

State-Owned Enterprises and Climate Action¹

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Introduction

State-owned enterprises (SOEs) present a powerful and important policy lever for many governments to implement reforms to achieve their ambitious climate mitigation and adaptation targets. On the one hand, SOEs are major sources of CO₂ emissions globally, and they are vulnerable to climate change impacts and low-carbon transition risks. On the other hand, SOEs are also some of the biggest investors in the world in green technology, and, among low- and middle-income countries (LMICs), they account for the majority share of infrastructure investment that is essential to both mitigation and adaptation. Given their ownership stakes, governments are well-positioned to directly influence SOE climate-relevant decisions through ownership, and regulatory and oversight policies, among other fiscal and public financial management reforms, e.g., tax, expenditure, and investment policies. Indeed, a ‘whole-of-government’ approach to climate action calls for inclusion of SOEs—particularly in the context of SOE public service delivery (PSD) mandates and corporate social responsibility (CSR). Among LMICs, where PSD mandates tend to be more prevalent, alignment of SOE policies with national climate objectives also presents a policy lever for low-emitting countries to leapfrog carbon-intensive development—effectively, mitigation—which combined with adaptation policies would likely have relatively limited dislocation impacts. A key challenge is identifying resilient and low-carbon transition pathways that balance competing near, medium, and long-term considerations, i.e., that help SOEs in balancing multiple and often unfunded mandates.

Despite these factors, there is only limited research on the opportunities provided by SOE policy reform to help tackle climate change. This is a major oversight. To help address this gap, this note is intended to support SOE-climate action policy guidance, especially for LMICs. The note is organized into three sections, below: 1) Overview; 2) Considerations for integrating climate into SOE policies: literature and emerging approaches; and, 3) Implications for policy.

1. Overview

A basic definition of SOEs is any corporate entity recognized by national law as an enterprise and in which the central level of government exercises ownership control²; however, there is no universal definition across countries.³ Most SOEs are not wholly owned by the government, and are usually created (or at least

¹ This paper is part of a World Bank project, led by Miria Pigato (Lead Economist) on ‘Securing a Sustainable Recovery: A Guide to Green Taxes and Spending’, under the supervision of Chiara Bronchi (Practice Manager) and Marcello Esteveao (Global Director) in the Macroeconomics, Trade and Investment Global Practice of the World Bank. The team is grateful to Kjetil Hansen-Shino (Senior Public Sector Specialist) and W. Bernard Drum (Consultant) for their insightful comments on this paper. The project includes seven technical Notes in response to a growing demand from client countries for insights on green spending policies and tax instruments to help support a sustainable recovery from the Covid-19 induced recession. Financial support from the Just-in Time COVID 19 Support Window for DPFs is gratefully acknowledged.

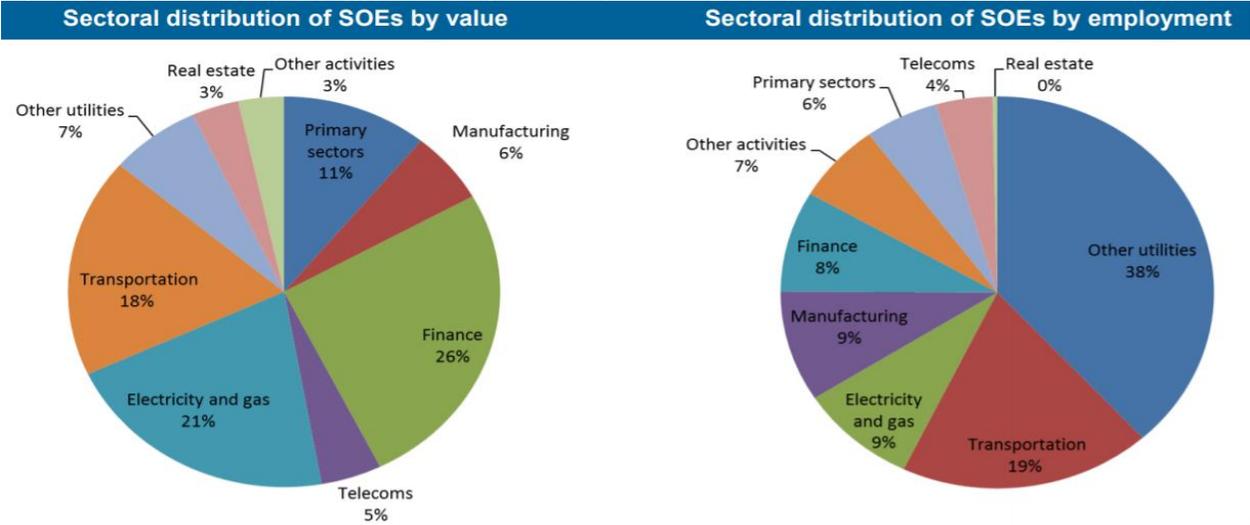
² OECD (2015).

³ The OECD, for example, categorizes an enterprise as an SOE when the State holds a 20 percent or more ownership stake. Prag et al highlight that the diversity of financial and legal forms of SOEs complicate attempts to define them, posing a significant challenge for research and analysis. Prag, et al (2018).

justified) as a measure to correct market failures to promote non-commercial objectives (NCOs)—such as economic development (including political and social objectives, such as job creation), and to protect strategic industries. Indeed, there is great diversity of SOE ownership structures, operations and reporting across countries, which presents challenges for policy analysis. Compared with SOEs in OECD countries (that tend to operate as relatively efficient monopolies), policy analysis is particularly challenging among LMICs, where SOEs tend to have more complex mandates and governance structures that are not always fully transparent.

