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The 'Changing Same of Power': State territoriality and natural gas market liberalization in Thailand

Alexander Dodge

Department of Geography, Norwegian University of Science and Technology, Trondheim 7491, Norway

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ABSTRACT

Natural gas markets have been traditionally territorialized within the nation-state apparatus. However, since the early 1980s, the territoriality of these markets has been evolving through liberalization, cross-border market integration, and globalization in the form of liquefied natural gas (LNG) trade. These dynamics have materialized unevenly across the global economy. While natural gas market liberalization has been implemented in the United States and Europe, natural gas markets in most Asian countries continue to be firmly controlled by regulated or state-owned natural gas monopolies. This is the case in Thailand, where despite multiple reform efforts since the 1990's, the partially privatized, state-owned natural gas company, PTT Public Company Limited, continues to hold a lucrative monopoly over markets in Thailand. In this article, I explain why natural gas market liberalization in Thailand has failed to materialize by drawing upon an analytical toolkit that includes both territorial and topological notions of power. In doing so, I aim to contribute to geographical studies of energy by demonstrating the different arrangements by which powerful actors may reproduce their authority over energy systems. PTT has historically maintained its reach over natural gas markets through the exclusive yet contested authority of the Thai-state over domestic natural gas resources and infrastructure. However, more recently, this authority has been transformed by LNG imports and the introduction of natural gas sector reforms in Thailand. Nevertheless, I find that PTT continues to reproduce its monopoly in gas markets by quietly working through regulations, contracts, and pricing regimes.

1. Introduction

Recently, several energy geographers have argued for a stronger analytical focus on the notion of territoriality in order to highlight and problematize the geographical and spatial forms created through energy systems and their transformations (Bridge and Bradshaw, 2017; Bridge, 2018; Bouzarovski et al., 2015). Bridge argues that "focusing on how energy systems are territorialized draws attention to the different scales and arenas of political action that govern energy systems because of the way they are spatially constituted" (Bridge et al., 2013, 336). Territoriality is a particularly relevant concept for energy research as energy systems in recent decades have become increasingly global through growing cross-border energy investments and energy market deregulation (Overland, 2016; Bridge and Bradshaw, 2015). In the natural gas sector, these trends have significant political-economic implications for state authority in relation to energy governance, energy security, and energy access (Bridge and Bradshaw, 2017).

While natural gas markets have been traditionally territorialized at the scale of the nation-state, such boundaries are being reconfigured through emerging political technologies and socio-technical practices (Bouzarovski et al., 2015). Historically, cross-border flows and the international trade of natural gas has been significantly limited and most natural gas has been consumed in the country of production (IEA, 2016). However, since the late 1980's, the territoriality of gas markets has evolved through liberalization, international market integration, and globalization in the form of liquefied natural gas (LNG) trade (Bouzarovski et al., 2015; Bridge and Bradshaw, 2017). These trends towards market liberalization are not geographically uniform. While natural gas markets in the US and parts of Europe have become deregulated through the unbundling of natural gas transmission networks and development of wholesale markets, natural gas markets in Asia continue to be firmly regulated under nation-state authorities, mainly through national petroleum companies (Stern, 2014; Six and Corbeau, 2017). This is the case in Thailand, where national natural gas markets continue to be monopolized, despite the attempts of authorities in Thailand to introduce competition into domestic natural gas markets since the 1990's. In this paper, I analyze the limits of natural gas liberalization through an empirical study of natural gas sector reform policies in Thailand.

Initially, deregulation and liberalization was due to pressure from

E-mail address: alexander.dodge@ntnu.no.

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the World Bank, who made natural gas sector reform a condition of structural adjustment loans after Thailand sought emergency assistance from the international monetary fund in the 1980's (Greacen and Greacen, 2004). Thailand's power generation sector relies heavily on natural gas, which accounted for nearly 64 percent of the energy fuel mix in 2014. Over the past couple of decades, the implementation of natural gas sector reforms has been politically contentious. Despite Thai authorities enacting the legal framework for liberalization in the natural gas sector, the sector is virtually monopolized by the national energy company, PTT public company limited (Nikomborirak, 2017). PTT is the largest corporation in Thailand and the only Thai firm to rank in the Fortune Global 500 with a revenue of 58 Billion US dollars (DeCarlo, 2017). PTT's dominating role in Thailand's energy sector has been the subject of heated political debate in Thailand in the last two decades, where the costs of energy and the allocation of benefits have been continuously contested (Kosit, 2013; Changsorn, 2016; Wannathepsakul, 2016).

In this paper, I intend to explain why natural gas liberalization in Thailand has repeatedly failed to materialize by analyzing how PTT's monopoly in Thailand's natural gas markets has been continuously reproduced. To do so, I draw on an analytical toolkit that includes both territorial and topological notions of power. Territorial notions of power tend to conceptualize power as extended outwards over mappable distances. Power under these notions may be instrumental, for instance, in terms of the legal and regulatory authorities of governments, whose reach over resources and infrastructure is extensive to the borders of the nation-state (Allen and Cochrane, 2010; Allen, 2003; Allen, 2016). Topological notions of power, however, are less concerned with physical and mappable spaces, and entertain the idea of non-mappable, relational spaces that can be composed, shaped, and distorted through intensive arrangements of power (Allen, 2016). By drawing upon intensive arrangements of power, powerful actors may manipulate outcomes to their advantage by placing certain possibilities within or outside the reach of others in relational space. While territorial notions of power are useful for analyzing powers that are extensive to the authority of the nation-state, topological notions of power draw attention to the quieter registers of power that don't necessarily depend on asserting authority over territory or resources to reproduce advantage (Allen, 2009).

Regarding topological notions of power, I draw upon Allen's (2016) conceptualization of the *changing same of power*, which draws attention to the intensive, relational arrangements by which power is exercised differently from extensive arrangements of power, yet whose reach remains invariant to or unchanged by transformation. Furthermore, I suggest in this paper that topological and territorial notions of power can be related to each other during analysis to explain how both extensive and intensive arrangements are used simultaneously in power's reproduction. In my empirical analysis, I discuss how PTT's dominance over natural gas markets has been historically maintained through the extensive authorities of the nation-state. Nevertheless, I find that these extensive authorities are being reassembled due to declining domestic production, LNG imports, and natural gas sector reform. Through my conceptual framework, I explain that while PTT's dominance over natural gas markets is under pressure from the evolving territoriality of natural gas markets in Thailand, PTT continues to maintain its monopolistic advantage in natural gas markets through more spatially distorted forms of power mediated through infrastructure, contracts, and price regimes. However, I suggest that territorial notions of power remain relevant, as I find that PTT's capacity to exercise intensive arrangements of power rely on legal and regulatory powers that are extensive to the territory of the Thai nation-state.

