter coalition to the APP, outsiders were not very enthusiastic about participating in the Partnership. There was only one recruitment during the APP's whole lifetime—Canada; while the EU remained critical for normative reasons stated above. The outcome of coalition building in experimental governance is largely dependent on capacity building and normalization mechanisms. Clearly, the APP's limited achievements in capacity building and its normative controversy negatively affected its coalition building attempts.

System Effects

Scaling

The APP was an outcome of the scaling of pre-existing bilateral partnerships. It was built on "the earlier Australian/US Climate Action Partnership concluded in February 2002, as well as strong bilateral relationships between parties, such as Australia and China" (Kellow, 2006, 298). In the early stages of the APP, some *simple scaling* effects occurred largely because of the initial success of the capacity building and coalition building efforts (APP, 2007). The outputs of the APP's projects seemed promising at the beginning. After their establishment, the APP Task Forces initiated a lot of projects. From 2006 to 2007, the PIC endorsed 110 projects proposed by the Task Forces. The second Ministerial Meeting "recognized 18 flagship projects exemplifying the different types of cooperative activities being undertaken by Partners" and launched the "Asia-Pacific Energy Technology Co-operation Centre" (APP, 2007). By the Third Ministerial meeting in 2009, there were in total 175 projects including 22 flagship projects endorsed (APP, 2009). However, this simple scaling trajectory ended very quickly. After only five years of operation, the APP was terminated in April 2011, with many projects left uncompleted and some transmitted to other interventions such as the CEM. The reasons for the APP's quick failure is not yet sufficiently analyzed by either government officials or researchers. However, based on the above review of APP's design and practices, we can argue that the APP's limited achievements of capacity building and coalition building were the main reasons for its failure. It is true that the change of the U.S. government played an important role in the termination of the APP; but if the APP was viewed as valuable and supported by strong public and private coalitions, it would not have been abandoned that easily. In this sense, the survival and development of an intergovernmental climate club arguably depend heavily on the substantial value-add they provide to the participating governments. Without those substantial contributions, their foundations will be fragile.

Although the APP has failed, by contributing to the normalization of several novel practices of climate governance, it inspired other minilateral climate interventions. Since there are several interventions that borrow ideas developed first in the APP, we can argue that the APP practices generated *modular scaling* effect (Hoffmann and Bernstein 2018, 201). For instance, the APP "served as the precursor" to the Bush administration's Major Economies Meeting on Energy Security and Climate Change (MEM) (Kellow, 2010, 13), which "adopted the APP approach of facilitating meetings of representatives from industry sectors…to devise a common work program on best practices'" (Karlsson-Vinkhuyzen and McGee, 62). The MEM's successor, the Major Economies Forum on Energy and Climate (MEF) initiated by the Obama administration, also contains certain features of the APP. For example, it "also established a 'global partnership'

to drive transformational low-carbon, climate-friendly technologies—with the goal of producing technology actions plans to share information across ten selected industries" (Karlsson-Vinkhuyzen and McGee, 63).

The APP's technology-focused and public-private collaboration practices were also adopted by the Global Superior Energy Performance Partnership (GSEP) under the CEM and the International Partnership for Energy Efficiency Cooperation (IPEEC). The GSEP adopts tasks and working methods that are similar to those of the APP. Like the APP, the GSEP organizes its projects through sector-specific working groups. The working groups "strive to accelerate energy efficiency improvements throughout industrial facilities and large buildings" by "encouraging facilities to take action and promoting cooperation on specific technologies or in individual energy-intensive sectors" (CEM, undatedc). Knowledge/information sharing and public-private collaboration in a "bottom-up manner" are also emphasized as key activities by the GSEP (CEM, undatedc; CEM, undatedd). The GSEP clearly states that its Power, Steel, and Cement Working Groups are the hosts of the projects under the three APP task forces: Power Generation and Transmission Task Force, Steel Task Force, and Cement Task Force (CEM, 2011). Participants of the GSEP Steel Working Group "shared the view that the APP Steel Task Force had been a successful framework for public-private partnership, and that it should serve as a foundation for the Steel Working Group" (CEM, 2011). "The formal transition of sector-specific activities from the APP to the GSEP has been based on the official view that i) the APP activities turned out to be successful and ii) they could lead to other successes in future, similar initiatives with similar working formats" (Fujiwara, 4; see also, Ministry of Economy, Trade and Industry, Japan, 2012, 9-10). Since APP projects were short-lived and have only achieved little, it is fair to argue that the transition from the APP to the GSEP was driven largely by the normalization of the APP's practices (e.g., sectoral approach, public-private partnership etc.), rather than by the substantial achievements of those projects themselves.