Despite data limitations, there is consensus that the role of SOEs in the global economy is significant, and that they tend to operate in sectors that are essential to supporting economic activity. For example, a World Bank study estimates that globally SOEs account for 20 percent of investment and 5 percent of employment, and that in some countries SOEs contribute to as much as 40 percent of production.⁴ The IMF calculates that the aggregate assets of all SOEs is equivalent to about 50 percent of global GDP.⁵ The OECD reports that 22 percent of the world’s largest 100 firms are state controlled companies.⁶ At the sectoral level, in a study covering 45 large OECD and non-OECD economies, the OECD estimates that the electricity and gas, transportation, telecoms and other utilities sectors combined account for 51 percent of all SOEs by value and 70 percent by employment—and overall, that finance is the largest individual sector, at 26 percent of all SOEs by value.⁷ (Figure 1).

Figure 1. Sectoral distribution of SOEs* globally by value and employment



Source: OECD (2017a).

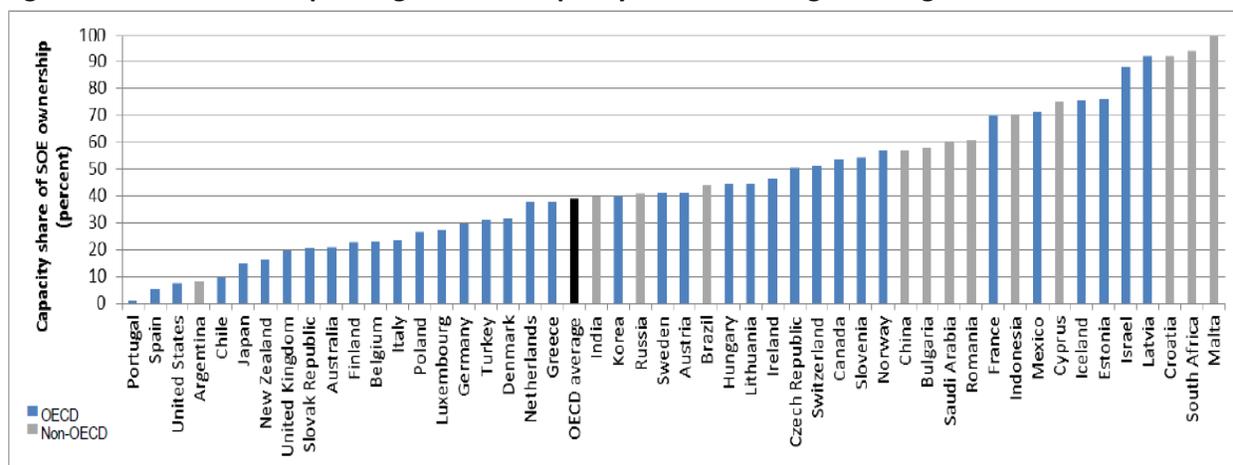
⁴ World Bank Group (2014).
⁵ Baum, Anna, et. al (2020).
⁶ OECD (2017a).
⁷ Ibid.

SOEs operate across carbon-intensive sectors, with a global carbon footprint second only to China

SOEs operate across a wide range of commercial activities, and often in sectors that are carbon-intensive and important to global value chains, including public utilities, manufacturing, metals and mining, and petroleum. SOEs are often some of the largest companies in their host countries—and their cross-border activities have increased over the last two decades. SOEs account for a growing share of corporations globally, and their role seems to be expanding, including through government capital injections to help SOEs withstand the COVID-19 crisis. SOEs are more prevalent in LMICs than in HICs, and frequently play a central role in their economies. SOEs have also been playing an important role in the world’s fastest growing economies, especially in developing Asia (e.g., China, India, and Vietnam).⁸ Among LMICs, over the past decade, the expansion of China’s SOEs into global markets has been especially pronounced, particularly since the Belt and Road Initiative (BRI) was launched in 2013.

In aggregate, SOEs have a global carbon footprint second only to China’s, and their operations and assets are vulnerable to climate change impacts.⁹ However, they are also some of the biggest investors in green technology. Indeed, SOEs account for over half installed capacity for power generation, fueled by fossil fuels or renewables. According to the data and definitions used by Prag et. al in their study of SOEs in 45 large economies (OECD and non-OECD), SOEs account for three-fifths of total global electricity capacity installed in 2016, and for over half planned power plants or under construction.¹⁰ (Figure 2). When combined, the GHG emissions of the largest 50 energy-related SOEs in the world would place them as the third biggest emitter among a list of GHG emissions by country, just below China and the United States.¹¹ In 2016, more than twice as much electricity was generated from fossil fuels (3600 GW) than from renewables (1788 GW)—of which SOEs held 60 percent and 64 percent shares, respectively.¹²

Figure 2. Share of SOEs in power generation capacity tends to be larger among non-OECD than the OECD



Source: Roettgers, Dirk and Bill Below (2018).

⁸ Asian Development Bank (ADB, 2020).

⁹ Benoit, Philippe (2019).

¹⁰ Prag, A., D. Röttgers and I. Scherrer (2018).

¹¹ Roettgers, Dirk and Bill Below (2018).

¹² Ibid.

