Singapore Green Finance Centre

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Paper presented at the 12th Annual SKBI Conference &
1st SGFC Regional Conference on Greening Energy Infrastructure

Transforming ASEAN Electricity SOEs – Opportunities and Challenges of Green Finance

November 2022

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Abstract

ASEAN electricity SOEs play a central role in the energy systems – from resource exploration to electricity generation, transmission, and distribution. To achieve the Paris agreement, ASEAN SOEs need to transition their energy systems. Currently, however, most academic and industry research focuses on the role of the private sector, ignoring the central role of ASEAN SOEs in the energy transition. This leaves a large knowledge gap on challenges of SOEs as the central owner and manager or most energy resources in the region to mobilize finance for the green transition. This article analzyes the role of ASEAN SOEs' for in electricity provision and evaluates the applicability of green financial instruments for SOEs under different circumstances based on their bankability and greeness. Based on the findings, the article provides resources for improved SOE green finance application.

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Introduction

State-owned enterprises are the dominant firm type in the energy and electricity sector, representing nearly two thirds of global electric power generation capacity (Benoit et al. 2022). In ASEAN countries – to varying degrees – state-owned power companies and state-owned enterprises are dominant across the energy system – from resource extraction and import to electricity production and distribution. Currently, most of the energy provided through SOEs is based on fossil fuels. To meet the decarbonization needs of the electricity system in line with the Paris agreement objectives, transitioning SOEs across ASEAN to provide green energy is necessary.

This transition is also part of ASEAN countries' policy goals to accelerate the transition and expand the share of renewable energies. The successful transition, however, hinges not only on relevant policy incentives for greening the energy system – which affect both SOEs and private companies, but possibly even more on SOE's financial resources and capacity to transition to green: SOEs typically have relied on government transfers and subsidies which have become even more challenging to obtain due to accelerating sovereign debt crisis in the wake of COVID19 across many ASEAN economies.

At this time, however, too little emphasis and knowledge has been given to the needs of SOEs in financing the energy transition, which requires a different approach than for private owned companies: in private markets the responsibility and risks to finance the energy transition lies predominantly with private companies and their investors depending on relevant regulations. In state-controlled markets relationships differ particularly to the government as owners, to the regulator which has vested interests in the state-owned company, and due to unclear ambitions of the SPC to provide a public good or be profit seeking.

This lack of support for SPCs is contrary to the recognition of differences in SOE governance to private companies' governance (La Porta et al. 1998; OECD 2012; Robinett 2006; Shleifer

and Vishny 1997) and between developed and developing countries energy system (Ararat, Claessens, and Yurtoglu 2020; Chen and Huang 2014). Yet, literature analyzing and making sense on the role of SOEs for financing the energy transition in emerging markets are rare (exceptions include (Benoit et al. 2022; Gabriele 2004)). Also in practice, the role of SEOs is mostly ignored: While the IEA states that "the region's [ASEAN] utilities, mostly state-owned, function as the primary counterparty to private generators and are the main investors in electricity networks" (Waldron and Arboleya 2019), SOEs are mentioned four times in the 200 page IEA energy outlook for Southeast Asia 2022 (International Energy Agency (IEA) 2022), and twice in the 128 page IRENA energy outlook for ASEAN 2022 (International Renewable Energy Agency (IRENA) and ASEAN Centre for Energy 2022). SOEs also do not feature as the source of investments for the energy transition.

This lack of research and lack of emphasis on SOEs for the energy transition, however, creates a large gap as this article shows in the first chapter: SOEs in ASEAN countries dominate the energy and particularly the electricity sector. SOEs in all ASEAN countries are participating and often monopolizing the energy system from exploration to generation, transmission, and distribution. The next chapter analyzes how SOEs can be a participant and ideally supporter of the green energy transition, with a focus on financing their transition. I utilize the models of different governance types of SOEs based on Benoit et al (2022) to identify pathways for mobilizing green finance for SOEs. I end with a conclusion and an outlook, where I provide recommendations for SPC/SOE green finance.

A better understanding of the role of SPC and SOEs in the energy sector has two major contributions: first, by accelerating the decarbonizing of energy systems in ASEAN, the goals of the Paris Agreement will more likely be met, which reduces risks of potential catastrophic climate change. Second, as is the focus of the article, by accelerating the energy transition in ASEAN countries, broader economic opportunities could be generated, particularly through

lower electricity costs, acceleration of innovation, and improvement of green finance availability. Contrary, not recognizing the need of SPCs and SOEs not only leads to higher risk of climate change, but might lead to significant stranded asset risks (Bos and Gupta 2019) of SOEs with high risks for public finance.

As such, the article aims to shed light how SOEs can finance the energy transition of ASEAN economies, where ASEAN economies can possibly serve as representatives of broader emerging economies characterized by high economic growth trajectories, high dependence on fossil fuels of their electricity system, diverse governance system of the electricity system, and ambitious plans for decarbonization.

The role of SOEs in electricity in emerging markets in general and ASEAN in particular

State-owned and state-linked enterprises (SOEs)[1] play a major role in both developed and developing countries' economies. SOEs account for 55% of infrastructure investments (Robinett 2020) and for 20% of global investment, 5% of employment and up to 40% of domestic output (Wong 2018). SOEs are engaged in many key economic sectors, such as energy, transport, and water, they provide financial services and jobs to millions of people around the world. They provide public services, commercial services, and, in many countries, are an important pillar for innovation.

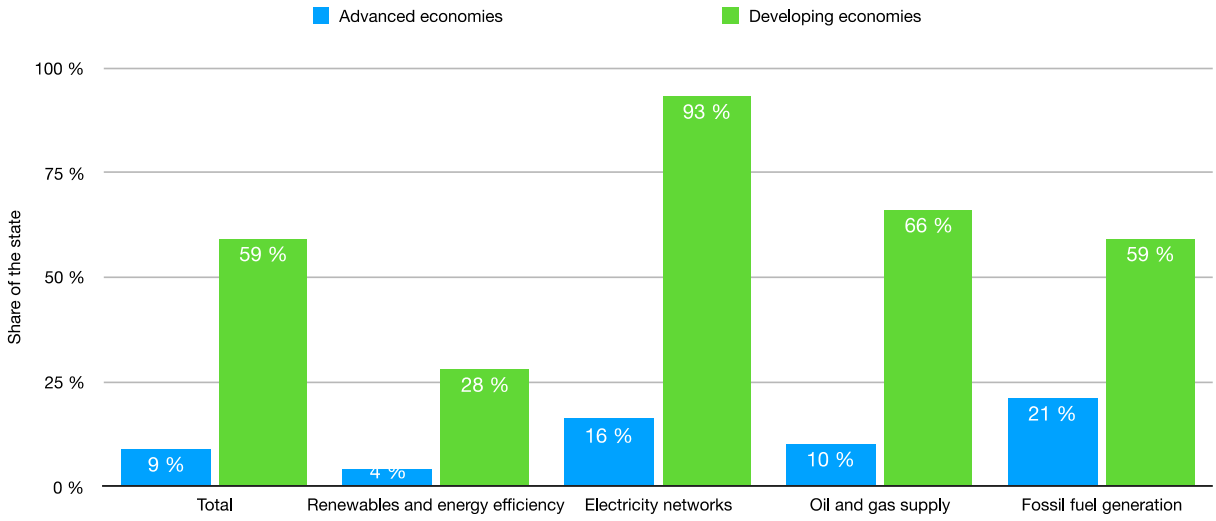
SOEs in ASEAN energy sector

SOEs play an even more central role for emerging economies, such as Asian emerging economies. For example, SOEs contribute to about 60% of total energy investments in

[1] Although there is no unique definition of state-owned enterprises, a commonly accepted definition includes those companies that are effectively controlled by the state, e.g., through majority ownership, golden shares, or by decree.

emerging economies, compared to about 9% in developed economies. Particularly in the fossil fuel sector and networks of emerging markets, SOEs are the dominant investor (see Figure 1).

