

EXPLOITING TIME IN GREEN VISIONS FOR THAILAND: HOW GREEN FINANCE LEVERAGES PAST INFRASTRUCTURE FOR FUTURE RETURNS

GIULIA DAL MASO

Ca Foscari University Venice, Venice, Italy. E-mail: giulia.dalmaso@unive.it (Corresponding author)

Received: August 2023; accepted October 2024

ABSTRACT

The climate crisis calls for a reassessment of infrastructure's role in the energy transition. This urgency has catalysed an expanding green finance paradigm, which is reshaping the roles of states and private actors through the creation of green infrastructural projects. This article examines Thailand's northeast province, an emerging renewable energy hub, to explore how Cold War-era geopolitical and military infrastructures are being repurposed as green assets. These upgrades, both technological and financial, align with reframing their historical political roles. The study reveals how infrastructure transformation involves shifts in the actors and mechanisms of financing. Once converted into green assets, these infrastructures serve as eco-temporal fix, allowing the military junta to address political instability while promoting a green future. The article ultimately shows how speculative processes in transforming infrastructure enable financial capital accumulation and reinforce political legitimacy.

Key words: China; Green finance; infrastructure; renewable energy; temporality; Thailand

INTRODUCTION

On Saturday 29 April 2023, temperatures hit 42°C in Bangkok. The heat index – how the temperature feels in combination with the humidity – reached 54°C. This led to an unprecedented level of electricity consumption, more than 39,000 megawatts in a single day. This drove electricity bills to record heights, which in turn squeezed households' income and pushed energy prices to the top of the electoral agenda. After it, a series of political slogans by the military government, determined to stay in power in the upcoming election, was centred on the promises of greener, energy efficient and more sustainable future visions for the country. This suggests that the development and financing of new renewable energy will have to be boosted.

In Thailand, as elsewhere, the climate crisis is deeply interlinked with the socio-economic

crisis. At the core of this relationship, the definition of new forms of political legitimacy become conditional on envisioning a green and sustainable future. States, or 'countries' in the bureaucratic language of the COPs, or Conference of Parties (Taylor 2023, p. 63), are struggling to face the magnitude of a global polycrisis (Tooze 2022). While the crisis of climate change 'does not respect political and national boundaries', existing forms of sovereign and political power, as well as geographical approaches, are radically called into question (Taylor 2023, p. 63). At the current juncture, the global response to the environmental crisis is increasingly materialising through a burgeoning green finance paradigm that, in its quest for expansion, is reshuffling the role of states and private actors through the creation of green infrastructural projects in order to realise a renewable energy-powered future.

Taking the case of Thailand as an emerging site of renewable energy production and experimentation, this article examines the role of green finance in funding infrastructures for energy transition. It explores the way the nascent Thai green finance apparatus is seeking to shift investments from brown to green assets by upgrading pre-existing infrastructures into new green projects that boost renewable energy production, functioning to maintain the state's legitimacy. This process has been promoted by state discourses, and an industrial policy – Thailand 4.0 – which has been boosted by the ruling military junta to project the country into a new 'green' and profitable future.

Focusing on two case studies in Thailand's eastern and north-eastern provinces. I show how infrastructures originally built during the Cold War era are reworked through a new wave of green finance-driven investments, and how this restructuring is influenced by the increasing influence of Chinese capital and actors in the region. The first case is the Eastern Economic Corridor (EEC), initially established in the late 1970s as a site for a US military base, and now transformed into a decisive global site for solar technology production, dominated by Chinese actors. The second case is the Sirindhorn Dam, a hydroelectric dam built by the World Bank in the 1970s, now converted into one of the world's largest hybrid hydro-solar floating projects through Sino-Thai cooperation. As I will show, the upgrading of these infrastructures through green finance mechanisms performs an (eco) temporal fix and acts in tandem with the rewriting of cartographies of governance over time.

Drawing on ethnographic research developed through multiple visits to the above-mentioned sites as well as interviews and conversations with local actors involved in these projects, the objective of this article is twofold: first, it shows how the upgrading of infrastructures into green assets is conditional upon a political narrative that was launched by the military junta to project the country to a green future as a mean of legitimisation. This green upgrading happens in parallel to the reframing of the economic and political role these infrastructures played in the past, and through a reshuffling of the actors involved in their financing. Importantly, China emerges

as a main new actor. Second, and connected to the first point, my findings show that the upgrading of these infrastructures, instead of acting as a tool to mitigate the socio-economic complexities of the climate crisis as they promise, predominantly serve to uphold the existing political status quo (Bigger & Millington 2023, p. 58).

INFRASTRUCTURE AS (ECO) TEMPORAL FIXES

Recent scholarship has increasingly focused on the temporality of infrastructures. Reversing more common and traditional approaches that emphasise infrastructural spatial and connectivity aspects (Wiig & Silver 2019; Mitchell 2020), these studies show the way in which infrastructures not only reflect and result from specific spatialities, and do mediate space, but also result from and are the product of multiple temporalities and as such mediate time (Monstadt 2022, p. 69). For instance, Timothy Mitchell's perspective suggests that instead of starting with conventional questions of space typically characterising infrastructural analyses (Larkin 2013), attention should be directed towards the temporal relationships that infrastructure carry and hold with time. Both geographers and anthropologists have stressed the importance of time in showing the linkage between infrastructures and processes of national development (Appel 2018; Bridge *et al.* 2018) and in promising dreams and narratives of technological and social progress (Anand *et al.* 2018, p. 27).

Grasping infrastructures temporalities is important to recognise how infrastructures change over time through their obsolescence, maintenance and adaptation (Silver 2014; Ramakrishnan *et al.* 2021), how they work politically (Pilò 2023, p. 1286), and how they mediate socio-ecological relations and the energy transition (Bridge *et al.* 2018). Following this literature, this article brings attention to infrastructures' multiple temporalities – and the multiple temporalities of their financing and capitalisation – to underline how their transformation in green assets is relevant to understanding geopolitical and socio-ecological relations (see Kay & Kenney-Lazar

2017; Huber 2018). In particular, this analysis intervenes in the burgeoning literature on infrastructures and green finance, and on the body of work that speaks to the financialisation of nature and the growing green assets class (Ouma *et al.* 2018; Birch & Muniesa 2020; Bridge *et al.* 2020; Ouma 2020; Dal Maso *et al.* 2022). It does so by bringing to the debate an analysis of the changing role of infrastructures over time, and by highlighting the way in which, as they turn into green assets, infrastructures perform as (eco) temporal fixes that enact future visions of (green) developments.

