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Measuring Clean Energy Regime Complex Effectiveness

> We declared, "No one in the world believes for a minute any of this will be easy, and that it will not be without resistance or setbacks, but everybody knows that the obstacles to action are essentially purely political." This is now the central challenge of Paris – for political ambitions to rise to the levels required for a major breakthrough in climate action.
>
> *–Renato Redentor Constantino, "How the Ants Moved the Elephants in Paris" in* Not Too Late

To best understand the regime complex's variable impacts on renewable energy policy change and geothermal development across Indonesia and the Philippines, it is important to examine the cases side by side. This chapter provides a comparative analysis of regime complex effectiveness across cases to better perceive the conditions for impact and how intervening variables such as energy crises or domestic political interests mediate effectiveness. Through the three mechanisms – utility modifier, social learning, capacity building – the regime complex has had a notably different impact in moving renewable energy development in Indonesia and the Philippines. While Indonesia's energy transition story is one wherein persistent barriers to geothermal development are slowly ameliorated in fits and starts, the Philippines in contrast kicked off with a rapid transition followed by a plateau. The following sections trace the mechanisms impact across the case studies and summarize key findings on the regime complex's effectiveness.

My empirical analysis of the cases of Indonesia and the Philippines examined how the clean energy regime complex affects domestic barriers to advance geothermal development through a set of the mechanisms of effectiveness. This analysis provides insights about how the effectiveness of the clean energy regime complex is mediated by domestic political interests in ameliorating barriers to energy transitions. The main findings of this book demonstrate that the utility modifier and social learning mechanisms of the clean energy regime complex

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impact financial and regulatory barriers through policy advising and targeted financial aid, which foster policy adoption and regulatory reform and de-risk financial investments in geothermal development. Less funding is allocated to technical capacity building in Indonesia – this may be indicative that technical capacity building was a lower priority, but it may also be indicative that the budget for capacity building is lower overall, and technical assistance can be provided through in-kind time of experts. Funding for technical capacity building is critical for addressing technical barriers and ensuring long-term sustainable change, as shown in the case of the Philippines, where a significant share of funding was allocated to technical capacity building. As argued by Young and Levy (1999), a regime's pathways of effectiveness may work in concert, and this is certainly evident in the mechanisms of regime complex effectiveness. Each mechanism is insufficient on its own, but combined they can have a transformative impact. Furthermore, this study underlined the facilitating and obstructing conditions at the domestic level that affect whether the clean energy regime complex can overcome lock-in to develop renewable energy (see Figure 7.2).

Across the cases, domestic political interests mediate the effects of the clean energy regime. As much of the regime complex literature treats the state as a black box, dissecting domestic political interests and investigating special interest group's intervening effects are integral to understanding regime complex effectiveness. Across both case studies, domestic political interest in developing geothermal energy, as opposed to other potential energy sources, is fundamental to the viability of the regime complex's impact. Without political will or convergence of domestic political interests and special interest groups to advance geothermal development, policy reform is not feasible and geothermal progress stalls. This is demonstrated by historically slow project implementation in Indonesia and the plateau reached by the Philippines since the early 2000s. When the clean energy regime complex can incentivize the convergence of domestic political interests in favor of geothermal development, policy reforms are more effective in removing regulatory barriers to spur along geothermal development. For example, through reforms to Indonesia's geothermal law, local governments were incentivized to relinquish their tendering authority to the central government through the provision of the production bonus. Without these reforms and changing incentive structures, local governments were unlikely to support regulatory reform due to the lost revenue.

This analysis reveals important policy implications for the effectiveness of clean energy governance in addressing barriers to clean energy development. Through development financing, technical assistance, policy advising, and norm diffusion, the clean energy regime complex has targeted financial, regulatory, and technical capacity barriers to geothermal development in Indonesia and the Philippines. However, the cases reveal different levels of effectiveness in overcoming barriers

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to enable rapid development of geothermal development capacity. The next section provides an analysis of the mechanisms across cases, followed by an overall analysis of the clean energy regime complex's impacts over time.

Regime Complex Mechanisms of Effectiveness and Impact across Cases

Utility Modifier Mechanism and Financial Barriers

The utility modifier mechanism functions by influencing the cost-benefit analysis of actors, typically by introducing or changing market incentives (Carbonnier et al. 2011; Young and Levy 1999). This mechanism works on a national and subnational level through the provision of multilateral or bilateral development aid or climate finance, which can change incentive structures or reduce financial barriers to renewable energy development; it is complementary to other forms of financial investment from private sources.