This paper aims to contribute to geographical studies of energy by demonstrating how both topological and territorial notions of power can be utilized, and related to each other in analysis, to explain how powerful actors reproduce their control and authority over energy resources and infrastructure. The rest of the paper is organized as follows: In the next section, I outline the theoretical background for the paper by discussing the notion of territoriality, and how energy systems become territorialized at different scales, and the dynamics by which such scalar organizations are transformed and contested. I then explain the limitations of the territoriality concept, and suggest the need for topological notions of power that work together with territorial notions of power. I draw on the work of Allen (2009, 2016, 2003) to explain the different modalities by which power is continuously reproduced despite transformation. In the third section, I continue the theoretical discussion through an empirical analysis of the territorial and topological arrangements of power by which PTT's monopoly over natural gas markets in Thailand has been reproduced, despite liberalization efforts since the 1990's.

2. Energy, territoriality, and topological notions of power

In the past decade, several discussions in geography have emerged around how energy systems both constitute and are constituted by the social production of space. (Bridge et al., 2013; Calvert, 2016; Zimmerer, 2011). The "spatial-turn" in energy research entails not only accounting for the spatial outcomes of certain technologies and practices, but also analyzing how socio-spatial processes shape and form energy systems (Bridge, 2018). By alluding to these processes, energy geographers aim to explain the spatial configuration and scales of organization in energy systems, in addition to highlighting geographical differences, and drawing attention to spatial relations of production and consumption (Bridge et al., 2013). In doing so, energy geographers can contribute to current knowledge and debates about the spatial scales by which energy systems are governed, and the politics by which such scalar organizations are contested and transformed (Frantál et al., 2014; Sovacool and Drupady, 2016; Sovacool and Cooper, 2013). One focus area where geographical insights has been particularly well positioned is drawing attention to the territoriality of energy resources and infrastructure (Bridge et al., 2013; Huber, 2018).

2.1. The territoriality of energy resources and infrastructure

Energy geographers have used the notion of territoriality to explain how political and economic actors exercise authority and commercial power over energy resources and infrastructure by delimiting and asserting their control over space (Bridge et al., 2018; Bridge et al., 2013; Huber, 2018). The territoriality of energy resources can refer to how resources become embedded in the proprietorial, institutional, and cultural-political structures of the nation-state (Bridge, 2008). Analyzing nation-state territoriality and the politics of resources, according to Huber (2018), is not only a question of accounting for the politics of control and governance over resources, but also a question of how the state is actively constituted through limiting and maintaining control and access to resources. The core and fundamental feature of the modern capitalist state, according to Parenti (2014), is its role in delivering the utilities of resources to capital by controlling the terrain and portions of the earth where these utilities exist. The state does this by legally and militarily seizing parts of the surface of the earth and encasing resources within the techno-managerial apparatus of administration, science, and governance.

Through the territorial delimitation of resource access and control, states assert their sovereignty in addition to delivering the utilities of resources to capital. Energy resources and infrastructure can play a key role in reproducing political power through claims of national significance (Huber, 2018; Bridge et al., 2018). Resources both constitute the institutional state apparatus and a cultural imagery of a shared nation-hood. The state's control over territory relies on popular understandings and forms of consent to state power (Huber, 2018). Therefore, while states deliver the utilities of resources to capital, the state may simultaneously stand as enactor of nationalist politics against the global work of capital to naturalize its control over territory. These issues reflect a need to further draw upon debates in energy studies on how the capacity of states, corporations, and civil society to influence and shape energy outcomes is constituted in terms of territoriality.

Bridge et al. (2013) notes that energy infrastructure has been territorialized in different ways over time. Modern industrial capitalism evolved through its intensive vertical reliance upon subterranean stocks of energy that required relatively little surface land to harness (Huber and McCarthy, 2017). Energy infrastructure, according to Bridge et al. (2018), forms the "central nervous systems" of economies, and entails more than moving, converting, or storing infrastructure. Infrastructure also has the capacity to organize social relations in significant ways, and energy systems have politics or create political affects. Energy infrastructures are significant for the reproduction of political-power through claims of national significance. The modernization of the nation, as a political project, has been tied with reterritorializing energy systems at the scale of the nation by replacing localized municipal systems with a national-grid (Bridge et al., 2013). For example, Correlje et al. (2003) explains that after the discovery of the giant Groningen gas field in 1959, the Dutch government played a key role by collaborating with Exxon and Shell to develop the institutional framework and infrastructure that would transform the Dutch gas regime from a fragmented, municipal utility system to a national system. States therefore have historically played a key role in collaborating with capital to shape the territoriality of energy infrastructure under the authority of the nation-state.

The territoriality of energy infrastructure is also shaped by the materiality of energy resources (Bridge, 2008). The production, distribution and use of energy resources underpins both material and immaterial relations (Calvert, 2016). Energy resources and energy systems have particular materialities that are implicated in political-economic possibilities and constraints, and therefore play a role in enabling and sustaining different forms of political economy (Birch and Calvert, 2015; Bridge et al., 2018; Mitchell, 2009). Natural gas, compared to other fossil fuels like coal and oil, requires lumpy and asset-specific infrastructures that have high fixed start-up costs, creating a high-barrier to entry for competitors, thus generating natural monopolies (Sica, 2018; Balmaceda, 2018). Sica (2018) explains that prior to the passing of the 1938 Natural Gas Act in the US, an oligopoly of utilities that owned interstate pipelines effectively blocked independent producers from selling gas to out-of-state markets to avoid competition and keep prices high.[1] To combat this market failure, the Natural Gas Act established the authority of the federal power commission to oversee interstate pipeline construction plans and audit price rates to combat price gouging. As in the US, the authority of the nation-state over natural gas infrastructure and markets in most countries has been justified by concerns about market failure and energy security (Victor et al., 2006). Therefore, the authority of the nation-state over natural gas markets is closely related to the materiality of natural gas resources and infrastructure.