As observed by Laura Bear, most works on the relationship between finance and infrastructures erase the temporality that lies behind a specific global asset class. These are only treated as sharing the capacity of generating long-term return thanks to their durable material structures (Bear 2020, p. 46). Yet even if infrastructure temporality and durability is seldom assessed and historicised, the time dimension of infrastructure is precisely what allows financial capital to circulate and accumulate, linking past and present into an inherently anticipatory and forward-looking future. Stemming from Marx's observation on the temporal contradictions of fixed capital and capital circulation, Bear shows how renewed projects of accumulation and legitimacy 'emerge from the ruins' (Bear 2020, p. 49) of older ones.

This article explains how past infrastructure projects, shaped by political and technological factors, are being reused to create promising and eco-friendly plans that attract financial support and political legitimacy (Muniesa 2014; Konings 2020, p. 74). Typically, green finance infrastructures allow nature to be subsumed into social relations of equivalence and substitutability, fundamentally altering nature's status and temporality (Sullivan 2013; Bracking 2019). Through the institutionalisation of the carbon market, the creation of carbon credits and the quantification of offset carbon to which green bond projects are attached, the insertion of negative externalities into the web of green metrics reflects the space and time compression that green finance enacts (MacKenzie 2009; Knox-Hayes 2013). This temporal lens allows us to envision green infrastructures beyond the current 'green' finance hype, stressing the

way their green capitalisation exceeds their formal role of nature-based solutions (Bigger & Millington 2023, p. 43). As stated by Monstadt, bridging infrastructures' timelines from the past to the present and future allows us to grasp how their roles change in their obduracy and malleability (2022, p. 70).

The findings I present below show how the green financing of renewable infrastructures in Thailand is connected to a political project of development that aims at marking a discontinuity with the past. Here, infrastructure serves as a temporal (eco) fix, a way for the state to enact environmental promises in order to erase the country's past phases of development and create an illusion of new green and technologically driven beginnings (Castree & Christophers 2018; Collard & Dempsey 2022). As I will show, this process stems from the attempt of the Thai military junta in power to be held accountable for a fresh mandate to act, without being held accountable for its authoritarian past. The turning of outmoded infrastructures into green assets in Thailand is thus associated with new political promises that are effectively enabled by the influence of past and renewed geopolitical and geoeconomic dynamics.

THAILAND 4.0

Studying Thailand is relevant to discussions that interrogate diverse forms of emerging green governance (Wainwright & Mann 2018) in relation to the temporal changes of old and renewed forms of sovereign power (Negri 2021). States, according to their specific historical and political formation, will have to get to grips with an unstoppable reconfiguration of a new global order, a 'climate leviathan' (Wainwright & Mann 2018). However, while so far the debate has focused either on the hollowing out of the traditional state functions through different configurations of (green) capitalisms, or on its recalibration in support of the capital markets through a de-risking role (Gabor 2021; Alami *et al.* 2023), in this article I highlight the way in which Thailand's burgeoning green finance governance has involved the state performing a hybrid strategy – accruing its political power and centralisation from the

same de-risking strategy it mobilises to back up and actively support green finance projects (Schindler *et al.* 2023).

Rooted in an ever-expanding and ambitious 'royal capitalism' (Unchanam 2020), the Thai junta's search for social and political legitimisation has materialised in a newly upgraded economic development policy. Contrary to the existing dichotomy that posits the permanence of royal power as antithetical to the development of capitalism – at least for secular states – the Thai monarchy has historically grown and resisted its extinction precisely because of its capacity to embrace the socioeconomic changes that from the early 21st century have characterised Thailand's engagement in a global capitalist order. The monarchy has successfully and hegemonically shaped a powerful and growing capitalist state.

The Crown Property Bureau (CPB), the legal administrative agency responsible for managing the property of the King of Thailand, has been pivotal in redefining the monarchy as a key market actor in Asia, thereby crafting a new image as a leading player among the cosmopolitan bourgeoisie class in Asia (Unchanam 2020, p. 6). Since its inception, the crown has evolved into one of the world's largest wealth conglomerates. Under the 70-year reign of King Rama IX, the monarchy not only became the largest landowner in Asia but also the major shareholder in two of Thailand's biggest banks, significantly influencing the regional economic landscape (Unchanam 2020). This substantial, long-standing industrial and financial dominance of the monarchy was further bolstered by 'khaki' capitalism, a term coined to describe the economic practices rolled out under the military junta. The junta, which seized power in the 2014 coup d'état and was in power for nearly 10 years, has long served as the monarchy's guardian, benefitting from unrestricted access to public institutions and state-owned enterprises.

In 2016, the junta started pursuing a distinctive model of capitalist adaptation by actively promoting a new economic plan that sought to legitimise its power. Under the 'Thailand 4.0' agenda, the government

embraced a top-down industrial policy seeking to push the country out of the 'middle-income trap' (Chiengkul 2019). This plan is a manifesto for the future. It openly focuses on innovation and technology to purportedly lead the country in the direction of a renewed dream of green enrichment. The policy is promoted in the form of an 'upgrading', a stimulus aimed at surpassing previous development phases, to ultimately realise an eco-tech utopia. The policy posits Thailand's temporal developments through a linear historical phase of modernization. It claims that, for the last decades, Thailand has based its development on cheap labour, the import of foreign technology and the depletion of natural resources. The junta seemed determined to mark a discontinuity with this past, focusing on innovation and technology to deliver 'green' growth, and to position Thailand as a green finance hub in Southeast Asia (Chiengkul 2019, p. 1690).

