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Power Connectivity in the Greater Mekong Subregion (GMS) – The Need for a Wider Discourse

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Abstract: Despite nearly over 30 years of efforts, power connectivity in the GMS remains rather low, limited to a few uncoordinated bilateral exchanges of electricity. Much of the existing thinking attributes this slow progress to factors that are proximate to the electricity industry, namely, insufficient infrastructure, lack of technical competence, and uncoordinated regulation. Through an analysis of the historical evolution of power connectivity in the GMS, this Policy Perspective demonstrates that this thinking (on industry-centric factors) is inadequate for providing a fuller appreciation for the reasons for the slow progress towards power connectivity and hence potential remedies to expedite the pace of connectivity. Such appreciation can instead be gained, this paper contends, by developing a wider discourse on the geopolitical and socio-economic issues, especially those issues that are central to creating a backdrop which is essential for converting GMS's growing physical electricity connectivity into a region-wide coordinated electricity market. Such issues include: reconciliation between geopolitical and regional interests; convergence of national and regional interests across the GMS countries; and national v regional identity.

Keywords: Greater Mekong Subregion; Policy discourse; Electricity; Market; Sovereignty

1. Introduction

Regional power connectivity – in the context of this paper – refers to fully interconnected national electricity systems that enable the trading of electricity across nations, facilitated by harmonised regulatory arrangements that ensure coordination in the operation (for example, generation scheduling and dispatch, and congestion management) and planning (such as, long-term supply adequacy) of a regional electricity system (IEA, 2019a; IRENA, 2019; World Bank, 2010). The purported rationale for regional power connectivity is lower electricity supply costs, achieved through the exploitation of scale and scope economies in electricity generation and supply. This, it is further argued, would incentivise much needed private investment in large-scale power projects that would otherwise not be viable at the national levels, especially for smaller, resource-rich countries with relatively small electricity demand. This, it is also argued, would result in increased access to electricity and provide economy-wide benefits (ADB, 2012a; IEA, 2019b; Krongkaew, 2004; UNESCAP, 2019).

A study initiated by the Asian Development Bank, for example, estimates the potential economic benefits from power connectivity via six existing or planned transmission interconnections in South Asia. It shows that the annual benefits are in the range of $3,861 million to $4,127 million, far exceeding the annualised costs ($229 million to $243 million) associated with the construction and operation of the interconnections (Wijayatunga et al., 2015). In another study, it is estimated that electricity market integration in Europe could bring annual savings of €12 billion to €14 billion (ESCAP, 2016). Similarly, the World Bank estimates that the economy-wide benefits of cross-border electricity trade in the Western African Power Pool (WAPP) would reach $5-8 billion per year by enabling countries to import cheaper electricity from neighbouring countries (World Bank, 2018).

More recently, regional power connectivity has also been cited for its contribution to greenhouse gas emissions reductions by enabling higher penetration of renewables in the electricity systems. The basic argument is that power connectivity could allow the sharing of complementary renewable resources (especially, wind, and solar) that are often distributed unevenly across the region (Akhtar et al., 2017; IEA, 2019b; IRENA, 2021). Take Denmark as an example. It has six interconnections with neighbouring

countries, which in total provide around 5.7 GW of import capacity. Significant interconnections with neighbouring countries enables Denmark to integrate about 50% of wind power without significant curtailments, according to IEA (2019b).

For the above-noted reasons, various regions around the world have over the years pursued power connectivity (Algarvio et al., 2019; Bown et al., 2017; Saadi et al., 2015; Shi et al., 2019). However, a deeper review of global experiences suggests considerable variations in the actual progress of power connectivity across these regions. In Europe, for example, power connectivity has progressed with relative ease, with the gradual integration of day-ahead markets achieved for over 85% of the European electricity system (Algarvio et al., 2019). In Central America and some parts of Africa (*e.g.,* southern Africa), power connectivity has also progressed significantly although not yet at the level of connectivity evident in Europe (Palestini, 2020; SAPP, 2021; UNCTAD, 2017). In most other regions, despite considerable efforts to promote power connectivity, actual progress has been relatively insignificant. The Greater Mekong Subregion (GMS) – the region of focus of this study – is one such region.