SOEs could play a major role in decarbonization and adaptation to climate change impacts

SOEs and their governments are positioned to directly influence climate-relevant decisions—especially in the context of SOE public service delivery (PSD) mandates and corporate social responsibility (CSR) mandates. SOEs have performed a wide range of important roles in most developing countries for decades, often in sectors that are considered strategic for the state and aimed at supporting economic development. As climate change presents systemic and existential risks¹³—to which the poor are disproportionately impacted¹⁴—de-carbonization and resilience of SOEs arguably fall squarely into the category of state strategic objectives. Indeed, given PSD mandates and CSR accountability, climate-action for SOEs is an imperative for governments. There are many growth and development considerations, e.g., including climate-co-benefits of reduced pollution and health impacts from mitigation. Diversification out of fossil fuels would also reduce energy dependency for hydrocarbon importers and strengthen external account positions.¹⁵

Because of their critical role in both brown and green activities, SOEs can play a major role in delivering on the needed structural shift towards de-carbonization and achieving the Paris 2030 targets. The Paris mitigation targets could be achieved by scaling up reforms across six key sectors: energy, industry, agriculture and food, forestry and land use, transport, and buildings and cities¹⁶—sectors where SOEs often are the largest operators. The greening of infrastructure investment will be critical in supporting a structural shift in economic activity to achieve de-carbonization and in determining the future emissions path. Pfeiffer et al calculate that the projected future emissions from existing power plants alone will lead to an increase in temperatures of over 2°C, and, as a consequence, in order to meet the Paris and SDG targets, global infrastructure investment must nearly all be clean from now on.¹⁷

There is encouraging progress in the greening of SOE power sector investments—e.g., between 2000 and 2014, SOEs in OECD and G20 countries increased the share of renewables in their electricity capacity portfolios from 9 percent to 23 percent, and SOEs account for more than half of planned investments in renewables.¹⁸ However, SOEs remain heavily vested in fossil fuels and account for two-thirds of power investments underway worldwide. Of particular relevance, SOEs account for around two-fifths of coal powered capacity and over half of new projects in the pipeline for coal plants.¹⁹ Further, while electricity generation is becoming greener, it is doing so at a relatively modest rate, and while SOEs appear to be investing more than the private sector in renewables, they unfortunately also seem to be investing more in coal plants. Power plants have long operational lives, and there is still a greater share in the electricity plant construction pipeline for fossil fuel (1842 GW) than for renewables (1160 GW).²⁰

The World Bank Group’s Public-Private Infrastructure Advisory Facility (PPIAF) calculates that, as of 2017, SOEs accounted for the largest share of infrastructure investment commitments in LMICs with 55 percent

¹³ E.g., Nicholas Stern, former World Bank Group Chief Economist, highlights that the potential damages from climate change intensifies as the world gets warmer, with serious risks of tipping points and potential ‘irreversibility’, if temperature increases beyond 1.5 °C (sea level rise, die-back of forests, etc.). Stern, Nicholas (2015).

¹⁴ Rozenberg and Hallegatte estimate, in the absence of inclusive and timely climate action, climate change impacts could push up to an additional 122 million more people below the poverty line by 2030. Rozenberg, Julie and Stephane Hallegatte (2015).

¹⁵ Eighty percent of the world’s population live in countries that import fossil fuels. Bond, Kingsmill, et al., (2021).

¹⁶ United Nations Environment Program (UNEP, 2021), and World Resources Institute (WRI, 2020).

¹⁷ Pfeiffer, Alexander & Millar, Richard & Hepburn, Cameron & Beinhocker, Eric (2016).

¹⁸ Ibid.

¹⁹ Prag, A., D. Röttgers and I. Scherrer (2018).

²⁰ Ibid.

of overall infrastructure investment, which was conducted primarily in the transport sector (50 percent) and energy sector (45 percent).²¹ (Figure 3, below). Infrastructure investment is essential to achieving both de-carbonization and adaptation targets—particularly as current investments are determining the carbon path and resilience for generations to come. The typical lifespan of an electric power station is two generations, and the expected lifespan for patterns of transport links and urban development is up to ten generations.²²

Given their critical role in infrastructure investment, SOEs can also play a central role in strengthening resilience to climate change. The latest UNEP Global Commission on Adaptation Gap report identifies five key areas of adaptation investment: natural environment, water, cities and urban areas, infrastructure, and food security and livelihoods of small-scale producers—areas where SOEs often play a critical role, especially in LMICs.²³ Hence to improve resilience and management of climate risks, SOEs will likely need to also participate in scaling up adaptation efforts, along with mitigation.

Figure 3. SOE, Public Entity, and Private Project Investment in LMICs
*Percent Share of Total Infrastructure Project Investment by Region, 2017**



*Ranked by SOE percent share of total. Source: PPIF (2017).

2. Considerations for integrating climate into SOE policies: literature and emerging approaches

Despite an often justified reputation for inefficiencies and corruption, there is significant evidence that well-governed SOEs “can play their part in the pursuit of global public goods, such as protecting the environment (e.g., by moving toward cleaner sources of energy in the power sector).”²⁴ Indeed, alignment of climate action policies through SOE sectors, including by lowering climate change impact and transition risks, could strengthen SOE efficiency and competitiveness that are central to effective PSD and economic development. The efficacy of climate policies for SOEs would be supported by good governance practices that are essential to maximizing efficiency, e.g., through well-defined objectives and clear rationale of ownership, clear lines of accountability. These practices would include ensuring economic objectives

²¹ Public-Private Infrastructure Advisory Facility (PPIAF, 2017).

²² OECD (2011).

²³ UNEP (2020a).