According to this rhetoric, while Thailand 1.0 focused on agriculture, Thailand 2.0 on light industry, and Thailand 3.0 on heavy industry, Thailand 4.0 is intended to lead to an upgraded, renewed and more equal economic era – a fourth industrial revolution that includes green finance as a way to upgrade past historical phases of development and their accompanying infrastructures. The Thailand 4.0 policy embodies a temporal fix, deployed through a set of discourses that resemble what Elizabeth Povinelli describes as the rhetoric of new late liberal environmental states (2011). This appears as the ultimate state strategic narrative to guarantee both capitalist growth and sustainability while maintaining political legitimacy. This narrative involves a reframing of the past, and the acknowledgement of what appears to be the 'bad chapters' of history – past industrialisation driven by fossil fuels and economic inequality – acting as a precondition to a temporal deferral, a strategy which involves the 'confident gestures to an idealised future' (Povinelli 2011, p. 93; Carton 2019; Collard & Dumpsey 2022), and which ultimately seeks to bind present state power to future projections of green growth. Through the adoption of the green finance complex, the Thai state is thus able to gain legitimacy as a green growth provider.

THE CHRONODEVELOPMENT OF THE EASTERN ECONOMIC CORRIDOR

As the junta's flagship spatial project, the Eastern Economic Corridor (EEC) in eastern Thailand mirrors the Thailand 4.0 strategy of territorial repurposing and optimisation. Situated at the intersection of an expanding regional hub, which links Thailand with the emerging economies of the Mekong (Cambodia, Laos, Myanmar and Vietnam), as well as with the north–south and east–west transport corridors connecting Thailand with the Myanmar–India highway, the EEC covers over 13,000 km², including three provinces – Chachoengsao, Chonburi and Rayong – and multiple major infrastructure projects, such as the expansion of a new seaport, the construction of a high-speed rail link, and the development of new industrial estates and innovation hubs. The government has launched measures to boost economic growth by accelerating investors' project applications with a particular focus on green growth, high-tech industries and innovation (NationThailand 2017).

The EEC has expanded out of a contested historical terrain. The area of the corridor used to be of great strategic importance during the Cold War. At that time, Thailand was a key ally in the US-led fight against communism in Vietnam, seeing the US military establish a military base in the north-east of the country. The Thai military base of U-Tapao – upon which the corridor was later developed – acquired a strategic role (OECD 2021). Here, in 1965, the US Army established its primary Southeast Asian airfield, and accommodated B-52 bombers during the Vietnam War. After the war, and during what are considered the golden years of Thailand – between the mid-1980s and mid-1990s – the Thai government developed the first version of the corridor, the Eastern Seaboard, which saw the rise of new industrial estates capitalising on past military sites and infrastructures (Phuangketkeow 2020). The project attracted billions of dollars of Japanese, American and other foreign investments in car making, electronics and other sectors, and paved the way for a decade in which Thailand's economy grew at an average annual rate of 9 per cent.

Attuned to the Thailand 4.0 agenda, the current acceleration of the EEC has developed

out of this legacy, yet it now involves new actors in different strategic economic sectors. In a relationship of continuity and discontinuity, this financial and political reshuffling has witnessed the growing involvement of a new actor: China. Today, Chinese investments dominate electricity in all emerging 'green' sectors across the corridor, especially solar and wind technologies and electric vehicles.

The corridor is becoming a key manufacturing hub for electric vehicles. Thailand's Ministry of Finance has now approved 26 electric car projects from 17 companies and is offering incentives to adopt electric vehicles within the country. Most companies in the sector are Chinese, including a subsidiary of Huawei, Shenzhen-based Great Wall Motor (GWM), and a Sino-Thai conglomerate, Zhejiang's Neta Auto (Thailand). Specifically, through the issuance of green bonds, the government approved 2.92 billion baht to subsidise EV purchases and production. In particular, the International Finance Corporation, the financial agency of the World Bank that offers investment, advisory services and asset management, has subscribed to a \$100 million green bond issued by the Thai public bank TMBThanachart, which is one of the main Thai banks controlled by the junta. This deal aims to achieve a 40 per cent reduction in greenhouse gas emissions in the country by 2030 (IFC 2022).

Within this framework, and thanks to these green finance instruments, as well as fiscal and 'green' subsidies that I describe in more detail in the next sections, the EEC has become a key site for the production of Chinese solar PV players. New tax incentives have offered Chinese solar panel companies the opportunity to set up factories in Thailand, and hence circumvent anti-dumping duties in Western countries. Two of the main Chinese solar companies operating globally, Lingyi and Talesun, mainly owned by the state-run Chinese Zhongli Sci-Tech Group, are now present in the EEC. China generates more solar technology energy than the rest of the world and has made this technology more affordable and competitive as an alternative electricity source. The existing Sino-Thai partnerships on solar production could bring down costs and serve to generate new green infrastructure. In turn, this

solar technology has been employed in green projects that are set to be financed through the issuance of multiple green bonds, issued by both the aforementioned state-controlled TMBThanachart Bank and the Electricity Generating Authority of Thailand (EGAT), Thailand's state-owned main public utility. Connected to it, EGAT announced plans to increase power generation capacity through the building of nine ambitious floating solar farms to be completed in 2026, which is expected to generate a total of 5 giga watts (Roney 2021). One of these has already been realised in the Sirindhorn Dam reservoir in Ubon Ratchathani, the case study I now discuss.

THE LIFECYCLE OF AN INFRASTRUCTURE: FROM HYDRO DAM TO A NEW SOLAR LIFE

The province of Ubon Ratchathani in north-eastern Thailand has recently become the site of one of the most innovative renewable infrastructures in the world. It is also one of the most up-to-date, paradigmatic cases of green finance deployment: a mode of 'green' technological upgrading. In October 2021, the biggest floating solar farm ever built was installed on the reservoir of Sirindhorn Dam, one of the many hydroelectricity dams in Southeast Asia. Through Chinese-produced cutting-edge solar technology, this hydro dam was given a new life as a green financial infrastructure. Harnessing power from 145,000 solar panels, and covering 720,000 square metres of water, this project is a hybrid system that converts sunlight to electricity during daylight and energy from flowing water at night.

Through a consortium led by the state-owned public utility EGAT, in partnership with state-owned Energy China and the Thai-German company Bgrimm (a German company grown and developed in Thailand at the end of the 19th century),¹ these power conglomerates long involved in energy production through fossil fuels have joined forces to become champions of renewable energy in Southeast Asia. The project is directly linked with the green finance apparatus. Not only

has Bgrimm issued a green bond linked to the project together with other green infrastructures for the total amount of 246 million US dollars, but the Sirindhorn Dam project is the first of a larger plan to increase the company's renewable power generation through the building of at least 20 other hydro dams in Thailand. Here, the Japanese-led Asian Development Bank, a multilateral bank acting as main investor, has committed to financing further green bonds linked to these infrastructures.