The GMS is a trans-national region of the Mekong River basin that comprises five Southeast Asian countries (Cambodia, Laos, Myanmar, Thailand, and Vietnam) and two provinces of China (Yunnan and Guangxi) (see Figure 1). Despite nearly 30 years of efforts, power connectivity in the region remains rather low, limited to a few uncoordinated bilateral cross-border exchanges of electricity. Overall, the current volume of electricity trade across the region stands at about 2% of total regional electricity consumption (ADB, 2020).

There is significant commentary on the possible reasons for the slow progress of power connectivity in the GMS. These reasons range from insufficient infrastructure, to lack of human resources, to uncoordinated regulatory processes (see, for example, Shi et al., 2019). However, considering that some other regions, such as Central America and southern Africa, have managed to appreciably progress power connectivity and achieve significant levels of multilateral electricity trade, despite facing similar difficulties as the GMS, one starts to question if the existing thinking on the matter, in GMS, is sufficient?

Against this backdrop, the primary objective of this Policy Perspective is to review the existing thinking on the reasons for the slow progress of power connectivity in the GMS,

with specific emphasis on identifying the 'limits' of such thinking, and hence ways to rectify the situation.

This perspective paper contributes to the emerging energy regionalism literature by drawing attention to regional cooperation in the electricity sector. Much of the existing energy regionalism literature has tended to focus on oil and gas sectors with limited attention on the electricity sector (Hancock et al., 2021). Another contribution of this paper is that it establishes the need for a broad framework to understand and conduct research on regional power connectivity. This framework would represent a point of departure from most existing studies that tend to focus on industry-specific issues affecting the progress of regional power connectivity (Eberhard and Shkaratan, 2012; Gregory and Sovacool, 2019; UNESCAP, 2018; Wijayatunga et al., 2015; World Bank, 2020). Its adoption would therefore provide deeper insights into why the progress of power connectivity has been slow in some regions and what could be done to rectify the situation. This contribution is particularly useful as the momentum builds – in the context of the global decarbonisation debate – to integrate the electricity systems across larger areas, to enable better access to clean and more affordable energy sources.

This paper proceeds as follows. The next section presents the existing thinking on GMS's slow progress toward power connectivity, based on a review of major studies available in the public domain. Section 3 assesses the adequacy of this thinking as a guide for the design of policy measures to deepen power connectivity in the region. Section 4 concludes this study with a call for a wider discourse on power connectivity as the initial first step of rectifying the situation. It also discusses some issues that may be worth considering for developing such a discourse.

Figure 1: Greater Mekong Subregion (Chen and Zhu, 2016)

2. Existing thinking on GMS's slow progress toward power connectivity

Power connectivity in the GMS has been planned to progress in four stages, characterised as follows: 1) one-way power sales under a Power Purchase Agreement (PPA) from an Independent Power Producer (IPP) in one country to a power utility of another country using dedicated interconnection facilities; 2) system-to-system trading between two countries, initially using spare capacity in the dedicated interconnection facilities, and eventually transitioning to use a third country's transmission facilities; 3) all countries become interconnected, and the planning and system operation functions are regionally coordinated; and 4) all countries complete the transition to regulatory frameworks that enable the establishment of a regional competitive market for electricity (ADB, 2008).

GMS countries were committed to developing the first two stages of cross-border electricity trading by the signing of the Inter-governmental Agreement on Regional

Power Trade in 2002. After almost twenty years, the region is still in the process of transitioning from Stage 1 to Stage 2. Key factors responsible for this, as identified by the existing literature, are as follows.