Figure 1: Share of state-owned energy investments by economy type and sector, 2019 (Data Source: (International Energy Agency (IEA) 2020))



As Table 1 shows, SOEs hold key positions across ASEAN country's energy supply chain, with SOEs dominating in fuel extraction and import, electricity transmission and distribution across all ASEAN countries. While most ASEAN countries allow for multiple sellers enabling independent power producers (IPPs) to participate in the market, most ASEAN countries' electricity generation is dominated or fully controlled by SOEs, except Singapore, Thailand, and Vietnam. While definite numbers of the role of SPCs are lacking, evidence suggests that state-owned enterprises accounting for 61% of installed capacity in 2016, and 52% of capacity planned and under construction (Prag, Röttgers, and Scherrer 2018).

The SOEs are thus directly or indirectly invested in an energy system that is 90% dependent on fossil fuels (oil: 35%, coal: 34%, gas: 21%) without any relevant change of this composition over the past 10 years (see Figure 2 top). Even if excluding oil from the energy system as it can be assumed that significant volumes of oil are used for non-electricity purposes (e.g., transport) (see Figure 2 bottom), it seems that the green electricity transition is

only slowly advancing from very low levels (e.g., solar energy share increased from 1.2% in 2020 to 2.1% in 2021 through the addition of 40 TWh).

Figure 2: ASEAN energy consumption (top graph with oil, bottom graph without oil) (Data Source: OurWorldinData, Graph: Author)

Table 1: Status of energy sector in ASEAN (Source: Author)

Country	Generation market structure	State of monopoly Fuel (extraction/ import)	Generation	Transmission	Distribution	Fossil fuel subsidy
Brunei	Single seller, single buyer	Competitive with SOE participation (e.g., Brunei Liquified Natural Gas (BLNG))	State monopoly (Department of Electrical Services, Berakas Power Company)	SOE monopoly (Department of Electrical Services, Berakas Power Company)	SOE monopoly (Department of Electrical Services, Berakas Power Company)	
Cambodia	Multiple sellers, single buyer	competitive	Quasi SOE monopoly (Electricité du Cabomdge)	SOE monopoly (EDC)	SOE monopoly (EDC)	
Indonesia	Multiple sellers, single buyer	Competitive with SOE participation (Pertamina)	Quasi SOE monopoly (Perusahaan Negara generating 60% of electricity)	SOE monopoly (Perusahaan Listrik Negara (PLN)	SOE Monopoly	
Lao	Multiple sellers, single buyer	Competitive with SOE participation (The Lao State Fuel Company (LSFC))	Quasi SOE monopoly (Electricté de Laos (EdL)) with 88 IPPs as of Dec 2021	SOE monopoly (EdL)	SOE monopoly (EdL)	
Malaysia	Multiple sellers, single buyer	Competitive with SOE participation (Petronas)	Competitive with SOE dominance (Tenaga Nasional Berhad (TNB))	SOE monopoly (TNB for most of Malaysia, except Sarawak Energy in Sarawak and SESB in Sabah))	SOE monopoly	
Myanmar	Multiple sellers, single buyer	Competitive with SOE participation (Myanmar Oil and Gas Enterprise (BOGE)	Competitive with SOE participation (National Power Corporation (NPC)	SOE monopoly (Myanmar Electric Power Enterprise (MEPE)	SOE monopoly (Yangon Electricity Supply Board (YESB), Electricity Supply Board (ESB))	
Philippines	Multiple sellers, multiple buyers	Competitive with SOE participation (e.g., Philippine National Oil Corporation (PNOC), Malangas Coal Corporation)	Competitive with SOE participation (National Power Corporation (NPC))	SOE monopoly (National Grid Corporation of Philippines (NGCP))	Competitive with SOE participation (about 120 small-scale electrification cooperatives (ECs)	
Singapore	Multiple sellers, single buyer	Competitive with SOE participation (Singapore Petroleum Company (SPC))	Competitive	SOE monopoly (Singapore Power Grid, Singapore Power Assets)	SOE monopoly (Singapore Power Grid, Singapore Power Assets)	

Thailand	Multiple sellers. single buyer	Competitive with SOE participation (e.g., PTT)	Competitive	SOE monopoly (Electricity Generating Authority of Thailand (EGAT)	SOE monopoly (Provincial Electricity Authority (PEA) and Metropolitan Electricity Authority (MEA)
Vietnam	Multiple sellers, single buyer	Quasi-monopoly for oil/gas (PetroVietnam, which can have JVs)	Competitive	SOE monopoly (Vietnam Electricity (EVN)	SOE monopoly (Vietnam Electricity (EVN)

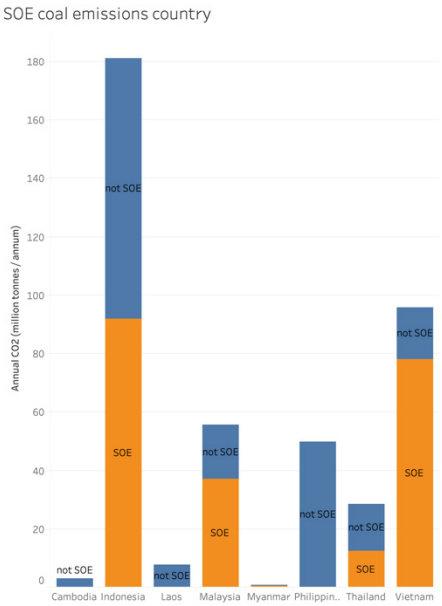
The mission to cut emission

With their strong role in basic infrastructure, particularly in energy, SOEs "are responsible for at least 7.49 gigatons of carbon dioxide equivalent annually in direct (Scope 1[2]) emissions (…) with the true scale of SOE-related emissions likely to be substantially higher" (Clark and Benoit 2022). These emissions are equivalent to at least 15% of direct global greenhouse emissions.[3] Looking at ASEAN itself, annual direct emissions (Scope 1) from ASEAN SOE coal producers alone amount to 220 million tons – more than 50% of the total coal emissions in ASEAN countries (see Figure 3).

Figure 3: Coal emissions from SOEs in ASEAN (Data: Global Energy Monitor, 2022, Author)

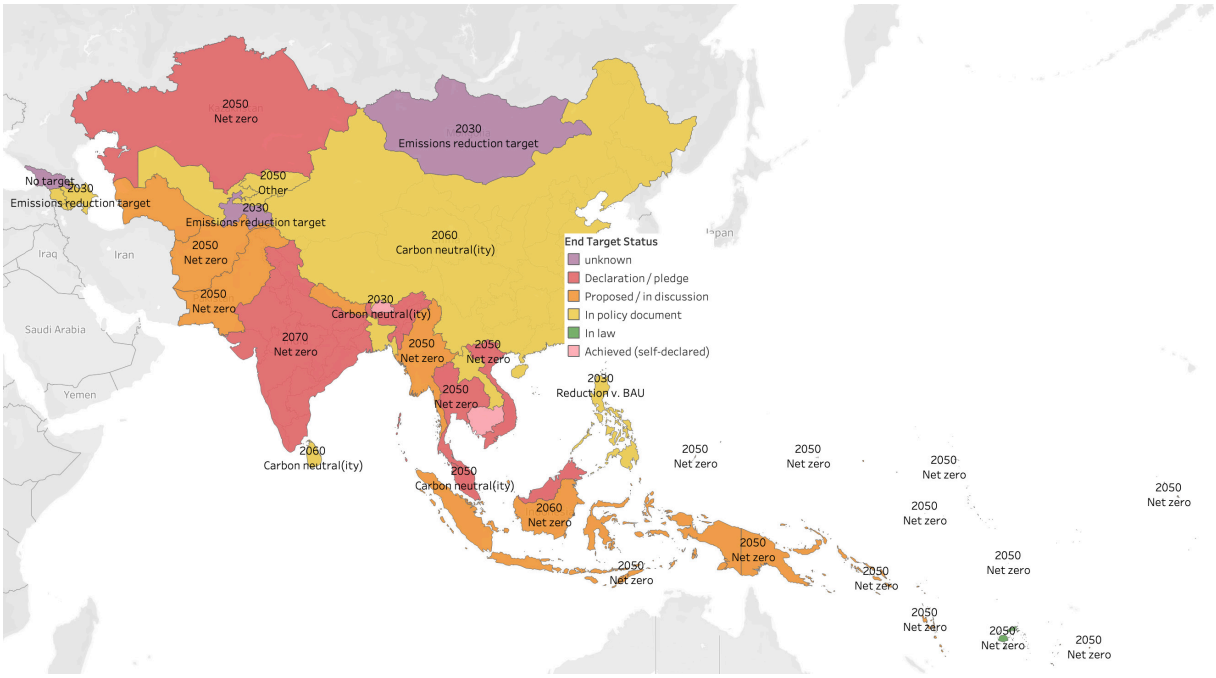
[2] Scope 1 emissions include only direct emissions, e.g., from burning fossil fuels to generate electricity. Scope 1 emissions do not include emission in the supply chain, such as emissions generated by the purchased electricity, emissions generated downstream by fossil fuels sold by SOEs to other actors, or emissions of portfolio companies.