As with many other hydro dams in Southeast Asia, Sirindhorn Dam (named after the princess of Thailand Sirindhorn, and constructed in 1971) was originally built with the financial support of the Japanese government and the World Bank, under the umbrella of 'development' associated with top-down Western technopower (Zeller 2012). Located in the Mekong River Basin, just upstream from another historically and politically controversial dam, Pak Mun Dam, Sirindhorn Dam was built by EGAT, which still controls it. Even if the dam is relatively small – only 42 m in height with an installed capacity of just 36 megawatt – the area of water impounded in the reservoir is vast, covering 280 km².

As a prelude of what today has been defined as the process of the financialisation of nature (Magdoff & Foster 2014; Bracking 2012, 2019; Sullivan 2013; Loftus & March 2016; Ouma *et al.* 2018; Bridge *et al.* 2020; Ouma 2020; Dal Maso *et al.* 2022), in the early 1970s the process of 'nature' accumulation (Smith 2007) was initiated in the contested geographical zone of north-eastern Thailand – a hot spot during the Cold War era where the Thai communist guerrilla insurgency was based. Hydro dams, as massive projects able to transform nature, were thus part of Cold War strategies around infrastructure carrying a geopolitical function (Tucker 2010). In the lower basin of the Mekong, on the border between Thailand and Laos, a series of hydro dams carried the formal aim of stabilising 'water levels throughout the year and provid[ing] massive irrigation water and power for the delta' (Sneddon 2012), but also – and more importantly – carried geopolitical aims.²

In Thailand, these initial waves of investments, while intensifying the penetration

of capital into nature (Smith 2007), were coupled with the provision of economic and technical assistance that masked US containment policy, that is, containing the political and economic influence of communism (represented by the Soviet Union and China) in Southeast Asia. The reinforced dualism between political goals and technical expertise was 'embedded within efforts to capture, redirect, enhance or otherwise alter water in the name of human aspirations' (Sneddon 2012, p. 566). In this process, the World Bank acted as a governing institution that exercised power and influence over the decision-making processes. It provided policy advice and technical expertise to the Thai government, framing the Sirindhorn Dam as a crucial element of the country's energy development and economic growth strategy.

The World Bank exercised influence through policy advice and technical expertise, framing the dam as a necessary component of Thailand's development agenda, which aimed at rendering 'technical' (Li 2005) geopolitical intervention. The World Bank also employed conditional lending to exert control over the project. Foreign investments were promoted as a win-win situation, in which both investors and the host government would gain revenues for these development programmes (Zeller 2012). Formally, the World Bank tied financial assistance to specific conditions, such as the adoption of environmental safeguards and the implementation of social impact assessments to ensure compliance with the Bank's standards.

Like most other big hydro dams in the Mekong, the Sirindhorn Dam had a devastating impact on affected communities. People from dozens of small villages in Ubon Ratchatani province, formerly living from fishing in the Lam Dom Noi watershed, were evicted from their land. The Sirindhorn Dam reservoir depleted natural resources, destroyed agricultural land, wildlife and natural habitats (Foran & Manorum 2009; Green & Baird 2016), and enacted a form of 'transnational enclosure' (Santasombat 2011, p. 5) in which state and commercial actors 'gain control over territories that have historically been used and cherished by rural people' (Green & Baird 2020, p. 3).

Thousands of dam victims stranded in the Nikom River were the first to mobilise, demanding compensation and relief from the government. Soon after the dam was built, they became actively engaged in the Assembly of the Poor movement, which extended across all the Mekong River, beginning with villagers angry about the local impact of the **Pak Mun Dam**, one of the most contested hydro dams in Thailand and the Mekong (Foran & Manorum 2009). As Sirindhorn dam, Pak Mun Dam was constructed by EGAT with support from the World Bank in 1994. The immediate impact of the dam was to flood 117 km² of land and displace its inhabitants. The project has been criticised for its adverse effects on the fisheries of the Mun River, the insufficient compensation payments to affected villagers, and its failure to produce the projected power output. Pak Mun Dam was the object of activists' widespread opposition which then extended to Sirindhorn dam. The grassroots organisation, which became the first on-the-ground rural political voice to gain international recognition, openly opposed big development projects within the framework of the World Bank and foreign aid that characterised Thailand's industrial path. This movement is still active today.

In all these developments, the role of the World Bank cannot be overstated. It transferred the decision-making processes around environmental and social risk management away from the authority of the state and towards project leaders (Hatcher 2014). It thus influenced the whole development paradigm of foreign aid in the region, whereby the trope of financial risk often compelled states to offer desirable terms to investors in a purportedly competitive global investment environment. This condition seems to align with the current green finance paradigm that sees a de-risking state at play, a process which typically 'creates a safety net for investors in development assets, protecting their profits from demand risks attached to commodified infrastructure assets' (Gabor 2021, p. 431).

Yet, one could argue, while during the Cold War Thailand was subject to top-down 'military modernization' (Simpson 2008), governed by American advisors and technocrats, now the military junta has developed a mode of development which is still seeking to attract

foreign investments through de-risking strategies, but also seeking to accumulate power and centralisation for itself by dominating state-owned and autonomous economic enterprises (Waitookiat & Chambers 2017; Schindler *et al.* 2023, p. 235). At present, it is striking to observe the modalities through which the Sirindhorn Dam presents a case in which a hydro dam – carrying a history of injustice, through temporal struggles, land dispossession, recurrent violations of human rights, recurrent floods and biodiversity loss (EJATLAS 2014) – has been repackaged and restructured to become a green asset, providing future income streams to both EGAT and multiple development and private actors.

GREEN FINANCE UPGRADING

Encouraged by the Paris Climate Agreement and the resultant commitment of countries to become carbon neutral by 2050, Thailand's embrace of green finance has taken the lead in the definition of Asia's renewable energy landscape. This has involved the construction of a green financial apparatus which seeks to capitalise on the reduction of CO₂ through investments in renewable energy projects and the related labelling, trading and offsetting of emissions driven by carbon markets (Maresca *et al.* 2023). The institutionalisation of the carbon market is among the multiple measures the Thai government has adopted to embrace a green finance paradigm. The new trading platform aims to incorporate the government's existing voluntary emission reduction programme and follows a previous effort by the EGAT and 10 of the state's biggest companies to set up a separate private market to trade credits over the counter. Such nascent green finance apparatus also entails the promotion of a power development plan including the issuance of green bonds and the establishment of a Green Bond Standard in 2016. This goes in tandem with the creation of a Corporate Sustainability Guide for Thai listed companies by the Stock Exchange Thailand (SET) and the Securities and Exchange Commission of Thailand (SECT).