While the territoriality of energy resources and infrastructure is typically related to the authority and power of the nation-state, the territorial state is highly ambiguous and contradictory, and includes accommodating or contesting forms of territorial rules beyond the state itself (Bridge et al., 2018; Bridge et al., 2013). Energy infrastructure draws together material interests from specific actors and groups across multiple scales, including international capital (Bridge et al., 2018). Energy infrastructure is significant to the processes of financialization and has been a site of experimentation for neo-liberal agendas (Eren, 2018; Purcell and Martinez, 2018). The territoriality of energy resources and energy infrastructure is not limited to the borders of nation-states, and is subject to multiple forms and scales of governance (Bridge et al., 2013; Bouzarovski et al., 2015). Since the 1980's, the territoriality of natural gas markets has been evolving through market deregulation and the globalization of LNG trade (Bridge and Bradshaw, 2017). Deregulation of natural gas markets started in the United States after the passing of the natural gas policy act in 1978 (Sica, 2018). In 1986, deregulation started in Europe, when the United Kingdom privatized the national gas company, British Gas. Bouzarovski et al. (2015) shows that in the last two decades, the European Union has been undertaking a set of directives and policies for deregulating and facilitating the cross-border integration of national gas markets under the governance of a common regulator. Bouzarovski et al. (2015) suggest that the territoriality of a common gas market does not exceed and work beyond individual nation-states but can be described as an assemblage that emerges as smaller gas transmission networks are integrated under a set of common codes and regulations implemented by nation-states.

While the materiality of natural gas historically constrained the spatiality and territoriality of natural gas markets, Bridge and Bradshaw (2017) note that the territoriality of natural gas markets is being reshaped by significant growth in LNG trade in the last two decades. By cryogenically liquefying natural gas, the density can be reduced six-hundred fold, and transported by sea – going beyond the continental limits of gas pipelines. Although the territoriality of LNG trade has historically been limited by high capital intensity and strong inter-firm relations in LNG production networks, Bridge and Bradshaw note that a significant expansion in global LNG production capacity in the last decade and emerging organizational arrangements are constituting global LNG markets. Overall, the notion of territoriality is useful to account for how the governance and authority of natural gas resources, infrastructure, and markets has traditionally been territorialized at the national-scale, and the processes by which the territoriality of natural gas markets is shifting due to liberalization and globalization.

Drawing attention to the territoriality of natural gas resources and infrastructure can also explain notions of national identity and highlight how different social groups and actors contest over the allocation and benefits of energy infrastructure, and highlight the recent trend for "renationalizing" energy infrastructure (Bridge et al., 2018). The privatization of energy production, distribution and supply has led to discontent and protests. Building on the notion of territoriality, I explain in the empirical section the dynamics by which nation-state authority over natural gas resources and markets in Thailand is evolving through privatization, liberalization, and globalization and how these evolving forms of territoriality are contested by different consumer and civil society groups. However, while highlighting the relations between territory, capital, and states provides a framework by which power, authority and politics may be studied, there are several limitations of territorial notions of power that I suggest can be addressed through topological notions.

2.2. Beyond territory: energy and topological notions of power

The perspectives discussed above surrounding the territoriality of energy points to a conceptualization of nation-state authority and power over energy infrastructure and resources in terms of administrative, regulatory, and jurisdictional scales from the local, to the regional, to the national, and to the global (Bridge et al., 2013). Based on these conceptualizations, I propose that understanding how power and authority is territorialized at different scales, and showing how territoriality is deterritorialized and reterritorialized through globalization and market reform, provides a basis for explaining how authorities and power over natural gas markets are evolving. In these territorial notions of power, arrangements of power are "extensive" in the sense that the legal and regulatory decisions of administrative powers are collectively binding and extensive to all those within a clearly demarcated space or territory. Extensive arrangements of power are not exclusive to states, as it is possible to speak of the jurisdictional or managerial control of

[1] This had the consequence of generating huge waste, as producers vented and flared natural gas in order to extract small amounts of oil fuels which were easier to sell to markets.

corporate headquarters as extensive over resources and capabilities within mappable, metric space. However, territorial notions of power, according to Allen (2009), tends to take the spatial geometry of power for granted. Allen claims that basic notions of territory and scales assume that the decisions of administrative power is impelled out from centralized authorities and uncomplicatedly reaches across demarcated spaces. Bridge and Bradshaw (2017) and Bouzarovski et al. (2015) avoid taking the spatial geometry of power for granted by showing how the territoriality of natural gas markets are being reshaped by global networks and reterritorialized through cross-border assemblages. However, these notions of rescaled and networked markets do not break with the notion that power and authority is extensive across fixed, topographical representations of space, and consequentially these territorial notions miss the other, more subtle ways by which authority over infrastructure and resources are realized (Allen and Cochrane, 2010).

Allen (2009) suggests that when the extensive authority of nation-states over territories become blurred, unbundled, and re-embedded through new forms of private authority, then topological framings of power may be better suited than territorial notions to capture how power is practiced. Topological notions of power are concerned with actual workings of power, not with what actors "can do" given their resources or legal authority over territory (Allen, 2016). Based on Allen's (2016) approach to topological framings of power, I suggest that focusing on the actual workings of power in energy systems entails analyzing how different actors act upon and respond to the contingencies that confront them, such as price shifts, declining energy resources, new policies, etc. Furthermore, the capacity of powerful actors to respond to contingencies and secure certain outcomes is not guaranteed. Borrowing from mathematical studies of topology, Allen (2016) uses the terms "equivalence" and "invariance" to conceptualize power as something that can be continuously reproduced through processes of spatial distortion. The "changing same of power" refers to the different modalities by which power is practiced and reproduced by institutions and actors by drawing other actors into their reach or keeping them at a distance. For example, when blunt displays of power or territorially-extensive authorities are no longer successful, some powerful actors may do better to establish their advantage through quieter registers of power that reproduce their presence by drawing other actors into their relational proximity. In the empirical section below, I demonstrate how PTT reproduces its power by maintaining its relational proximity to gas buyers in Thailand, and excluding other possible competitors by doing so.

Topological notions of power directs research towards more intensive arrangements of power, that focuses on the relationships and interplay between different institutional interests and authorities, where power relationships are mediated through events, technologies, and practices for specific political and economic ends (Allen, 2011). Whereas territorial notions of power consider extensive arrangements of power that take place over defined physical distances and territories, topological notions of power draw attention to intensive arrangements of power that work through non-metric, relational distances that are constitutive of space (Allen 2016). In other words, the distinction between extensive and intensive arrangements of power is a question of how the relationship between space and power is understood. Allen (2016) suggests that powerful actors exercise intensive arrangements of power to compose and shape relational distances to: "*place certain possibilities within reach, to draw others within its orbit to seek advantage, or equally, to place certain possibilities beyond reach" (49)*. Allen notes how actors use technologies to create a simultaneous presence in a diversity of settings, so that the gap between here and there is bridged relationally (Allen, 2003). These intensive arrangements of power are not foreign to studies in social science on energy that have discussed how material artifacts, such as regulatory codes, audits, calculative agencies, contracts, pricing regimes, etc. can be used to mediate relationships between states, corporations, stakeholders and publics (Barry, 2013; Birch and Calvert, 2015; Mitchell, 2009; Boyer, 2014).