[3] In addition to these Scope 1 emissions, SOEs also play an important role in selling fossil fuels to electricity producing companies, or sourcing products from electricity for their buildings, which have both a climate and a biodiversity impact. Furthermore, many state-owned financial institutions – whether they are development banks or commercial banks – are instrumental in financing economic activities – from fossil-fuel companies to green energy.



According to the ambitions of many Asian countries, these emissions need to be urgently reduced (see Figure 4): most Asian countries have set national climate ambitions through nationally determined contributions (NDCs) and policy commitments with net zero emission or carbon neutrality goals anchored in proposal, policy documents, and in laws. Half of ASEAN member states are signatories to the international effort to end coal utilisation in the power sector. Brunei Darussalam, Indonesia, the Philippines, Singapore, and Viet Nam signed on to the Global Coal to Clean Power Transition statement during the 26th United Nations Climate Change Conference (COP26) . In addition to tackling the climate crisis, leaders from 93 countries and the EU, including many Asian countries (e.g., Maldives, Mongolia, Nepal, Pakistan, Sri Lanka) have committed in 2020 to reverse biodiversity loss by 2030 through the Leaders Pledge 4 Nature (“Leaders’ Pledge for Nature” 2020).

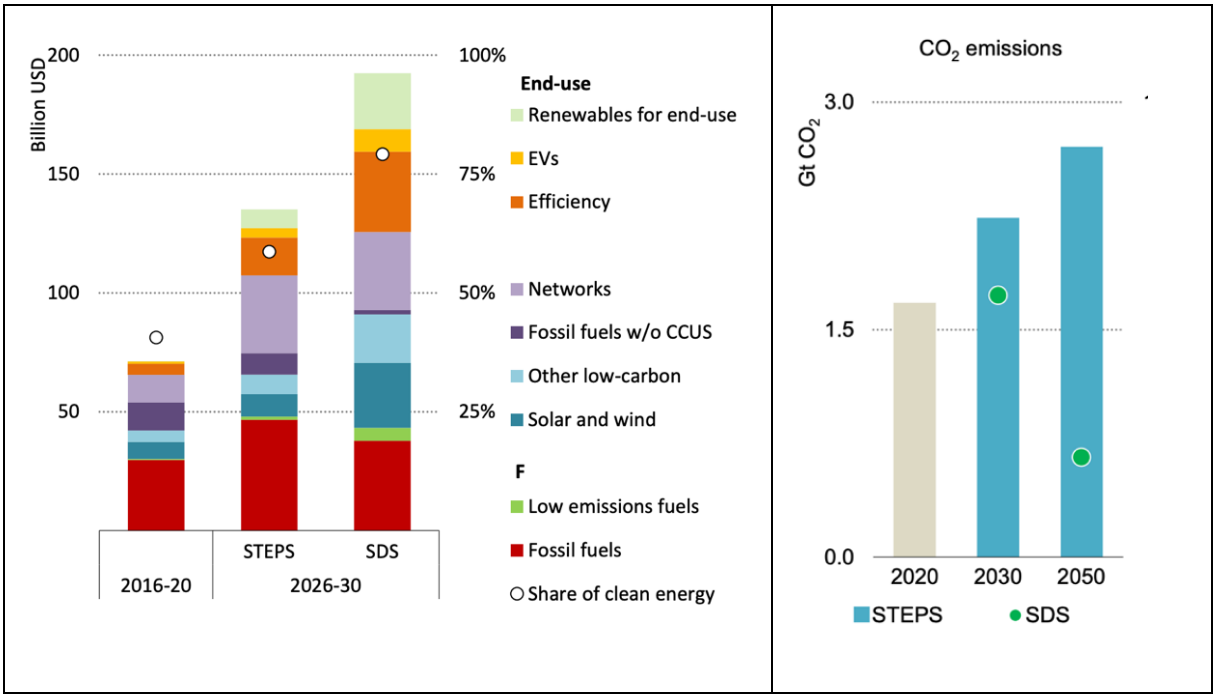
Figure 4: Climate commitments of ADB developing member countries (Data: (Net Zero Tracker 2022))



Financing needs for ASEAN green transition

The green transition of electricity systems in ASEAN will require investing trillions. With energy demand in Southeast Asia expected to continue its growth of around 3% per year until 2030 and under today's policy settings (which IEA refers to as "stated policy scenario" (STEPS) (International Energy Agency (IEA) 2022)), annual average energy investments of USD 130 billion by 2030 would be required. This strategy, however, would increase emissions by about 25% by 2030 and by 80% by 2050. Accelerating the transition in Asia to reach the 1.5-degree target would require investing USD 190 billion per year. The more ambitious investment strategies would reduce emissions by about 75% by 2050 (see Figure 5 right side).

Figure 5: Average annual energy investment in Southeast Asia (2016-2030) (left) and CO2 emissions 2020-2050 (right) (International Energy Agency (IEA) 2022)

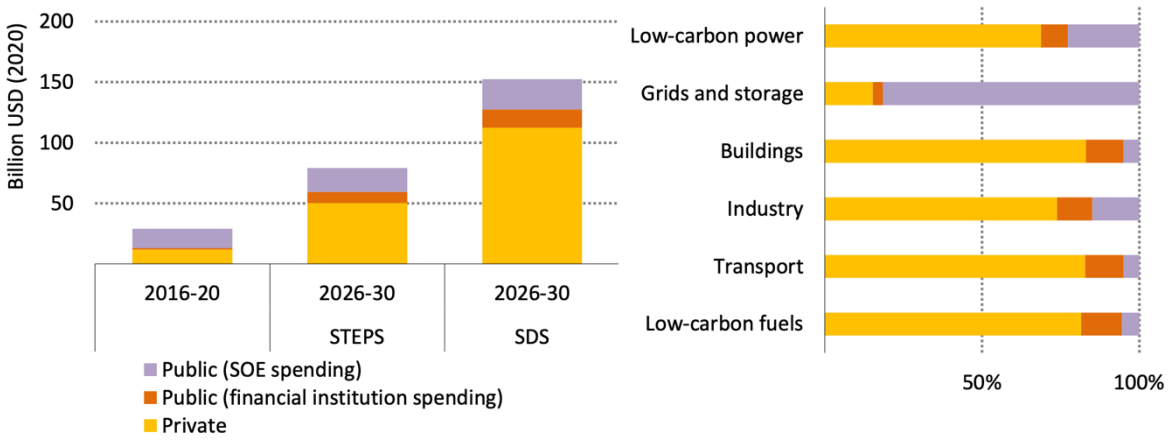


The more ambitious transition scenario would also reduce total costs related to energy supply by as much as USD 160 billion cumulatively to 2050 (International Renewable Energy Agency (IRENA) and ASEAN Centre for Energy 2022), e.g., due to lower electricity cost for consumers: for example, the IEA estimates that the levelised cost of energy (LCOE) of solar PV in Indonesia could be around 40% lower if its investment and financing risks were comparable to advanced economies (International Energy Agency (IEA) 2022).