In this context, state-controlled infrastructures emerge as catalysts to attract investments

in this new climate financial regime. As I have shown in the case studies presented here, infrastructures offer the front load for green bonds and carbon market trading, unlocking a new green 'wall of money' by attracting capital and technology from private and foreign investors, as well as multinational banks and foreign technology. Produced by the Climate Bond Initiative (CBI) – the international organisation in charge of defining green bonds standards – the recently outlined Thailand Green Infrastructure Investment Opportunity (GIIO) programme aims to identify and demonstrate green infrastructure investment opportunities around the world.

Connected to it, the newly created Kingdom of Thailand Sustainable Financing Framework (KOT Framework) aims to attract foreign investments aligning with international green bonds standards, such as the International Capital Market Association (ICMA) and Sustainability Bond Guideline and ASEAN Capital Markets Forum (ACMF). Furthermore, the Thai central bank – the Bank of Thailand – has recently joined the growing global Network for Greening the Financial System (NGFS) to develop a framework for green financial institutions, which includes guidelines for the integration of environmental considerations into risk management and lending practices and the adoption of green financial products (Ariyaprichya & Volz 2022). Ultimately, the Bank of Thailand prepared a series of climate stress test exercises with large financial institutions by the end of 2023, expanding it to an industry-wide exercise in 2024 (BOT 2022).

These green finance developments act in conjunction with the promotion of a Power Development Plan 2018–2037, which claims to embrace the country's ambition to reduce coal-fired power plants' capacity to 12 per cent. Formally, the plan aims to promote investments in renewable technologies, the creation of smart energy management through processes of decentralisation to optimise energy distribution, and to allow additional wind and solar capacity. Amid the global energy crisis that caused a surge in natural gas prices, the government has also announced an unprecedented feed-in tariff programme, with subsidies for renewable power purchase

plans, and is aiming to double wind and solar capacity by 2030 through the promotion of new market actors. Through the case studies I have examined, however, it emerges that this ambitious green financial master plan, while rhetorically presented as 'disruptive' of old developmental models and actors, seems to preserve existing power hierarchies, augmenting state control over these infrastructures and the profits they might generate through green finance mechanisms.

In particular, EGAT remains Thailand's largest state-owned, vertically integrated utility. It is both the biggest producer and importer of electricity, which is largely generated by natural gas and coal power plants. In addition, EGAT owns 100 per cent of transmission assets nationwide and performs the role of unique system operator (Sirasontorn & Koomsup 2022). Via power purchase agreements (PPAs) it also remains the sole electricity buyer. As a state enterprise, EGAT maintains its monopoly power over the grid, the electricity transmission market and thus the entire process of energy transition (Inagaki 2022, p. 2). EGAT has capitalised upon and influenced the shaping of the nascent Thai green finance through various methods: issuing green bonds to foreign investors and multilateral banks, investing in green energy projects, and earning carbon credits. Generated by multiple renewable energy infrastructures, these credits can then be sold in carbon markets, allowing other companies or countries to offset their emissions. This context positions state-owned EGAT as one of the main beneficiaries of the Thai green finance sector, potentially leading to monopoly profits and an influential role in the fast-developing future Asian green energy markets.

CONCLUSION

By adopting a temporal lens, this article has explored how the rehabilitation of pre-existing infrastructural projects is enabled by the mobilisation of green mechanisms that activate new forms of capitalisation through the deployment of temporal (eco) fixes. In the cases of both (i) the Chinese contemporary

solar technology production in the subsidised regime of the Eastern Economic Corridor – emerging out of a territorial strategy conceived for military purposes during the Cold War – and (ii) the upgraded hydro dam transformed into one of the largest solar floating platforms in the world, it can be seen that green finance capitalises on the material durability of these infrastructures while serving a political promise of development.

Through their technological upgrading, these infrastructures become labelled as 'green' and thus remunerative green finance assets that attract new rounds of investment from new public and private financial actors. This investigation complicates current accounts on the growing green finance apparatus and energy transition which remain dominated by what Frederic Jameson calls a 'reduction to a present': a situation characterised by the effacement of the past and the future (Jameson 2003, p. 708). Instead, it focuses on how finance engages in a process of temporal material binding, capitalising on the infrastructures' changing role over time (Bryan & Rafferty 2007; Tellmann 2020, p. 355). This involves acknowledging the influence of past geopolitical and socioeconomic dynamics, while simultaneously reshaping new ones.

The global demand to shift investments from brown to green assets (Carney 2015) thus seems ultimately driven by the logic of 'financialised finance' – a logic which accelerates the process of energy transition in the direction of the singular logic of profit maximisation (Dörny & Schulz 2018, p. 718). Yet, the way this process materialises is spatially heterogeneous, reflecting how (green) capital 'hits' the ground across diverse temporal, spatial and political dimensions (Mezzadra & Neilson 2019). In Thailand, this process is defined by a rhetoric of future-driven promise.

In particular, the article has underscored the evolving geopolitics of development in Thailand's green finance governance. Through the temporality lens, it is possible to note that China plays a significant role in reshaping these infrastructures to green assets. As has been underscored by other observations looking at the scope of Chinese investments' outwards expansion (Lee 2014; Sidaway & Woon 2017; Jensen 2022; Cheng

& Apostolopoulou 2023), the history of these infrastructures shows the participation of a diverse array of actors. This indicates that the geopolitics of Thailand's energy transition cannot be simply categorised within the bipolar framework of a 'new cold war' configuration (Schindler *et al.* 2022, 2023) but should be situated within a multifaceted past and present multipolar dimension involving myriad partnerships with Japanese and German entities and multilateral capital. As a global-shifting phenomenon, the impact of outward Chinese capital involved in high project costs becomes the catalyst to reassert forms of monopoly power over these infrastructures' lifecycles, and thus offers ways to renew financially generated income streams (Dal Maso 2022; Rogers 2023). Thus, the article documents the way infrastructural projects emerge as a combination of geographical, technical and social forms that sustain political and economic power (Bridge *et al.* 2018). This complexity is further augmented by the centralisation of Thai state monopoly power, particularly through the role of its public utility, EGAT.

