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Competitive neutrality in the Malaysian power sector: Removing barriers for a greener and more innovative energy industry

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** This work draws from a broader research agenda on state-business relations in Malaysia which has been conducted by the research team at IDEAS, including work on competitive neutrality. We would also like to thank participants of a focus group discussion and two reviewers for their insights and suggestions.*

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1. Objective of the Study

The aim of the study is to map out the regulatory framework and later assess whether the state of competitive neutrality is achieved within the Energy Sector in Malaysia. When SOEs and non-SOE players are able to compete on a level playing field, a state of competitive neutrality is achieved. This state is important for Malaysia to achieve as it signals an ecosystem that is vibrant and competitive, very attractive for both domestic and foreign investors.

The Energy sector and its needs are changing significantly and fast. Environmental concerns and international agreements such as the Paris Accord have pushed countries and companies to emphasise the environmental impact of different energy sources, adding a quality dimension to how electrons are generated (their *greenness*). A variety of policy instruments and voluntary schemes (renewable energy targets and portfolios, large scale solar auctions, carbon taxes, etc.) are increasing the demand for green energy over traditional fossil fuel sources, not just internationally but also locally in Malaysia to attract investors into the country.

The study is conducted via the collection of publicly available secondary data. Available literature and blueprints were also referred to, as part of an examination of the sector, its regulatory framework and its incentives. With regards to the energy sector, a focus group discussion with both regulators and market players took place as part of the study to better understand the challenges faced by the sector and its players in relation to competition and competitive neutrality. The paper was then reviewed both externally and internally, to ensure that the content was updated according to current developments within the sector. Additionally, the paper offers policy recommendations that can be applied to improving competitive neutrality within the energy sector.

This study is structured as follows. After the introduction in Section 1, Section 2 focuses on the economic characteristics of the electricity sector broadly, its historical treatment as a natural monopoly, and changes over time, such as the wave of deregulations and privatisations in the 1990s and, more recently, policies to support the growth of renewables. Section 3 does a deep dive into Malaysia's regulatory framework, tracing its evolution over time, key actors, and ownership patterns. Using the OECD framework on competitive neutrality, Section 4 discusses different policy challenges and gaps, and explores options that can be considered by policymakers to align the country's regulatory framework with the stated goal of decarbonising the energy sector and levelling the playing field between SOEs and private sectors. Section 5 concludes this study with some final thoughts on how to collectively promote a fairer, more inclusive, and greener power sector in Malaysia.

2. Introduction: Players, GLCs, and Local Regulators

For most of the 20th century, electricity was treated as a commodity, where the major concerns for policymakers and consumers were related to its availability and affordability. Frequently, the generation, transmission, and distribution of energy was overseen under the umbrella of one company, following a vertically integrated model. A company big enough to be involved in all those areas and operating in a critically important industry was rarely left to the private sector. Typically, such utility companies were held under government ownership: they have come to be known as state-owned enterprise (SOEs), or government-linked companies (GLCs). Technical and economic characteristics of the utility sector – as explored further below – led it to be regulated as a natural monopoly, with limited competition and rates set by a public regulator. This model largely represents Malaysia's existing power infrastructure, with few changes from reforms since the 1990s.

Nowadays, however, the energy system is changing significantly and fast. Environmental concerns and international agreements such as the Paris Accord have pushed countries and companies to emphasise the environmental impact of different energy sources, adding a quality dimension to how electrons are generated (their *greenness*). A variety of policy instruments and voluntary schemes (renewable energy targets and portfolios, large scale solar auctions, carbon taxes, etc.) are increasing the demand for green energy over traditional fossil fuel sources. Consumers with a solar rooftop system can utilise their own generation and sell surplus energy to the grid, giving rise to prosumers and thorny regulatory issues on how to pay for the system's reliability and backup capacity. Furthermore, given the intermittency of most existing renewable sources, the current energy system has to be adapted to incorporate more variable energy resources (VERs), which calls for investments in smart grid solutions, interconnections, and energy storage. Users with internet-of-things (IOT) appliances have the ability to adjust their energy load to the real, instantaneous generation cost, thus balancing the load demand. This non-exhaustive list shows how technology, environmental concerns, and policy choices are revolutionising the power sector across the globe.