Allen (2016) suggests that powerful actors are not only powerful because they possess resources or authority over territory, but because they can "hook-up" other actors and reach into their everyday lives through different practices and technologies. Furthermore, Allen suggests that powerful actors may draw upon intensive arrangements of power to close off possibilities from others, keeping them at a distance. Both corporations and states may draw upon intensive arrangements of power to reproduce their authority. Erensü (2018), for example, explains how the Turkish government, through its *Milli Energy Strategy*, draws capital owners within their orbit and secures their unconditional loyalty in a liberalized energy system through the rapid resolution of land-disputes, loosening of regulatory burdens, and the patrimonial sponsorship of energy infrastructure investors. Through Allen's topologies of power approach, I suggest the need to account for relations between actors and material objects such as gas transmission codes, gas supply contracts, and pricing regimes, and to analyze how these relations constitute intensive arrangements of power in natural gas markets.

While Allen suggests that territorial notions of power miss the many relational arrangements by which power works, he maintains that territorial and topological notions of power are not mutually exclusive, and both framings of power could work along-side each other in analysis (Allen, 2009; Allen, 2011; Allen, 2016). However, Allen does not discuss the extent to which these framings of power can be simultaneously drawn upon to analyze how intensive and extensive arrangements are related in the reproduction of power. Allen and Cochrane (2010) discuss how the spatial reach over territory is reassembled through intensive arrangements. Allen and Cochrane detail how these intensive arrangements of power can reproduce a government's reach, but they don't account for how certain forms of spatial reach and extensive authorities, such as legislative and regulatory powers, may be contingently necessary for intensive arrangements of power to be realized. While liberalization and globalization may distort the extensive reach of states and state-owned corporations over natural gas markets, the empirical section in this paper demonstrates that certain forms of legal and regulatory authorities over natural gas markets in Thailand are maintained despite these processes. Corporations and states may draw upon intensive arrangements of power that work through laws and regulations that shape relational distances, but the effectiveness of these strategies may depend on the extensive sovereign authorities of nation-states over domestic gas markets that can be best understood through territorial notions of power. In the following empirical section, I demonstrate that both territorial and topological notions of power can be used, and related to each other, to explain why PTT's dominance in Thailand's natural gas markets has continuously been reproduced, despite attempts to implement liberalization reforms since the 1990's.

3. Natural gas monopoly and liberalization in Thailand

In this section, I further develop the discussions surrounding intensive and extensive arrangements of power in energy systems based on a theoretically informed case study of natural gas sector reforms in Thailand. The case study is based on an empirical research period in Bangkok, Thailand in February 2017 in addition to desk-based research. Similar to other countries, the territoriality of natural gas resources and markets in Thailand has been primarily exclusive to the authority of the nation-state. It is through this territoriality that PTT has been granted monopolistic control over natural gas resources and markets in Thailand. Since the 1980's, this territoriality has been subject to contesting forms of territorial rules beyond the state itself, through pressure to liberalize and deregulate natural gas markets by the International Monetary Fund (IMF) and the World Bank. At the same time, reforms have sparked nationalist backlash against structural adjustment programs, nationalist forms of capitalism, and civil society movements. In other words, the territoriality of natural gas resources and markets in

Thailand has been highly ambiguous and contradictory.

This empirical section is divided into three parts. In the first section, I detail the dynamics of territoriality through an historical analysis of natural gas markets, reforms, and contentious politics in Thailand. The historical analysis is based on the work of researchers who have written on the topic of energy reform and politics in Thailand. In addition, I also analyze different policy documents, laws, reports, and newspaper articles. In the second and third part of the empirical section, I account for the current situation surrounding natural gas market reforms by explaining how the globalization of the Thai natural gas sector through LNG imports threaten PTTs monopoly over natural gas markets in Thailand. I discuss how, despite these changes, PTT continues to reproduce its dominance through intensive arrangements of power. My analysis in the second and third section is based primarily on 12 in-depth interviews conducted in February 2016, and industry reports. The interviewees included government regulatory and planning officials in Thailand. In addition, executives at energy-related companies in Thailand, both state-owned and private, and an energy consultant with considerable experience on the topic were interviewed. The interviews uncovered the various issues and challenges (at the time of the interviews) that were associated with market liberalization in the Thai natural gas sector.

3.1. History of natural gas sector reform in Thailand and territorial power

The 1971 Petroleum Act in Thailand, exemplifies what Parenti (2014) describes as states judicially controlling portions of the earth and delivering the utilities of environmental resources to capital. After Thailand claimed sovereignty over the continental shelf in the Andaman Sea in 1971, it granted, through the Petroleum Act, the rights to private parties to explore, produce, store, transport and sell petroleum in concession areas (Ruangsuvan, 1981; Hongladaromp, 1985). A concession agreement with Union Oil Co. (Chevron today) led to the discovery of the major Erawan gas field. Following the discovery, the Thai government established the Natural Gas Organization of Thailand (NGOT) in 1977 with the directive of developing and implementing projects that would enable the use of natural gas for the benefit of the country. The push to develop natural gas production and consumption in Thailand followed the 1973 oil crisis. At the time, Thailand was almost entirely dependent on imported crude oil to meet its energy needs, particularly in the power sector (Hongladaromp, 1985). Thailand received loans from the World Bank to construct the pipeline. Following advisement from the World Bank, Thailand established the Petroleum Authority of Thailand which would eventually be merged with NGOT to form the state-owned enterprise, PTT company limited (World Bank, 1979). The incorporation of PTT consolidated the territoriality of natural gas resources and infrastructure under the authority of the nation-state. PTT was assigned a broad range of responsibilities, including procuring, exploring for, developing and producing petroleum and natural gas in addition to constructing ports for petroleum business activities, storage, transport systems, and refineries (Hongladaromp, 1985).