Delivered by the junta, Thailand's future-oriented discourses on the energy transition have translated the necessity to move from fossil fuels to 'renewable' energy into political legitimacy campaigns. Green finance has thus offered both the monarchy and the military a further opportunity to blur their autocratic image and become the champions of a new imaginative 'green' power. If finance is increasingly called upon as a tool to fight climate change, it will need to develop green infrastructures that are realisable and attentive to the historical and local realities in which they operate.

ACKNOWLEDGEMENTS

I am deeply grateful to Praset Rangkla, whose support made the fieldwork for this research possible. I would also like to thank the Special Issue editors and the anonymous reviewers for their valuable suggestions, which have significantly enhanced this essay. My sincere thanks go to Reijer Hendrikse, Samuel Rogers, Nathan Green and James Sidaway, as well as the Politics, Economics

and Space Research Group (PEAS) at the National University of Singapore (NUS), for their insightful and constructive feedback throughout the development of this paper. This research was supported by the European Union's Horizon 2020 Research and Innovation Programme under the Marie Skłodowska-Curie Grant Agreement No. 101024555 (CHINGREEN). I conducted much of this work during my stay at the Asia Research Institute (ARI) at NUS.

Endnotes

¹B Grimm is a Thai company with German roots. It was founded in Bangkok in 1878 by the Austrian trader Erwin Mueller and the German pharmacist Bernhard Grimm and played a key role in Siam's development at a time of rapid modernization. The group started its activity by opening one of the kingdom's first modern pharmacies, and it then won a concession to dig Bangkok's irrigation canals using German equipment, helping tame a cholera epidemic. Since then, the company remains one of the oldest and biggest health and energy infrastructural companies in Thailand, having served the Thai Monarchy for almost 150 years. Today, B Grimm is expanding into faster-growing renewable energy sector and into new markets such as Vietnam, where the company opened the country's largest solar power project in 2019.

²Under this formal, technical intervention, the Economic Commission for Asia and the Far East (ECAFE), the agency of the United Nations which at that time began to play an aggressive role in development planning for mainland Southeast Asia, foregrounded an explicit anti-communist motivation: "The entire project area is susceptible to outside subversive influence because it lies in close proximity to areas controlled or infected by Communist forces. [...] Strenuous efforts on the part of the governments have recently exposed the situation and corrective policing measures have been instituted in addition to the social and economic programmes. It is hoped that alert effective police action plus successful implementation of the economic and education improvement measures will stabilise the area and will forestall the expansion of subversion and chaos" (ECAFE 1956; Tucker 2010, p. 159).

REFERENCES

- ALAMI, I., J. COPLEY & A. MORAITIS (2023), The 'Wicked Trinity' of Late Capitalism: Governing in an Era of Stagnation, Surplus Humanity, and Environmental Breakdown. *Geoforum* 153, 103691. <https://doi.org/10.1016/j.geoforum.2023.103691>.
- ANAND, N., A. GUPTA & H. APPEL, (eds.) (2018), *The Promise of Infrastructure*, Durham: Duke University Press.
- APPEL, H. (2018), Infrastructural Time. In: N. Anand, A. Gupta & H. Appel, (eds.), *The Promise of Infrastructure*, pp. 41–61. Durham: Duke University Press.
- ARIYAPRUCHYA, S. & U. VOLZ (2022), Sustainable finance in Southeast Asia. In: D. Schoenmaker & U. Volz, (eds.), *Scaling up sustainable finance and investment in the global south*, pp. 281–302. Paris and London: CEPR Press.
- BEAR, L. (2020), Speculations on Infrastructure: from Colonial Public Works to a Post-Colonial Global Asset Class on the Indian Railways 1840–2017. *Economy and Society* 49(1), pp. 45–70.
- BIGGER, P. & N. MILLINGTON (2023), Temporalities of the Climate Crisis: Maintenance, Green Finance and Racialized Austerity in New York City and Cape Town. In: A. Wiig, K. Ward, T. Enright, M. Hodson, H. Pearsall & J. Silver, (eds.), *Infrastructuring Urban Futures*, pp. 42–66. Bristol: Bristol University Press. <https://bristoluniversitypressdigital.com/display/book/9781529225648/ch003.xml>.
- BIRCH, K. & F. MUNIESA, (eds.) (2020), *Assetization: turning things into assets in technoscientific capitalism*, Cambridge: MIT Press.
- BOT (2022), Policy Statement of the Bank of Thailand Re: Internalizing Environmental and Climate Change Aspects into Financial Institution Business. Bank of Thailand. <https://www.bot.or.th/content/dam/bot/fipcs/documents/FPG/2566/EngPDF/25660028.pdf>.
- BRACKING, S. (2012), How do Investors Value Environmental Harm/Care? Private Equity Funds, Development Finance Institutions and the Partial Financialization of Nature-Based Industries. *Development and Change* 43(1), pp. 271–293.
- BRACKING, S. (2019), Financialisation, Climate Finance, and the Calculative Challenges of Managing Environmental Change. *Antipode* 51(3), pp. 709–729.
- BRIDGE, G., B. ÖZKAYNAK & E. TURHAN (2018), Energy Infrastructure and the Fate of the Nation: Introduction to Special Issue. *Energy Research & Social Science* 41, pp. 1–11.
- BRIDGE, G., H. BULKELEY, P. LANGLEY & B. VAN VEELLEN (2020), Pluralizing and Problematizing Carbon Finance. *Progress in Human Geography* 44(4), pp. 724–742. <https://doi.org/10.1177/0309132519856260>.
- BRYAN, D. & M. RAFFERTY (2007), Financial Derivatives and the Theory of Money. *Economy and Society* 36(1), pp. 134–158.
- CARNEY, M. (2015), Breaking the Tragedy of the Horizon—Climate Change and Financial Stability. *Speech Given at Lloyd's of London* 29, pp. 220–230.
- CARTON, W. (2019), "Fixing" Climate Change by Mortgaging the Future: Negative Emissions, Spatiotemporal Fixes, and the Political Economy of Delay. *Antipode* 51(3), pp. 750–769.
- CASTREE, N. & B. CHRISTOPHERS (2018), Banking Spatially on the Future: Capital Switching, Infrastructure, and the Ecological Fix. In: *Futures: Imagining Socioecological Transformation*, pp. 154–162. London: Routledge.
- CHENG, H. & E. APOSTOLOPOULOU (2023), Locating the Belt and Road Initiative's Spatial Trilectics. *Geography Compass* 17, p. 12. <https://doi.org/10.1111/gec3.12683>.
- CHIENKUL, P. (2019), Uneven development, inequality and concentration of power: a critique of Thailand 4.0. *Third World Quarterly* 40(9), pp. 1689–1707.
- COLLARD, R.C. & J. DEMPSEY (2022), Future eco-perfect: Temporal fixes of liberal environmentalism. *Antipode* 54(5), pp. 1545–1565.
- DAL MASO, G. (2022), Bridging "Green" Asymmetries Through Crises: How a Chinese Green Bond has Landed in Portugal. *Focaal* 93, pp. 46–59.
- DAL MASO, G., A. TRIPATHY & M. BRIGHTMAN (2022), A Moral Turn in Finance?: Labeling, Purpose, and the Morality of Markets. *Focaal* 93, pp. 1–17.
- DÖRRY, S. & C. SCHULZ (2018), Green Financing, Interrupted. Potential Directions for Sustainable Finance in Luxembourg. *Local Environment* 23(7), pp. 717–733.
- ECAF (1956), Final Report of the Mekong Planning Study (Bangkok, 1956), 1–2.
- EJATLAS (2014), Sirindhorn Dam, Thailand <https://ejatlas.org/conflict/sirindhorn-dam-thailand>.
- FORAN, T. & K. MANOROM (2009), Pak Mun Dam: Perpetually Contested? In: F. Molle, T. Foran & M.