²⁴ E.g., Baum, Anna, et. al, (2019).

account for CSR objectives, and provide for regular and publicly disclosed reporting on the performance of the SOE portfolio, including for climate-relevant activities.²⁵

With complex mandates, SOE incentive structures may not reflect government climate objectives

SOEs often face a more complex governing structure and set of incentives than private sector companies. Generally, SOEs are tasked with public service mandates—and, as Prag et al argue (2018), “[governments] with SOE holdings can pursue firm-level energy policies through mandating SOEs to invest in specific electricity generation technologies.”²⁶ However, there are many significant actors who influence corporate decision-making in SOEs, and some political actors, for example, may represent interests that focus on keeping energy costs low despite the environmental costs. SOEs are often insulated from the disciplines of market forces—but, this can be a double-edged sword. On the one hand, in meeting economic development and social welfare mandates (including low prices and high employment), as well as expectations of some SOEs to generate fiscal revenue for the government, SOEs can be at a competitive disadvantage relative to their private sector counterparts, limiting their capacity to invest in green technologies. On the other hand, of course, SOEs often receive preferential treatment—which is an important consideration, e.g., given the large up-front capital costs of building power plants. SOEs often benefit from government protections and financial support, which may also limit their responsiveness to carbon-pricing mechanisms. Nevertheless, Benoit (2019) argues that, while it is often assumed SOEs are beholden to governments, given their ownership structures and public-service mandates, many SOEs have significant political influence in their own right, and may be able to resist government policy objectives.²⁷

While studies on SOEs and climate policy is limited, especially for LMICs, recent research suggests that SOEs appear to be more climate friendly than their domestic private-sector peers in emerging countries. Hsu et al. (2018) analyzed publicly listed firms and SOEs across 44 countries in key sectors in which SOEs are prevalent, notably utilities and natural resources.²⁸ Their research finds that SOEs engage more in environmental issues than non-SOEs, with better performance metrics in areas such as CO₂ emissions, natural resource use, and innovation in eco-efficiencies. Their research further indicates that “...state ownership promotes environmental engagement, rather than governments picking and keeping green companies and divesting polluting firms as political expedient.” The degree of environmental engagement also appears to reflect the political and policy inclinations of the relevant governments. They find that state-held companies in emerging markets countries (middle income countries) are more likely to internalize environmental and social costs (but are less good at maximizing shareholder value). They conclude that “...the role of state ownership is more effective in dealing with environmental issues than private ownership in emerging economies.”²⁹ These findings suggest that the driver of SOEs appearing to be more climate friendly than private-sector peers in emerging markets is active government and regulatory oversight, and not necessarily tax and expenditure policy. This may reflect that SOEs tend to be less sensitive to tax and expenditure policies, (particularly among LMICs where PSD mandates are more pervasive), and that climate-aware governments may find it easier to send a directive to SOEs rather than alter the behavior of the private sector.

²⁵ Kane, Korin and Hans Christiansen (2015).

²⁶ Prag, A., D. Röttgers and I. Scherrer (2018).

²⁷ Benoit, Philippe (2019).

²⁸ Hsu, Po-Hsuan and Liang, Hao and Matos, Pedro (2020). The study uses two main data sets: (1) Orbis (Bureau van Dijk) on ownership for publicly listed companies, and (2) Thomson Reuters' ASSET4 Environmental, Social, and Corporate Governance database (ASSET4).

²⁹ Ibid.

A ‘whole-of-government’ approach and policy efficacy call for SOE climate-related reforms

Climate-informed SOE reforms could strengthen development policy-consistency and PSD. With public ownership stakes, the SOE sector provides an important opportunity to advance government objectives for climate action that would strengthen the mainstreaming of climate policies for a ‘whole-of-government’ approach. In addition to direct SOE ownership mandates and oversight policies, the scope to support climate related reforms covers a wide range of policy instruments: tax, expenditure, PFM reforms (e.g., for procurement and public investment management (PIM)), business incentives, and regulatory policies (e.g., CSR mandates and ESG disclosure). These should apply across public and private entities—i.e., effective climate action policy-alignment would entail that governments ensure SOEs are subject to the same climate-aware policies as other private and public entities (e.g., with a more level playing field, such as by removing government subsidies), such as fiscal related measures (e.g., application of carbon taxes, and climate-informed public procurement and investment practices). SOE-ownership and oversight policies to support climate action would complement and reinforce application of other broader climate-related fiscal and regulatory policy measures to SOEs. This would strengthen policy consistency across entities and the efficacy of the country’s overarching climate policy implementation.

Employment mandates for SOEs in many LMICs could also play an important role in facilitating a just transition—in addition to implementing mitigation and adaptation measures with a focus on ensuring an equitable balance of costs and benefits. Investing in adaptation for enhanced resilience and in renewables for carbon neutral development could also strengthen PSD by boosting productivity and efficiency in SOE-sector output and productivity for the wider economy. Lower carbon emissions could also boost productivity through co-benefits, such as reduced air pollution and traffic congestion.

SOE climate action is also good for business, including through responsible investment and risk mitigation that can boost productivity. For example, climate change impacts present significant implicit and explicit contingent risk liabilities, including for SOEs, e.g., through disruptions in service delivery, output, asset damages and losses, and higher financing costs. These risks contribute to higher operational costs, as vulnerability to climate change impacts contributes to increased real and perceived higher investment risks, which translates into higher prevailing interest rates.³⁰ Correspondingly, companies that engage in low-carbon activities face lower cost of capital.³¹ These factors are leading to more climate-aware business investment practices. Similarly, governments are increasingly adopting climate-informed screening for public procurement and investment management,³² which should be adopted by SOEs to strengthen policy consistency and efficacy (although the extent of adoption is unclear).

Further, there is a growing recognition of significant business opportunities for corporations, including SOEs, in pursuing responsible investing, i.e., by considering and disclosing environmental, social and governance (ESG) factors, especially in the infrastructure sector. ESG factors, for example, can have important linkages to returns over time, long-term liabilities, and reputational risk. The increase in internationalization of SOEs in recent years could lead to increased scrutiny of CSR mandates and ESG disclosure. The need to adopt responsible investment practices and provide ESG disclosure is also becoming important for financial sector entities—including for countries that have state-held sovereign

³⁰ Klinga, Gerhard et. al (2018).

³¹ McKinsey and Company (2021).