The IEA estimates that 80% of the required investments in clean energy worth USD80 billion in STEPS and USD150 billion in the Sustainable Development Scenario (SDS) would be born by the private sector (see Figure 6). However, taken the current energy structure (see Table 1) and the historic energy investment which are dominated by SOEs (see Figure 6 left side 2016-2020 data), it seems optimistic that private capital can be the driver to implement either STEPS or SDS due to either the market structure or enabling environment in ASEAN energy systems. Accordingly, IEA states that „boosting investment in clean energy technologies requires strengthening clean energy policy and regulatory frameworks and addressing a wide range of financial hurdles. Well-designed frameworks – including clear policy targets, independent regulation, least-cost system planning and cost recovery tariffs – are crucial to

attract investors“ (International Energy Agency (IEA) 2022). Thus, cross-cutting issues such as unpredictable regulatory frameworks, restrictions on foreign direct investment and currency risks all hamper investment flows.

Figure 6: Sources of finance for clean energy investments by scenario (left) and by technology (right) in Southeast Asia (Source: (International Energy Agency (IEA) 2022))



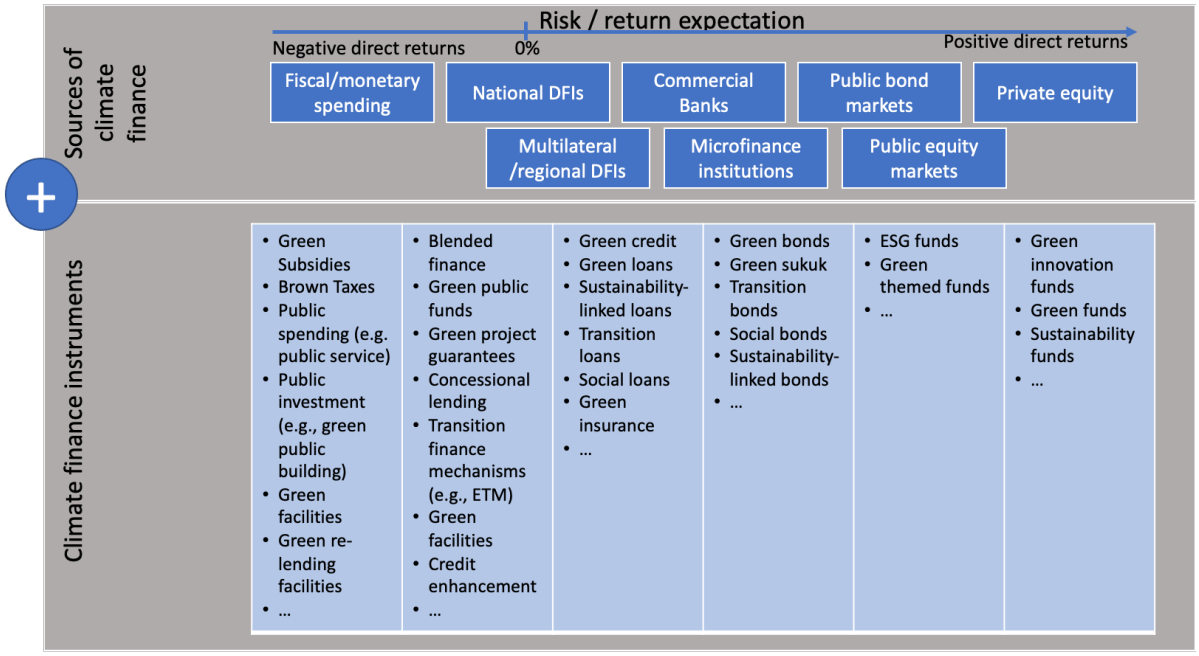
Assuming that the energy transition in ASEAN cannot be carried by private companies alone, it seems rather necessary to analyze how SOEs can be part of the energy transition, rather than ignoring their role and, in particular, how SOEs can mobilize finance to invest in the energy transition.

Analyzing accessibility of green financing for ASEAN energy SOEs

SOEs conceptually can utilize a toolbox of sustainable finance instruments for the green transition. Figure 5 provides a summary of various climate finance instruments relevant of the green transition aligned with investors' risk taking and return expectations. On the left side are fiscal and monetary spending from governments that often has a very low or even negative return expectation and that traditionally are an important source for SOE financing. On the other side of the spectrum are private equity funds that have a high risk taking willingness in exchange for a high return expectation, which can provide financing (often

equity or possibly mezzanine capital) through green innovation funds, which however seem not compatible with financing SOEs due to the unmet expectation of high returns.

Figure 7: Sustainable finance instrument toolbox (Source: Author)

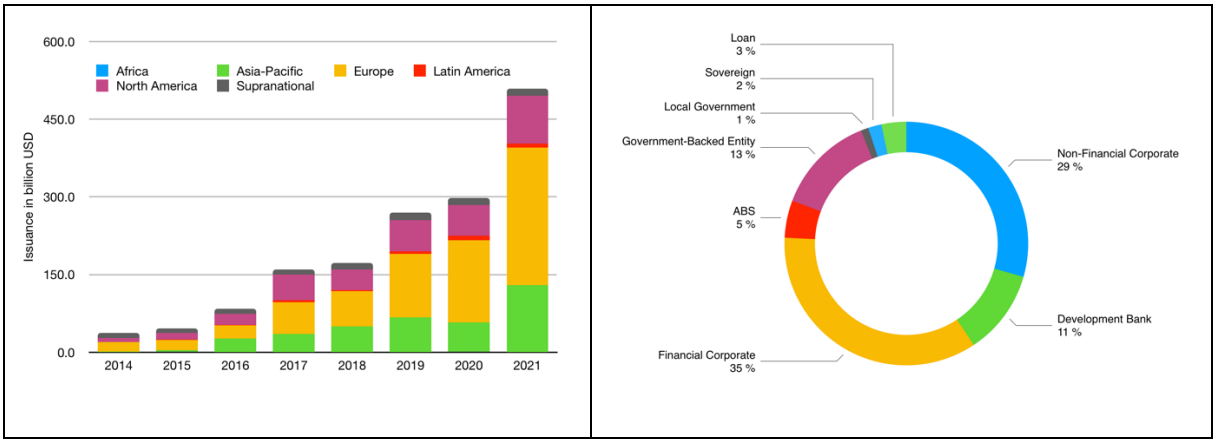


With public financing strained, not least due to global sovereign debt issues in the wake of the COVID-19 pandemic, SOEs must evaluate how to mobilize funds from different sources but government funding, including commercial financial institutions and investors (e.g., through green bonds). All of these green financial instruments require for the SOEs to be attractive to more commercially oriented investors. This depends on two factors asset (irrespective of issuing on local or international capital markets): SOE or underlying asset needs to be (1) bankable to different extent for different instruments (and the sources of climate finance), and (2) have "green" assets to invest in. Furthermore, each financial instrument tends to have specific financial and non-financial requirements, such as financial ratios to issue debt instruments (e.g., a bank for credit or the market regulator for bonds requires the debt issuing SOE to have specific levels of debt-to-equity ratios).

One financial instrument that has gained much attention to finance the green transition of private and public activities is green bonds. Green bonds can be defined as a financial

instrument that ties the proceeds of a bond issue to finance or re-finance in part or in full new and/or existing eligible green projects (International Capital Markets Association (icma) 2021). The global green bond markets grew exponentially from $37 billion in 2014 to $522 billion in 2021 (see Figure 7). In 2021, developed countries accounted for 75% and emerging markets 21% (up from 10% in 2020) of the global issuances. The Asia-Pacific region accounted for about 25% of global green bond issuances in 2021. However, despite their central role for development in the region, government-backed entities in developing Asia-Pacific countries accounted for only 13% of the green bond market between 2014 and 2021 (compared to e.g., 15% in Europe).

Figure 8: Green bond issuances 2014-2021 for different regions (left) and cumulative share of green bond issuance for different issuers in developing countries in Asia-Pacific (right) (Data: (Climate Bonds Initiative (CBI) 2022), graphic: author)



Bankability of SOEs

Bankability of SOEs requires for the SOE to have several factors in place, such as proper corporate governance to provide oversight (OECD 2015), operational efficiency to generate sufficient cash-flows to pay for cost of capital, agency to raise money from capital markets. Particularly for raising green finance, SOEs need to overcome additional challenges related to their governance (Climate Bonds Initiative (CBI) 2021) that focus on transparency (e.g., can SOE measure, verify and report on green finance performance, credibility (e.g., is SOE

credible to green regarding strategy and implementation), management capacity (e.g., does SOE have management capacity to issue and manage green financial instruments, such as green bonds) and green eligibility (e.g., does SOE have green eligible projects).