The clean energy regime complex impacts the development of clean energy in EMDEs through financial incentives, particularly when coupled with policy advising (the social learning mechanism). The analysis of Indonesia and the Philippines revealed different impacts on policy and geothermal development. In the case of Indonesia's geothermal energy development, the clean energy regime complex played an important role in providing targeted funding to address critical financial barriers to geothermal development. An example of regime complex impact through the utility modifier mechanism in Indonesia is financial support via the CTF providing a concessional loan to Supreme Energy for the Rantau Dedap geothermal project. The combination of CTF and CDM funding supported the exploratory phase of development when Supreme Energy lacked the capital needed to complete this important and costly development stage. Furthermore, the creation of the GREM and GEUDP revolving funds demonstrate how financial barriers to exploration drilling and the major risks surrounding development could be ameliorated by incorporating public funding. In the case of the Philippines, financial assistance to geothermal projects was vital in early stages of SOE-led development.

Many geothermal projects were not bankable across cases without development financing. As described in the 2009 JICA report for Indonesia and UNFCCC CDM project documents for both Indonesia and the Philippines, the expected IRRs for geothermal projects were far below the benchmarks and were not financially viable (JICA 2009). The UNFCCC documents for the Lahendong II geothermal project in Indonesia revealed that part of the purpose of CDM financing was to incentivize the PLN to develop geothermal assets. Thus, the intention was not to fill all the financial gaps, but to reduce major risks to incentivize further development or private investment in the geothermal industry by private actors or SOEs.

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Nevertheless, it is important not to exaggerate the overall impact of the clean energy regime complex via the utility modifier mechanism. We must carefully distinguish between the impacts of the clean energy regime complex utility modifier mechanism and domestic political interests in favor of geothermal energy development. In the latter case, the clean energy regime complex institutions provided development assistance to address financial barriers in both cases as a response to signaling by the respective governments. The clean energy regime complex also initiated careful policy dialogues to support governments and industry in overcoming barriers to clean energy transitions and renewable energy development across cases. The cases revealed that development aid alone (the utility modifier mechanism) is insufficient to incentivize the transformational change needed to enable the growth of geothermal development. Policy advising (social learning) and technical assistance (capacity building) are necessary to complement project financial support (utility modifier) to ensure a viable industry, address regulatory and technical barriers, and promote institutionalization of technical capacity and long-term normative change.

Figure 7.1 shows the variation in financial flows to geothermal energy over time. While financial assistance to geothermal energy increased in Indonesia during

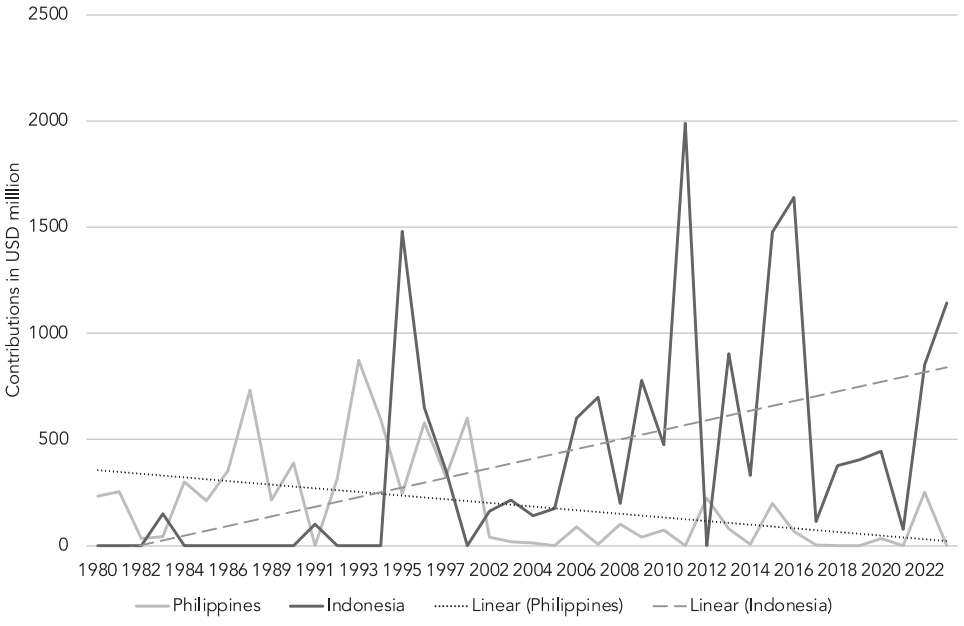


Figure 7.1 International public finance to geothermal development in Indonesia and the Philippines over time.
Source: ADB 2004, 2016, 2024; JICA 2008, 2016, 2024; KfW et al. 2015; OECD 2024; UNEP DTU 2016; World Bank 2016a, 2024b