As Schmalensee (2021) puts it, there is a historical and an emerging regime in electricity supply. The historical can largely be characterised as composed of dispatchable sources of energy and policies which are technology-neutral regarding generation. In the emerging regime, on the other hand, VERs play a much bigger role and policies are supportive of their growth. This shift, which is imperative to decarbonise the global energy system in line with net zero commitments by 2050, is both a challenge and an opportunity. It challenges incumbent players by disrupting their business-as-usual activities and by potentially mothballing carbon-heavy assets like coal power plants. It also opens a plethora of business opportunities to renewable energy (RE) producers, energy efficiency solution providers, electric vehicle manufacturers, battery storage companies, and so on.

Regulations that were appropriate at a given time may now be a barrier for innovation, energy efficiency, and decarbonisation. For that reason, scholars, practitioners, industry players, and regulators around the world are dedicating close attention to the institutional frameworks that can enable sustainable development, energy justice, and decarbonisation.

This study contributes to this debate by focusing on the role of competitive neutrality, as defined by the OECD (2012), in Malaysia's power market. While the Malaysian government has adopted policies which are compatible with the emerging regime in its pledges to boost VERs such as net-metering and

large scale solar (LSS) auctions, its industrial organisation and regulatory framework largely resembles the historical regime, with the predominance of vertically integrated GLCs operating with fossil-fuel-heavy generating assets and limited competition. In Malaysia, there is limited private participation in the generation sector through independent power producers (IPPs), but GLCs such as Tenaga Nasional Berhad (TNB), Sarawak Energy, and Sabah Electricity dominate transmission, distribution, and retail.

The existing players and current regulatory regime have been largely successful in delivering affordable and reliable energy supply to the country. Nonetheless, the characteristics of the emerging regime may be better served by opening up the sector to competitive pressures which can speed up decarbonisation and enable new business models and players to emerge. This will be key to mobilising the estimated up to US$ 415 billion needed for an ambitious energy transition in Malaysia until 2050 (IRENA 2023). Malaysian policymakers will also need to consider regulatory reforms that create a predictable investment environment for renewables while limiting fossil fuel subsidies (WEF 2023).

3. The Evolution of the Existing and Emerging Power Sector and Regulatory Regimes

In a time of deep technological change in communication and transportation, it is surprising to note that not a lot has changed in the hardware of the electricity industry since the times of Thomas Edison and George Westinghouse, who famously battled over the industry current standard (alternating over direct current). The existing electricity grid technology is largely similar to the original designs of Westinghouse and Edison (Bradford 2018). The scale today, however, is much larger than what was previously seen by the pioneers of the electricity industry. Today, generating stations (such as large nuclear or coal power plants) can reach gigawatts of capacity, and transmission lines can be extended across hundreds of kilometres, until the electricity is transformed into lower voltages to reach its final users. The growth of the electricity industry in the 20th century can largely be characterised by a gradual expansion of generating capacity and distribution reach under limited incremental innovation. Building power stations, transmission, and distribution capacity involves large sums of capital, which only a few companies were originally able to afford at a national scale. Furthermore, electricity consumption fluctuates throughout the day and over the seasons, and energy cannot be easily stored. Demand needs to be matched with supply instantaneously, all the time. This means that power stations need to be built to match total peak demand (and not the average demand) in order to avoid blackouts. Some of these power stations built to meet peak demand may be idle for significant periods of time, but they act as an insurance to the system, guaranteeing a reliability of supply. This is known as the excess capacity margin. An immediate issue is how to pay for that excess capacity, since those power plants will be called upon only when required.[1]

Historically, the solution to these simultaneous challenges has been vertical integration. If the same company is in charge of generation, transmission, and retail operations, it is easier to coordinate the system expansion and remunerate the different components of the system. However, vertical integration further increases the barriers of entry to competition, and can lead to market power over

[1] Perhaps the most notable innovation in energy generation during the 20th century was the rise of nuclear energy, but its deployment receded after safety and environmental concerns following accidents in the Three Mile Island (1979), Chernobyl (1986) and Fukushima (2011) plants.

consumers.