Benoit et al (2022) identify four electricity SOE archetypes based on some of these factors (e.g., agency, profit motivation, capacity): depleted provider, competitive contributor, grinding behemoth and statist caterer (see Table 2). What is congruent between three of the four archetypes of energy SOEs (the exception being competitive contributor), is that SOEs exhibit characteristics that are negatively related to SOE's bankability and access to commercial investors, including the government-SOE relationship, which is not at arm's length for autonomous decision making, the SOE capacity that might not provide sufficient ability to manage projects, the exposure to market competition, which reduces incentives to increase operational efficiency.

Table 2: Archetypes of state-owned power companies (Source: (Benoit et al. 2022))

SPC archetype	Description	Possible contribution
Depleted provider	either insolvent or its finances are structurally weak, such that it depends on regular subsidies to maintain operations. It is fundamentally a development-motivated firm with a primary objective of facilitating national economic productivity, although it may also be subject to political pressure to pursue financial sustainability. Its activities are subject to capture by powerful interests in and around government. In its weakened condition, the SPC has little agency over decision-making regardless of political alignment with government policy	Dominant position in electricity market gives it potential to contribute substantially to sectoral decarbonization, but potential remains largely unfulfilled due to chronic financial and operational challenges preventing realization of corporate strategy. With direct, indirect and market-wide actions unlikely to succeed, government should consider firm restructuring or unbundling, and/or market reforms to encourage entry by other players.
Competitive contributor	most similar to a private sector company, although it operates under majority government control. The SPC has a moderate-to-high degree of agency to act independently of government, a moderate-to-high profit-maximizing motivation, and high capacity to pursue its goals (with access to financial resources from capital markets, and technical and commercial expertise)	High capacity and generally profit-seeking motivation allow it to be effective and efficient in implementing decarbonization actions when it chooses, but its limited role in the market limit its influence on sectoral decarbonization. Government can take direct action to influence its behavior, although it may encounter resistance from the SPC in attempting to do so and the result may not be either effective or efficient.
Grinding behemoth	motivated by maintaining service delivery at affordable prices than profit, limiting the effectiveness of market-based measures. It enjoys protections insulating it from market competition and also has a dominant role in the sector (typically as a vertically integrated utility with a monopoly on T&D and a majority market share in generation). It has access to sufficient financial resources from government and/or capital markets to sustain reliable operations and make strategic investments and has a relatively high degree of agency in deciding how to implement decarbonization mandates within its corporate structure	Dominant position in the electricity market and status as near-sole, or sole, purchaser of electricity gives it potential to contribute substantially to sectoral decarbonization, but inefficiencies, motivations beyond profit-seeking, and capacity/resource constraints, can limit this potential. Government can take direct action to alter its motivations or mobilize resources in support of the SPC to allow potential to be fulfilled
Statist caterer	low agency and a motivation that de-emphasizes profitability and revenue in favor of acting as a conduit for political priorities and retaining strategic control over the electricity sector. It operates under low competitive conditions and ultimately, its incentives to decarbonize depend on alignment with the political interests of government and firm and leadership, which may be effectively interchangeable. It has moderate capacity in the form of access to sufficient financial resources to operate without service interruptions, but these resources are primarily supplied by government in the form of low-cost finance and direct equity injections from the public budget	Dominant position in electricity market gives it potential to contribute substantially to sectoral decarbonization, but limited agency and subservience to government means ability to do so depends on SPC's internalization of government priorities and ability to act on them. Limited capacity to address operational inefficiencies, given its primary purpose as service provider and/or development actor, will likely increase the cost of decarbonization relative to competitive contributors

Table 3 provides the analysis of how the different archetypes of SOEs score on the financial and non-financial requirements of different financial instruments. The competitive contributor is most flexible in utilizing financial instruments including green bonds and ESG funds, while the depleted provider is unlikely to succeed in raising additional funds from the capital market based on its capacity, agency, profit motivation. The grinding behemoth and statist type, meanwhile, would be able to utilize blended finance and possibly transition bonds and green credit.

Table 3: Matching SOEs and green financial instruments

Type	**Agency**	**Profit motivation including financial leverage**	**Capacity (e.g., risk management, financial ability)**	**Operational efficiency (exposure to market)**	**Transparency**	**Green eligibility**	**Possible market instruments**
Green government funds	Medium	Medium	Medium	Low	Medium	Low-high	
Blended finance	Medium	Medium	Medium	Medium	Medium - high	Medium	
Transition bonds	High	High	High	Medium	High	Medium	
Green credit	Medium	Medium	Medium	Medium	Medium	High	
Green bonds	High	High	High	High	High	High	
ESG funds	High	High	High	High	High	High	
Depleted provider	Low	Low	Low	Low	Low	?	none
Competitive contributor	Medium/ high	Medium/ high	High	Medium/ high	Medium/ high	?	Transition bonds, green credit, green bonds, ESG funds
Grinding behemoth	Medium	Medium	Medium/ high	Low/ medium	Low/ medium	?	Blended finance, possibly green bonds
Statist caterer	Medium	Low/ medium	Medium	Low	Low/ medium	?	Blended finance

Analyzing green and transition eligibility for SOEs

The eligibility of SOEs for green financial instruments depends on the applicable definition of 'green'. Various jurisdictions and their regulators, private market participants and associations have aimed to define eligible 'green' projects over the past years (Nedopil, Dordi, and Weber 2021). For example, Asian markets have developed the ASEAN green bond standards (ASEAN GBS) through the ASEAN Capital Markets Forum[4]. As the standards are based on the green bond principles of the International Capital Markets Association (ICMA), the ASEAN GBS are more easily accessible to international investors.

Furthermore, many Asian governments and regulators have issued green finance standards, such as China's green bond catalogue of 2016 (latest version issued in 2021) (People's Bank of China (PBOC) 2015), Indonesia's Green Finance Taxonomy published in 2022 (Sustainable FInance Indonesia 2022), or Singapore's Green Finance Action Plan.

Similarly, many developed countries have published and applied green bond and green finance standards, such as the EU Taxonomy, or the market-driven Climate Bonds Taxonomy by the Climate Bonds Initiative (CBI) (Climate Bonds Initiative 2019). These standards also impact emerging economies, as most investors interested in green finance are from the developed countries and expect international harmonization of green finance standards to lower their research cost and increase tradability of green bonds when investing in either home or international markets.

An important step toward harmonization of green bond standards relevant for Asian SOEs was the establishment of the International Platform on Sustainable Finance (IPSF) under the

[4] The ASEAN Capital Markets Forum (ACMF) is a high-level grouping of capital market regulators from all ASEAN jurisdictions. Established in 2004 under the auspices of the ASEAN Finance Ministers, the primary responsibility of the ACMF is to develop a deep, liquid, and integrated regional capital market.

leadership of China and the EU. The IPFS issued the Common Ground Taxonomy in 2021 (IPSF Taxonomy Working Group 2021) that allows for a more harmonized categorization of green projects and relevant processes for green bond issuance across jurisdictions, including in emerging economies.

For the energy sector, solar, wind, geothermal energy sources including their manufacturing and project development are considered green across all taxonomies. Upgrading of coal fired power plants would only be considered in few green finance definitions as green (e.g., China) while others don't label it as green due to the risk of extending lifespans of existing coal plants. Also, coal mining would not be considered as green (e.g., Indonesia's green finance catalogue identifies it as yellow if it meets stringent criteria and "red" otherwise). Gas fired power plants and industries are also considered green only in select standards (e.g., EU), but come with stringent requirements (e.g., gas needs to replace existing coal generation plant and reduce emissions by at least 55%, while direct emissions cannot exceed 270g CO2e/kWh) (European Union 2022).

Besides the definition of the activity, the standards tend to also prescribe reporting requirements, particularly for public instruments (e.g., green bonds) on the use of proceeds and possibly include independent reporting requirements on non-financial performance (e.g., environmental impact of green financial instruments) based on the company's measurement, reporting, and validation (MRV) systems.

