

Out with the Old in with the New? The Indian Public Sector's Role in the Energy Transition

The Indian state has maintained control over the energy sector (oil, coal, power, utilities) for more than half a century, primarily through state-owned enterprises (SOEs). Many of these sectors have been gradually opened up post-1990 to incremental private competition. As global and domestic incentives and pressures align towards more serious action on climate change and an energy transition away from fossil fuels, many of these energy SOEs are facing existential questions and are being nudged or shoved into pivoting much more quickly than they have before. It has often meant pushing these firms to change decades old business models and encouraging rapid organisational change through board control.

At the same time, there are new SOEs on the rise in particular sectors which are becoming vehicles of choice for a procurement-based jumpstart to the energy transition. As Indian SOEs struggle with their organizational identities, watching the incremental growth and recognition of their private competitors, what kinds of roles are they likely to inhabit in India's future energy markets? Will they still be occupying the commanding heights of the Indian economy? Indian marketcraft around clean energy is sending mixed signals at the moment.

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Introduction

The Indian energy sector is in the middle of its most consequential transition since the early 2000s. The urgency of action necessitated by global climate change, major changes in economic and governance philosophies since the 2014 election of the NDA government (which have intensified from 2019 onwards), and the belated confronting of India's tangled fiscal realities (in both Centre and States) have all led to significant policy decisions in the last decade which are irreversibly changing India's energy landscape.

Some of the larger themes and directions of policy action are clear. Firstly, India clearly intends to act more decisively on climate change through a range of actions: increased deployment of renewable energy generation (grid-scale and decentralised) and enhanced energy efficiency measures (as measured by energy intensity of GDP) among the most important of these commitments enshrined in India's Nationally Determined Contributions (NDCs) to the UN Framework Convention on Climate Change (UNFCCC). There is also clearly rising momentum behind the deployment of newer energy technologies (electric vehicles, hydrogen, battery storage, etc.), although most of these are still in their infancy.

Secondly, the private sector will play a much larger role in the energy transition across sectors (power, oil & gas, electric mobility, hydrogen etc.). In these sectors it is clear that the dominant position of state-owned enterprises (SOEs) is being actively transformed through policy. This is not the incremental liberalisation, disinvestment and private sector entry that was observed in the 1990s and 2000s, but rather a systematic scaling back of the half-decade dominance of SOEs in the energy space. SOEs are increasingly being used for their financial, procurement, and commercial characteristics rather than their historical role as frontline implementers of greenfield infrastructure projects. They are being co-opted into nascent experiments in Indian

marketcraft. Many of these experiments are designed to favour the private sector, which leads to potential organisational tensions and crossed incentives.

Finally, the historical forms of state-dominated, Cold-War inspired technological cooperation with international partners through SOEs are being slowly discarded in favour of newer forms of technological licensing and innovation, which often put SOEs on the backfoot because of their deliberative, bureaucratic internal processes. In a world where speed matters to close deals (particularly in the start-up world), Indian energy SOEs face a dilemma of how to adapt to the new financialized economy. The rest of this paper will dig deeper into these themes and directions.

The Statist Legacy

After more than three decades of liberalisation, most energy sectors in India have a hybrid form of governance which have strong statist legacies, but have allowed varying degrees of private involvement (Chatterjee 2017). In fact, throughout the developing world, such hybrid systems are closer to the norm than the exception. Victor & Heller's study of developing country power markets, found that despite the global market reformist push of the 1980s and 1990s, these market reforms led "not to the ideal textbook outcomes but to a hybrid – what we call a 'dual market'- that combines some features of textbook reform with powerful residues of state monopolies" (Victor and Heller 2007, 11). Such arrangements have been observed in oil and coal industries as well across the developing world (Victor, Hults and Thurber 2011, chap. 1) (Thurber and Morse 2015, chap. 1). Let us consider a few examples from India's energy sectors.

Coal India Limited (CIL), the primary government owned coal mining company, still produces over 80% of domestic coal production (Coal Director of India 2021, chapter 1). However if one looks under the hood, over half of CIL's coal production is done through various forms of

outsourcing and subcontracting, which means that the private sector is already heavily involved in the sector, albeit not as much through ownership (Chandra 2018, chap. 1). And although captive coal production by private companies has been relatively stagnant for the last decade, the current policy agenda is still focused on encouraging greater private entry into coal mining. In the last decade, especially in the aftermath of a national coal allocation scam in 2013, the Central government has been trying exceptionally hard to bring in the private sector directly into the coal mining industry in various forms; through regular auctions of coal blocks to private companies (over 42 coal mines had been auctioned by February 2022), through changes in law (particularly of the Coal Mines Nationalisation Act, 1973) to allow commercial coal mining, and through increased scaling up of various forms of mining subcontracting in mines owned by public sector companies. And yet the result has been underwhelming: between 2013-2014 and 2020-2021, total raw coal mined in India increased from 564 to 716 million tonnes, while total private production actually decreased from 37 million tonnes to 30 million tonnes; while subcontracting has thrived under the public sector companies that dominate the sector, production from mine ownership by private companies has progressed remarkably slowly (Ministry of Coal 2015, chap. 1) (Ministry of Coal 2021, chap.1). In fact, some private companies prefer to remain subcontractors, rather than take the larger risks and liabilities that come with mine ownership.

This duality can also be observed in India's power sector. The Electricity Act, 2003 was a watershed moment in India's electricity history since it created the legal foundation for private sector entry into all parts of the power sector (generation, transmission, and distribution). Over the last twenty years, these sectors have seen private entry with varying degrees of success. According to the Central Electricity Authority (CEA), state-owned (both Centre and State) power generation still accounted for 52.7% of all power generation and 61.8% of all utility

power generation in the country (CEA 2021). In a recent study on India's power utilities by a government think tank, the authors observed that "only about 10 percent of India's population is served by private distribution licensees" (Regy et al. 2021, 2). The few private utilities that do operate in the power sector work primarily in profitable, high margin urban environments. In the oil and gas sectors, a problem similar to what was observed in coal has emerged. From the late 1990s onwards, successive Central governments have tried desperately to evolve auction environments to attract international investors and oil majors to enter the Indian market, most notably in what was called the New Exploration and Licensing Policy (NELP) which auctioned 254 oil & gas blocks for hydrocarbon exploration between 1999-2012. However, these policies have struggled to yield fruit; the vast majority of the blocks were won by domestic SOEs or Reliance Industries, and over the last twenty years, the proportion of Indian oil & gas produced domestically has actually declined; yet another indictment of some of the difficulties of encouraging private sector ownership of natural resources in India.

What is fairly clear is that a particular group of large government-owned firms (eg. Coal India, NTPC, ONGC, etc.), primarily those owned by the Central government, have been allowed to maintain high, if not borderline monopolistic market shares in energy and infrastructure sectors which are still considered politically important. As has been documented in great detail (Banerjee, Sane et al 2022, chap. 1), over two decades after setting a disinvestment policy (the Department of Disinvestment was created in 1999 when the first NDA government came to power), many of the efforts at reducing government control and shareholding over Central SOEs have been slow and incremental in nature. There are various reasons for this.