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Table 7.1 *Summary of findings for the utility modifier mechanism*

Case study	Impact of the utility modifier mechanism
Chapter 4: Indonesia policy	Financial aid played a key role in Indonesia's ambitious international commitments to emissions reduction as demonstrated in the 26/41 Commitment and the JETP.
Chapter 5: Indonesia geothermal development	The case showed strong support that financial assistance (the utility modifier mechanism) had important impacts on geothermal development in terms of supporting growth in installed capacity and removing financial barriers, such as through the GREM/GEUDP.
Chapter 6: Philippines geothermal development	There were undeniable impacts from international development assistance in facilitating the early development of geothermal energy in the Philippines (Period 1), providing support for the utility modifier mechanism, but less impactful in Periods 2 and 3.

Period 3, the largest finance flows to geothermal energy in the Philippines occurred during Period 1, dwindling during Periods 2 and 3. These findings show that the international public finance to geothermal development varied over time and across cases. The flows to geothermal development in the Philippines were at their height during Period 1, largely sourced from institutions that are central to the clean energy regime complex. The trend of development assistance flows to geothermal energy in Indonesia were highest during Period 3, as shown by the dramatic rise in levels of geothermal finance between 2011 and 2022, as seen in Figure 7.1.

It appears that financial assistance is a necessary but not always sufficient condition on its own to incentivize clean energy development. Without buy-in from government and domestic political interests, and without overall normative change on the part of policymakers, renewable energy projects either stall or do not amount to transformative change once completed. The clean energy regime complex's financing in the Philippines was effective in early stages of SOE-led development, but it has been less effective in promoting the changes necessary to incentivize private investment. In Indonesia, the clean energy regime complex has not been effective in incentivizing private investment until Period 3; the GREM and GEUDP programs have subsequently supported the government-led exploration drilling program (see Table 7.1).

Social Learning as a Pathway to Sustainable Change

The clean energy regime complex's social learning mechanism supports change in the behavior of actors by introducing new ideas and information through international forums, workshops, and policy advising. The social learning mechanism

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requires a cognitive shift and change in beliefs about cause and effect, rather than simply a reproduction of existing policies (Clark et al. 2001; Dobbins et al. 2007; Elkins and Simmons 2005). It functions by diffusing norms of energy transitions or different problem-solving approaches to unlocking renewable energy development to policymakers at the national and subnational levels to support an energy transition. The social learning demonstrated through cognitive or normative shifts helps address regulatory barriers to renewable energy development.

Impacts of the clean energy regime complex through the social learning mechanism are evident in both Indonesia and the Philippines. Social learning is evident in the normative changes of actors that align with ideas and information diffused by the clean energy regime complex and result in policy changes in line with the regime complex objectives (Clark et al. 2001). The clean energy regime complex's social learning mechanism is evident in information, ideas, and norms promoted through international conferences, policy advising, aid conditionality, and institutional capacity building. In both Indonesia and the Philippines, the social learning mechanism is evident in policymaking and in policy reforms that remove certain regulatory and financial barriers to geothermal development. Social learning is a necessary condition for fostering long-term change but not a sufficient condition for incentivizing change on its own. Together with financial assistance, both mechanisms are necessary and sufficient conditions for geothermal development. However, the window of feasibility to promote social learning is mitigated by the regime complex's ability to converge domestic political interests, as discussed later in this chapter.

In Indonesia, the social learning mechanism impact is evident in the reform of the Geothermal Law, the creation of the GREM and framing around project risks, and the registration of CDM projects. The long process of reforming the 2003 Geothermal Law involved years of policy advising by multilateral and bilateral development agencies, and lobbying by the industry association and other stakeholders in the energy sector that recognized the necessity of regulatory reform in order to spur development. The impact is evident in the 2014 Geothermal Law, which corrected many of the problems of the 2003 Geothermal Law, representing regulatory changes resulting from social learning. Furthermore, the policy dialogues between the World Bank and the Government of Indonesia regarding the creation of a finance mechanism to reduce the risks of exploration drilling eventually led to the launch of a government-led drilling program. The creation of this program represents a transformation in how the government views its role in reducing risk, representing successful social learning and cognitive shifts.