- Kakonen, (eds.), *Contested Waterscapes in the Mekong Region: Hydropower, Livelihoods and Governance*. London: Earthscan.
- GABOR, D. (2021), The wall street consensus. *Development and Change* 52(3), pp. 429–459.
- GREEN, W.N. & I.G. BAIRD (2016), Capitalizing on Compensation: Hydropower Resettlement and the Commodification and Decommodification of Nature–Society Relations in Southern Laos. *Annals of the American Association of Geographers* 106(4), pp. 853–873.
- GREEN, W.N. & I.G. BAIRD (2020), The Contentious Politics of Hydropower Dam Impact Assessments in the Mekong River Basin. *Political Geography* 83, 102272.
- HATCHER, P. (2014), *Regimes of risk: The World Bank and the transformation of mining in Asia*, London: Palgrave Macmillan.
- HUBER, M. (2018), Resource Geographies I: Valuing Nature (or not). *Progress in Human Geography* 42(1), pp. 148–159.
- IFC (2022), IFC Subscribes to First Green Bond Issued by TMBThanachart Bank Focused on Electric Vehicles in Thailand <https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=27231>.
- INAGAKI, H. (2022), Uneven geographies of Bioenergy Expansion: Historicizing Interconnected production and Circulations of “Sweet Power” in northeast Thailand. PhD Thesis. ScholarBank@NUS Repository. <https://scholarbank.nus.edu.sg/handle/10635/224898>.
- JAMESON, F. (2003), The End of Temporality. *Critical Inquiry* 29(4), pp. 695–718.
- JENSEN, C.P. (2022), Emerging Potentials: Times and Climes of the Belt and Road Initiative in Cambodia and Beyond. *East Asian Science, Technology and Society: An International Journal* 16(2), pp. 206–229. <https://doi.org/10.1080/18752160.2021.1927937>.
- KAY, K. & M. KENNEY-LAZAR (2017), Value in capitalist natures. *Dialogues in Human Geography* 7(3), pp. 295–309.
- KNOX-HAYES, J. (2013), The spatial and temporal dynamics of value in financialization: Analysis of the infrastructure of carbon markets. *Geoforum* 50, pp. 117–128.
- KONINGS, M. (2020), Speculation. In: C. Borch & R. Wosnitzer, (eds.), *The Routledge Handbook of Critical Finance Studies*, pp. 73–95, Vol. 2020. New York, NY, USA: Routledge.
- LARKIN, B. (2013), The Politics and Poetics of Infrastructure. *Annual Review of Anthropology* 42, pp. 327–343.
- LEE, C.K. (2014), The Spectre of Global China. *New Left Review* 89, pp. 28–65.
- LI, T.M. (2005), Beyond “The State” and Failed Schemes. *American Anthropologist* 107(3), pp. 383–394.
- LOFTUS, A. & H. MARCH (2016), Financialising Nature? *Geoforum* 60, pp. 172–175.
- MACKENZIE, D. (2009), Making Things the Same: Gases, Emission Rights and the Politics of Carbon Markets. *Accounting, Organizations and Society* 34(3–4), pp. 440–455.
- MAGDOFF, F. & J.B. FOSTER (2014), Stagnation and Financialization: The Nature of the Contradiction. *Monthly Review* 66(1), p. 1.
- MARESCA, A., G. DAL MASO & A. TRIPATHY (2023), Interpellating Finance—A Dramaturgical Model for Green Bond Pricing. *Valuation Studies* 10(1), pp. 90–117.
- MEZZADRA, S. & B. NEILSON (2019), *The Politics of Operations: Excavating Contemporary Capitalism*, Durham: Duke University Press.
- MITCHELL, T. (2020), New Silk Roads—Timothy Mitchell—Infrastructures Work on Time, *New Silk Roads*. <https://www.e-flux.com/architecture/new-silk-roads/312596/infrastructures-work-on-time/>.
- MONSTADT, J. (2022). Urban and Infrastructural Rhythms and the Politics of Temporal Alignment. *Journal of Urban Technology*, 29(0), 69–77. <https://doi.org/10.1080/10630732.2021.2007205>
- MUNIESA, F. (2014), *The provoked economy: Economic reality and the performative turn*, London: Routledge.
- NATIONTHAILAND (2017), One-Stop Service to Help Boost Foreign Flows into EEC <https://www.nationthailand.com/business/30325236>. August 17
- NEGRI, A. (2021), *The End of Sovereignty*, Cambridge/Hoboken, NJ: Polity.
- OECD (2021), OECD Investment Policy Reviews: Thailand. https://www.oecd-ilibrary.org/finance-and-investment/oecd-investment-policy-reviews-thailand-2020_c4eeee1c-en.
- OUMA, S. (2020), This can(’t) be an Asset Class: The world of Money Management, ‘Society’, and the Contested Morality of Farmland Investments. *Environment and Planning A: Economy and Space* 52(1), pp. 66–87. <https://doi.org/10.1177/0308518X18790051>.
- OUMA, S., L. JOHNSON & P. BIGGER (2018), Rethinking the Financialization of ‘Nature’. *Environment and Planning A: Economy and Space* 50(3), pp. 500–511.
- PHUANGKETKEOW, S. (2020), Thailand’s Eastern economic corridor: a bold strategic move. *Researchers*