Firstly, profitable SOEs are massive financial contributors to the government receipts (Centre and State). The top 20 SOEs in India (15 of which are energy-adjacent) contributed over ₹3,20,000 crores (more than USD \$40 billion at July 2022 exchange rates) to the Central Exchequer in FY 2019-2020 (Department of Public Enterprises 2020, chap. 1). This was more

than 10% of the Union Budget in FY 2019-2020. These contributions come in various forms: dividends from state shareholding (many of the largest SOEs are publicly listed), taxes on energy products (coal and oil in particular), royalties to state governments to operate on their land, and more. For these reasons, both bureaucrats and politicians have been reluctant to let go of profitable, generative SOEs because of the significant short-term budgetary implications of losing these receipts. Loss-making SOEs are easy to make a case for privatisation (however finding buyers is hard). Profit-making, revenue-generating SOEs are harder to part with.

Secondly, SOEs are an extension of the economic power of line ministries. Since India does not have a consolidated state-asset management entity like Temasek in Singapore, or SASAC in China, SOEs still report to their line ministries, and sign Memoranda of Understanding with their parent ministries for annual performance targets. NTPC does this with the Ministry of Power, Coal India with the Ministry of Coal, ONGC and BPCL with the Ministry of Petroleum & Natural Gas etc. The senior bureaucrats from each of these ministries sit on the boards of these companies. This gives them almost direct control over major decisions related to large tenders, corporate priorities, price revisions, expenditure of CSR funds, approval of wage revisions and much more. From the late 1990s onwards, the Navratna and Maharatna policies of the Department of Public Enterprise were designed to give a certain degree of financial autonomy and operational independence to profitable SOEs who had earned the privilege of arms-length management from the government. But over the last decade, the extent of micromanagement of SOEs from line ministries has increased. These forms of micromanagement will be discussed later in the paper.

Third, SOEs have been a locus of political mobilisation in many parts of India for over half a century, especially in regions where SOE activities are a large proportion of local economies and SOEs are significant generators of local employment (full-time or contractual). Whether it is Coal India in places like Dhanbad, Asansol and Angul, NTPC in places like Singrauli, Korba,

and Ramagundam, or ONGC in places like Jorhat, Mehsana, and Rajamundry, the activities of energy SOEs have created and built public goods and infrastructures in many cities in India. Effective politicians in these areas often need to have good relationships with these companies (and sometimes even come from SOE unions), given the kinds of favour trading that often exists in the local political economy of these regions (Chandra 2018, 160-163). The arguments for retaining control over SOEs are not simply economic, but also political. Local politicians in SOE dominated regions often use their role as credible intermediaries to give jobs (or at least promise them), lobby for promotions, encourage public expenditure in preferred areas (especially in infrastructure), admit patients in SOE-run hospitals and students in SOE-financed schools and more. The entangled realities of local political economy have often come in the way of Centre-led privatisation exercises, because of the objections of regional politicians (even within incumbent parties pushing these policies).

A brief illustrative example. Between 2015-2018, under the intellectual leadership of Vice-Chairman Arvind Panagariya, Niti Aayog (the government's internal think tank and successor institution to the erstwhile Planning Commission) undertook a fairly exhaustive consultative and analytical exercise on privatisation of Central SOEs. They came up with their own typology and priority list of what SOEs should be considered for privatisation based on financial outcomes, strategic value and other measures. And many of their recommendations were even approved by India's Cabinet, but struggled to proceed towards implementation.

Part of the consultation was stakeholder meetings between Niti Aayog staff and management from various SOEs (particularly the smaller less profitable ones). In an interview with someone who was part of these consultations, I was told of the kind of arguments made to try to exclude particular SOEs from the privatisation agenda. A senior manager of a tea-related SOE in West Bengal argued that since the tea gardens were close to the Chinese border, it could not be privatised for national security reasons. In another case, a sitting Member of Parliament from

the ruling party, officially unaffiliated with the concerned SOE, but elected from the region where the SOE operated, showed up and tried to negotiate to take the concerned SOE off the privatisation list (Former Niti Aayog Employee, Personal Interview, March 2 2020). Ultimately, this broader exercise and its policy recommendations was dismissed by the government (Arora 2018). Privatisation politics was clearly far more complicated than the economists involved in the process had expected. The policy language used in the last few years tends to focus more on asset monetisation of SOE assets, privatisation of a few select large SOEs (like Air India and Bharat Petroleum Corporation Ltd. (BPCL) rather than the expansive, comprehensive privatisation agenda which was proposed six years ago, which has borne little fruit so far.

Finally, capital expenditure from SOEs have been crucial for driving the investment cycle in India in the last decade. As later sections of this paper will show, given the relative pessimism in private investment that has been observed in the last decade, public expenditure has had to fill the void in whatever limited way it can. There is a fundamental problem in Indian public policy at the moment where a cautious private sector and a banking sector which has recently had its hands burned on excessive infrastructure borrowing and lending are both still recovering from the macroeconomic consequences of India's non-performing assets (NPA) crisis in the 2010s, the unexpected shocks related to demonetisation and GST implementation, and now the long shadow of Covid (Chandra and Walton 2020). A previous generation of infrastructural expansion was done on the basis of so-called "easy money" where state-owned banks took strong directions from successive governments in the 2000s and early 2010s to lend massively to energy and infrastructure projects (power, steel, cement, coal).

India's elite bureaucracy (the Indian Administrative Service (IAS)) is itself quite divided on whether or not large scale privatisation of profitable SOEs makes sense. In an investigative series for Bloomberg Quint called "Privatisation Files," journalist Somesh Jha detailed how

line ministries were resisting the Ministry of Finance's heavy-handed pursuit of a widespread privatisation agenda announced in 2020. Based on extensive analysis of internal correspondence between ministries, Jha found that "In all, as many as 21 ministries and departments supported the policy without offering any significant comments. Seven departments wanted sectors controlled by them to be in the strategic list, seven sought an exemption from the policy, another three departments gave conditional approval and 10 sent in suggestions and comments, while some raising issues" (Jha 2021). In this collective manifestation of bureaucratic foot-dragging, clearly the bureaucratic consensus on privatisation did not necessary match the political enthusiasm to pursue this agenda.

The New SOEs (SECI, EESL)

In the last decade a number of organisations have emerged in the energy sector in India, which look very different from the established legacy SOEs described in the previous section. While still owned and/or controlled by the state, their function has been focused on market creation, risk mitigation, and occasionally financial intermediation. Sometimes these organisations have been supported by legacy SOEs (primarily financially), but operationally they have very different approaches and values compared to legacy SOEs. Consider a few examples.