³² See for example: OECD (2017).

wealth funds (SWF), including LMICs (such as Chile, Ghana, Mexico, Nigeria). SWFs are typically funded by excess fossil fuel revenues and can be among the largest investors globally.³³

Strengthening the consistency in the climate-related incentives structures that SOEs and private companies face is a critical area of reform to support policy efficacy and a more level playing field. Two important examples are subsidy and environmental tax reforms. SOE subsidy-reforms for fossil fuels could help catalyze private sector de-carbonization. SOEs often receive numerous benefits in terms of business requirements and incentives that are not extended to the private sector (e.g., preferential access to land, government loan guarantees, import duty waivers, etc.). These benefits are essentially implicit or explicit subsidies, and are often extended to carbon-intensive activities, which contributes to the locking in of a carbon-intensive development path. In the context of climate action policy, aside from addressing the fiscal burden, many such benefits may need to be rationalized in order to remove distortions and to align incentives structures with climate action policies and to level the playing field for private sector companies. There tends to be aversion to SOE pricing and subsidy reforms, as they often involve significant stakeholder engagement that may become political. However, current low fossil fuel prices provide an important opportunity for governments to address these challenges and phase-out fossil fuel subsidies, along with introducing environmental tax reforms. Taylor (2020) has estimated the supply-side subsidies for renewable energy to have been around US\$ 167 billion in 2017, while total direct fossil-fuel subsidies in 2017 were around US\$ 447 billion.³⁴

Changes to subsidies and environmental taxes and subsidies designed to recalibrate relative price signals in favor of preserving natural capital and limiting carbon-output are two of the most important climate-effective fiscal levers available to governments. Environmental taxes can both change economic behavior and raise revenue. Taxes on goods and activities that produce negative externalities—such as pollution— increase economic efficiency. While fuel demand is relatively price insensitive in the near term, heavier taxation of fossil fuels could also shift innovation and consumption of SOEs toward renewable energy sources, although research in this area for SOEs is limited.³⁵ There is, however, evidence that environmental taxes and regulation spur innovation for low-carbon technologies and have knowledge spillovers for other sectors.³⁶ For example, Dechezleprêtre et al., (2014) researched the impact of the European Union Emissions Trading System (EU ETS) on low-carbon patenting activity as a measure of innovation among regulated firms, and show that the EU ETS has increased innovation activity by 10 per cent in low-carbon technologies among regulated companies.³⁷

Varied SOE reforms have incorporated climate-related mandates and targets

While information is often ad hoc, a growing number of countries are pursuing SOE policy reforms to adopt climate-related policies, which have tended to focus on mitigation. Examples are primarily from HICs, although there are some examples from upper-middle income developing countries (e.g., China, Malaysia, Peru). For instance, according to a recent OECD report, eighteen of the 28 countries surveyed (mainly HICs) have made material progress in recent years in national practices “concerning the integration of sustainability-related values” into government policies, requirements, and expectations

³³ Sovereign Wealth Funds (SWFs) are estimated to hold assets of about \$US 6 trillion as of 2015. Price Waterhouse Coopers (PWC, 2016).

³⁴ Taylor, M. (2020).

³⁵ Aghion et al., (2012) studied innovation activity of firms in the car industry and show that they tend to innovate relatively more in clean technologies when they face higher fuel prices.

³⁶ Bowen, A., Duffy, C. & Frankhauser, S. (2016).

³⁷ Dechezleprêtre, A., Martin, R., and Mohnen, M. (2014).

with regard to the SOE sector.³⁸ Countries are taking a variety of approaches to implement reforms—including through state-ownership policy, oversight and reporting mechanisms, national climate related strategies and plans, applying CSR policies to SOEs, and enterprise specific reforms.

Among these approaches, a recognized best practice for SOE governance is to explicitly identify a country's objectives for state ownership, e.g., by adopting state ownership policies.³⁹ Nordic countries, (e.g., Sweden) have led the way in using state ownership policies to incorporate climate-related mandates and targets for their SOEs as a key element of a 'whole-of-government' approach to strengthen policy consistency, accountability, and transparency. In many countries, state-owned banks (SOBs) are mandated to extend project finance to support specific development objectives, including climate action, which can be extended across sectors for a variety of activities (e.g., the United Kingdom). Countries are also adopting SOE-climate reforms through oversight and reporting mechanisms, which are considered essential for good governance and to strengthening accountability and efficacy⁴⁰, and these are often applied to a cross-section of sectors (e.g., China). At the sector-specific level, there are multiple approaches, including by explicitly adopting SOE climate reforms through national sector policies—especially for high-emission sectors such as energy (e.g., the Ukraine). Another sector specific approach is implementing climate reforms as part of a broader SOE restructuring program (e.g., Malaysia). (Box 1).

With many governments extending backstopping due to the evolving COVID-19 crisis (e.g., airlines and NOCs)⁴¹, emergent SOE restructurings may present a unique occasion to reassess SOE ownership policies and PSD mandates and to integrate climate action into SOEs. This would support a 'greening the recovery' from COVID-19, and SOE policy could also function as an automatic stabilizer. Policies supporting climate change mitigation and adaptation and aimed at addressing decarbonization transition risks may be significant, e.g., particularly for energy intensive SOEs, and related impacts on SOE financial viability and operational performance would be important to consider (and for example included in SOE business plans and strategies). Climate-related considerations could also pose contingent risks and costs for SOEs that the government may have to cover (and be considered in fiscal risk analysis).⁴²

Box 1. Examples of country approaches to SOE climate-policy reforms

A whole-of-government approach: Integrating Paris and SDG targets into state ownership policy.