- at ISEAS – Yusof Ishak Institute Analyse Current Events (Vol. 13, No. 2020).
- PILÒ, F. (2023), Security Planning, Citizenship, and the Political Temporalities of Electricity Infrastructure. *Urban Geography* 44(7), pp. 1285–1304.
- POVINELLI, E. (2011), *Economies of Abandonment: Social Belonging and Endurance in Late Liberalism*, Durham: Duke University Press.
- RAMAKRISHNAN, K., K. O'REILLY & J. BUDDS (2021), The Temporal Fragility of Infrastructure: Theorizing Decay, Maintenance, and Repair. *Environment and Planning E: Nature and Space* 4, pp. 674–695. <https://doi.org/10.1177/2514848620979712>.
- ROGERS, S. (2023), The Emergence of the 'Rentocrat'. *New Political Economy* 28, pp. 1–14.
- RONEY, T. (2021), China Poised for Thailand's Solar Move <https://chinadialogue.net/en/energy/china-poised-for-thailands-solar-move/>.
- SANTASOMBAT, Y. (2011), *The River of Life: Changing Ecosystems of the Mekong Region*, Chiang Mai: Mekong Press.
- SCHINDLER, S., I. ALAMI & N. JEPSON (2022), Goodbye Washington Confusion, hello Wall Street Consensus: contemporary state capitalism and the spatialisation of industrial strategy. *New Political Economy* 28(2), pp. 223–240. <https://doi.org/10.1080/13563467.2022.2091534>.
- SCHINDLER, S., I. ALAMI, J. DICARLO, N. JEPSON, S. ROLF, M.K. BAYIRBAĞ, L. CYUZUZO, M. DEBOOM, A.F. FARAHANI, I.T. LIU, H. MCNICOL, J.T. MIAO, P. NOCK, G. TERI, M.F.V. SEOANE, K. WARD, T. ZAJONTZ & Y. ZHAO (2023), The Second Cold War: US-China Competition for Centrality in Infrastructure, Digital, Production, and Finance Networks. *Geopolitics* 29(4), pp. 1083–1120.
- SIDAWAY, J.D. & C.Y. WOON (2017), Chinese Narratives on "One Belt, One Road" (一帶一路) in Geopolitical and Imperial Contexts. *The Professional Geographer* 69(4), pp. 591–603.
- SILVER, J. (2014), Incremental Infrastructures: Material Improvisation and Social Collaboration Across Post-Colonial Accra. *Urban Geography* 35(6), pp. 788–804. <https://doi.org/10.1080/02723638.2014.933605>.
- SIMPSON, B.R. (2008), *Economists with Guns: Authoritarian Development and U.S.-Indonesian Relations, 1960–1968*, Stanford: Stanford University Press.
- SIRASOONTORN, P. & P. KOOMSUP (2022), *Energy Transition in Thailand*, Bangkok: The Friedrich-Ebert-Stiftung (FES): Report.
- SMITH, N. (2007), Nature as accumulation strategy. In: L. Panitch & C. Leys, (eds.), *Socialist register 2007: Coming to terms with nature*, pp. 19–41. London: Monthly Review Press.
- SNEDDON, C. (2012), The 'Sinew of Development': Cold War Geopolitics, Technical Expertise, and Water Resource Development in Southeast Asia, 1954–1975. *Social Studies of Science* 42(4), pp. 564–590.
- SULLIVAN, S. (2013), Banking Nature? The Spectacular Financialisation of Environmental conservation. *Antipode* 45(1), pp. 198–217.
- TAYLOR, P.J. (2023), The Geographical Ontology Challenge in Attending to Anthropogenic Climate Change: Regional Geography Revisited. *Tijdschrift Voor Economische en Sociale Geografie* 114(2), pp. 63–70.
- TELLMANN, U. (2020), Beyond Performativity: Material Futures Of Finance. *Economy and Society* 49(3), pp. 345–363.
- TOOZE, A. (2022). Welcome to the world of the poly-crisis. *Financial Times*, 28 October.
- TUCKER, R.P. (2010), Containing communism by impounding rivers: American strategic interests and the global spread of high dams in the early Cold War. In: J.R. McNeill & C.R. Unger, (eds.), *Environmental Histories of the Cold War*. New York: Cambridge.
- UNCHANAM, P. (2020), *Royal Capitalism: Wealth, Class, and Monarchy in Thailand*, Madison: University of Wisconsin Press.
- WAINWRIGHT, J. & G. MANN (2018), *Climate Leviathan: A political theory of our planetary future*, London: Verso Books.
- WAITOOKIAT, N. & P. CHAMBERS (2017), Arch-Royalist Rent: The Political Economy of the Military in Thailand. In: P. Chambers & N. Waitookiat, (eds.), *Khaki Capital: The Political Economy of the Military in Southeast Asia*, pp. 40–92. Copenhagen: NIAS Press.
- WIG, A. & J. SILVER (2019), Turbulent Presents, Precarious Futures: Urbanization and the Deployment of Global Infrastructure. *Regional Studies* 53(6), pp. 912–923. <https://doi.org/10.1080/00343404.2019.1566703>.
- ZELLER, N.R. (2012), New Means, Old Ends? World Bank Governmentality in Thailand and Lao People's Democratic Republic. Master's Thesis, University of Tennessee. https://trace.tennessee.edu/utk_gradthes/1224.