Solar Energy Corporation of India (SECI), has been the tip of the spear in India's pursuit of grid-based solar power (and to a lesser extent off-grid solutions as well). Formed in September 2011, and initially a not-for-profit company (later it was made for-profit), SECI was created to further the goals of the National Solar Mission (NSM) and reported to the Ministry of New & Renewable Energy (MNRE). The NSM was one of major components of the National Action Plan on Climate Change (NAPCC) that India adopted in 2008, and was the government's first major foray into creating national market institutions for solar power.

If we look at India's energy sector using Steven Vogel's market institutionalist approach from Marketcraft, we can gain some insight into what roles newer entities like SECI are playing in the larger power market ecosystem. Since the Electricity Act, 2003 was passed, Indian power markets can be considered to be in the "building market institutions" phase of Vogel's typology (Vogel 2018, 24). Over the last twenty years, there has been a general emphasis on increasing the role of private sector entities throughout the power supply chain. As described earlier, this has been quite successful in generation, but not as much in transmission and distribution which are still largely state-owned and state-operated. State utilities (also known as discoms) still procure most of the power in India, which means that state preferences largely guide this market. Given that most discoms are run by state governments, this leads to a complicated federalism of power procurement which when combined with politics of power subsidies, and the perpetually stressed finances of most state governments makes most discoms very risk averse and resistant to systemic changes (Bharvirkar, Dubash and Kale 2018, chap. 1).

What did SECI's creation change in this equation and why should be considered a step towards market development? It is an entity dedicated to building up solar power generation in India, and was created in 2011 when a range of solar power technologies, photovoltaics (PV) in particular, were beginning to descend the cost curve, but were still quite expensive by Indian standards. When SECI was created solar PV generated power in India was still in the range of Rs. 7-10/unit, when average prices prevailing in the country were at most Rs. 4/unit. While there are clearly many other non-price considerations which make the deployment of solar power attractive, if not essential, the extreme financial stress and short-term time horizons of most discom managers and state governments prevented them from considering most policy actions with long-term payoffs, especially if those policy actions meant procuring more expensive power (Chandra 2018b). With this systematic risk aversion, deploying solar power in most states was bound to be difficult. Hence the creation of SECI.

SECI has been a key pillar of Indian marketcraft to develop the renewable energy industry. As an entity backed by the Central government, its most important role has been its regular announcement of government tenders for various projects, primarily related to the deployment of large solar installations across the country (consistent with the early goals of the NSM), but also veering into other areas like wind power, wind-solar hybrids, battery energy storage systems, solar cell manufacturing etc. SECI is a small organisation, with less than a thousand full-time staff, which essentially functions as a market maker and guarantor for what would be otherwise considered risky investments in the Indian power sector.

Given the long history of financial troubles in the Indian power sector, and the particularly long shadow of the Enron Dabhol project in the mid-1990s, international investors had largely avoided the Indian power sector throughout the 2000s and 2010s. This was part of the reason that the domestic banking sector was strongly guided by successive governments in these decades to lend generously to power generation projects; in the absence of external finance domestic financial resources had to be mobilized to support the expansion of power generation, a necessary input for economic growth. One of the big continuing concerns for potential investors in the Indian power sector is the financial health and ability to make timely payments by state discoms. In a recent analysis of the outstanding payables of Indian discoms, India Ratings, a Fitch Group credit rated agency, found that 74% of the 41 discoms whose financial statements it analysed in depth had payable days above 90 in 2020 (it took more than 90 days for the discoms to pay power suppliers for supplied power) (India Ratings 2022). Imagine trying to run a capital-intensive business where you have to wait more than three months to get paid by your customer. It's not entirely surprising that there are few private actors who are willing to deal with this kind of counterparty risk from state discoms. Hence the need for SECI.

In such a situation, part of the political economy of the power sector necessarily becomes the ability to get paid on time, so that your business can continue operating. In almost any country

with federal governance structures, private companies are far more willing to sign contracts with central or union government entities than with state or provincial entities. Central governments are less likely to renege or default on contracts, generally have access to more sources of revenue, and most importantly can borrow money more easily from domestic and international markets to finance deficits when necessary. Like many other countries, India passed a fiscal responsibility framework legislation (the Fiscal Responsibility and Budgetary Management Act, 2003 (FRBM)) mirrored by similar fiscal responsibility legislation at the state level, to commit to national deficit targets of around 3%. Across India, power subsidies are a massive part of state expenditures. As a consequence, there tends to be a fair amount of uncertainty about when the money makes it from the state's balancesheet, to the discom's balancesheet, to finally paying suppliers for the power.

This is where SECI's role becomes important. In almost all the tenders that SECI floats, power suppliers sign a power purchase agreement (PPA) with SECI, rather than with the ultimate wholesale consumers, state discoms. It then becomes SECI's responsibility to find ultimate buyers for the supplied power, maintain liquidity to pay suppliers on time, get discoms to pay SECI in a timely fashion, pay surcharges for late payment etc. In addition, one of the unique parts of the SECI PPAs is that SECI actually provides a Letter of Credit to power suppliers, which suppliers can draw on in the event of SECI's failure to pay (SECI 2022).

With these kinds of financial guarantees provided, well in excess of what any discom in India (public or private) would be willing to contract, SECI created conditions for the emergence of a national solar and renewable energy generation market in India over the last decade, supported by a whole range of other government policies. This was textbook industrial policy; a state vehicle (SECI) propping up a market with desirable characteristics which the private sector was reluctant to enter in without incentives and other forms of risk mitigation. While the NSM's initial goals in 2010 were to deploy 20 GW of solar power by 2022, after the NDA

government came in 2014, it increased the ambitions of the NSM by almost five times, promising that India would have 100 GW of solar capacity, and 175 GW of renewable capacity by 2022. While India has not managed to hit these targets (as of June 2022 there are about 58 GW of solar generation active on the grid), the policy momentum behind renewable energy has pivoted the agendas of many public and private actors in this space. Much of this was enabled by the spectacular decline in solar cell prices globally from the early 2010s onwards. Lazard's analysis shows that the levelized cost of utility-scale solar power has come down almost 90% in the last twelve years (Lazard 2021). Over the decade plus of SECI's existence, solar PV has gone from being a commercially uncompetitive, but desirable technology (renewable energy, no emissions during generation), to becoming commercially competitive in India. As you can see in **FIGURE 1**, the bid prices on SECI solar PV tenders (and other tenders) have fallen quite spectacularly in the last decade, and the amount of tendering by Central entities (of which SECI is a big part) has increased considerably from 2016 onwards.