Entrenchment

The moderate outputs of coalition and capacity building made it difficult for the APP to entrench. However, although short-lived, the APP's networking and information sharing components that targeted the sectoral market had become entrenched over time (thanks mostly to the effect of normalization effect) and were able to survive beyond the APP. For private sector actors, transnational information sharing and networking are becoming their normal practices. The 2011 survey mentioned above showed that "most of the respondents (88%) were willing to continue these successful projects regardless of the APP... More than two-thirds of the respondents (71%) were planning to participate in similar activities… A majority of the respondents (79%) also believed that the EU should participate in a similar initiative" (Fujiwara, p.5). Since the APP projects' outputs were limited and only marginally beneficial for the private sector actors, it is reasonable to interpret this survey outcome as driven by the normalization of private sector practices of networking, information sharing, and transnational collaboration.

System Trajectories

Since the APP did not cause delegitimization of the climate governance approach that required governments' political actions and policy changes, the risk of system reinforcement on jurisdiction level did not become a reality. On the contrary, as the "first" experimentation (U.S Congress, 2006, 11) on building a framework that linked public and private sectors and major emitters from both the North and the South, the APP constructed valuable and innovative ideas

and practices that survived beyond itself. The successors of the APP, especially the CEM, continue to focus on promoting the diffusion of clean energy technology, and on bringing together public and private actors and developed and developing countries. In this sense, we can conclude that by experimenting and promoting new ideas and governance practices, the APP has enlarged the toolkit of global climate governance, although it is hard to tell if and how such changes in practice have broader effects on carbon lock-in. In addition, because the APP helped to raise the international attention to private sectors and turn transnational cooperation among private sector actors on clean technology and market development into normal practices, the APP has arguably contributed to the *improvement of the transitional market* on clean technology.

The CEM: Targets, Outputs, and System Effects

The Targets of the CEM

Similar to the APP, the CEM prioritizes promoting the development, diffusion, and deployment of clean energy technology. It has 13 initiatives covering topics of energy efficiency, clean energy, integration, and human capacity. The specific targets of those initiatives, set by the CEM1, are to "avoid the need to build more than 500 mid-sized power plants in the next 20 years, promote the rapid deployment of electric vehicles, support the growing global market for renewable energy and carbon capture technologies, bring solar lanterns or other improved energy services to more than 10 million people without access to grid electricity by 2015, and help encourage women to pursue careers in clean energy" (CEM, 2010). Broadly speaking, those targets show that the intervention's ultimate goal is to improve and transform the approach to energy production and consumption globally.

The CEM seeks to accomplish its goals both through altering the policies and regulations of its member states (jurisdictions) and through engaging with private sector actors directly (markets). Sharply different from the APP, which mainly focused on building incentives and capacity among private sector actors, the CEM emphasizes both "market pull" and "market push" approaches. The CEM's Super-efficient Equipment and Appliance Deployment (SEAD) Initiative clearly states its tasks as addressing "both ends of the efficiency spectrum: helping 'pull' super-efficient devices into the market through cooperation on measures like manufacturer incentives and research and development investments and helping 'push' inefficient devices off the market by bolstering national policies like minimum efficiency standards" (CEM, 2010). This mission statement reflects the consensus among member states that to promote the large-scale transition to clean energy, engagement with private sector actors is only part of the solution; equally importantly, the national governments should cooperate with each other and make proper policies and rules. As a result, the CEM initiatives' key focuses are on "empowering energy decision-makers around the world with the up-to-date information and tools they need to improve the policy environment for clean energy" and facilitating "international coordination that amplifies each government's clean energy deployment efforts" (CEM, undateda).