Another example from Indonesia that demonstrates social learning processes is the CDM registration for geothermal projects. The learning process of CDM registration – transferring from policymakers at the national and subnational levels

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to industry – represents cognitive changes and social learning. During a period when renewable energy development was not seen as connected to emissions reduction, the trainings for CDM registration and the process of government representatives completing the registration was an important learning process that linked these two ideas. On a larger scale, the process of setting emissions targets began in 2009 when the Indonesian government adopted the 26/41 Commitment, which eventually translated into national and subnational policy on climate change and carbon emissions reduction. These examples demonstrate the social learning mechanism's impact on policy and normative change in Indonesia.

In the case of the Philippines, the major impacts of social learning are evident in the prioritization of geothermal energy to address the energy crisis in the 1970s, and the later reform of the 2002 Renewable Energy Law. While the Philippines had abundant resources in geothermal energy, it took the 1973 oil crisis and oil embargo to create the political urgency for finding alternative energy sources to improve energy security. This urgency enabled political will to converge domestic interests in favor of geothermal development as a solution to improving energy security. Arturo Alcaraz, the head of ComVol, took the opportunity to learn about the feasibility of geothermal development from other geothermal-producing countries like New Zealand and multilateral donor agencies. Alcaraz demonstrated the viability of geothermal energy, exemplified by the Tiwi plant, in comparison to other energy alternatives like nuclear and coal, and geothermal was prioritized as the main source of power generation henceforth.

The second instance of social learning in the Philippines is evident in the creation of the 2008 Renewable Energy Law. Social learning happened over the course of 20 years, as activists, civil society groups, industry, the WWF, Greenpeace, the Catholic Church, and NGOs formed the Renewable Energy Coalition and worked together to create a renewable energy law and protest the continued development of coal. The shifting of public awareness about the negative externalities of coal and tipping the scales toward renewables took decades. In time, domestic political interests converged around supporting renewable energy, and policymakers adopted the 2008 Renewable Energy Law, which removed critical regulatory barriers to development.

Throughout the history of energy transitions in both Indonesia and the Philippines, the global understanding around renewables and energy security and renewables and emissions reduction has significantly changed. Renewable energy is now seen as a viable alternative to fossil fuels to improve energy diversification, and the connection between renewable energy development, emissions reduction, and economic development is clear. This major shift in the perspective of policymakers extends beyond individual renewable energy projects and beyond individual administrations. Despite changes in government administrations, policymakers continue to prioritize renewable energy as a resource for development, whether geothermal or other

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Table 7.2 *Summary of findings for the social learning mechanism*

Case study	Impact of the social learning mechanism
Chapter 4: Indonesia policy	There is a clear prioritization of building renewable energy installed capacity in the 2010 Fast Track II program and later through the JETP, and translation of emissions reduction policy. This suggests that social learning has taken place and the clean energy regime complex had an impact, particularly in Period 3.
Chapter 5: Indonesia geothermal development	Social learning is supported by the evidence from the changes of framing for government officials in funding high-risk exploration financing with the launch of the GREM/GEUDP and ultimately through the government-led exploration drilling program during Period 3.
Chapter 6: Philippines geothermal development	There was evidence of social learning in the adoption of the Renewable Energy Law in the Philippines, particularly during Period 2, but low amounts of funding for policy advising relative to other mechanisms.

renewable energy technologies, albeit with different variable amounts targeted. This suggests that the clean energy regime complex has had a deep and transformative impact on social learning and normative change that traverses individual projects or individual policymakers, as institutional knowledge is passed on across administrations (see Table 7.2).

Technical Capacity Building and Capacity Barriers

Through the regime complex capacity-building mechanism, technical trainings support the development of human and institutional capacity, reducing technical and knowledge barriers to renewable energy development. The capacity-building mechanism functions by building up technical human capacity to address knowledge barriers. Authors such as Chayes and Chayes (1993: 188) distinguish noncompliance with formal regimes as an issue of purposeful defection from capacity issues, from defection when a country may not have the institutional capacity or resources to comply with legal agreements.