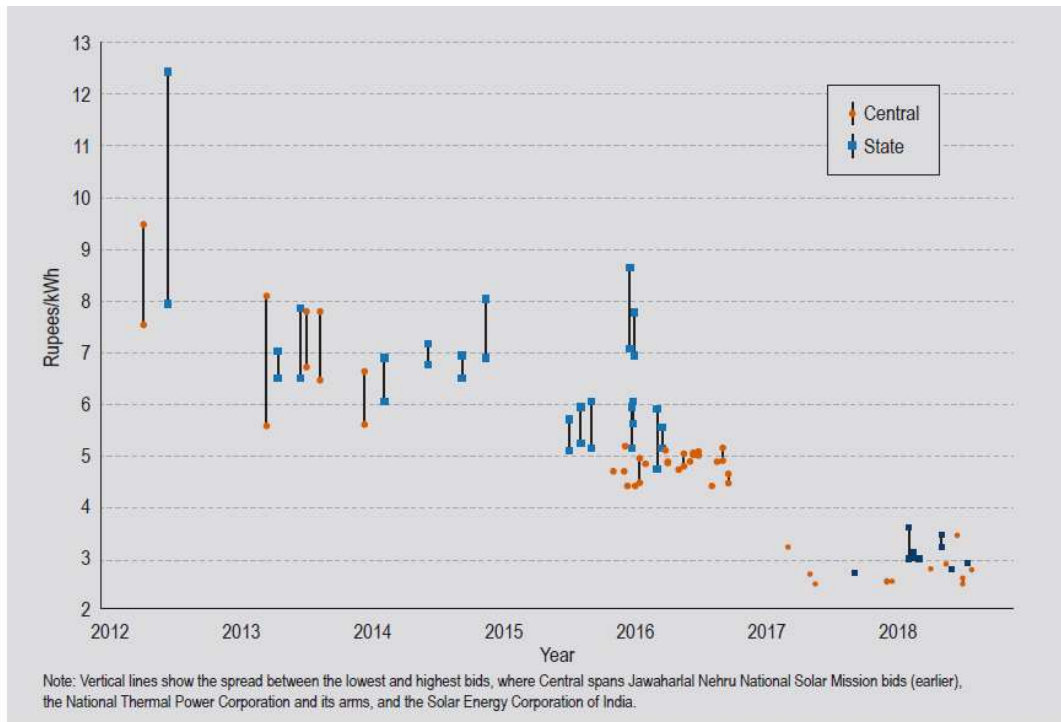


Figure 1: Evolution of Solar Bids in India (Figure 5 from (Gross and Tongia 2018) reproduced with permission)

Driven by the exponential decline in solar module prices, significant learning by doing by firms deploying technologies, and global capital markets taking interest in renewable energy investments, SECI has become one of the vehicles of choice for a light-touch Central government-guaranteed procurement approach to expanding renewable energy investment in India. In addition to large Indian corporations (Tata Power, Adani Green, Mahindra Renewables, ReNew Power, Greenko etc.) a range of international power developers (Sembcorp (Singapore), Solarpack (Spain), Al-Jomaiah Energy (Saudi Arabia)) have also participated in the various rounds of tenders over the last decade trying to dip their feet in the Indian power market's waters. However, given the history of foreign firms getting their fingers burned in the Indian power sector (think Enron in Maharashtra, or China Light & Power (now called Apraava Energy)), the more likely route for power sector investors has become partnering with or taking large stakes in existing firms. A few examples of such collaborations:

Tata-BP Solar, Total's (French) 20% stake in Adani Green Energy Limited, GIC's (Singapore) 56% stake in Greenko, Masdar's (UAE) investments in Hero Future Energies, Abu Dhabi Investment Authority's (sovereign wealth fund) large stakes in Greenko and ReNew, and Goldman Sachs' (USA) 49% stake in ReNew Power.

SECI's role, and some of the other organisations considered in this paper all play a similar role of providing an organisational solution to a market coordination problem. The policy priority on solar deployment in India has been clear since the early 2010s, yet the fractured federal power market in India and its history of financial troubles was clearly not sufficiently attractive for market participants to take risks on these new generation technologies. Historically, an SOE would have undertaken these projects from origination, to capital raising, to financial closure, to technology licencing, to engineering and procurement, to land acquisition, to project completion and asset maintenance (for up to 20-30 years in the case of some power plants). But now, both older and newer SOEs are being used to lower market frictions and reduce bureaucratic red tape to allow private developers to undertake projects of various kinds. This transition of state-owned entities as greenfield infrastructure providers, to environment creators and facilitators is an essential part of the evolution of the political economy of infrastructure in India over the last decade. We can observe this kind of intermediary role in other newer SOEs as well.

Energy Efficiency Services Limited (EESL) is another example of a company which has been at the forefront of this new SOE wave in the last decade. EESL was an entity created in 2009 under the Ministry of Power by the recommendation of the Bureau of Energy Efficiency (BEE), for the mass deployment of various technologies which could help with India's energy conservation and efficiency efforts. While BEE had existed since the early 2000s, and had managed to establish various standards and labelling programs across the country, most of its work in deployment was limited to pilot programs in areas like street lighting, which could

demonstrate to state governments and other consumers the potential savings from switching devices (Malhotra et al. 2021). It had neither the financial resources, nor the mission to do national scale procurement. Not unlike the fractured power market described earlier, procurement of energy consuming devices (lights, water pumps, ACs) or energy monitoring devices (smart meters) at scale was also fractured across state markets and departments. This was complicated even more by the fact that state procurement was only a small part of electronic device consumption across India; nudging private consumers to switch technologies was a fundamentally different problem from convincing state governments to adopt certain technologies. Hence EESL was formed.

EESL calls itself an Energy Service Company (ESCO), and its main role in the last decade has been to procure energy-efficient technologies at scale and provide incentives for their adoption to market players across the board, whether they are state governments, utilities, private distributors or consumers. The initial equity capital for establishing EESL came from a range of power sector SOEs (NTPC, REC, Power Grid, and Power Finance Corporation (PFC)) (this idea of taking financial resources from incumbent SOEs and deploying them in other areas is a theme we will see again).

In the last decade plus of operation, EESL has certainly managed to scale a range of technologies and mainstream them successfully. According to EESL's 2020-2021 annual report (up to March 2021), the company has managed to install 12 million street lights across over a thousand urban clusters across India; it is working on expanding its street lighting program to rural panchayats as well. It has distributed over 370 million LED lightbulbs across all states and territories of India. It has installed over 1.6 million smart meters across India, which if used properly could help discoms significantly with monitoring energy consumption patterns, designing demand response incentives etc. And to a lesser extent it has also branched out into other areas, ceiling fans, ACs, charging stations for e-mobility and decentralized solar.

In the last few years, there certainly seems to be a little bit of scope creep on EESL's initial energy efficiency agenda, but the company has become a partner of choice for many new energy-related programs because of its track record and its ability to work with various state agencies to get things done.

In fact, this is one of the essential characteristics of both SECI and EESL that has made their different agendas so successful. They are part of the state and have strong financial and policy backing from their parent ministries, which gives them political capital and access to bureaucratic networks. These characteristics make it much easier for these entities to navigate the parallel bureaucracies of Central and state governments. There are very few large corporations in India who have the political capital to reduce frictions the way these new SOEs do. Not surprisingly, almost every major bilateral and multilateral development bank working in India's energy sector has either collaborated with EESL on a project, or has provided financial support to a company which has bid in the SECI auctions. Both MNRE and the Ministry of Power have actively nudged development banks to work with these organisations and support projects which use the commercial ecosystems they have created.