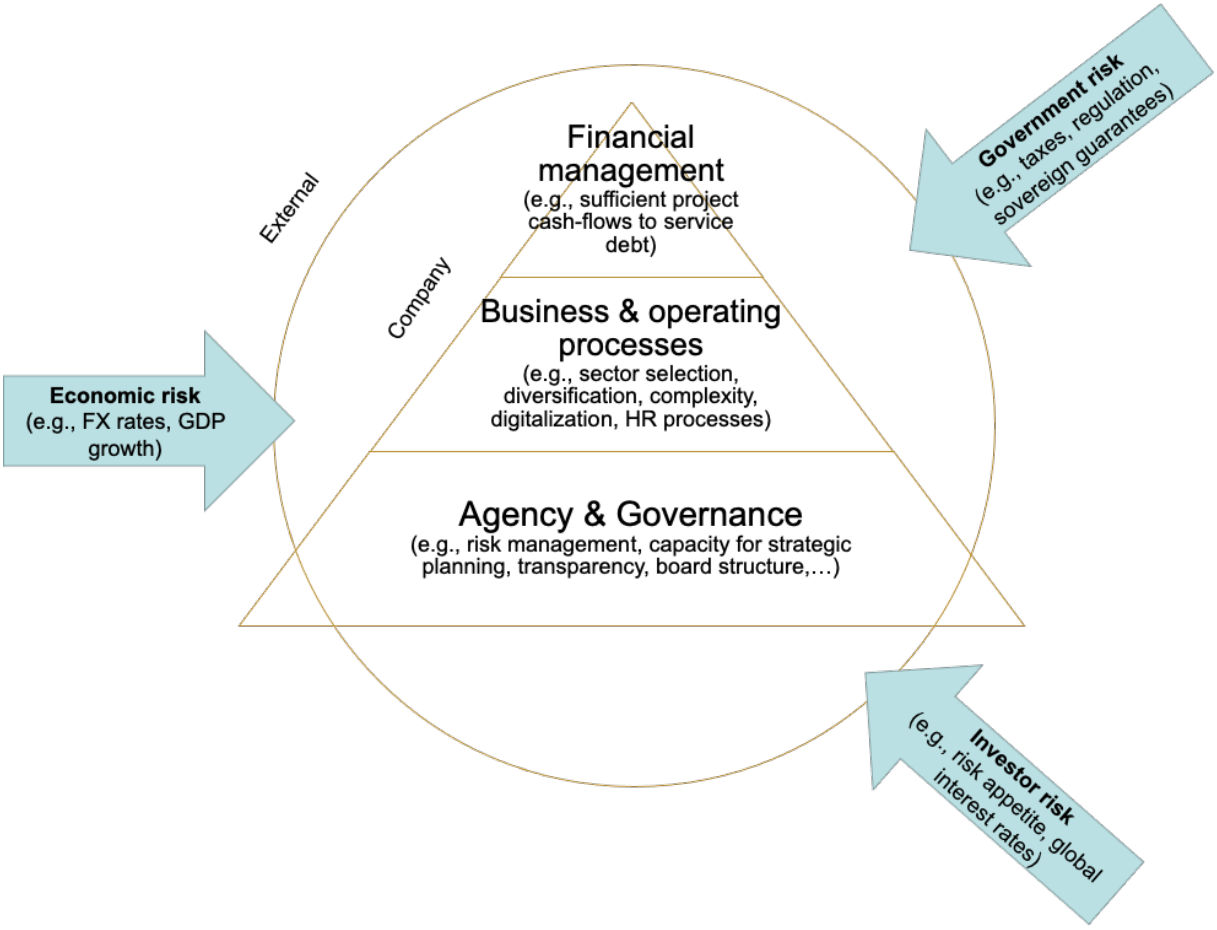
Expanding access of ASEAN electricity SOEs to green finance

Improving bankability and greenness of SOEs is challenging. Based on research with SOEs and experts under the Asian Development Bank's SOE governance programme, the following section provide an analysis of challenges and improvements for Asian SOE to access green finance.

Improving bankability

Investors expect the bond issuer to be able to pay for interest and principal of the bond. This requires for the issuer or the underlying asset of the bond to be "bankable" based on current and projected cash flows and the internal (company) and external risks impacting those cash flows (see Figure 7). Investors will be interested that the SOE bond's risk/return profile is equally good or better than of alternative issuers. This requires the SOE to manage its external and internal risk factors.

Figure 9: Bankability factors for SOE corporate debt (Source: Author, (Asian Development Bank (ADB) 2021a)



External risk factors, such as government risk, investor risks, economic risks can impact bankability of an SOE green bond and possibly lead to requirements for higher interest rates to compensate for the risks. Many external factors cannot be controlled by the SOE but must

be monitored and managed properly (e.g., exchange rate reserves or hedging to reduce FX risks).

Internal risks impacting bankability, on the other hand, can be directly controlled and reduced by the SOE.

Agency

A prerequisite in SOE governance to issue sustainable financial instruments, such as green bonds, is the enabling environment that permits SOE's to raise capital from non-government sources. Usually, SOEs that are partly listed on stock exchanges have more autonomy to raise funds from capital markets due to existing non-government investors in the company. For fully state-owned enterprises, the ability to raise funds from capital markets depends on the SOE's arrangement with the owner (e.g., a dedicated government ownership entity, such as Khazanah Nasional Berhard in Malaysia, or the government itself through specific line ministries or the Ministry of Finance).

SOE that depend on their government owner to provide finance, need to obtain the permission for raising funds on the capital markets and for building the technical capacity to engage with capital markets. The permission to engage with capital markets might have to be provided for the SOE treasury (i.e., in how far can the SOE independently manage its finance) and/or for the SOE management team (i.e., do SOE managers have the autonomy/permission to raise funds and disclose relevant information).

The more experience and capacity an SOE has gained in engaging with capital markets and with private investors, the easier the green bond or green financial instrument placement will be. Contrary, an SOE without any capacity or experience might not even have a relevant credit rating.

To overcome the capacity gap, ministries in several countries, for example Japan, have established centers to support the issuance of green bonds for private companies. For

countries with less experienced SOEs, simlar centers could be established to support SOEs in issuing their green bonds within the ministries or the SOE holding entities. Further capacity building can be supported through technical assistance projects, as well as secondment of staff and management from more experienced to less experienced SOEs.

SOE governance

Engaging with capital markets requires a certain level of transparency and accountability of the SOE towards the investors. Investors typically value SOEs higher that have better and consistent public reporting, transparent processes and can be held accountable for misconduct. Contrary, companies and SOEs that are opaque, that provide little ability for investors to enage with the company and little access to efficient redress in case of breach of contract, are less desirable for investors.

For many Asian SOEs, addressing governance issues has been a core challenge. Some SOEs across Asia have successfully improved corporate governance and issued bonds and listed parts of their shares on capital markets. Yet, the majority of SOEs in Asia has little experience in capital markets and often also lacks sufficient incentive, capacity, and partially authority to reform its governance to meet investor standards.

Yet, for SOEs interested in issuing sustainable and green finance instruments, such as green bonds, ensuring good governance is crucial.

Addressing SOE governance includes several key aspects, impacted by the relationship between the owners of the SOE (e.g., fully state-owned, partially state-owned) including the SOE's internal systems and controls of management (e.g., the role of the board), the identification and management of risks (including environmental, social and governance risks), the strategy setting process including the selection of projects, as well as the reporting and disclosure.

Many resources have been developed to address SOE governance, particularly for control systems and risk management and their content is wide-ranging (OECD 2015; 2022; Asian Development Bank (ADB) 2021a; Asian Development Bank 2021; World Bank Group 2014).

What is relevant beyond these existing standards for green investors when considering investing in SOEs is a clear green strategy developed by the board and top management that is directly related to the company's capacities for implementation and investment strategy. This could mean, for example, a credible green investment (or brown divestment) program based on a publicly stated environmental strategy. A green development strategy defines the medium- to long-term ambitions, projects, business models and revenue streams of the company that require green finance (which can be raised through green bonds, as well as through other channels). A credible green development strategy signals sincerety, foresight and top-level support within the company to actually contribute to a green transition. Without such a strategy, a green bond issuance could be defined as a pilot green bond, while it could make it more difficult to attract private and particularly institutional investors as they fear reputational risks. For example, a coal company that issues a one-off bond for a green project, but otherwise continues to fund coal-related projects, might be unattractive for green investors due to both reputational and economic risks (i.e., as the coal company might run into stranded asset risks on a corporate level). The green transformation strategy should ideally be communicated clearly with the markets. This strategy needs to be clearly communicated by the board with strong support and endorsement by the (government) owners.