The access to low cost oil and natural gas reserves played a significant role in Thailand's economic development. Natural gas resources and infrastructure formed the "central nervous system" of the Thai economy. Natural gas has been linked to the transition from an primarily agricultural to an export-led industrial economy (Barron, 2016). Low-cost natural gas resources and labor attracted significant foreign direct investment in manufacturing and petrochemicals (Dixon, 2001). Economic growth in Thailand sharply accelerated during the mid-1980s. The share of natural gas in Thailand's energy mix grew significantly, and in 2015 natural gas accounted for nearly 64 percent of electricity generation in Thailand (Energy Policy and Planning Office, 2015). PTT has acted as the sole purchaser, transporter and distributer of natural gas in Thailand, and purchases all indigenous gas from producers (Nikomborirak, 2013). These arrangements that territorialized natural gas systems at the scale of the nation-state were tied to the modernization of the nation, which as explained later in this section, is tied to the nationalist backlash against neoliberal reforms. It was through these processes of territorialization and monopolization, that the extensive authority of the Thai State and PTT over natural gas markets was consolidated.

The authority of the nation-state and the territoriality of natural gas infrastructure came under pressure by multi-lateral donor organizations in the 1980s. The reliance on expensive, imported crude oils after the oil crisis in the 1970's led to the accumulation of high public sector debt (Wisuttisak, 2012). The economic boom and high growth in urbanization in the 1980s, in addition to subsidized electricity tariff rates, led to a massive increase in electricity demand and power shortages (Jarvis, 2011). Due to political pressure to maintain low electricity tariffs, Thailand sought emergency assistance from the International Monetary Fund. In 1982, Thailand took out structural adjustment loans from the World Bank with the condition of deregulating and liberalizing the utilities sector and implementing measures to privatize state-owned enterprises (Wisuttisak, 2012).

Greacen and Greacen (2004) label the 1990's as the "neoliberal" era in Thailand's energy history, as authorities sought to introduce competition into the utilities market. Authorities enacted new regulatory frameworks, largely adopted from models developed in the UK, in order to rapidly deploy new energy infrastructure. According the Greacen and Greacen, after the 1991 military coup of the Chatchai administration, the military sought to maintain legitimacy in the eyes of the World Bank and the IMF, and curtailed the power of labor unions to fight subsequent moves to privatize state-owned enterprises such as PTT. In this way, the regulatory apparatus of the Thai state included forms of territorial rule beyond the state itself (i.e. The World Bank and IMF). In 1992, the National Energy Policy office (NEPO) was established and tasked with reorganizing the institutions involved in the energy sector. Dr. Piyasvasti Amranand, the secretary general of NEPO at the time, spearheaded the deregulation efforts (Jarvis, 2011). Dr. Piyasvasti drove forward a strong agenda of market rationalism and privatization, and lobbied the prime minister and cabinet for reform in the energy sector. NEPO at the time was a largely influential body and assumed significant powers over most facets of energy policy, planning and pricing.

NEPO secured technical assistance from the Word Bank to assist in privatization of the energy sector. After the financial crisis in 1997, the Thai government drew up and approved the "Master Plan for State Sector Reform" as part of Thailand's bailout package from the IMF (National Energy Policy Office, 1998). In 1998, the business management consultancy, London Economics, submitted a World Bank funded report outlining the plan for reform and restructuring of the Thai energy sector. The report suggested the establishment of an independent regulatory agency, providing companies with incentives through price regulation, facilitating a role for the private sector, and developing a primary legislation for the regulatory office (London Economics, 1998). In addition, the report suggested limiting PTT's monopoly and make room for competitors by preventing PTT from entering further take-or-pay contracts and from contracting for all the gas in any new gas field. Furthermore, the report suggested introducing account separation between PTT's commercial marketing and transmission system operation activities.

Following the London economics report, in 1998, NEPO proposed the plan "Privatization and Liberalization of the Energy Sector in Thailand" (Jarvis, 2011). The cabinet, led by then Prime Minister Chuan Leekpai, accepted NEPO's plan and agreed to implement reforms in the gas sector (Jarvis, 2011). The reforms included partially privatizing PTT, and legally separating PTT's transmission from its marketing business by establishing PTT Transmission Co. Ltd. This energy reform agenda, which entailed significantly reworking the extensive authority of both the Thai State and PTT over the energy sector, was not without discontent in Thai society and sparked nationalist backlash (Barron, 2016). Unions protested the privatization of state-owned enterprises, and Thai nationalists felt that energy reforms would lead to takeover by foreign interests (Greacen and Greacen, 2004). Consumers feared the uneven distribution of benefits such as increased power prices and that reforms would lead to privatized monopolies. The press feared corruption and favoritism in the privatization process.

Contentious politics surrounding the energy reform agenda mirrored wider discontent with neoliberalism after the 1997 Asian financial crisis, and the blaming of IMF structural adjustment programs and foreigners for Thailand's economic ills (Glassman, 2004). These resentments towards global neoliberalism helped propel the Thai Rak Thai Party led by Thaksin Shinawatra into power in 2001. Greacen and Greacen (2004) label this period in Thai history as the "National Champion" era. Thaksin's version of "nationalism" was complicated as it was opposed to IMF market liberalization reforms, but carried on with the privatization of state-owned enterprises (Simpson, 2016). PTT was partially incorporated and 49 percent equity share was floated on the Thai Stock Exchange. The government continued to maintain a majority shareholder position with 51 percent equity, thereby maintaining PTT as a state-owned company. Through the partial corporatization of PTT and other state-owned enterprises, Thaksin intended to build up cash flows to avoid IMF loan obligations and carry out a number of populist programs such as a moratorium on debt for farmers, national health insurance, and infrastructure expenditures (Glassman, 2007; Jarvis, 2011). Although PTT was privatized, Thaksin's regime retained PTT's extensive authority over Thailand's natural gas markets. Many of the proposed energy reform initiatives outlined in NEPOs plan that would have introduced competition in the Thai gas market were dropped. Furthermore, in 2002, Dr. Piyasvasti was transferred out of NEPO. NEPO was renamed as the Energy Policy and Planning Office (EPPO) and its electricity policy-making role was relocated to the ministry of energy. EPPO lost its reformative power and energy policy was controlled firmly inside the executive branch and subject to direct political considerations. Therefore, the Thaksin regime was able to undo the IMF's influence and reestablish the extensive authority of the state over Thailand's energy system by maintaining majority ownership of PTT and upholding its monopoly over natural gas markets in Thailand.