Sweden has adopted a comprehensive set of climate reforms for the entire SOE-portfolio through its state ownership policy that explicitly tasks enterprises with achievement of the national environmental and climate objectives, including the 2030 Agenda for the SDGs. Enterprises must provide identification, assessment, management, and transparent reporting of climate-related financial risks and opportunities in their operations. Each enterprise is required to analyze the SDGs and identify goals that it has an impact on and can contribute to achieving through its operations. Enterprises identify targets that are then vetted to ensure they align with Paris.⁴³ Notably, the lion's share—over 80 percent—of the direct GHG emissions from Sweden's SOE portfolio are from enterprises with targets that have been independently approved⁴⁴ by the Science Based Targets (SBT)⁴⁵ initiative. These state ownership reforms complement other national

³⁸ OECD (2020b).

³⁹ E.g., OECD (2020b).

⁴⁰ E.g., Baum, Anna, et. al, (2019).

⁴¹ For discussion of the impact of COVID-19 on SOEs, see e.g., N. Manuilova and R. Burdescu (May 2021).

⁴² World Bank (2021a, forthcoming).

⁴³ Ministry of Enterprise and Innovation, Sweden (2020).

⁴⁴ Ibid.

⁴⁵ Science Based Targets (SBT) is an independent organization that helps companies to set science-based emissions reduction targets. SBT (2021).

interventions (e.g., energy and CO₂ taxes) and sectoral interventions (e.g., various green bonds issued by a forestry SOE, state-owned banks (SOBs), and municipal-owned companies (MOCs)). Combined, Sweden's climate reforms comprise a whole-of-government approach, for which the SOE sector is a key component.

SOE-sector led climate policy through oversight and reporting mechanisms. China is an important example for this approach, given both its high level of emissions (largest in the world) and vast SOE portfolio—but also because China's effective policy framework for climate action relies heavily on SOEs.⁴⁶ China's SOE oversight commission, the State Council's State-Owned Assets Supervision and Administration Commission (SASAC), has been central in advancing climate-related policies. These include a set of measures introduced in 2010 that explicitly require energy conservation and emission reduction through enterprise strategies and operations, e.g., all central enterprises under SASAC's mandate are required to formulate specific plans and determine internal responsibilities for energy conservation and emission reduction, among other measures. The measures also direct enterprises to support the development of the renewable energy, including by contributing to R&D, and require them to set their own targets for conservation and emission reduction based on scientific criteria and aligned with national strategies. While these mechanisms have supported significant progress for some SOEs, including the remarkable expansion of China's renewables industries over the past decade, this is being substantially undermined by parallel competing policies that support ongoing SOE investment in carbon-intensive activities. For example, China extends various producer subsidies to its domestic coal sector SOEs and financing coal power stations in other countries. These subsidies, aside from imposing a large burden on public finances, are locking in high GHG-emissions as new coal-fired power plants continue to be brought into operation.⁴⁷ China's SOEs are also closely involved with large BRI projects, including construction of coal-fired power plants abroad, locking in high-emissions for host countries.

Integration of SOE climate reform policy into national strategies at the sectoral level. In August 2017, the government approved the Energy Strategy for Ukraine 2035, which identifies a host of reforms aimed at energy efficiency and sustainable development and identifies energy sector SOEs to be involved with implementation. This includes key energy SOEs, e.g., Naftogaz, the largest oil and gas company in the Ukraine, and National Nuclear Energy Generating Company "Energoatom", which operates all of the Ukraine's nuclear plants.⁴⁸ The strategy incorporates a number of climate-related goals, such as improving energy efficiency across the production and consumption chains, and developing renewable, low-carbon energy sources, while also taking an 'integrative' approach to reform the coal industry aimed at greening and decarbonizing the sector.

SOE sustainable finance policies. The UK Green Investment Bank (GIB) in the United Kingdom was set up as an SOB in 2012 with the explicit mandate to further environmental goals through project finance. Before it was privatized in 2017 (and renamed Green Investment Group), GIB invested in over 100 green infrastructure projects and seven funds to support renewables, waste/biomass, and energy efficiency.⁴⁹ Its success is in part attributed to its high standards of governance, which supported environmental, social as well as financial outcomes.⁵⁰ Similarly, a number of Scandinavian countries have set up state-owned

⁴⁶ China's climate-related reforms include other types of interventions, notably a nationwide market-based mechanism (like the European Union's GHG-emission pricing), however, mitigation through SOE policy reforms has been far more extensive. Mayer, Benoit, Mikko Rajavuori, and Mandy Meng Fang (2017).

⁴⁷ China is estimated to have put new coal-fired power capacity into operation in 2020 that is equivalent to more than three times the amount built across the rest of the world—and has more coal power under development that could power the whole of Germany when it comes on stream. Stanway, David (2021).

⁴⁸ Energy Security, Ukraine Government Portal (accessed 11 May 2021)

⁴⁹ Fikova, Monica, et al. (2018).

⁵⁰ OECD (2020a).

investment funds, such as Nysnø in Norway that seeks to contribute to a reduction in GHG emissions by investing in new, climate-friendly technology.⁵¹ Other examples of sustainable finance include the issuance of SOE-climate-related bonds. This includes green bonds to raise capital for low-carbon solutions, such as renewables, which SOEs have issued across various countries (e.g., Sweden, Latvia, and Lithuania). Another instrument is transition bonds for ‘brown’ industries to raise capital for SOEs to shift into greener activities (e.g., Hong Kong, and an SOE transition sukuk, Islamic bond, in Abu Dhabi).