As a typical technology-focused climate club, the CEM applies several norms and practices that are different from the Kyoto regime, including the "technology-focused market liberal discourse" initially promoted by the APP (McGee and Taplin, 2006), minilateralism, equal North-South collaboration, and the public-private partnership approach. However, different from the APP, which had a clear intention of setting an *alternative* global climate governance model, the CEM is largely technical and action-focused. For instance, the main reason for the adoption of the voluntary collaboration approach is to increase the momentum and efficiency of CEM

activities, to allow its "partners to focus their efforts on those initiatives in which they are most interested or most capable" (CEM, undateda). The CEM is normatively and legally less controversial because the Obama administration did not treat it as an alternative to the mainstream climate governance regime. While the Bush administration saw the APP as the only acceptable platform for climate and energy cooperation and framed clean technology development and diffusion as the only appropriate approach to climate governance, the Obama administration viewed reaching a post-Kyoto global climate agreement as the key target (Skodvin and Andresen, 2009, 264). Besides the United States, no CEM member has expressed a negative view of the multilateral climate regime. The CEM also identified itself as "an important stop on the road to the 2015 Paris climate negotiations" (CEM, 2015b). In addition, compared with the APP, the CEM made no true innovation regarding governing norms and practices, for all the approaches and principles applied by the CEM and its initiatives were invented previously. Therefore, we can conclude that there is no evidence showing that the CEM holds any interest in reshaping the conventional global climate governance practices.

Transformative Political Mechanisms

Capacity building

To encourage governments to make pro-clean energy policies, the CEM must first increase the capacity of policymakers to conduct policy-making more efficiently and effectively. To do so, it seeks to provide policymakers with (1) information about best policies and practices, (2) direct technical assistance, as well as (3) training programs on skills of collecting and accessing information. The CEM has made many accomplishments along those three lines.

Lacking information about effective pro-clean energy policies is a key factor that constrains policy progress. The CEM initiatives operate as hubs that gather information about and showcase relevant policies being used by governments of major economies and leaders of clean energy. The CEM combines three communication mechanisms that foster information sharing, including dialogues at the annual Ministerial meetings, public-private engagement, and the sector/issue-specific initiatives. As the CEM's most important tools, the initiatives have built platforms wherein participants can share knowledge and practices and learn from each other. For example, the SEAD initiative launched a Policy Exchange Forum in 2015 that allowed policymakers to "share and learn from one another about cutting-edge and cost-effective approaches to specific appliance energy efficiency challenges" (CEM, 2015e). Some initiatives seek to affect government policies by showcasing the benefits of existing policies. The Energy Management Working Group (EMWG), an initiative focuses on accelerating the use of energy management systems in industry and commercial buildings, has conducted several case studies showing that implementing energy management systems (e.g., implementing the ISO 50001 international energy management systems standards in Canada and the United States) can help to improve energy performance during business activities (CEM, 2015f). The initiatives' research informed governments (e.g., Mexico and Chile) about the benefits of relevant policies and encouraged their policy change. Similarly, the Multilateral Solar and Wind Working Group (MSWWG) works with the International Renewable Energy Agency (IRENA) to provide "energy professionals and policymakers around the world with high-quality, uniform data for solar and wind project assessment, investment decisions, and policy planning" (CEM, 2015f). In addition to policy provisions, the CEM also provides easier access to clean energy technologies. For

instance, developing countries can gain knowledge about Carbon Capture, Utilization and Storage (CCUS) technologies through the CEM's Carbon CCUS Action Group.[6]

Beyond information provision, CEM initiatives also allow governments to receive direct technical assistance for policy-making. In this sense, the CEM initiatives serve as networks that link policymakers directly with experts around the globe. For instance, the 21st Century Power Partnership (21 CPP) is playing a key role in building the capacity of India, Mexico, and South Africa to "manage the integration of variable renewable energy and the deployment of large-scale energy efficiency and smart grid solutions" (CEM, 2015f). The 21 CPP is participating both directly (e.g., providing technical assistance to South Africa's regulation-making; publishing Renewable Energy Roadmap for India) and indirectly (e.g., holding workshops for policymakers) in countries' policy-making processes (CEM, 2015c). The Clean Energy Solution center should be highlighted as a key capacity building tool of the CEM. "The goal of the Solutions Center is to become the primary resource for clean energy policy information, assistance, and peer learning for governments and government-affiliated practitioners" (CEM, 2015d). It is a low-cost policy-making assistance mechanism, which offers many free and user-friendly services, including "Ask an Expert Service", "Web-Based Training and Peer Learning", "Resource Library and Policy Tools and Data", "Best practice policy report", "Clean Energy Policy Briefs", and many other joint programs with IOs such as the World Bank, the Asian Development Bank and so on (Ibid). The Solution Center has a noticeable impact on clean energy policymaking. Its "Ask an Expert Service" has responded to "more than 160 requests from nearly 80 countries for expert policy assistance" (Ibid). This assistance has encouraged and facilitated relevant policy-making efforts. To list a few examples: the Solution Center has assisted "the design of the renewable energy policy framework in Nicaragua," offered "assistance with appliance standards and labeling programs, cool surface policies, and building certification rating incentives in Mexico," and helped the Mexican government with the development of clean energy policy database (CEM, 2015f).