Newer Forms of Private Engagement

In a previous generation, the partners of choice for systemic change in the Indian energy system would have been large SOEs. The World Bank was essential in aiding the formation of NTPC in the 1970s as a large Central generator which could cut through the politics and inefficiencies of state SEBs to provide generation across state lines. In the mid-1990s, Coal India was given almost USD \$1 billion in loans from the World Bank to help restructure the company and pivot it towards a more sustainable revenue model, premised on large opencast mines. Bharat Heavy Electronics Limited (BHEL) has licensed many technologies from foreign firms over the last half century and brought them into India, particularly in the power sector. Many different actors

have tried to collaborate with state discoms over the last three decades to try to improve their financial and technical performance (Kale 2014). Because of SOE dominance in energy sectors, there was almost no choice but to partner with SOEs until the early 2000s.

Part of this was also because SOE-adjacent institutions were the gatekeepers for new energy technologies (and sometimes still are). Without the approval of the Central Electricity Authority, no new power generation technologies could be introduced in India. If one wanted to experiment with newer forms of coal mining, you could not bring it into the country without the blessing of the Central Mine Planning and Design Institute (the technical planning subsidiary of Coal India) (Chandra 2018, chap. 4). Since the parent ministries of various dominant SOEs relied on SOEs for assessments of new technologies, many of these SOEs and their technical wings could reject newer technologies, or encourage the companies (usually foreign) pushing these technologies to license them with the SOEs rather than have them available more broadly on the open market. Because of these issues, even after liberalizing in the early 1990s, foreign firms were initially reluctant to establish India operations. Those that did, like General Electric, often had SOEs as their largest clients.

What changed from the early 2000s onwards is that many of these gatekeeping institutions started losing their veto power as energy demand started increasing dramatically, and state SOEs struggled to meet these demands. Not surprisingly, this was also the period when policies promoting greater private involvement in energy sectors started taking off. From the early 2000s onwards, independent power producers started becoming a large part of the power generation mix, imported coal started becoming a larger part of domestic coal use, coal subcontractors and Mine Development Operators (MDOs) started getting more involved in coal mining more broadly (especially in captive blocks), the New Exploration and Licensing Policy (NELP) attempted to bring private oil and gas players to India, and various forms of distribution franchisee experiments started picking up across state discoms.

Global tenders also helped push these changes. Before the 1990s, when an SOE would float a tender for a particular service or technology, there was always an implicit assumption that if that business could go to a domestic firm (ideally another SOE), then it often would. Through such mechanisms, companies like Coal India, ONGC, NTPC and others held up an entire ecosystem of smaller manufacturers and SOEs which were generally much less productive and innovative. But from the 2000s onwards, with the safety net of government budgetary support gone, many of these larger energy SOEs had to find ways of improving their technological systems quickly in order to become more productive and profitable quickly. If these companies wanted better excavators for mining, drilling technologies for oil wells, more efficient boilers and turbines for power plants etc., sometimes they inevitably had to turn to foreign suppliers since such technologies were simply unavailable in India. A technology ecosystem that had been dominated by the Cold War dynamic, and often resulted in India receiving second-best technologies from the Soviet Union at affordable prices, gradually opened up to a much broader set of actors (Engerman 2018, chap. 3). An entire generation of technology suppliers and service companies like Komatsu, CAT, Schlumberger, Siemens, Alstom, GE etc. entered the Indian market during this post 2000s period to supply technologies for India's burgeoning energy demand and collaborate with both SOEs and private firms.

This also led to the emergence of a culture of subcontracting which spread very quickly over the next few decades. One of the best ways for SOEs with severe budget constraints and concerns about their bottom-line to enhance their productivity while avoiding long-term liabilities was to simply not hire full-time employees, but rather hire external firms to do work contractually. The SOE may own the mine, the power plant, or the oil well, but most of the employees and technology would be provided by external contractors who would be compensated on the basis of their production/extraction. And naturally, the SOE would manage

subcontracts in such a way that the SOE could earn a nice margin between the cost of the subcontractor and the price of the final good or service sold to downstream consumers.

As shown through the case of Coal India, this led to the conversion of large energy SOEs from being primarily implementers of greenfield projects in the 1970s-1990s, to also becoming massive contract-management companies from the 2000s onwards, where as much work on the ground was done by various levels of subcontractors as was done by the company's own employees (Chandra 2018, chap. 4). Such subcontracting environments are where many private companies in India first managed to gain access to the industry and understand how it works. This has been true around most energy-SOE dominated industries.

In the last decade, the technology environment with respect to energy has changed dramatically, especially with rapid scientific advancements in various forms of green and renewable energy technologies. As has been true historically, very few of these technologies have actually been developed in India, and whether it is solar cells and modules, wind turbines, newer battery technologies (for electric vehicles and grid-scale), hydrogen electrolysers, or more, the majority of these technologies are being brought into India from outside of the country. As Lema and Lema have argued, the entire SOE-centred approach behind licensing and technology transfer which dominated in India and China is starting becoming less relevant, and other forms of transfer and innovation became more widespread. As contrasted with the conventional mechanisms of technology transfer (imports, FDI/joint ventures, technology licensing) they describe a set of other unconventional mechanisms which are being increasingly adopted in both India and China. This includes joint R&D with multinational corporations (MNCs), acquisitions of overseas R&D labs, and cross-border mergers and acquisitions (Lema and Lema 2012). Not surprisingly, SOEs rarely have the capabilities or the government authorisation to engage in most of these unconventional mechanisms which extend beyond Indian borders.

Naturally, this is where private sector companies have stepped in over the last decade and a half. Companies like Suzlon (at one time India's leading wind power company) were first-movers in some of these unconventional mechanisms in the late 2000s, acquiring European companies which specialized in specific parts (turbines, blades etc.) of the wind power supply chain. More recently, we have seen major speculative moves by India's largest business groups in acquiring promising start-ups or early stage companies across the world.

For example, Reliance Industries' new subsidiary, Reliance New Energy Solar Ltd (RNE SL), has been on an acquisition spree in the last few years. After the oil-to-4G major's announcements regarding expanding into renewable and green energy in a big way (supposedly with a ₹ 75,000 crore investment war chest), and its commitment to net-zero carbon targets at its AGM, this space has clearly become one of the firm's new growth areas. In the last two years, it has fully acquired and provided growth capital to UK-based Faradion (an early stage sodium-ion battery technology firm), fully acquired Norway-based REC Solar Holdings AS (a high-quality solar PV and module manufacturer), acquired a 40% stake in Sterling & Wilson Solar (a leading Indian renewable EPC and O&M company), invested in the Series C fundraising round of Germany-based NexWafe (another high-end, specialized solar wafer manufacturer), and signed a cooperation agreement with Denmark-based Stiesdal A/S to manufacture hydrogen electrolyzers in India (John 2021). These are not just firms with manufacturing capabilities; many of them also have deep intellectual property portfolios and a strong R&D cultures which could have long-term payoffs as the global green economy scales up. While not as frequently or with as much fanfare, the Adani Group, Tata Group, Mahindra, Hero Future Energies, and have all engaged in their own deals, partnerships and acquisitions outside of India in this space as well.