Climate reform incorporated into enterprise restructuring. With the finalization of a multi-year restructuring program for the Malaysia Aviation Group (MAG), one of Malaysia’s largest SOEs, in 2021 MAG launched the ‘MAG Sustainability Blueprint’ to promote socio-economic development and achieve net-zero CO₂-emissions by 2050.⁵² Under the Blueprint, the airline is pursuing an extensive set of measures to reduce its emissions.⁵³

Extending national corporate social responsibility (CSR) policy to SOEs. Ahead of the UN Copenhagen Summit, in 2008 the Danish government committed to a set of climate action targets, launched a “CSR Action Plan”, and passed a law requiring the country’s largest 1,000 companies (including SOEs) to report annually on their CSR activities.⁵⁴ In response, the Danish Oil and Natural Gas SOE (DONG, later renamed Ørsted) adopted the SDG targets and started investing heavily in renewables. As a result, its share of renewable generation increased rapidly from 15 percent in 2009 to 86 percent in 2019, and Ørsted became the world’s largest offshore wind generator.⁵⁵

SOE-initiated reforms to diversify and address decarbonization transition risks. PetroPeru’s board, under its own initiative, for example, is seeking to diversify into renewables to strengthen profitability and sustainability, similar with some SOE petroleum majors in the OECD, such as Norway’s Equinor.

Alignment of SOE and climate policies varies by country, industry, and national priorities

There are multiple entry points to align SOE policies with national climate objectives, and the appropriate approach will significantly depend on national priorities, given the pronounced heterogeneity of SOEs across countries. In many LMICs the SOE portfolios are large and diverse, and SOE climate-action reforms will need to take into account a number of considerations, including: (a) sector and market factors, including PSD and development mandates; (b) relevant climate-related factors for the country and enterprises; (c) national climate mitigation and adaptation commitments and plans; and, (d) the political environment and stakeholder motivation to pursue reforms. The approach of reforms will vary depending on the focus of climate action reform objectives for a given SOE industry, i.e., adaptation, mitigation, or just-transition, or a combination thereof, and on the scope, i.e., broad-based reforms (e.g., state ownership policy reforms), a specific industry or set of industries (e.g., infrastructure, energy, and agriculture), or cross-sectoral issues (e.g., institutional reforms). The approach will also depend on country-specific conditions, including the dimensions of climate-change challenges it is experiencing.⁵⁶

⁵¹ <https://www.nysnoinvest.no/en/about-nysno/>

⁵² The CEO of MAG is quoted in the announcement, “In the long run, our sustainability initiatives will drive us to be a more responsible, efficient, and effective organization, with the character and mindset to be environmentally responsible...” Malaysia Airlines Group (MAG, 2021)

⁵³ Ibid.

⁵⁴ Morsing, Mette (2011).

⁵⁵ Ham, Nathanael (2020).

⁵⁶ At the country level, while ten of the biggest twenty emitters globally are LMICs, most LMICs are relatively small emitters. Indeed, combined, the 74 World Bank IDA and IDA Blend countries contributed only 4 percent of global emissions in 2019. Ritchie, Hannah, and Max Roser (2020). Carbon intensity is rising rapidly in some LMICs, however, pointing to the need to shift to a low-carbon development path.

For example, poorer, low-emitting countries—that are often more exposed to rising heat stress and rising sea levels—would likely emphasize swifter adaptation. They would also likely prioritize investments in renewables to leapfrog the heavy investment in fossil fuel technology that has been associated with economic development (also an effective approach to mitigation policy). To the extent that low-emitting LMICs focus on pursuing a green and resilient growth path, they may have more limited job and industry dislocation impacts that are often associated with mitigation policies in more-carbon-intensive countries.

While there is great diversity in both the challenges countries are facing with climate change and the characteristics of their SOE-portfolios, a systematic approach for identifying and adopting climate action policies would involve a common set of main steps, including: (i) conducting a climate-informed state ownership policy assessment; (ii) conducting a climate-diagnostic of the SOE sector portfolio; (iii) formulating a climate-strategy and implementation plan for the SOE sector; and, (iv) determining oversight, monitoring and evaluation (M&E), and audit and disclosure requirements, including regular climate assessment and diagnostic reviews. Governments could underpin the reform process by adopting measures to support good governance practices and institutional capacity building, which are widely recognized as key to successful SOE reform outcomes.

As part of the process of identifying country-specific climate related reforms, international best practice suggests governments explicitly identify national climate-related objectives for its SOE portfolio directly into state ownership policies. These would include provisions for monitoring and verification, which in turn would be reflected in SOE sector strategies, plans and reporting. Governments would want to ensure that public ownership mandates are non-distortionary and transparent and consistent with decarbonization. Carbon-emission, mitigation, and adaptation costs and benefits of SOE activities would be considered when countries review their SOE ownership rationales. Ownership assessments focused on climate action may lead to shifts in public holdings (e.g., divestment), or contribute to the rationale of retaining ownership in an SOE (e.g., for strategic purposes). Ideally, ownership rationales would be transparent and clearly defined to justify public ownership, and the rationales would include assessment of the costs of continuing with, or divesting from, climate related SOE activities.

To support more climate-aware diagnostics of countries' SOE portfolios, the World Bank's forthcoming 'SOE Climate Toolkit' (part of the Integrated SOE Framework (ISOEF)) includes a diagnostic questionnaire to help client countries and World Bank staff conduct such SOE climate mappings (with a focus on financial disclosures).⁵⁷

Steps to ensure that ownership and national climate policies are aligned

- 1) Countries would conduct an ownership policy assessment to ensure ownership policies are fully aligned with a country's national climate change commitments. A climate-diagnostic of the SOE portfolio could also be conducted to complement and inform the ownership assessments, e.g., by identifying gaps and areas of needed reform. These assessments and diagnostics could be calibrated to the industry-level or for the entire SOE-portfolio and cover a range of policy issues, such as the following listed below, depending on country circumstances:
- 2) *Ownership policies and mandates*—such as public service obligations (e.g., low-cost fuel, jobs), reporting and public oversight requirements, degree of corporatization (independence from

⁵⁷ World Bank (2021 *forthcoming*). See also World Bank (2021b).

political interference), corporate motivation for climate action (policies to increase board directors' climate awareness and expertise).