The partial privatization of PTT and other state-owned enterprises led to strong protest movements from consumer protection NGOs (Sirasoontorn and Quiggin, 2007). In August 2006, the Supreme Court took up a case against the corporatization of PTT filed by the Foundation of Consumers who petitioned to delist and completely renationalize PTT (Nikomborirak, 2013). During the court case, the Thaksin government was ousted following a military coup in September 2006. In October 2006, Dr. Piyasvasti was reinstated as the minister of energy. The post-coup period provided a brief "window of opportunity" for energy liberalization. One of the key initiatives that Dr. Piyasvasti took during this time period was the passage of the Energy Industry Act in 2007 (Jarvis, 2011). The Energy Industry Act established a single regulatory body, the Energy Regulatory Commission (ERC) and was modelled after the UK Office of Gas and Electricity Markets (Nikomborirak, 2013). The ERC would be responsible for promoting competitive practices, having oversight over tariff review, distributing licenses, etc. The Energy Industry Act was an important factor for the December 2007 decision of the administrative court not to force the delisting and renationalization of PTT (Jarvis, 2011). Instead, the court ordered that state land and gas pipeline assets that belonged to the Thai State should be transferred to the Ministry of Finance.

However, the reform period from 2006 was short-lived, as in 2008, Dr. Piyasvasti was again moved from his position as the Thai Minister of Energy (Jarvis, 2011). The subsequent Thai cabinets adopted a "go-slow" attitude towards the ERC, and delayed approval for its budget. Simpson (2016) explains that while these cabinets did not abandon all the neoliberal philosophies underpinning energy reform, these cabinets did not proceed with reforms due to political instability at the time. Since the passage of the Energy Industry Act, PTT continues to act as the sole purchaser of natural gas in Thailand and operates pipelines on a monopoly basis (Nikomborirak, 2013). PTT maintained its monopoly, because, as explained in the theoretical section, the materiality of natural gas creates natural monopolies (Sica, 2018). While PTT returned some of its natural gas pipelines to the state, it reserved the entirety of pipeline capacity through legacy contracts and, in doing so, effectively blocked competitors from using the pipelines (Nikomborirak, 2013). In addition, PTT was required by the Supreme Court ruling to only return gas pipelines that were commissioned before PTT's privatization, so PTT continued to maintain extensive power and control over large parts of natural gas transmission networks in Thailand. In 2012, The Ministry of Energy and Finance was accused by the Foundation of Consumers of not enforcing PTT to return pipelines that were owned by the state, specifically offshore pipelines that were built before PTT was privatized (Thip-Osod, 2012). By continuing to own offshore pipelines, PTT continued to maintain its extensive reach over Thailand's natural gas market through its exclusive access to domestic natural gas reserves in Thailand.

The history of natural gas sector reforms in Thailand has been highly turbulent and contentious, as various groups and political actors have contested over the territoriality of natural gas resources and infrastructure in Thailand. Despite privatization and market reform efforts, PTT has continued to operate under the extensive authority of the nation-state in Thailand, allowing PTT to enjoy a regulated, yet lucrative monopoly over Thai natural gas markets. PTTs power seems to reach over space into everyday aspects of Thai life, as natural gas is primary a source of fuel for electricity generation, natural gas vehicles, and cooking. Nevertheless, the Energy Industry Act has continued to live on through the operations of the ERC and EPPO, even if political authorities were not necessarily pushing the act politically. In the next section, I discuss how the importation of LNG starting in 2011, and the Third Party Access (TPA) regime issued by the ERC is threatening the extensive power arrangements that have traditionally enabled PTT to dominate Thailand's natural gas sector. Responding to these contingencies, I find that PTT draws upon intensive arrangements of power to reproduce its advantage in Thai gas markets.

3.2. The 'changing same of power' in Thailand's natural gas Markets

Up until now, I have drawn upon territorial notions of power to discuss how PTT has maintained its extensive authority over natural gas markets in Thailand despite privatization and the passing of the Energy Industry Act. As previously discussed in the theoretical section, territorial notions of power are useful to conceptualize how authority and power are extensive to administrative, regulatory, and jurisdictional scales, such as that of the nation-state, and the contentious politics through which nation-state territoriality is transformed through privatization, liberalization, and globalization. However, as the exclusive authority and extensive power of the nation-state becomes blurred and unbundled, power becomes more difficult to account for, even with a vocabulary associated with rescaling (Allen, 2016). Working together with conventional territorial framings of power, a topological framing of power in energy systems draws attention to the more relational, intensive arrangements by which advantage can be reproduced.

The key challenge to liberalization in the Thai natural gas sector has been that PTT has held monopolistic rights and extensive reach over pipelines within the boundaries of the Thai nation-state. The capacity of competitors, such as concessioners on Thai gas fields, to sell natural gas to markets was effectively blocked, as PTT maintained ownership over domestic offshore pipelines. Therefore, despite its partial privatization and the passing of natural gas reforms, PTT effectively maintained its monopoly over Thailand's natural gas markets. However, since 2011, the territoriality of natural gas markets in Thailand has been transformed by the importation of LNG. While Thailand has historically enjoyed the benefits of having ample quantities of low-cost natural gas resources, natural gas reserves in Thailand peaked in 2004, and since then the reserve to production ratio has dramatically declined (Barron, 2016). Since 1998, Thailand has become increasingly dependent on importing natural gas from Myanmar to sustain its growing consumption. In 2014, nearly 18 percent of gas supply in Thailand was imported from Myanmar. As expanded imports from Myanmar is uncertain, and domestic production declining, the Thai government sought to diversify its energy sources by commissioning the Map Ta Phut LNG terminal in 2011 (Interview, energy planning official, February 2016). At the same time, PTT has signed a number of LNG supply contracts with different international suppliers, including Malaysian Petronas, Qatar Gas, BP, and Shell.

Although PTT has traditionally maintained its extensive reach over Thailand's gas market through the territorialities of natural gas resources and infrastructure that have been historically exclusive to the nation-state, LNG opens new windows of opportunities for natural gas liberalization in Thailand. The introduction of LNG imports to Thailand's gas markets plays a key role in deterritorializing gas markets in Thailand as markets are connected to gas sources beyond the boundaries of the Thai-Nation and PTT's extensive control over Thai Gas Pipelines and upstream gas sources. While PTT's control over offshore pipelines continues to be disputed in courts, the energy regulatory commission has the authority to break PTT's monopoly and diminish its extensive reach over Thailand's gas markets by issuing Third Party Access on LNG terminals and onshore gas transmission networks (Koomsup and Sirasoontorn, 2007). The ERC enacted the Third-Party Access Regime for Thailand in 2014. The TPA regime was enacted through the Energy Industry Act, Section 81 "A Licensee who owns an energy network system must allow other licenses or energy industry operators to utilize or connect to his system in accordance with the terms stipulated and announced by the licensee" (EPPO, 2007). The TPA regime forces the operators of LNG terminals to allow access to third parties to utilize terminal capacity under regulated conditions (ERC, 2014). Therefore, PTT is obligated to allow access to the use of the Map Ta Phut Terminal and onshore transmission pipelines to third-party gas retailers (Interview, energy regulatory official, 2017).