The clean energy regime complex has attempted to address human capacity barriers in Indonesia and the Philippines through technical capacity building, technical assistance, workshops and trainings, and scholarship programs (see Table 7.3). Funding for technical capacity building represented a significant share of overall flows to support geothermal development in the Philippines (37%), but a smaller share in Indonesia (6%) (see Figures 6.8 and 5.8 respectively). Despite variable amounts of funding, technical assistance and capacity building played a key role in each country in supporting early development. However, Indonesia demonstrated that while technical

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Table 7.3 *Summary of findings for the capacity-building mechanism*

Case study	Impact of the capacity-building mechanism
Chapter 4: Indonesia policy	Capacity building was weakly funded in this case.
Chapter 5: Indonesia geothermal development	This chapter found support for the regime complex impact through the capacity-building mechanism. There were small levels of funding for technical capacity building and technical assistance (6%) of overall funding. Technical capacity building was tertiary to the utility modifier and social learning mechanisms.
Chapter 6: Philippines geothermal development	Technical capacity building represented 37% of the overall funding to develop geothermal energy in the Philippines. This is significant and demonstrates that it has been a priority for donors (particularly the ADB, Japan, and New Zealand), which provides support for impact through the capacity-building mechanism.

capacity building was necessary to overcome technical human capacity barriers to geothermal development, the capacity-building mechanism was not strong enough to have an impact on the overall speed of geothermal development. In the Philippines, technology transfer, technical trainings, and support from New Zealand were critical factors in the country's fast ramp-up in geothermal development. Technical assistance and technical capacity building directed to address the Philippines power sector crisis was a major priority in the 1980s and 1990s during Period 1.

Domestic Political Interests, External Shocks, and Political Will as Intervening Variables

Domestic political interests and non-state actors are important elements of international political economy literature and transnational network literature, which are left out of much of the regime complex literature. Milner's work is important in underlining the fact that while a state acts at an international level as a unitary actor, there are different political processes and diverging political interests at a subnational level (Milner 1997). Likewise, Gourevitch (1978) and Putnam (1988) highlight the important interaction between the international system and domestic politics, whereby the international system can influence domestic politics just as the various interests of subnational actors can influence a state's position in an international system or in international negotiations. These interactions between international and domestic politics are critical elements to incorporate into regime complex conceptualization, particularly when examining regime complex effectiveness or impacts.

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The convergence or divergence of domestic political interests is a major intervening variable that mediates the overall effectiveness of the clean energy regime complex in both Indonesia and the Philippines. The regime complex incentivizes renewable energy development by building broad-based political support to address vested interests blocking or stalling renewable energy development. The history of geothermal development in both countries revealed that domestic political interests often interfered in geothermal development or energy transitions more broadly.

In Indonesia, domestic political interests and vested interests in fossil fuels have slowed implementation of renewable energy policies and development of geothermal resources. Reforming the 2003 Geothermal Law took more than a decade. Once domestic political interests shifted in favor of geothermal development, a new geothermal law was adopted in 2014. One major aspect of the successful reform of the geothermal law was shifting the tendering authority from local governments to the central government, removing the possibility of rent-seeking. To incentivize support for this provision in the new law, trade-offs were provided to local governments who would still receive a production bonus for geothermal projects (to prevent rent-seeking).[1] This example demonstrates how changing incentive structures can result in the convergence of domestic political interests.

Similarly, domestic political interests in the Philippines shifted away from geothermal energy in the early 2000s as interest in coal and other renewables became more prominent. The Renewable Energy Law was passed in 2008, but geothermal was not one of the major renewable energy technologies promoted through the feed-in-tariff scheme. When the clean energy regime complex can promote convergence of domestic political interests that were previously conflicting, policy change is possible. The cases of Indonesia and the Philippines provide support for the argument that convergence of domestic political interests is necessary for significant policy reform to pass and to ameliorate barriers to facilitate geothermal development and an energy transition.

Other intervening variables such as external shocks via energy or economic crises (e.g., the 1973 oil crisis or the Asian financial crisis) had similar impacts on changing the government's sense of urgency to reform policy (Chelminski 2022). This was in part driven by aid conditionality in structural adjustment loans – for example, in the privatization of the power sector in the Philippines in the 1990s during the power crisis, and the decentralization of the government in Indonesia following the 1997 Asian financial crisis. However, the oil crisis in 1973 had opposing effects across cases due to the different domestic energy resources in each country. The oil crisis decreased energy security in the Philippines, which

[1] See Winters and Cawvey 2015 for a description of rent-seeking in Indonesia.

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lacked a domestic oil supply, motivating a rapid investment in renewable energy for energy diversification to improve energy security. In contrast, Indonesia's oil and gas industries benefited from the oil crisis, which led to further entrenchment and carbon lock-in as the government continued to prioritize development of fossil fuels to ensure economic growth and energy security. In closing, external shocks, as observed through energy crises, are crucially important turning points in driving domestic political interests in favor of particular energy policies, whether diversifying energy supply through renewables development or doubling down on domestic oil and gas resources.