The point here is that the giants of the Indian private sector, with deep pockets, faster internal decision-making, and considerable access to capital are simply able to move much quicker in

the international environment to conclude deals in these spaces than Indian SOEs. While not everyone can conclude deals at the speed of RNESL, this decisiveness in the face of technology uncertainty is simply not something that most Indian SOEs know how to deal with. Faradion and its senior management came to India on a road-show in late 2019, to market its technologies and seek Indian investors and collaborators. Despite Covid-19, Reliance did its due diligence, established RNESL as a subsidiary in June 2021, and by late 2021 had announced all of the acquisitions and partnerships described earlier.

There is considerable uncertainty in which green technologies may or may not scale during the upcoming energy transition. For example, when it comes to grid-scale batteries, it is far from clear which technology is “winning” at the moment; lithium, sodium-ion, compressed air, organic flow, even pumped hydro, are all under consideration and being deployed in different parts of the world. The last few decades of technology partnerships with Indian SOEs have largely been either buying established technologies off the shelf, licensing them, or in rare cases, figuring out how to modify existing technologies for Indian conditions (eg. BHEL’s supercritical boilers, or coal to methanol plants). As one Indian SOE senior manager put it to me “we do far more D [Development] than R [research] in our R&D.”

Unfortunately, this is also the consequence of a public sector financial culture which is highly risk averse, and more than willing to take punitive retrospective actions against officers who are perceived to have wasted resources or engaged in favouritism towards the private sector. RNESL’s acquisition of Faradion was for GBP £100 million, with another GBP £25 million invested as growth capital. Other than the staggering order of magnitude, no Indian SOE will likely ever get board authorization to engage in capital raising or foreign investment of these orders of magnitude. Officers within Coal India, Indian Oil, NTPC have been arguing with their boards and parent ministries for more than a decade to enter some of these new energy areas (particularly solar); their ideas have usually been rejected because of the kinds of

territorial battles that emerge amongst rival energy ministries. But there also seems to be a clear philosophical choice by the current government, which prefers implementation of newer greenfield projects by private entities, rather than allowing SOEs to diversify outside their historical core competence. While SOEs are certainly being co-opted into the energy transition in various ways, it seems to be in a more financially instrumental way than including these firms as genuine partners.

Asset Manager Capitalism and SOEs

Across the world, state-owned assets are increasingly being viewed through the lens of financialization. More than half a century ago, in the wake of World War II, after the gradual retreat of colonial capital, and confronting the limited interest and capability of domestic private actors, many countries decided to pursue strategies of state-led industrial growth in which SOEs rose as central economic actors (Gómez-Ibáñez 2016). However, in the last thirty years, with increasing financialization, many countries have chosen to use SOEs and their assets very differently. If we imagine a spectrum, on the left extreme would be the old-style industrial state capitalism, where SOEs still occupy the commanding heights of the industrial economy, have dominant market share in most strategic industries, coordinate with state interests, control prices, and are large, dominant actors in the domestic economy. On this side of the continuum, engineers and technical experts tend to dominate SOE management and operations and engineering competence, domestic capabilities and technology acquisition is just as important, if not more important, than financial outcomes and profitability. Many developing countries, including India and China could be considered to be on this side of the spectrum in the 1950s and 1960s. On the right extreme of this spectrum is the fully financialized state asset manager, where bankers, lawyers and economists manage a portfolio of state investments across industries. On this side of the spectrum, everything is about financial returns. Various investments are compared for their expected short-term and long-term returns,

portfolios are optimized quarterly and annually, strategic and technological decisions are subservient to financial performance. Employment and technology are not nearly as important as resource generation. The centralized asset manager which has its own statutory authority and legitimacy within the government ecosystem prevents political claim making and potential for interference and kleptocracy that accompanies a more disaggregated forms of SOE management. This is an ideal type, but Singapore's GIC and Temasek and China's SASAC can be considered closer to this side of the spectrum.

Most countries, including India, started on the left side of this spectrum in the 1950s and have been moving consistently rightwards since the late 1980s onwards. In India this movement has accelerated considerably in the last decade. While it has happened in fits and starts rather as a continuous, philosophically consistent process, India is trying to move closer to asset manager style control over SOEs (Chandra and Chatterjee 2022). This has come in direct conflict with the bureaucratic desire to maintain economic power of line ministries, which the ministries have tried to protect with limited success.

While there is a clear philosophical preference for private sector entry and expansion into all parts of the energy ecosystem under the current government, there is also a more myopic reason for financialization and sale of state assets; a series of policy decisions (including the demonetisation episode and the haphazard implementation of India's Goods and Service Tax) over the last decade, compounded by disruptive external events like Covid-19 and the recent commodity spike following the Russia-Ukraine war have actually left the Central government desperate for revenue. These revenue headwinds were in place well before the Covid-19 pandemic hit (Chandra and Walton 2020).

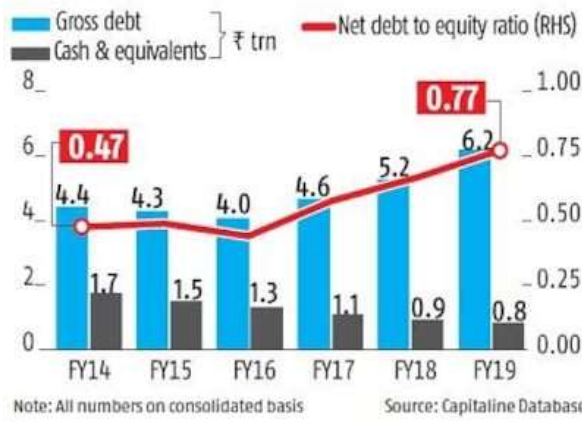
As described earlier, the privatisation agenda of the NDA from 2014-2019 was not successful. Almost every government in the last few decades has dramatically overestimated the

contributions of disinvestment and privatisation receipts to the Union Budget. In fact, between FY 2015 and FY 2020, the main source of reduction of government equity in SOEs came from SOEs buying each other (thereby giving the government cash), rather than any public sale of state assets (Banerjee, Sane et al 2022). This included ONGC taking a controlling stake in HPCL, PFC taking a controlling take in REC, and NTPC taking over the North Eastern Power Corporation Ltd (amidst other non-energy SOE transactions).