Inadequate infrastructure: The national grids in some GMS countries (Cambodia, Laos, and Myanmar, in particular) are weakly-integrated and mainly built on low and medium voltage backbone lines that are unsuitable for long-distance transfer of electricity (ADB, 2016a; Antikainen et al., 2011). For example, in Cambodia, the national grid is made up of 24 weakly integrated provincial systems, mainly built on 115 kV and 230 kV lines, despite the fact that 500 kV lines are more efficient in long-distance transfer of electricity (ADB, 2018). Similar observations can also be made for Laos and Myanmar. In Laos, the national grid is made up of three weakly integrated systems (namely, central, northern, and southern) dominated by 115 kV and 230 kV lines (ADB, 2019a). Myanmar's national grid has been developed primarily to serve the southern urban area (particularly, the Yangon area) where the modern economy is concentrated. The grid is made up of 132 kV and 230 kV lines with one 500 kV line linking Meiktila with Hlaingthaya currently under construction (ADB, 2016b). The inadequacy of the national grids has posed a significant technical barrier for deeper power connectivity across the region (ADB, 2016a; Antikainen et al., 2011).

Inflexible Power Purchase Agreements: Cross-border power trading in the GMS has been largely conducted bilaterally, through Power Purchase Agreements between IPPs and electric utilities of the importing countries. In some cases, electric utilities in the importing countries are given exclusive rights for using the interconnection facilities with no access granted to other entities (even the host country's utilities). The lack of third-party access to the interconnection facilities has affected the transition to deeper connectivity with system-to-system trading, especially if one notes the long-term nature of most PPAs (25 years, in most cases) (Antikainen et al., 2011). There are over 4,500 MW interconnection capacity in GMS that is dedicated to transporting electricity from specific power projects located in one country to another, based on PPAs. This accounts for roughly 80% of total interconnection capacity in the region (ADB, 2020).

No third-party access to the grid: Third-party access is a key pre-requisite for deep power connectivity. This applies where generators can use the interconnection assets, for a certain wheeling fee, to trade electricity with power utilities or large consumers

connected to the network of importing countries. The basic requirements for third-party access are: 1) all countries should permit third-party access under non-discriminatory, transparent rules; 2) there must be a published list of use-of-system charges; and 3) there should be clear procedures for handling congestion and disputes. However, these basic requirements are not met in the GMS at present (ADB, 2020).

Uncoordinated planning and operation processes: The planning of power sector development has not yet been coordinated nor optimised in the GMS. Progress was made in developing an integrated regional modelling database, and initial training was provided to regional power utilities in the use of various planning tools (*e.g.,* OptGen) (ADB, 2016c). However, these modelling tools have not been widely adopted, and there has been little progress on a coordinated effort by regional power utilities or regulatory bodies to redress this issue. As a result, GMS countries have continued to develop unilateral plans for electricity system expansion (ADB, 2020). Similarly, while some progress has been made in developing a common grid code for governing the operation, maintenance and planning of the electricity systems across the GMS, the grid code has not yet been implemented. Furthermore, representatives from some GMS countries indicated during the meeting of the Working Group for Planning and Operation in 2019 that the implementation of the grid code in their respective jurisdictions is likely to be delayed (ADB, 2019b). This lack of coordination in the planning and operation processes makes the transition to deeper power connectivity difficult in the GMS.

Lack of technical competence: Most electric utilities and regulators in the GMS lack necessary technical skills and knowledge for conducting regional electricity trading and planning. As identified by the Asian Development Bank (ADB), there are three priority areas for capacity building. Firstly, training should be provided to staff from electric utilities in the region to improve their ability to evaluate the benefits and costs of cross-border power trading and negotiate PPAs. Secondly, training should be provided to staff from planning institutions in the region on integrated resource planning techniques. Thirdly, experiences of implementing power connectivity in other regions (for example, Nord Pool) could provide valuable learning opportunities for the GMS and should be shared with decision-makers and planners in the region (ADB, 2020).