Training programs that directly work with responsible personnel are also very effective tools to build policymakers' and private practitioners' capacities. For instance, the SEAD initiative has developed a Street Lighting Tool, "a free and easy-to-use calculator that can help purchasers make more informed choices regarding street lighting fixtures to help achieve up to 50% in energy savings" (CEM, 2015f). By training government officials from Canada, India, and Mexico to use this innovative tool, the policymakers' capacity to make a more energy efficient choice has been improved. In the meantime, some initiatives also focus on building local capacities. For instance, the Cool Roofs and Pavements Working Group (CRPWG) has worked in India in 2014 to conduct a "labor training project in a low-income housing community" (CEM, 2014a). In sum, to quote some researchers, the major function of the CEM initiatives can be labelled as "Joint Capacity-Building", which not only addresses lack of knowledge, but also seeks to meet "the need for well-trained people all along the value chain of renewable energy installations," such as engineers, administrative staff, and finance specialists (Fritzsche, Zejli, and Tänzler, 2011, 4504).

[6] In 2014, the action group's work was transferred to the Carbon Sequestration Leadership Forum that focuses more closely on CCUS.

Coalition Building

Given that the targets of the CEM are to promote both government and private sector actions on climate and energy governance, it relies on political coalitions to survive and develop. The CEM is strongly supported by its participants. Its capacity building efforts, its cooperative and action-focused working environment, and its reward mechanism are three major factors that give actors incentives to participate actively.

For both developed and developing countries, the CEM provides a platform for mutual learning on best practices and new technologies. For developing countries, in particular, the CEM initiatives are especially valuable channels to gain access to some crucial technologies of carbon mitigation, which would otherwise be unavailable. For instance, the aforementioned CCUS technologies allow countries to "put captured CO2 to use in order to realize some other beneficial outcomes other than just mobilizing large amounts of capital to simply put CO2 in the ground for climate change mitigation purposes" (Zakkour, Scowcroft, and Heidug, 2014, 6954). The access to this technology thus attracts developing countries' support to CEM activities. For example, Zhang Gaoli, the Vice Premier of China, emphasized promoting technology transfer as a key function of the CEM in his opening remarks in CEM8.

The CEM has created an action-focused environment. It applies a "distributed leadership": "any government interested in furthering a substantive idea on clean energy technology is encouraged to identify willing partners and proceed" (CEM, undateda). This bottom-up approach is quite different from the top-down approach of the APP, "where Policy and Implementation Committee identified projects for funding" (Weischer et al., 2012, 182-183). This free opt-in system is, according to Tawney and Weischer (2011), the key reason for the continued success of the CEM (5). First, it reduces the chances of conflicts among CEM members. The CEM initiatives are not dependent on any type of common agreements, thus need not go through any formal bargaining processes. Although members may disagree with others' proposals, they can simply choose not to join those initiatives rather than contesting them. Secondly, since countries join an initiative only by interest, they usually put more energy into the initiative. As a result, although an initiative may not have many participants, it is likely to foster high commitment. Thirdly, this extremely flexible initiative-creation process significantly reduces the costs of governance experimentations. Since the initiatives are self-organized, even if the experimentation of one initiative fails, the reputation and credibility of the CEM as a whole will not be damaged. Overall, with a series of initiatives working well in the CEM, a pro-action and cooperative working environment has been created, which further encourages members to participate and contribute.

There are at least two mechanisms in the CEM that can help to build coalitions with private sector actors. First, CEM events are valuable networking opportunities for companies seeking overseas investment possibilities. For example, during its participation on the CEM6, Fijian Hongbo Cpto-Electronics Technology CO., Ltd, a Chinese company working on energy efficient LEDs, took the opportunity to investigate the possibility of investing in Mexico and other Latin American countries (Xinhuang, 2015). Second, some initiatives of the CEM apply novel reward mechanisms that grant awards on annual basis to key contributors to the development and diffusion of clean energy technology.