- 3) *Emissions tied to SOE-operations, procurement, and investment*—composition of carbon-intensive and renewable applications in SOE activities.
- 4) *Incentives structure, and legal and regulatory framework*—that lock in technological and institutional carbon-intensive investment and behavior (e.g., investment and procurement policies, environmental taxes, price ceilings, import tariff waivers, and guarantees), provide for consistency of application across types of ownership, and incentivize sustainable value creation and CSR-accountability;
- 5) *Assets*—including staff, structures, and associated operational risks (e.g., to supply chains).
- 6) *Climate-related risks*—including those tied to climate-related natural disasters (e.g., increased frequency and intensity of hurricanes and cyclones), chronic climate-change impacts (e.g., rising sea levels, increased incidence of heat stress), and those tied to the failure to mitigate (e.g., stranded assets, lack of diversification of industries) or adapt (loss of livelihood, life and limb, and higher borrowing costs);
- 7) *Corporate finances and financial disclosure*—i.e., current financial viability of an SOE based on existing operational structure, whether loss-making or profit-making, and outstanding obligations (including to other SOEs and or central government), and ESG disclosure.
- 8) *Macro-fiscal issues, including fiscal risks and public sector contingent liability risks*—including assessment of risks associated with climate change (beyond existing fiscal and contingent liability risk exposures to SOEs for a full-picture of risks and relative importance of climate-related risks).
- 9) *SOE-sector specific and enterprise specific strategies and business development plans*—e.g., SOE planned investments should be aligned with the national climate agenda, including explicit targets, and business plans should include the financial implications of adaption and mitigation measures; and,
- 10) *National strategies for climate action and other climate-related strategies, e.g., national energy strategies, should integrate relevant SOE-sector actions*—including the integration of SOEs in the climate-relevant national implementation plans.

At the SOE-level, reforms could include hiring expertise at the board level and adopting net-zero business strategies with an emphasis on CSR accountability, (which could also be specified in state ownership policies). Efforts by SOEs to align with national climate action strategies include: i) ensuring managers and directors are versed in climate issues and appoint board members with relevant expertise and technological skills; and, ii) developing climate-aware business strategies that include explicit targets for mitigation, diversification, and adaptation. Climate aware business strategies would include plans to retire and repurpose carbon-intensive assets, while building resilience against operational disruptions and physical losses due to climate hazards. Diversification would include investing in new low-carbon technologies and businesses, pursuing M&A opportunities, and scaling up the use of nature-based climate solutions. For financial institutions this would include capital-providers divesting from financing carbon-intensive activities. SOE reforms would also include coordination with stakeholders to inform net-zero strategies, and sharing business implementation plans to build buy-in.

For consistency and efficacy, governments would want to extend its climate-strategies for SOEs with international activities to apply to foreign holdings, particularly given the internationalization of SOEs in

recent years. China's SOE sector is an important example, as its SOEs are often engaged in large BRI projects that are underway in many developing countries, where adaptation needs are particularly high. During the period 2001 and 2020, overseas lending by the China Development Bank and Export-Import Bank of China has been primarily directed to infrastructure projects for fossil fuels (74% of fuel specified investments), while renewables account for a tiny fraction (1%).⁵⁸ Aside from the risks associated with locking into a more carbon-intensive path for the recipient countries, with growing ambition to achieve the Paris 2030 and SDG targets, there is an increased risk of stranded assets and poor investment returns. Hydrocarbon and nuclear power account for the balance of investments (25%), which are more carbon-friendly than fossil fuels.

3. Implications for policy

This Note is an initial effort to identify a framework for countries to integrate the climate agenda into their SOE sector policies. Multiple factors point to a critical role for SOEs to play in achieving the Paris Agreement targets. The scope for such reforms is extensive and multi-dimensional. Given the diversity of portfolios, SOE climate-action reforms will need to take into account country-specific circumstances, including: (a) sector and market factors, including PSD and development mandates; (b) relevant climate-related factors for the country and enterprises; (c) national climate mitigation and adaptation commitments and plans; and, (d) the political environment and stakeholder motivation to pursue reforms. The approach of reforms will likely vary, depending on the focus of climate action reform objectives for a given SOE industry, i.e., adaptation, mitigation, or just-transition, or a combination thereof, and depending on the scope, i.e., broad-based reforms (e.g., state ownership policy reforms), a specific industry or set of industries (e.g., infrastructure, energy, and agriculture), or cross-sectoral issues (e.g., institutional reforms).

While there is great diversity of SOE-sectors across countries, there are a number of common main steps and possible entry points for countries to adopt climate action policies, including: (i) conducting a climate-informed state ownership policy assessment; (ii) conducting a climate-diagnostic of the SOE sector portfolio; (iii) formulating a climate-strategy and implementation plan for the SOE sector; and, (iv) determining monitoring and evaluation, and audit and disclosure requirements, including for regular climate assessments and diagnostic reviews.

Given the macro-criticality of climate change and the central role SOEs have in addressing mitigation and adaptation among many countries, particularly for LMICs, the topic merits further research. The scope for research is extensive, due both to a dearth of literature and the breadth of the topic. A key challenge is identifying resilient and low-carbon transition pathways that balance competing near-, medium- and long-term considerations, i.e., that help SOEs in balancing multiple mandates and often with strained finances.

⁵⁸ Boston University Global Energy Finance Database (2021).

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