Further considerations in the role of domestic politics in renewable energy development are political regime types. In the Philippines, under the Marcos dictatorship, martial law allowed the government to develop domestic resources under a command-and-control system without the possibility of diverging subnational interests. State-owned enterprises were mobilized to not only develop geothermal capacity but also to guarantee electricity offtake. In contrast, Indonesia, under the Suharto regime, prioritized oil development instead of geothermal energy development. Then, following democratization and decentralization, Indonesia's domestic political interests and rent-seeking through local governments interfered with energy development.

Furthermore, both cases also showed the impact of political will to promote renewable energy development. In Indonesia, Irwan Prayitno played a key role in implementing the 2003 Geothermal Law to solve an energy security crisis. In the Philippines, Arturo Alcaraz and Pabling Malixi among others were important figures in promoting geothermal energy in order to improve energy security. The lack of political will to remove identified barriers to geothermal energy development has led to slow development in Indonesia and plateaued growth in the Philippines. The cases also demonstrate the role that political will can play in converging domestic political interests in favor of an energy transition.

To further explore the role of domestic political interests, the examination of the regime complex's ability to overcome lock-in is necessary as well. Figure 7.2 presents the regime complex lock-in matrix, placing the empirical chapters across the matrix.

As explored in Chapters 4 through 6, the best opportunity for the regime complex's influence on overcoming policy and technology lock-in is when energy security is low and political will for change is high. This combination (lower right-hand quadrant in Figure 7.2) was present in the Philippines in the 1970s (Chapter 6), when the oil crisis and subsequent energy crisis – due to energy insecurity – motivated geothermal energy development. The most unlikely moment for overcoming lock-in is when energy security is high and there is a lack of political will for change. This situation (upper left-hand quadrant of the matrix in Figure 7.2) is

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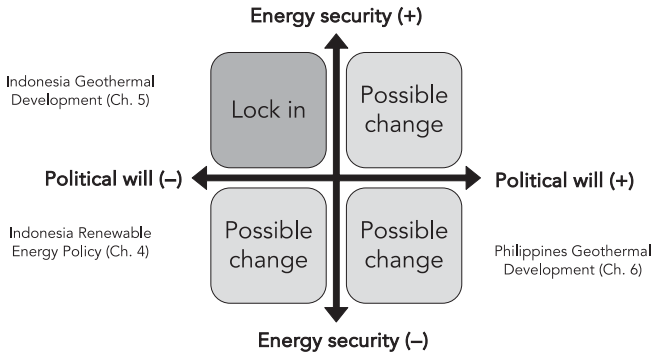


Figure 7.2 Regime complex and lock-in matrix: Empirical analysis.

illustrated by the case of Indonesia from the 1970s to 1990s, when, following the oil crisis, the country greatly benefited from an abundance of oil resources and the rising price of oil (Chapter 5). In the absence of political will for change, the clean energy regime complex had little impact in overcoming technology and policy lock-in. The remaining two quadrants of "possible change" – strong political will for change but high energy security, as well as high energy insecurity but weak political will for change – represent potential opportunities for the regime complex to overcome lock-in with the right mix of incentives, whether they be financial or through capacity building and social learning. As energy security decreases, it would be expected that the political will for policy and technology changes increases. It is in these transitional periods that the regime complex has an opportunity to demonstrate alternative policies and technologies, diffuse norms, and provide financing and capacity building for supporting and facilitating energy transitions.

Indonesia's case of renewable energy policy adoption (Chapter 4) (lower left-hand quadrant in Figure 7.2) provides an example of the change that can occur when energy insecurity is increasing, but there is limited political will to undertake transformational change. This describes the case when Indonesia's energy security decreased after its shift from net exporter to net importer of oil during Period 2. SBY made the 26/41 Commitment of emissions reduction with international support, inviting aid from the clean energy regime complex to bolster the country's energy transition. Limited government resources were provided for investment in renewable energy at the time in this case, but institutional and policy changes were implemented that set the stage for a possible future energy transition.

Figure 7.3 provides a visual illustration of regime complex mechanisms across the three periods of analysis. The next section elaborates how donor assistance flows to geothermal energy varied over time across both countries across the three periods of analysis.