To illustrate, since 2012, the SEAD initiative has been organizing the annual Global Efficiency Medal competition to find the most energy-efficient products. Although the awards do not generate substantive economic benefits directly, they are economic and political symbols that can generate substantial reputation-building effects. On the one hand, the winners are granted a

Global Efficiency Medal. Their winning products can also be marketed with a SEAD label. This increases the "recognition and visibility for key issues and achievements in clean energy" (CEM, undatedb). That is to say, the major functions of the SEAD awards programs are to "showcase manufacturers' ability to meet consumer demand for feature-rich, energy-efficient products that provide high-quality service while reducing energy costs" (CEM, 2015e) and influence consumers' purchasing decisions, increasing the winners' market share (CEM, 2014c). On the other hand, the award ceremonies bring local companies to the high-level international forum and grant them political and international recognition. This recognition gives them more incentives to continue leading technology innovation in their countries. As an extra bonus, the award winners also have a better chance to gain financial support from their national and local governments.

On the CEM6 Awards Ceremony, the SEAD initiative's Global Efficiency Medal was granted to Nanyang Explosion Protection Group Co. Ltd, a Chinese company working on energy efficient motors. Meanwhile, the International Smart Grid Action Network (ISGAN) gave its Award of Excellence to the "Grid4EU Large-scale Demonstration of European Smart Distribution Networks" for its contribution to the use of smart grids. The award encourages Nanyang Explosion Protection Group Co. Ltd to lead the innovation of relevant technology in China. In the meantime, this company also has gained access to work with the Chinese national government to develop "industrial standards for energy efficient motors" (Nanyang Explosion Protection Group Co. Ltd, 2015)

In addition, the CEM is more open than the APP to a wide range of actors. While the APP processes were closed to NGOs, the CEM sees great value in NGO participation. "The CEM encourages robust involvement by key private-sector partners (including both industry and nongovernmental organizations). These partners are encouraged to provide high-level policy input that is gathered at each Ministerial meeting and to participate directly in the technical work of the initiatives themselves" (CEM, undateda). The private-sector actors are involved deeply in the work of the CEM. They are invited to attend each Ministerial meeting and to provide high-level policy inputs. The technical work of the CEM initiatives is also open to their participation. In addition, the CEM initiatives also partner with other International Organizations, research institutions, and minilateral interventions to conduct their work. For example, the aforementioned SEAD initiative "is supported by the Collaborative Labeling and Appliance Standards Program as the operating agent [and] the Lawrence Berkeley National Laboratory for technical analysis" (CEM, 2015e). In 2014, the SEAD initiative and the ASEAN Standards Harmonization Initiative for Energy Efficiency (ASEAN SHINE) built a partnership to promote energy efficient air conditioners (ACs) in the ASEAN region (CEM, 2014b). In 2015, the CEM's 21CPP and Clean Energy Solutions Center and the World Bank's Energy Sector Management Assistance Program (ESMAP) decided to work together to provide technical assistance to developing countries on the integration of the wind and solar energy (The World Bank, 2015). This mutual support and interdependence between the CEM and other actors provide the CEM with many political stakeholders.

Normalization

In contrast to the APP, which was designed as a tool to undermine the normative beliefs embedded in the Kyoto regime, the CEM poses no normative challenges. Although the CEM is productive in its own right, it only occupies a very small position in climate governors' practices and discourse. Therefore, though we can argue that the practices around CEM do serve to

strengthen several norms and working methods in global climate and energy governance, it is hard to tell how much of the normalization effects can be traced back to it.

The inference we can make is that the CEM, together with other minilateral interventions, have contributed to the normalization of several new practices in global climate and energy governance. For one thing, technology development and diffusion are now seen as equally important as emissions restriction in global climate governance. At the CEM6, "Laurent Fabius, France's Minister of Foreign Affairs and International Development and President of the 21st United Nations Conference on Climate Change (COP21), stressed the importance of clean energy, which he said would be 'central' to reaching agreement to limit global warming at COP21 in December 2015" (CEM, 2015a). For another, minilateral interventions such as the APP, the MEF, and the CEM collectively contribute to the normalization of non-Kyoto intergovernmental climate clubs. Countries are getting more and more comfortable with participating in such clubs. During a CEM session at the COP20, Christian Pilgaard Zinglersen, Deputy Permanent Secretary in Denmark's Ministry of Climate, Energy and Building, made the point that "participation in the CEM has helped his country move 'from bilateral to increasingly mixing bilateral with multilateral [cooperation],' in areas such as power sector transformation" (CEM, 2014d). Similarly, although at the CEM1 China only participated in two initiatives, Wan Gang, the minister of the Ministry of Science and Technology of China, noted during an interview in 2010 that China was studying and interested in all CEM initiatives (Li, 2010).