Particularly for green financial instruments, timely, accurate and regular reporting on the use of proceeds, and potentially the impact of the green financial instrument is required (i.e., for sustainability-linked instruments). SOEs interested in issuing green financial instruments therefore need to ensure to have sufficient capacity and autonomy in providing this timely

information to investors and ideally the public and have the ability to ideally hire independent verifiers and auditors to ensure the credibility of the reports.

More broadly, green and sustainable investors possibly have an even stronger interest than regular investors in sound overall SOE governance. This would include strong stakeholder engagement, credible fight against corruption, merit-based employmenet policies, and a board that has the necessary authority, competence, integrity and accountability. Good SOE governance can be based, for example, on OECD Guidelines on Corporate Governance for State-Owned Enterprises[5].

Financial capability

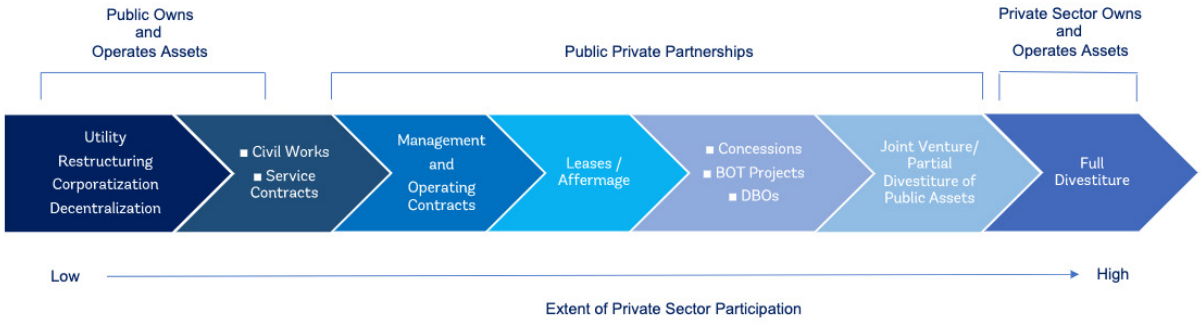
A further prerequisite for SOEs to improve bankability and help investors understand potential risks is good financial management, e.g., through better cash-flow planning. A further tool for investors to evaluate a company's performance and its bankability are independently audited balance sheets and timely annual reports, which SOEs should produce accordingly.

A viable option to improve bankability of many SOEs and their projects (depending on regulation and an SOE's capacity) and overcoming SOE specific governance and management risks (and possibly to ensure a focus on green assets) is to establish a special business unit outside the SOE that issues and utilizes the green bond. This unit can take the form of a newly formed subsidiary (e.g., a green energy subsidiary), a joint venture (JV) with another public or private entity, and similarly a special purpose vehicle (SPV) in a public private partnership (PPP). Such models are prevalent in many infrastructure projects (e.g., roads, energy projects) that involve both public actors and private partners. Public-private partnerships (PPP) take a wide range of organisational forms, depending on the local circumstances, laws, project, and

[5] (OECD 2015)

experience of the actors (see Figure 8) – ranging from fully publicly owned entities with private contractors to mostly privately owned joint ventures with SOE participation.

Figure 10: Public Private Partnership (PPP) agreements (Source: World Bank)[6]



The special business unit formed will be incorporated and be responsible for providing all the steps necessary for a green bond issuance (e.g., green bond framework, reporting, validation etc.), and ideally has more flexibility to hire relevant staff and external experts and set up appropriate governance systems.

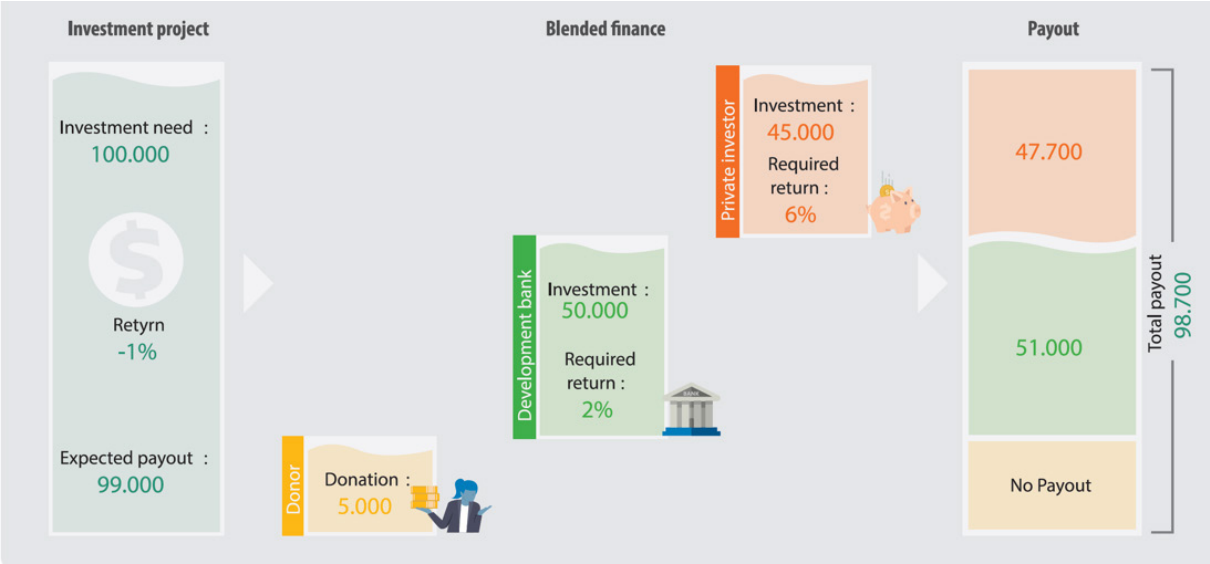
However, setting up JVs or other forms of PPPs requires for the SOE to provide relevant resources, such as knowledge, physical assets etc. that make it attractive for the private partner to join the JV. The SOE in the JV also needs to be able to make autonomous decision based on the JV contract on mostly or fully commercial terms. This often requires for the SOE to overcome specific governance issues (e.g., some SOE staff might be seconded to the JV that has different salary and hierarchy structures and the SOE needs to find ways to deal with the differences).

To further improve bankability of a specific bond issuance, SOEs or the PPP can utilize a number of debt enhancement mechanisms. This includes the utilization of blended finance

[6] (The World Bank n.d.)

mechanisms, that utilizes both commercial and concessionary finance to reduce the overall financing cost (see Figure 9).

Figure 11: Blended finance mehcanism (Source: Nedopil, Xu, UNDP)[7]



Additionally, SOEs can work with strong and credible **anchor investors and underwriters** before floating the green bond on the market, for example through multilateral development banks, policy banks or even private investors. These investors provide credibility and ensurance for other public investors.