The deterioration of finances of large energy SOEs has unfortunately been an intentional and consistent part of state asset management philosophy over the last decade. If you look at **Figure 2**, the increase in gross debt and complete depletion of the cash position of SOEs across the board (mostly energy SOEs), is quite apparent (Jacob and Jai 2019). “[O]ne of the defining characteristics of this government has been its frequent use of PSU cash, bankability, CSR spending and public procurement to promote specific policy initiatives....Such asset stripping for short-term cash flow has faced resistance from the financial bureaucracies of PSUs, but these have usually been overruled by the board dominance of the IAS and other government representatives in major PSUs” (Chandra and Walton 2020). Economic commentator Ruchir Sharma has called this approach “privatisation by malign neglect.” As he describes it “India...has adopted a de facto policy of what I can only describe as *privatization by malign neglect* [emphasis added]. The political class can’t bring itself to sell off the old state companies, or to reform them either. Instead, it simply watches as private companies slowly drive the state behemoths into irrelevance” (Sharma 2016). When he wrote this, he was referring primarily to Air India, but as we can see this strategy has slowly be extending to other SOEs as well.

FINANCIALS WORSENERD IN THE PAST 5 YEARS

The trend in indebtedness and leverage ratio of top 10 central PSUs



Top PSUs' gross debt and cash equivalents at the end of FY19 (Figures in ₹ trillion)

Company	Gross debt	Cash & equivalent
NTPC	1.61	0.02
Power Grid	1.46	0.04
ONGC	1.07	0.12
IOCL	0.96	0.13
SAIL	0.45	0.002
BPCL	0.44	0.06
HAL	0.04	0.001
GAIL (India)	0.03	0.01
BHEL	0.02	0.07
Coal India	0.02	0.33

Figure 2: Declining SOE Financial Situation 2014-2019 (reproduced from Jacob and Jai 2019)

To be fair, not all of this money is being diverted to the Central government through buybacks, dividends, and other mechanisms. Some of it is still being used by these firms for energy-related economic activity, but often in very different directions from the earlier avatars of these energy SOEs.

NTPC has been primarily a coal-based thermal power generator (about 20% of all power generated in India comes from NTPC) for almost half a century. But in the last five years it has not only commissioned solar PV generation projects across India (21 projects of 1.7 GW commissioned, another 11 projects of 1.6 GW under implementation) but also incorporated NTPC Renewable Energy Ltd in August 2020, a subsidiary wholly dedicated to the renewably energy business. Although grandiose, the company claims to have a target of deploying 60 GW of capacity through RE sources by 2032 (this is equivalent to more than India's **entire** commissioned RE fleet of roughly 57 GW in July 2022), which would constitute roughly 45% of its overall generation. Since 2014, the company has issued almost ₹50,000 crores worth of

domestic bonds, much of which has gone towards its traditional business, but has also started issuing green bonds specifically for its RE business. Given the company's dominant position in the power sector, strong balancesheet, and history of operational excellence, much of this debt gets subscribed very quickly.

NTPC's power trading wing NVVNL, has also been the guarantor for the early NSM projects for the last decade. When SECI was first formed, it neither had the requisite capital, nor the experience in power markets to be able to provide the kind of guarantees that the NSM was proposing. Hence, for the last decade, an NTPC subsidiary has been piling up contingent liabilities for paying RE generators, and using its political capital within the power system to make sure that it gets paid on time, and is consequently able to pay private companies who had participated in Phase-1 of the NSM. Both SECI and NTPC benefit from tripartite agreements which allow the companies to claw back money from Central allocations to state governments if state governments are in significant arrears or payment default. Almost no other entity in the Indian power ecosystem has such advantages.

CIL has also begun responding to some of the international and domestic pressures of the energy transition. With the long-term future of coal under threat, and the necessity to eventually reduce fossil-fuel based power generation in the medium-long term, CIL has also begun thinking seriously about its future. As the company's Sustainability Report for 2020-2021 highlights, business diversification and the creation of new verticals within the company is underway. CIL has invested in two major urea projects for fertiliser manufacturing, is expanding its coal gasification footprint (converting coal to gas for domestic use), has set up an SPV for expanding into new and renewable energy (including solar, wind, hydrogen etc.), and has also announced its intention to enter the aluminium smelting business (Coal India 2021). CIL has also started participating in some of the reverse bidding e-auctions of state governments (not SECI) for RE projects, winning a 100 MW bid with a Gujarat discom.

Admittedly, some of these business meanderings seem more coerced than willing; why a Central and Eastern India based company (CIL) should be bidding on projects in Gujarat is an open question. However, many of the other projects are based in region where CIL has considerable social and political capital, and where private investment has been difficult to attract. Using CIL's resources in its operational areas (rather than wasting CSR funds in other parts of the country), for non-mining economic activities could be a very productive form of public investment (Chandra 2019).

After the relative failure of the privatisation exercise of Bharat Petroleum (BPCL) in the last few years, the government's goalposts have shifted from outright privatisation towards asset monetisation. The way the National Monetisation Pipeline (NMP) describes asset monetisation is the following: "Asset Monetisation, as envisaged here, entails a limited period license/ lease of an asset, owned by the government or a public authority, to a private sector entity for an upfront or periodic consideration" (Niti Aayog 2021a). While this would not technically be a sale of an asset, it would basically give the government money up front, and transfer control (but not ownership) of the asset to whichever private investor put up the most money up front. Then presumably this money would be plunged right back into the construction of productive new infrastructure assets. While such monetisation experiments have worked occasionally for NHAI, which has essentially sold the tolling rights for certain attractive highway corridors through its Toll Operate Transfer (ToT) model, there are very few assets which have such clear sources of revenue realization. Yet the NMP has massive monetisation targets for everything from power transmission, to power generation, to oil and gas pipelines, to mining, urban real estate and more. After almost a year of announcing this pipeline, the number of assets actually monetised so far has been fairly slim. Some incentives exist for fiscally distressed states to sell underperforming SOE assets. But more importantly, there is a fundamental problem at the root of this approach; can private parties unilaterally increase prices on whatever asset they decide

to bid on? As Amartya Lahiri points out “Perhaps the biggest drawback of the announced plan is that it fails to articulate the reasons for public sector inefficiency in asset management. If it is personnel related, then privatising management may be the right answer. If, however, the inefficiency is related to constraints on pricing and bill collection then the roots of the problem are unlikely to be addressed by leasing out their management to private operators” (Lahiri 2021). Given India’s history of frequently under-pricing and often subsidising various energy goods and services (coal, LPG, electricity, petrol, diesel), there may not be much political room to raise prices on these goods, even if the intent is there.

In many ways the NMP and its approach exemplifies the revenue-hungry asset manager mentality, without dealing with any of the thorny political economy problems of subsidies, redistribution, territoriality of SOEs and ministries, and much more. Reading Niti Aayog’s NMP documents, it definitely reads like a banker’s solution to a politician’s problem. And herein lies some of the major problems in Indian marketcraft in this space.