However, it is worth noting that some of the norms and working methods carried by CEM and other minilateral interventions are still criticized as not favorable for achieving global climate and energy governance goals. For example, the diffusion of a voluntarism norm also had risks. Some scholars note that minilateral interventions "are prone to avoid quantifiable targets, which makes it difficult to assess whether their resources match their needs" (Widerberg and Pattberg, 2015, 51). In addition, studies point out that the public-private partnership working method currently applied by minilateral interventions does not unleash the full potential of private sectors. "Membership comes in many different forms and nonstate actors are generally included as 'partners' (CEM and R20), 'observers', or part of the 'Project Network' (GMI)…. However, states tend to retain veto power by excluding nonstate actors from voting on core functions and decisions" of the interventions (Widerberg and Pattberg, 51-52). In this regard, what is being normalized is the practice of inviting private sector actors to participate in interventions' activities, rather than the recognition of their equal authority with states or accountability for their activities. This is certainly not satisfying for those who ask for a more equal public-private partnership in climate governance.

System Effects

Scaling

As an active intervention, the CEM has made significant contributions to capacity and coalition building efforts in global climate and energy governance. As a result, members agree that the CEM is productive, necessary, and thus needs to be upgraded. The CEM is now going through a simple scaling process, through which "individual interventions grow… in…size and/or range of activities" (Bernstein and Hoffmann, 2016, 20). At the CEM6, the representatives of the CEM's participant governments "laid out a vision for a more effective, ambitious CEM, referred to as 'CEM 2.0,' that can play a fundamental and sustained role in accelerating the transition to a global clean energy economy" (CEM, 2015a). The CEM 2.0 expands on the CEM 1.0 in terms of membership and activities. The CEM6 welcomed the

Kingdom of Saudi Arabia as a new member. The meeting also announced the launch of two new initiatives, as well as a plan to strengthen one existing initiative. First, Australia, China, France, Germany, India, Indonesia, Korea, Mexico, Russia, South Africa, Sweden, the United States, and the European Commission collectively launched the CEM Global Lighting Challenge, which seeks to establish "a global race to reach cumulative sales of 10 billion high-efficiency, high-quality and affordable advanced lighting products" (Ibid). Second, the CEM Power System Challenge, launched by Denmark, Finland, France, Germany, India, Indonesia, Japan, Korea, Mexico, Norway, South Africa, Sweden, the United Arab Emirates, the U.S., and the European Commission, aims at facilitating and coordinating participating governments' policy-making efforts to build "clean, reliable, resilient and affordable power systems of the future" (Ibid). Third, based on the shared acknowledgment of the value of the Clean Energy Solution Center, the CEM members decided at the CEM6 to scale-up the center. "The scale-up initiative includes increasing the number of global experts to help respond to significantly more requests for assistance as well as establishing a new section on Clean Energy Finance" (Ibid).

Entrenchment

Evidence also suggests that the CEM, or some of its components, are becoming entrenched. At the CEM6, members agreed that it was necessary to increase the effectiveness of the CEM and to level-up its institutionalization. As a result, members established a new CEM Steering Committee with the task of providing "strategic guidance to CEM efforts year-round and to help prioritize efforts on areas of greatest potential impact" (CEM, 2015a). This new committee consists of China, Denmark, the European Commission, France, India, Mexico, the United Arab Emirates, and the United States. The CEM Steering Committee will serve as a mechanism to further institutionalize the activities of the CEM. Its main immediate task is to "draft a non-legally binding Framework Document to establish a transparent decision-making process for the CEM," and to find ways to further strengthen the CEM institutions, its self-monitoring mechanisms, its communications efforts, and its connections with other climate and energy governors (CEM, 2015a). In addition, since some CEM initiatives have managed to turn their knowledge into policies, standards, and regulations in targeted countries, those policy provisions are becoming entrenched over time on the jurisdictional level. Lastly, the network-building between the CEM and International Organizations and other minilateral interventions further strengthen the CEM's role in global climate and energy governance. Not only do they cite each other's documents, but they also work closely together on substantial projects (as discussed in the "coalition building" section) (Barnsley & Ahn, 2014). The networking among interventions shows that the CEM is becoming an important part of the regime complex of global energy and climate governance. Since multiple interventions depend on each other to operate their projects, their survival and continual development are much more secure than the interventions before them (e.g., the APP).