However, despite issuing the TPA regime, the ERC has not issued any licenses to any third-party gas retailers (interview, energy regulatory official, 2017). Today, PTT continues to be responsible for all LNG imports in Thailand. According to an energy regulatory official in Thailand, officials have struggled to find new third-party retailers for LNG terminals in Thailand. Utilizing a topology of power framework, I discuss three different modalities of power by which PTT intensively reproduces its advantage by keeping domestic buyers in reach, and competitors at a distance, despite the TPA regime. First, PTT maintains its advantage as network codes are quietly manipulated to guarantee that PTT is the sole user of natural gas pipelines and terminals. Second, PTT's relational proximity to gas buyers is maintained through existing long-term contracts with no exit clauses. Third, pricing mechanisms in Thailand allows PTT to reproduce its monopolistic advantage, by always being able to sell natural gas at a lower price than possible competitors. At the same time, I explain that these intensive arrangements of power are not mutually exclusive to the extensive arrangements of power that have been unaltered by the TPA regime. Nevertheless, as extensive arrangements of power surrounding authority over territorial and managerial control are spatially distorted through LNG imports and TPA regimes, I suggest that PTT is able to work through intensive arrangements of power to maintain its reach into Thai Gas Markets by drawing customers into its relational proximity and keeping competitors at a distance.

3.3. Power topologies in Thailand's gas markets

The "quieter registers of power" discussed in the theoretical section are exemplified by the modalities by which PTT continues to effectively reserve 100 percent of pipeline and LNG terminal capacity through the network codes established under the TPA regime. Consequently, through these intensive arrangements of power, PTT is able to effectively keep competitors at a distance, as they are blocked from using pipelines and LNG terminals in Thailand. However, these intensive arrangements of power are not divorced from the extensive authorities of the nation-state, as exemplified by the decision of regulators not to draw upon their extensive legal and regulatory authority to enforce ownership separation. In EU regulations regarding TPA terminals, the operator of the LNG terminal should operate as an separate entity than the terminal users, as the operator is expected to grant non-discriminatory access to terminals (Heather, 2016). In Thailand, however, regulators opted to only enforce a legal separation of PTT's LNG subsidiary that operates the Map Ta Phut LNG terminal from its mother corporation. In addition, regulators enforced only an account unbundling of PTT Natural Gas Distribution, which operates natural gas pipelines in Thailand. In an interview, a government regulatory official justified the reluctance to enforce ownership separation:

Europe promoted ownership separation to make sure there is 100 percent transparency, but in Thailand we are still under a process, and we still don't know if we should enforce ownership separation, but we will try to make it as transparent as we can. (interview, government regulatory official, 2016)

Under the Thai TPA regime, transmission system and LNG terminal operators are expected to ensure that operators should "promote fair and transparent service of an energy network system, without unjust discrimination", and the operator should allow third parties to connect to and/or utilize natural gas facilities (ERC, 2014). Capacity should be allocated on a first-come-first-serve basis. Nevertheless, the TPA regime requires that natural gas facility operators allocate available capacity on a grandfathered basis (ERC, 2014). "Grandfathered" is the continuation of existing contractual rights to use a natural gas facility. Through this clause, PTT continues to control 100 percent of reserved pipeline and LNG capacity (interview, government regulatory official, 2016). However, the TPA regime also includes a use-it-or-lose-it obligation, where if the shipper has not utilized its capacity for a period defined by the natural gas facilitator of up to 12 months, then the terminal operator should require the user to release the capacity for reallocation (ERC, 2014).

While PTT holds 100 percent of reserved capacity, the LNG terminal at Map Ta Phut is currently underutilized. PTT has argued that there are brief periods where full terminal capacity is utilized and therefore is not required to give up their capacity (interview, consultant, energy management agency, 2016). While the TPA regime allows transmission system operators to allow this, a consultant at an energy management agency noted that:

> If the regulator wanted to, they could probably make the case that PTT should give up their capacity (on the LNG terminal), but the problem is that PTT owns PTT LNG, and PTT LNG is unlikely to make the case for forcing PTT to give up their capacity. And in terms of political power, if the regulator is in dispute with PTT, then PTT will win. (interview, consultant, energy management agency, 2016)

The quote from the consultant points to a situation where PTT is able to quietly reproduce its advantage by working through the codes and regulations defined by the TPA regime. These intensive arrangements of power effectively place possibilities for competitors to access natural gas infrastructure at a distance. However, by the territorial authority granted through the energy industry act, the energy regulatory commission has the extensive power to enforce ownership separation in Thailand. Nevertheless, the quote above suggests that the capacity of the regulator to enforce ownership separation is limited by intensive, relational power arrangements between the Thai State and PTT, which are best understood through topological notions of power. Thus, the situation surrounding ownership separation demonstrates how intensive and extensive arrangements of power are interrelated.

The second register by which PTT maintains its dominance over natural gas markets is by reproducing its relational proximity to buyers in the Thai gas market. PTT maintains these proximities through long-term gas supply agreements that were signed before the ERC enacted the third-party access regime. In its recommendations for the liberalization of the Thai natural gas sector, the London Economics report noted that PTT should not be able to enter in further take-or-pay contracts, or allowed to contract for all the gas in any new fields (London Economics, 1998). These recommendations were disregarded by Thai authorities at the time. Today, the challenge is that while the TPA regime was launched in 2014, PTT continues to hold all long-term gas supply agreements (GSA) with currently operating power plants in Thailand (interview, government regulatory official, 2016). A GSA is required before a Power Purchase Agreement (PPA) is signed, and the GSA normally lasts the lifetime of the PPA (15–20 years) (interview, executive manager, independent power producer, 2016). Exit clauses were not incorporated in the GSA, as PTT was previously the sole retailer of natural gas in Thailand.

> If the government really wanted competition in the gas supply, then they should have a clause that says an existing customer can renegotiate gas agreements with PTT, but now they can't because they are locked in (interview, executive manager, independent power producer, 2016).