No regional body for promoting regulatory coordination: To deepen power connectivity, in 2012 the GMS governments signed a memorandum of understanding

(MoU) to develop a Regional Power Coordination Centre (RPCC). The RPCC is intended to act as a coordinating body for promoting regional electricity trading and planning and would play a facilitating role in enabling trading and planning to take place effectively (ADB, 2020). So far, limited progress has been made in developing the RPCC, due mainly to the disagreement among GMS countries on its host location (Shi et al., 2019).

3. 'Limits' of existing thinking

The previous section has clearly demonstrated that the existing literature overwhelmingly tends to attribute the slow progress of power connectivity in the GMS to industry-centric factors, that is, factors that are proximate to the electricity industry (*e.g.,* insufficient infrastructure, lack of technical competence, and uncoordinated regulation). This study contends that such industry-centric thinking, on the reasons for the slow progress of power connectivity, is narrow and acontextual. Limiting analysis to strictly industry-centric factors fail to consider the influence of wider contextual factors in shaping socio-political acceptance for power connectivity. It is therefore unlikely to provide, on its own, meaningful insights into the ultimate reasons for the slow progress of power connectivity, and hence the basis for designing measures to promote a greater level of connectivity.

To substantiate this contention, this section reviews the historical evolution of power connectivity in the GMS, with a view to demonstrate the significance of various contextual influences that have provided stimulus for power connectivity. Table 1 provides a snapshot of the broad contours of power connectivity in the GMS. Details are presented below.

3.1 1950s to 1970s

The post-war period (1950s to 1970s) witnessed some early efforts to promote economic cooperation in the GMS. One key effort was the creation of the Mekong Committee as an intergovernmental organisation of four riparian states (Cambodia, Laos, Thailand, and the Republic of Vietnam) to promote regional cooperation in exploiting the potential of the Mekong River for hydropower, irrigation and flood control (MC, 1957).

The stimulus for economic cooperation during these years came from an array of external contradictions, such as Cold War contentions and Sino-Soviet schism. These

perpetuated internal instabilities and conflicts, *e.g.,* communist insurgency, widespread poverty, and an ever-widening rural-urban divide in countries of the Mekong region and also exacerbated a series of territory and border disputes across the region (Makim, 2002; Weatherbee, 1997). In these circumstances, national security became a palpable concern for countries of the region, and the pursuit of economic cooperation in select areas (for example, hydroelectric projects) was viewed as a means of rectifying the situation, as it could 'inhibit violence in the region, and evoke, among the riparian countries, a sense of what is possible if they cultivate the habit of working together' (Black, 1970).

This view was also supported by the United States and its allies, which considered economic cooperation as an alternative strategy to contain growing communism in the region without the necessity of large-scale military involvement (Dosch and Hensengerth, 2005; Ratner, 2003). Guided by this consideration, the United States and the US-led international development organisations (such as the World Bank) provided significant technical and financial support for economic cooperation programs and projects in the Mekong region (Cosslett and Cosslett, 2014).

Table 1: Evolution of power connectivity in the GMS

	1950s to 1970s	1980s to 1990s	2000s to the present
Contextual backdrop and drivers	- External contradictions, such as Cold War confrontation, and Sino-Soviet schism - Internal instabilities (*e.g.,* communist insurgency) - Territory and border disputes among GMS countries - Focus on facilitating economic cooperation in select areas including hydroelectric projects - GMS countries: supportive of economic cooperation as a platform for dialogue - US and its allies: supportive of economic cooperation as an alternative strategy to contain communism in the region	- End of post-war economic boom - Economy-wide reform based on neoliberal principles - Re-integration of the GMS economies into the globalised world market - Pursuit of economic cooperation as a strategy to attract foreign investment - Additional impetus: the need to expand supply capacity to alleviate power shortage, and the inability of the public sector to assume this task	- Political appeal of economic regionalism as a strategy for mitigating the risks originating from global market forces - A 'soft' approach to economic cooperation that favours informal decision-making - Activity-based cooperation, focusing on the development of regional projects based on mutual understanding, accommodations, and tacit agreements
Outcomes: power connectivity	- Creation of Mekong Committee, responsible for promoting cooperation in the development of large hydroelectric projects - Wars and turmoil impaired most projects initiated by the Mekong Committee - Limited progress, except a few joint hydroelectric projects between Laos and Thailand	- Focus on promoting private participation in large hydroelectric projects and associated exporting facilities - Lack of investment, especially in the aftermath of the 1997 Financial Crisis	- Focus on promoting 'physical' connectivity through the development of several large generation and interconnection projects - Limited progress on regulatory harmonisation and coordination (essential for deep connectivity) - Limited scope of cross-border electricity trade, mainly confined to select low-volume, uncoordinated bilateral trading