System Trajectories

The CEM generates system improvement and transformation effects on both jurisdictions and transnational clean energy markets. By working closely with national or regional governments on policy-making, the CEM can introduce policies and best practices on energy efficiency or energy transformation, thus reform or reshape policies and regulations in multiple jurisdictions. These efforts in turn either improve or transform (depending on the nature of the projects) the jurisdictional system of the carbon lock-in. Meanwhile, through encouraging

governments to "push" technology innovation, and building incentives and capacities among private sector actors directly, the CEM also contribute to the transformation of the global clean energy market.

Conclusion

This working paper applied Bernstein and Hoffmann's (2016; 2018) theoretical framework on the politics of decarbonization to a comparative study of the development and system effects of two U.S.-led climate clubs (interventions): the APP and the CEM. Broadly speaking, the paper showed that the varied achievements these two interventions made regarding capacity building, coalition building, and normalization determined their varied trajectories and system effects. The APP pushed the normalization of new discourses, norms, and practices, but its non-commitment and technology-only approach generated constant contestation. Its capacity building and coalition building achievements were also constrained by its flawed working strategies and the lack of financial resources. In contrast, the CEM has not generated significant normative innovation in global climate governance, but its capacity building activities have proven to be lost-cost, efficient and welcomed by its clients—states. In addition, it also has built strong coalitions supporting its works. As a result, the two interventions' system effects vary. The APP failed to scale up or become entrenched, but it caused reflections on existing climate governance approaches and inspired other climate clubs. At this time, the CEM is a successful intervention in itself. Its capacity building and coalition building achievements have generated simple scaling and entrenchment effects. However, even though we are now witnessing the proliferation of climate clubs, we lack evidence to support the argument that we are witnessing modular scaling effects of the CEM. Climate clubs nowadays pick up ideas from each other - so there may be network effects - but we are not able to trace the flow of ideas back to a particular intervention.

The comparative study of the two interventions unravels some key lessons for the fate and impacts of climate clubs. For the survival and development of climate clubs, avoiding normative controversy, constructing an action-oriented working environment, and providing value-added, low-cost, and efficient services to important stakeholders are of the greatest importance. The voluntary and flexible nature of the climate clubs makes it easier for them to gain support from multiple stakeholders. However, these features also mean that stakeholders can pull out their political and financial resources as they wish. As a result, a climate club must find a way to convince stakeholders (especially the most powerful ones—states) that it is an indispensable instrument for climate governance and in their interest. Normative controversy can make a climate club famous and influential, but it also hurts the current and potential coalitions around it.

Furthermore, to be considered "useful" and "indispensable," a climate club must make smarter decisions regarding its clients and project design. First, working with private sector actors (the APP approach) requires a huge amount of resources and uncertain project outputs. This approach may be welcomed by private sector actors, but cannot satisfy climate clubs' most important stakeholder—states. The CEM, instead, targets directly serving states' needs, thus has gained significant political support from the latter. Secondly, funding is always a problem for voluntary climate clubs. The funding shortage can be eased if the climate clubs' projects are seen as valuable. However, climate clubs also need to consider how to lower the costs of its projects. In this regard, the CEM's most featured projects, for instance, the Clean Energy Solution Centre and the rewards build on existing technical resources all over the world. They are thus both cheap and efficient. Third, the CEM is an umbrella club covering multiple independent

initiatives. This is quite different than the APP's centralized project designing process. This feature of the CEM allows states to organize and participate in customized projects, thus further lowers the chance of conflict of interests and disputes.

Having summarized the survival strategies of climate clubs, it must also be acknowledged that by conducting norm innovation and bold governance experimentation, even failed interventions, as is shown by the case of the APP, may generate wider normative impacts on the practices of other interventions and private sector actors.

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