Again, as reflected in the quote, PTT is able to maintain relational proximities to power plant operators through long-term contracts, due to the reluctance of the government to draw on its extensive authority to enforce the addition of exit clauses to existing contracts. These arrangements surrounding long-term contracts keep competitors at a distance, since it will only be possible for third-party retailer to enter the market if there is a need for a new GSA. New GSAs are hard to come by, as energy planners ultimately plan to reduce natural gas consumption, as Thailand is expected to become further dependent on LNG, which is more expensive than domestic gas and Myanmar imports (interview, government planning official, 2016). Through long-term GSAs, current gas operators remain effectively "hooked-up" to PTT for the duration of the GSA, and therefore gas operators are unable to switch suppliers.

The third register by which PTT reproduces its presence in Thai natural gas markets is through the mechanisms by which natural gas is priced in Thailand. Gas prices in Thailand comprises of the wellhead gas price, a marketing margin, a transmission tariff and a distribution tariff (Nikomborirak, 2013). The domestic wellhead gas price is specified in the gas purchase contract signed between the producer and PTT. EPPO, through its extensive authority over natural gas markets, regulates the marketing margin, which is based on gas pool pricing. Gas pool pricing is the weighted average price of gas from domestic sources, Myanmar imports, and LNG imports (Nikomborirak, 2014). The challenge of pool pricing for prospective third parties is that it gives PTT an unfair competitive advantage. As mentioned previously, PTT has an effective monopoly over domestic gas procurement and domestic natural gas supply in Thailand, which is considerably less expensive than imported LNG.

> While gulf gas is declining at the moment, PTT still has the advantage of gas supply through pool pricing because gulf gas is less expensive. If you want to use TPA, your LNG import price will not be able to compete with PTTs price. How do you resolve this? Only PTT has access to Gulf Gas. For a TPA to work, everyone must compete on the same prices and then you can compete on the logistics of operations (interview, executive manager, independent power producer, 2016).

The situation explained in the quote reflects how PTT's presence in Thai gas markets is mediated through pricing mechanisms in Thailand which reproduces PTT's advantage over competitors.

PTT continues to maintain its monopoly through pricing regimes, TPA codes, and contracts, even if its monopoly is no longer legally granted by the extensive authority of the nation-state. Nevertheless, the success of these intensive arrangements are not guaranteed. Intensive arrangements of power in the Thai case continue to rely on the extensive authority of the state to regulate contracts, pricing regimes, and TPA codes - authorities which have remained unaltered by the TPA regime and Energy Industry Act. The energy consultant speculated on why the Thai government was reluctant to use its legal and regulatory powers to liberalize Thai markets.

> The ERC was required to pass the TPA regime (due to the 2007 Energy Industry Act), but I don't think anyone in the government is actually committed to it. It's not like they are doing this for competition, they are obliged to do it. The current government is not the sort that is going to undermine PTT to create competition. (interview, consultant, energy management agency, 2016)

The consultant's speculations reflect how power can be reproduced by quieter, relational registers which are realized through extensive arrangement of power. As PTT is a state-owned company, although it is partially privatized, and regulated under government legislation applying to state-owned enterprises, its ability to reproduce its power through intensive arrangements, in turn reproduces the authority of the government over natural gas markets. Whether government officials are aware of it or not, the government is intensively reproducing its sovereignty over Thai gas markets by upholding price regimes, contracts, and ownership regimes which enable PTT to draw customers into its relational proximity while keeping competitors at a distance. It is beyond the empirical scope of this paper to explain why the current government in Thailand does not more actively pursue the reform agenda laid out in the Energy Industry Act. Nevertheless, while PTTs extensive control over pipelines has been previously opposed by social movements (as is the case with the 2006 court case and the 2012 accusations by the Foundation of Consumers), quieter registers of power, as Allen (2016) suggests, are more difficult to mobilize opposition against. In this way, PTT reproduces the territoriality of natural gas markets at the scale of the nation-state, despite neo-liberal reforms and globalization through LNG imports.

4. Conclusion

The main aim of this paper has been to contribute to geographical studies of energy by demonstrating how both topological and territorial framings of power can be utilized, and related to each other, to explain how powerful actors reproduce their control and authority over energy resources and infrastructure. Based on this paper's empirical case study of natural gas reforms in Thailand, I conclude that such an analytical approach can better equip energy geographers to explain why the territoriality of energy systems is geographically differentiated according to different national contexts. While market liberalization and deregulation has transformed natural gas infrastructure and markets in the US and Europe since the 1980's, natural gas markets in Thailand continues to remain effectively monopolized by PTT despite the implementation of market reforms. The history of natural gas sector reform in Thailand shows that reform initiatives have been sporadic due to regime changes, political contestation, and lack of political will. As a result, PTT has historically maintained its monopoly through the extensive authority of the nation-state over natural gas markets. Nevertheless, these powers were not guaranteed and PTT's authority has been deterritorialized by the TPA regime issued by the ERC. The TPA regime seems to be less politically motivated than it is obligated, as the liberalization of the Thai energy sector was the basis by which the supreme court rejected delisting and renationalizing PTT in 2006. Furthermore, PTTs extensive power over gas markets is also being deterritorialized by declining domestic reserves and LNG imports.

Based on the case study, I also conclude that by accounting for different modalities of power and their relatedness, energy geographers can better explain why energy laws and regulations, specifically those intended to break monopolies, aren't always successful. Instead of framing dominance as solely the virtue of an actor's resources or social positionalities, topological notions of power highlight the quieter registers and relations through which power can be reproduced. Furthermore, geographers can consider how the territorial powers of governments, that remain unaltered by deregulation, may be related to the intensive arrangements by which power is reproduced. Since these registers of power are quiet, and are not necessarily illegal, the capacity of social movements (such as the Foundation of Consumers in Thailand) to mobilize against such arrangements might be limited. In doing so, geographers can point to the limitations of neoliberalism in energy systems. The empirical case study demonstrated that quieter registers of power allow PTT to abide regulations and laws, but maintain its dominance through network codes, contracts, and price regimes, which are in turn enabled by unaltered, extensive authorities of the nation-state in Thailand. The case of Thailand pertains to neo-liberal reforms, but the same lessons may be drawn for research on attempts to increase public participation and democracy in energy transitions or how incumbents reproduce fossil fuel regimes despite government policies for meeting climate emission targets and decarbonization.

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Alexander Dodge: Conceptualization, Methodology, Investigation, Resources, Writing - original draft, Writing - review & editing, Project administration.

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