As part of these programs, the Mekong Committee initiated several large hydroelectric projects in the 1960s and 1970s. However, most of these projects were impaired by continuing regional war and turmoil that characterised the post-World War history of the Mekong region. One example is the Prek Thnot dam in Cambodia's Kompong Speu province, where the work began in the late 1960s, but was suspended in the mid-1970s because of disruption from ongoing wars (Weatherbee, 1997). A complex array of diplomatic and socio-political issues, arising from the Indochina Wars and Vietnam's reunification, also created substantial uncertainty for countries of the region as they considered committing to regional power projects (Makim, 2002). Aside from several hydroelectric projects jointly developed by Laos and Thailand, the initial outcome of efforts to promote power connectivity in the region was minimal, largely limited to maintaining a dialogue between various countries of the region (Stensholt, 1996; Weatherbee, 1997).

3.2 1980s to 1990s

The 1970s saw the end of post-war economic boom, and the world economy began to step into recession. There were several important events during this period that contributed to the recession, including the two oil crises, the collapse of the Bretton Woods system, and the Vietnam War (Carroll, 2020). The 1970s recession prompted a rethinking of developmental strategy and policy in the Western countries, resulting in the implementation of wider economic reforms based on neoliberal principles that emphasised market opening, private ownership, and de-regulation (Yang and Sharma, 2020). In the 1980s, this trend gradually extended its reach in the Mekong region. For example, Thailand initiated an export-oriented industrialisation strategy with the support of large foreign investments (mainly from Japan) in the early 1980s (Stubbs, 1989). The former command economies of Cambodia, Laos, Myanmar, and Vietnam (the CLMV countries) started a transition towards market economies in the mid-to-late 1980s (Verbiest, 2013). As a consequence, the national economies of the Mekong region began to gradually re-integrate into the globalised world market (Makim, 2002).

It is in such context that economic cooperation gained momentum in the GMS. This momentum, according to some, arose from the belief that economic cooperation and integration was necessary for developing countries to attract foreign investment and promote socio-economic prosperity in the backdrop of growing economic globalisation

(Lawrence, 1996). As argued by one of the former secretaries-general of ASEAN: 'Regional integration, in today's world, is the only way to generate sufficient economic activity, improve efficiency, heighten competition, attract investment, and thus create jobs…The forces of globalisation require closer regional integration if Southeast Asian countries and Southeast Asian firms are to hope to be competitive in the global economy' (Sridharan and Srinivasa-Raghavan, 2007, p17).

The momentum behind economic cooperation led to the implementation of several initiatives for promoting 'physical' connectivity across the Mekong region through better coordinated infrastructure planning and development, with large power projects considered key elements of these initiatives (Ratner, 2003; Verbiest, 2013; Weatherbee, 1997). Additional impetus for these projects came from the power crises of the mid-to-late 1980s and early 1990s. These years witnessed the electricity industries in several countries of the region becoming increasingly unable to meet fast-growing electricity needs, and likewise the inability of the governments to finance electricity development (Yang and Sharma, 2020). In Thailand, for example, the electricity consumption grew at an annual rate of 14.1% over the period 1990-97, but installed capacity grew at only 7.7%, giving rise to concerns that the country's economic growth could falter due to the lack of electricity supply (Sharma, 2005).