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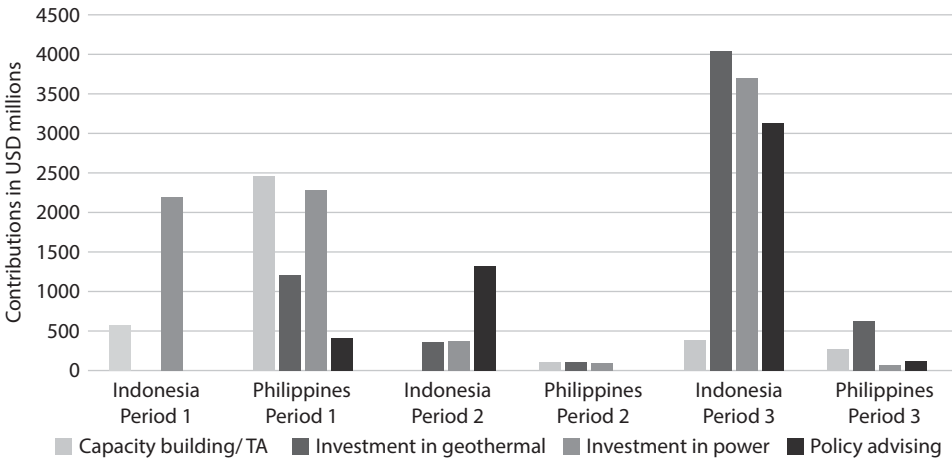


Figure 7.3 The clean energy regime complex mechanism's impact across three periods.
Source: ADB 2004, 2016, 2024; JICA 2008, 2016, 2024; KfW et al. 2015; OECD 2024; UNEP DTU 2016; World Bank 2016a, 2024b

Period 1: The Rise of Clean Energy Issue Salience

Period 1 is characterized by the global awakening of environmentalism at both the international and national levels. The Kyoto Protocol was adopted in this period, and discussions about the need for renewable energy governance began in response to the 1973 oil crisis and concerns over peak oil. The institutional landscape for clean energy governance had just started to crystalize, with the CDM and joint-implementing agreements within the climate change regime as the only institutionalized mechanism for renewable energy promotion. International public finance was allocated to EMDEs with a focus on electricity sector reform and electrification.

On the ground in Indonesia and the Philippines during this period, the impacts of the oil crisis and Asian financial crisis reverberated, requiring major political and economic reforms in both countries. These external shocks and crises had a foundational impact on the ways that governments approach energy development. The power sector crisis in the Philippines is a major motivation to continue building installed capacity, whereas in Indonesia, the Asian financial crisis shook the country to the core, and once plentiful oil production began to falter due to rampant corruption and mismanagement of the sector, particularly after the fall of Suharto.

Period 1 marks the rise of multilateral financing of renewable energy development in EMDEs through existing multilateral development banks. As discussed in Chapter 3, World Bank financing of geothermal projects dates back to the early 1980s, the beginning of the regime complex's emergence (see Figure 3.1). Bilateral

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technical assistance and multilateral development aid were crucial to driving early clean energy development efforts in the Philippines and Indonesia (albeit with fewer impacts on the latter) during Period 1.

The high flows of development assistance to the Philippines during Period 1 was in line with energy needs in the country in response to the 1973 oil crisis when oil imports were embargoed. All major mechanisms were present in the Philippines during this period, including the capacity-building, social learning, and utility modifier mechanisms, showing that the financial, regulatory, knowledge, and technical capacity barriers were the primary focus of development funding. In contrast, Indonesia profited from the oil crisis due to rising global oil prices and its abundant oil resources and production. Therefore, the development of geothermal energy was not a government priority during Period 1. Despite a lack of political will, multilateral and regional development banks made efforts to provide technical assistance for geothermal scoping studies in Indonesia, indicating an early interest in potential geothermal development. These efforts did not spur geothermal development until years later.

Period 2: Institutional Proliferation for Clean Energy

During Period 2, there was a rise in the number of transnational institutions participating in the clean energy issue domain, as the multilateral system of climate change governance was gridlocked. The United States exited the Kyoto Protocol during this period, and there was a shift away from the multilateral system and toward alternative forums and transnational initiatives, leading to greater institutional proliferation and fragmentation of the governance sphere in Period 3.

Toward the end of this second period of the regime complex's emergence, development aid flows tapered off in the Philippines and started to rise in Indonesia (Figure 7.1). The clean energy regime complex's financial flows were present in Indonesia and the Philippines during this period through the utility modifier mechanism, albeit at low levels, since there are still flows of funding for geothermal installed capacity. In the Philippines, the clean energy regime complex via the social learning mechanism was also active in catalyzing support for renewable energy through the Renewable Energy Commission and the eventual adoption of the 2008 Renewable Energy Law. The provision of funding for capacity building was lower during Period 2 across cases. Overall, there were lower levels of funding from bilateral and multilateral sources in Period 2 compared to the other two periods.