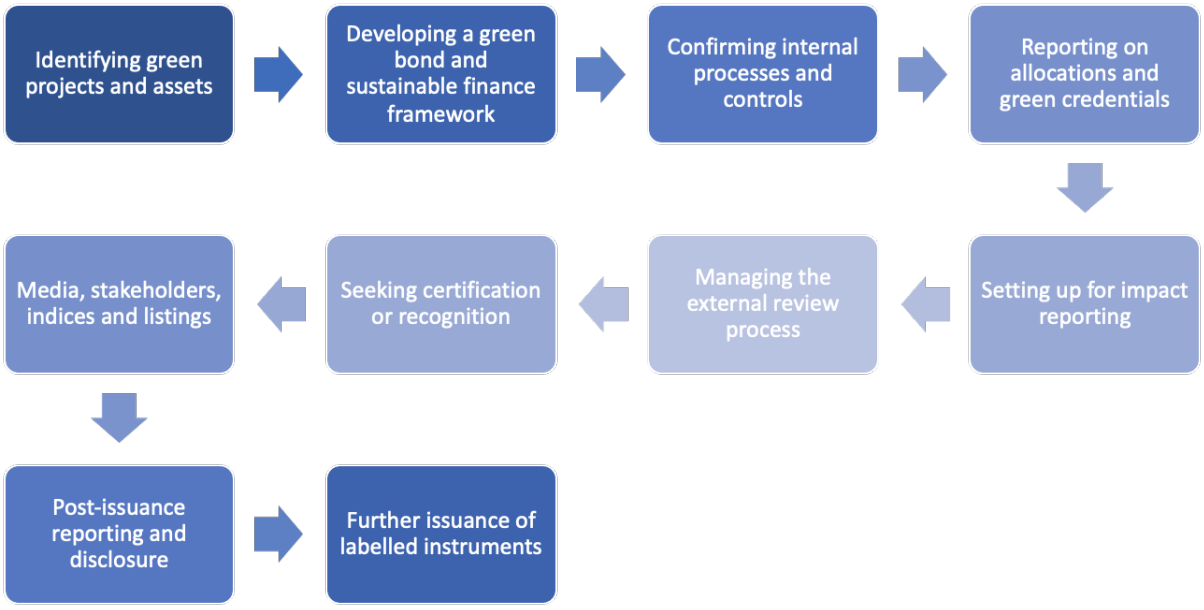
Furthermore, partners, such as domestic and international development finance institutions can provide exchange rate insurances, particularly for local currency bond issuances, to reduce exchange rate risks for investors, while at the same time utilizing the SOE bond issuance to deepen local capital market development.

[7] (Nedopil Wang, Qing, and United Nations Development Programme 2020)

Ensuring “greenness” through domestic and international standards

Once the governance and bankability prerequisites for SOEs green bond issuances are met, the actual process of green bond issuance starts. Figure 10 provides the relevant process steps for SOE green bond issuances (Asian Development Bank (ADB) 2021b).

Figure 12: Outline of Green bond issuance (Source: (Asian Development Bank (ADB) 2021b)))



One key issue in the green bond issuance is to ensure are that the use of proceeds needs to be appropriately described in the legal documentation for the security, where all designated green projects should provide clear and defined environmental benefits. Accordingly, the environmental benefits will be assessed and, where feasible, quantified by the issuer. The SOE needs to clearly specify if parts of bond are used for re-financing.

Particularly to attract international investors, external opinions on the green bond are encouraged.

Summary and outlook

The green transition of SOEs is paramount to meet global climate goals and avoid catastrophic climate change. As SOEs particularly in Asian countries play a central role in many of the high-emitting sectors particularly in energy, they need to mobilize billions to

invest in new green assets, while they need to ideally more rapidly phase-out utiliziation of high emitting and inefficient assets (e.g., coal-fired power plants). The current academic and grey literature (e.g., IEA, IEEFA, ADB) mostly ignores the role of SOEs in the Asian energy transition, while few academic papers have started to provide some basic frameworks (Benoit et al. 2022), which this article also draws from.

The article thus contributes to this line of research. It first analzyes how SOEs in the ASEAN play a central role in the energy transition by providing data on the the monopolies and quasi-monopolies that SOEs enjoy in the ASEAN electricity markets. The result shows that it is paramount to mobilize green and transition financing for SOEs rather focusing on than private energy operators. This is not to say that private operators do not also play an important role in many countries' electricity generation as independent power providers. But as the article shows, their role to expand the provision of green energy has been negligible when looking at the share of green energy provision.

For SOEs to mobilize sufficient resources where government funds are more difficult to mobilize, not least due to a tense sovereign debt situation, the article then analzyes the possibilities for SOEs to utilize the growing toolbox of green and sustainable finance instruments. One such green finance instrument that gained much investor interest is green bonds, which theoretically could serve as an important tool to mobilize private sector capital for SOEs' green transition. Currently, however, only few Asian SOEs have utilized the green bond markets. A reason for this is that the majority SOE types analyzed in this article lack sufficient bankability as well as greenness.

The article highlights how SOEs need to address specific governance and capacity gaps due to their (part) ownership by governments to successfully increase bankability. Four points stand out. First, SOEs need to establish sound governance systems vis-à-vis their government owner to give them the permission to raise funds from capital markets and improve risk

management, transparency and accountability ability to fulfill basic investor requirements. Second, SOEs need to establish a credible green strategy with a strong project pipeline to attract investors. Third, SOEs need to improve bankability of their projects and ideally of the whole SOE through improved financial management and operational efficiency to reduce cost, improve delivery and cash-flows relevant for investors to reduce financial risks; and fourth, SOEs need to build capacity and knowledge on green bonds issuance according to domestic and/or international green bond standards including relevant monitoring, reporting and verification (MRV) capacity to provide the required information in a timely manner about the use of proceeds (or the impact of the sustainable-linked instrument) to investors.

Based on these findings from the article, a further outlook to support SOE green finance in ASEAN can be provided, particularly to support SOEs in accessing green capital markets. Here, domestic and international partner organizations, including development finance institutions, can provide direct support to the SOE to improve their bankability and greeness, as well as indirect support on improve the enabling policy environment for SOE green finance.

On the direct support, international partners can work with SOEs to provide, for example, technical assistance to develop green bond framework, improve corporate governance including risk management processes, transparency and reporting, to develop green project pipelines, and to create new business units if necessary (e.g., public private partnerships (PPP)). Additionally, facilitation funds to support evaluation and design of green project pipelines and their implementation, to compensate for costs associated with developing and verifying green bond framework, green bond issuance and measurement, reporting and validation (MRV) can be established. Next, funds for anchor investments in green bonds to reduce risks and signal credibility of bond to external investors could be provided. Additionally, the reduction of capital constraints of state-owned enterprises, by mobilizing

equity injections into SOEs that allow them to also increase debt financing could be supported. Next, stranded asset risk need to be reduced that arise if assets of SOEs (e.g., coal-fired power plants) become non-operational by supporting buy-out of specific assets (e.g., through ADB's Energy Transition Mechanism). Finally, foreign-exchange risk can be reduced through facilities to compensate international investors for foreign exchange risk in local currency bond issuances.

Through indirect support, the enabling environment for SOE green finance can be improved: as SOEs are often closely regulated and owned by various government department, ministries and regulators, the issuance of green finance instruments, such as green bonds, requires the enabling environment that both provides basic governance structures permits SOEs to raise outside capital, provides incentives for SOEs to accelerate green investments, and provides confidence to investors about manageability of political risks. Specific actions on improving the enabling environment for SOE green finance include improving policy frameworks for green transition through roadmaps and binding regulations (e.g., climate targets), through reduction of non-green incentives, or through supporting the development of carbon pricing or other policies that help to internalise negative externalities such as emissions to provide credible signals to investors, private and public companies for future investment directions. Next, real economy barriers for green development should be addressed, e.g., through supporting the development of local green manufacturing and R&D capacity. Additionally, local capital market capacity and structures can be supported, including development of green finance frameworks, disclosure frameworks etc. that are attractive and trustworthy to international investors. Next, SOE governance and SOE management from the regulator/owner aspect should be improved including in autonomy of SOEs to raise funds, bankability, transparency and disclosure. Additionally, green banking capacity for responsible banking regulator can be developed to provide green credit frameworks including green credit statistics frameworks (e.g., the Sustainable Banking and Finance Network provides such tools

with the support of the IFC). Finally, green finance (ESG) disclosure through development support of disclosure requirements and disclosure capacity should be improved.

In summary it can be found that while some SOEs have already been able to utilize green finance and are capable of expanding green finance utilization, most types of SOEs in ASEAN require more capacity and support for utilizing green finance instruments. Successfully embarking on the green finance utilization and thus green transition for SOEs requires cooperation between the owners of the SOEs (e.g., various ministries), their regulators, the local capital markets and the SOE itself. Providing role models of successful SOE green bond issuances should provide much needed impetus for other SOEs and allow to spread capacity throughout the economy. Successful utilization of green bonds will ultimately support much needed upgrading of ASEAN SOEs and the whole economies to a greener and more resilient future.

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