In such settings, many of the efforts to promote power connectivity in these years focused on facilitating private participation in large-scale hydro projects and associated exporting facilities. The outcomes of these efforts were uninspiring, however, typified by a general lack of interest from the private sector, especially after the 1997 Financial Crisis (Krongkaew, 2004).

3.3 2000 to the present

The Asian Financial Crisis had far-reaching impacts on the Mekong countries, and exposed their inability to deal effectively with the risks of contagion originating from global market forces (Freeman, 1999). This further reinforced the political appeal of economic cooperation among neighbouring countries, which resumed its momentum in the early 2000s as the economic situation gradually stabilised across the region. This momentum, as observed by Amitav Acharya and many other scholars, manifested in the pursuit of a 'soft' approach to economic regionalism (Acharya, 2001; Katzenstein, 2000). This approach, in stark contrast with European-style formal bureaucratic

structures and legalistic decision-making procedures, emphasises informal and less legalistic styles of decision-making for promoting regional economic cooperation. The implementation of this approach resulted in economic cooperation through a dense network of working groups and advisory committees (the Regional Power Trade Coordination Committee, in the context of power connectivity), where a diverse range of state actors interact with each other in pursuit of their own interests in the regionalisation process (Yeo, 2010). More recent years also witnessed the growing influence of non-state actors (civil society, NGOs, *etc.*) in shaping the regionalisation process, enabled by various consultative and deliberative practices (Saichan and Komatsu, 2018). In such settings, regional economic cooperation has become activity-based, mainly involving the implementation of regional projects in specific areas (such as energy, telecommunications, transportation, and tourism), based on mutual understanding, accommodations and tacit agreements (Tan, 2014).

The evolution of power connectivity in the GMS appears to fall in line with the above-noted observation, *i.e.,* the prominence of a 'soft', project-based approach to regional economic cooperation. Power connectivity is arguably one of the key areas for economic cooperation in the region, as cheap and reliable electricity supply is widely considered a catalyst for the much-needed development to reduce poverty and rural-urban divide in most Mekong countries, especially Cambodia, Laos, and Myanmar (Shin et al., 2020). One of the most comprehensive programs for promoting power connectivity was the 10-year strategic framework endorsed by regional policy makers in 2002, to strengthen physical infrastructure linkages in order to facilitate cross-border trade, investment, tourism, and other forms of economic cooperation (ADB, 2007). Specific objectives, as set out in this framework for achieving deeper power connectivity included: facilitating the development of grid interconnection infrastructure; increasing private participation in power projects; and promoting the development of regional electricity trading (ADB, 2007).

Later, in 2011, a second 10-year strategic framework was endorsed, which attached higher priority to strengthening the institutions (*e.g.,* regionally coordinated regulations and associated enforcement agency) that support physical infrastructure, in order to maximise the impact of past and future infrastructure investments (ADB, 2012b). In relation to power connectivity, the strategic framework calls for the establishment of a GMS Regional Power Coordination Centre (RPCC), responsible for overseeing power

trade development, harmonising regional power plans and investments, coordinating regulatory and trading regimes, and internalising environmental and social impacts in the preparation of the GMS power expansion plans (ADB, 2011).

Progress toward the establishment of the RPCC has, however, been quite slow, mainly due to the disagreement among GMS countries on the host of the RPCC (Shi et al., 2019). In the absence of a regional body responsible for promoting greater harmonisation and coordination in electricity regulation, power connectivity has progressed in the GMS essentially as a project-based initiative, focusing on the development of large hydroelectric and interconnection projects. As a result, cross-border electricity trading has been limited to a series of uncoordinated bilateral exchanges of electricity between IPPs and electric utilities of the importing countries. There is little scope for system-to-system trading (ADB, 2020; IEA, 2019b), except the recent 'pathfinder' trial (*i.e.* LTMS-PIP) on electricity export of up to 100 MW of hydro electricity from Laos to Malaysia (and later Singapore) via Thailand (ASEAN Centre for Energy, 2020).