Period 3: The Emergence of the Clean Energy Regime Complex

During Period 3, the international institutional landscape for clean energy was extensive as the governance sphere proliferated and expanded. As the institutions

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proliferated and norms around energy transitions were widely diffused, a global shift prioritizing renewable energy development in order to mitigate climate change was widespread. The overall flows of development aid to Indonesia aligned with the emergence of the clean energy regime complex during Period 3, but the flows to the Philippines geothermal energy development were highest during Period 1. As the Philippines had already developed most of its primary geothermal resources in Period 1, growth in this sector plateaued during Period 3 as the country largely shifted its focus to other renewable energy priorities. A resurgence of interest in developing remaining secondary geothermal resources resulted in renewed focus and calls for international support to address a new set of barriers to geothermal development, namely financial risks associated with exploration drilling. However, progress remains to be seen.

Social learning and capacity-building mechanisms are also supported in the Indonesia case studies on renewable energy policy and geothermal energy development. Social learning was demonstrated in Indonesia's adoption of renewable policy and shift toward energy diversification during Period 3. Likewise in this period, Indonesia succeeded in reforming the geothermal law and norms around the government supporting high-risk exploration activities, with support from policy advising (the social learning mechanism) and technical assistance and training programs (the capacity-building mechanism) for geothermal energy offered by various institutions of the clean energy regime complex. In contrast in the Philippines, by the end of Period 3, the government and private sector's interests in geothermal energy development faced new challenges associated with declining quality of resources, rising costs of developing secondary resources, and additional barriers to new exploration and development. During Period 3, international development assistance was focused mainly on policy advising and technical capacity building to address new barriers associated with exploration drilling risk in the Philippines; funding for development financing to de-risk exploration drilling in the Philippines was proposed, but has not yet been formally approved.

Conclusion: Measuring Effectiveness across Cases

A regime complex's impacts on domestic politics manifest differently than a traditional regime with a formalized international treaty that includes mechanisms for compliance. Nevertheless, a regime complex, through proliferating yet fragmented institutions, can have a significant impact on domestic politics, particularly in the clean energy area. The various elemental institutions, including multilateral development banks and organizations, bilateral development agencies, and transnational advocacy networks that make up the regime complex, can have a substantive

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impact on domestic politics. These institutions impact domestic politics through the provision of development aid or climate finance (the utility modifier mechanism), policy dialogues and norm diffusion through international conferences and negotiations (social learning), and through trainings, workshops, and technical assistance (capacity building).

The cases of Indonesia and the Philippines revealed how the clean energy regime complex can impact domestic political interests and help remove financial, regulatory, and capacity barriers to energy transitions. The empirical cases also reveal the variable levels of effectiveness depending on the convergence or divergence of domestic political interests and political will in favor of an energy transition throughout the periods studied. Throughout these empirical case studies, this book demonstrates the importance of incorporating domestic politics as an indicator of regime complex effectiveness, particularly in the realm of the global energy transition to net zero. Using the *problem-solving* or *process* approach to measuring the effectiveness of the clean energy regime complex in promoting energy transition in EMDEs, we see how the clean energy regime complex enables EMDEs to implement the changes necessary to start shifting to net zero at the domestic level. It is critical, then, to understand not only the interaction between international and domestic politics, but also the conditions under which regime complexes can be effective or ineffective in promoting change at the domestic level.

Across the empirical case studies, targeted financial assistance (the utility modifier mechanism) and policy advising (the social learning mechanism) are both necessary conditions of the regime complex in promoting a transformative impact. Through technical trainings and technology transfer (the capacity-building mechanism), the clean energy regime complex further addresses technical capacity in the geothermal industry to ensure longevity of the industry and continued geothermal growth. Each mechanism on its own is insufficient to create the transformative change needed to ensure that impacts extend beyond the adoption of legislation or the completion of an individual geothermal project. In order for an energy transition and transformative change to occur, normative change around the benefits of clean energy technology as a solution to climate change mitigation and emissions reduction must be sustained in the long term and embedded within government institutions. As shown throughout these case studies, diverging domestic political interests and lack of political will to develop geothermal energy or adopt renewable energy regulations are key in explaining the variation in effectiveness of the clean energy complex across case studies. An energy transition will always face challenges and vested interests, particularly when there is so much at stake for incumbents.

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