Conclusion

In Vogel’s conception of Marketcraft there are a range of governance areas where institutions need to be built (largely through government policy) to facilitate the deepening and broadening of markets. For him market development is about building institutions rather than reducing barriers. These include institutions and norms around corporate governance, accounting, banking, capital markets, labour markets, antitrust, sectoral regulation, and intellectual property. While the illustrative examples of SECI and EESL show the potential impact of Indian experiments with marketcraft in the energy space, what it also shows is that some of these institutions are essentially providing centralized workarounds for these norms, rather than dealing with the thornier problems of establishing the norms themselves. SECI becomes a way of bypassing the deeper problem that it is nearly impossible to hold a payment defaulting state

or Central government accountable in the Indian court system. Because power generators have to repeatedly interact with discoms, they have a strong disincentive to litigate against them. Only in desperate cases, or when the generators are influential enough, is legal action seriously considered. Perhaps this is what piecemeal Indian marketcraft looks like.

In their influential framing Pritchett, Sen and Werker argues that in many developing countries, the success or failure of private firms often depends on the kinds of short-medium term deals the firm can strike with the bureaucrats or politicians in power, rather establishing some kind of long-term, system-wide stable equilibrium (Pritchett, Sen and Werker 2017). As a firm you just hope that the deals last long enough that both parties can benefit and some profits can be realized.

If we apply this logic to the role of SOEs in India's energy transition then the nature of some of these deals is becoming more clear. Where SOE finances can be used within the company to further national goals related to infrastructure creation or Atmanirbharta (self-reliance) they are being used and the core missions of these SOEs are being gradually transformed away from fossil-fuel roots towards other priority areas. But leaving too much money on these companies' balancesheet is clearly considered a waste of valuable financial resources. In the long run, the survival of India's energy SOEs seems less important than being able to spend that money up front, whether it is to shore up Central government finances, fund new infrastructures, signal to the world that India is taking its climate commitments seriously, or provide guarantees to private investors to attract them to India. While the largest energy SOEs are clearly technically competent, financially viable actors in the energy ecosystem, their resources are often being used to deepen the private subcontracting and leasing ecosystems around state-owned energy assets.

Historically, the energy SOE and the state have had disproportionate power over private actors in the energy space. Given the political salience and patronage potential that control over energy goods and services provides, this is not entirely surprising. However, it would seem that this dynamic is gradually being flipped. While SOEs may continue to run much and operate much of the legacy energy infrastructure in India, much of the new energy economy is clearly being delegated to the private sector. New SOEs like SECI and EESL are part of a larger strategy of de-risking domestic markets just enough, usually using the financial and procurement heft of the state, that investors are willing to participate in the new energy economy. Even CIL, NTPC and ONGC are becoming more involved in contract management of private companies.

Unfortunately, the question emerging now is can these state-owned entities transition from being greenfield project implementers, to tender writers and contract managers who can actually hold private contractors accountable for the mistakes they make and the corners they cut? If a large MDO engages in legally questionable behaviour when acquiring land, resettling people, and dealing with a mine's environmental consequences, will CIL have the ability to hold that contractor responsible? If NTPC gives a large fuel import tender to a private firm, and that firm over invoices and overcharges NTPC for fuel, can that company be held accountable? If a private company wins a SECI auction, sets up a solar farm, but continues to use substandard, cheap panels which produce less power than expected, will there be consequences for that investor? If an LED manufacturer supplying in bulk to EESL has failure rates higher than expected tolerances, will that manufacturer face any penalties?

The reality is that many of these questions extend beyond both the responsibility or the political authorization of the SOE to the judicial, regulatory and standard setting ecosystem. And that's where the problem lies.

India is just emerging from an NPA crisis which was largely caused by overinvestment in certain kinds of infrastructure, power and steel in particular. Many private companies promised to build power plants which were simply not viable, which they often had no intention of actually running. And they did this primarily on the back of debt provided by state-owned banks. In trying to deal with the fallout of this overextension of the banking system, an entire new bankruptcy ecosystem had to be constructed over the last decade, which has still struggled to dispose of these cases quickly and effectively. Indian state-owned banks are still busy selling their bad assets to asset reconstruction companies today.

The number of institutional failures that led to the NPA crisis are staggering; accounting fraud and mismanagement, corporate boards completely failing to hold promoters and managers accountable, consulting firms actively advising clients on how to game the banking ecosystem, sins of omission and commission by financial regulators in regularly auditing scheduled commercial banks, banks intentionally underreporting the size of their stressed asset portfolios, non-banking financial companies overleveraging and financial engineering well beyond their means and much, much more.

Policy networks have played a big role in this transformation; as described earlier, until even the late 1990s, energy SOEs had disproportionate influence in sectoral policymaking. Given the lack of technical staff in most Central ministries, frequently what would happen is that SOE sectoral experts (particularly in coal, power, oil & gas) would often be seconded to ministries, or would be posted in Delhi and made available to their parent ministries for policy advisory work. Even today, the SCOPE (Standing Committee on Public Enterprise) complex in Delhi houses most of the major SOEs in India, and personnel from those offices are frequently working closely with regulators and parent ministries. However, what has changed in the last 2-3 decades is that the policy advisory space has suddenly become more crowded. Now in addition to the SOE expert, there are now more private companies with public affairs and public

policy personnel lobbying ministries and even the Prime Minister's Office (PMO) directly, there are influential sectoral consultants well-networked with top bureaucrats in their areas, and there are corporate lawyers in particular sectors who are also quite influential as well. In conversations with senior personnel at various SOEs (CIL, NTPC, BHEL), there seems to be a consensus that their SOEs' influence is in decline; they're still at the table, and can get themselves heard, but the table is much bigger now and they are not always the loudest voice in the room. The rule shaping power that SOEs had gradually accumulated in their sectors up until even the early 2010s has diminished considerably in the last decade.

Perhaps the learning from all of this, and from the few experiments in marketcraft that have been discussed in this paper, is that policy decisions can try to insulate certain parts of the market, or shelter certain sectors in trying to engage in productive building of market institutions, but this is not a substitute for having larger, functional ecosystem where actors can hold themselves and each other accountable without having to run to state to solve all of their problems. SECI can corner parts of the renewable energy market and make it safe, and EESL can create a facilitating environment for manufacturing, procurement and distribution of energy efficient products, but they cannot protect actors from the larger risks of the political ecosystem. If the Andhra Pradesh government decides to unilaterally cancel your generation contract from 7-8 years ago, or if the Uttar Pradesh government decides to "negotiate" with generators to only pay 60-70% of their arrears, there are very few places to go for participants in the Indian power sector for relief. You either grin and bear it, or you throw your hands up and leave the industry. In a recent column, economist Ajay Shah reflects on why private investment is still subdued in India, "Our [him and Vijay Kelkar] sense is that the private sector has been deterred by an interventionist state, policy risk, faults of public systems, such as the tax system, and the lack of rule of law followed by coercive state agencies, such as regulators....The problem lies in the tax system, the capital controls, the legal risk, the sudden

policy changes, and the fears associated with agencies and regulators” (Shah 2022). While these kinds of problems exist, marketcraft on the margins can only solve isolated problems for so long.

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