4. Conclusion and policy implications

Through an analysis of the historical evolution of power connectivity in the GMS, this Policy Perspective has demonstrated that regional power connectivity is a complex undertaking, shaped by a host of mutually interacting and unpredictably reinforcing influences. In such settings, a natural strategy for policymakers to promote regional power connectivity is to remain focused on narrowly defined issues internal to the electricity system, such as insufficient infrastructure, lack of technical competence, and uncoordinated regulatory processes. This is especially true when limited resources and tight deadlines combine to make a broader policy debate impractical.

Though useful, this approach towards regional power connectivity has failed to appreciate the influence of wider geopolitical and socio-economic contexts that have historically provided the impetus for regional power connectivity. It could produce policies that work initially. But these policies usually fail to progress power connectivity to a higher level. All too often such policy failure is attributed to some proximate external events rather than to shortcomings in the policy approach itself.

Clearly, there is a need for a wider discourse on regional power connectivity that appreciates the interactions between regional power connectivity and the wider geo-

political, socio-economic, and cultural contexts – an initial first step for rectifying slow progress towards power connectivity. In such a discourse, particular attention should be given to issues affecting the creation of regional electricity institutions for governing cross-border electricity transactions; the creation of these institutions is essential for converting GMS's growing physical electricity connectivity into a region-wide coordinated electricity market.

According to Aalto (2014a), the regional electricity institutions can be both *formal* and *informal*. Formal institutions can be further divided into three categories: 1) *regulations and rules* for governing cross-border electricity transactions; 2) *organisations* responsible for implementing and enforcing formal regulations and rules; 3) *agencies* established by national governments, energy companies and international financial institutes to coordinate some aspects of energy policy or their mutual relations. Informal institutions are 'well-established rules, norms and practices' that 'lack any precise organisation or written format, wield less authority and create weaker obligations' (Aalto, 2014a). Yet they can create strong path-dependencies for the development of formal electricity institutions, as these institutions often derive their legitimacy from the underlying informal institutions (Yang and Sharma, 2020).

These institutions are needed to reduce transaction costs and create orders in cross-border electricity trade, as well as to help mitigate the ecological and climatic consequences of electricity generation, transportation, trade and consumption (Aalto, 2014a). Despite their importance, several empirical studies have found a general lack of development in formal institutions for governing cross-border electricity trade in Asia, including the GMS (Aalto, 2014b; Shi et al., 2019).

One key issue affecting the institutions-building process is concern about a loss of energy sovereignty, *i.e.,* the ability of a country to make autonomous decisions regarding its electricity supply and policy (Thaler and Hofmann, 2022). The creation of regional electricity institutions implies that the governance of some electricity issues (*e.g.,* electricity pricing, congestion management, and supply sufficiency) is taken out of the scope of national policymaking, which may be at odds with Southeast Asia's fundamental norms (informal institutions) of protecting and enhancing sovereignty and autonomy, as evidenced by the long tradition of non-interference in the internal affairs of other nations across the region (Aalto, 2014b; Suzuki, 2019).

The concern about a loss of energy sovereignty may also arise from the consideration that reliance on electricity imports could expose an electricity-importing country to a hold-up problem if its trading partners fail to export (Vanheukelom, 2013). This viewpoint seems to be challenged by some on the ground that cross-border electricity trade is a mutually dependent relationship. The exporting country, keen to reap the benefits of electricity trade (*e.g.,* revenues from electricity sales), would be incentivised to redress domestic issues (such as social unrest caused by the construction of large hydroelectric project) that affect its electricity export (Oseni and Pollitt, 2016). The strength of this argument, however, is weakened if one notes that any supply failure represents only missed opportunities for the electricity exporting country but real economic costs (*e.g.,* power shortages, production curtailments, and job losses) for the importing country. These economic costs are likely to have widespread socio-political ramifications, which would in turn intensify the concern about the loss of energy sovereignty due to the pursuit of regional power connectivity.

Regional power connectivity is, however, not incompatible with sovereignty. As suggested by Litfin (1997), sovereignty can be conceived as an aggregated concept that comprises three constitutive elements, namely, autonomy (independence in policymaking), control (the ability to produce an effect), and legitimacy (the recognised right to rule). Taking this view further, regional power connectivity may be progressed through a sovereignty bargaining process, where a country may suffer a loss in some elements of sovereignty (*e.g.,* loss of autonomy in electricity policymaking), but this is the *sine qua non* of receiving gains in other elements from closer regional electricity cooperation (for example, improved legitimacy by lowering the costs of electricity supply).

Considering regional power connectivity as a multidimensional sovereignty bargaining process helps, conceptually and theoretically, redress the national-regional dichotomy by acknowledging its potential as a constructive contribution to enhancing sovereignty rather than characterising it as a possible threat to it. In practice, this process entails difficult decisions to be made regarding trade-offs between autonomy, control, and legitimacy. Consensus-building becomes therefore quite challenging and overcoming this challenge requires to address at least the three issues below.

Firstly, as suggested by some regionalism literature, especially from a structural-

functionalist tradition, regional cooperation (regional power connectivity, in our instance) is not pursued as an end in itself but as a means to an end (Moller, 2008). As such, to progress power connectivity to a higher level, all participating countries need to agree that this provides solutions to the problems they face, and that these problems cannot be solved in a national context. Yet reaching this agreement is not an easy task, as it involves a diverse range of state, civil society, and external actors, who pursue their interests through a myriad of ways and over differing timescales (Hooghe and Marks, 2001; Moravcsik, 1998; Taylor, 1991). The interests of these actors are also informed by a host of ever-changing domestic (security, stability, development) and international (geo-strategy) exigencies (Borzel and van Hullen, 2015; Caballero-Anthony, 2008; Neumann, 2003). In such a setting, consensus-building becomes an extremely challenging task. This challenge gets further compounded by GMS's substantial diversity in terms of culture, history, religion, political regime, and economic development, which makes a convergence of interests difficult to attain (Zhao, 2013). How to redress this challenge is therefore an important issue for achieving a higher level of power connectivity in the GMS.

Secondly, a central proposition of power-based theories of regionalism is that powerful countries within or outside the region play a critical role in facilitating the regionalisation process by being 'regional paymaster, easing distributional tensions and thus smoothing the path of integration' (Mattli, 1999, p 56). These countries, however, only assume such a role in pursuit of their own economic or geopolitical interests (Antkiewicz and Whalley, 2005; Clarkson, 2008). In the context of power connectivity, this means that a convergence of interests between these countries is required. How to fulfill this requirement is an important issue in the GMS, especially given the growing competition in the region between several major powers, as evidenced by the presence of multiple and sometimes overlapping regional cooperation programs initiated by them (Pitakdumrongkit, 2019).

Thirdly, as suggested by the social constructivist theories of regionalism, the interests of various actors involved in the process of regional integration are not pre-given but socially constructed through the interactions between material incentives (for example, economic benefits), inter-subjective practices, and the identities of these actors (Smith, 2001; Wendit, 1999). In other words, the behaviour and choice of an actor – whether or not to promote regional cooperation in a particular situation – are socially-dependent,

and the rational choice assumption of actor behaviour cannot fully explain the emergence and quality of regionalism (Wendit, 1992). This viewpoint highlights the significance of a shared regional identity in driving the regionalisation process. Building an identity shared by GMS countries is still an ongoing process. In the absence of a shared regional identity, competing visions for the direction, depth, and pace of regional power connectivity are likely to emerge, which would in turn make deeper power connectivity difficult to attain.

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