These characteristics of the electricity industry have made it hard to rely on the market price as a regulatory mechanism. Just like railways (a textbook example of natural monopoly), the electricity industry has high barriers of entry arising from the capital cost required to build the infrastructure and network effects enjoyed by the first mover. It would also be wasteful to have competing companies building transmission and distribution infrastructure next to one other. Therefore, historically, governments have stepped in to balance different needs. Their measures have included:

1. Regulating tariffs to prevent companies from exploiting their monopoly over the consumer base

2. Securing investments in generation and transmission in line with the country's growth plans

3. Expanding electricity access according to industrial or social priorities (such as impoverished areas and new industrial zones)

Government intervention can come in many forms and, as in the electricity sector, it has evolved throughout the 20th century. A simple intervention is for the government to directly own power companies and run the sector through a leading SOE, as has happened in a variety of countries (developing and developed alike), including the UK, France, Brazil, and Malaysia. There is a large body of academic literature on the pros and cons of direct government control that is beyond the scope of this paper, which is on competitive neutrality in the Malaysian power market. But it is worth noting that, in order to tackle issues of information asymmetry, rent-seeking, soft-budget constraints, and agency problems between governments and SOEs, governments have increasingly come to rely on indirect forms of control (Musacchio and Lazzarini 2014). These include setting up independent regulatory bodies and/or corporatising government agencies by reforming their governance and bringing in private shareholders, as has been the case in Malaysia and other countries.

The UK is commonly cited as a model for reforming the energy sector from a government monopoly towards a regulated and competitive market. Britain pioneered competition in electricity markets with the passing of the Electricity Act in 1989, which split the monopoly of the government-owned electricity generator and transmission company in England and Wales into two competing private electricity companies and another transmission company. The British model had three key characteristics (Reverdy, Marty and Bolton 2021):

1. Competitive retail markets, with the phasing out of regulated tariffs and consumers being allowed to switch suppliers

2. The establishment of an independent electricity regulator

3. The creation of a wholesale market (electricity pool) where generators compete on the basis of bids and are paid the system marginal price (SMP) for dispatch, and a capacity payment to incentivise investments in a generating capacity.

While the British model has evolved and been reformed since it was first implemented, it represents a

paradigm shift in managing the electricity sector, with more reliance on market forces under regulatory mechanisms to secure social objectives. Globally, reforms led to the unbundling of the sector, with competition moving faster in electricity generation and, in some jurisdictions, extending to retail. Because of network effects and the issue of wasteful duplications of infrastructure, transmission and the physical delivery of electricity to ultimate customers continued to be treated as a natural monopoly, either directly owned by governments or by the private sector, subject to tight regulations.

As summarised by Schmalensee (2021), the experience of restructuring the energy sector brought some good and bad news. Firstly, it demonstrated that competitive markets provide more incentives for efficiency than the previous arrangements of regulation or government ownership. However, in places with weak regulatory oversight, private players could now exploit their market power: the Enron scandal in California is perhaps the most notable example.

Therefore, while complex to design and implement, regulatory reforms to promote competition in the power sector have largely been successful in reducing generating costs and providing adequate investments for excess capacity. Currently, however, both the historical and restructured energy regimes have to contend with the challenges of decarbonising the power system and accommodating more intermittent generation (VER).

3.1 How Renewables Change the Energy System and Challenge Existing Companies

Currently, new energy generated by solar and wind sources are generally cheaper than new energy generated from fossil fuels, when measured using the Levelised Cost of Electricity (LCOE) metric. However, those sources are intermittent and their incorporation into the grid brings new challenges, which are not directly accounted for by LCOE cost comparisons.

Solar and wind plants are intensive in capital expenditures (CAPEX), but have minimal operational expenditures (OPEX) cost since they do not have to pay for fuel. Once the equipment installation is complete and a plant is connected to the grid, the energy generated by solar and wind installations will have zero short-run marginal cost (SRMC). This stands in stark contrast to other traditional sources of electricity generation, such as coal- or gas-fired power plants, which have OPEX costs deriving from fuel that needs to be bought constantly, and their higher maintenance costs.

The higher the penetration of zero marginal cost generation, the more it will upend the economics of traditional generation markets. This is so because the efficient scheduling of power stations is conducted by prioritising plants with the smallest SRMC, which is dispatched first. As demand fluctuates, more power stations are called to supply electricity from the lowest to the highest marginal cost, which, when aggregated, forms a dispatch curve. The system marginal price (SMP) is the cost of the last station required to meet the instantaneous demand of the system. This price is then paid to all generators under operation, and the difference between the SMP and the SRMC of a plant contributes to paying back its fixed costs.

To further illustrate this point: if all the energy demand of a given time can be met by hydro sources (which typically have a lower SRMC, since fuel is free), the SMP is typically low. However, as demand rises during the day, other more costly sources (such as natural gas) will be dispatched and the SMP, which is then paid to all generators, will rise. This model, however, may not be enough to induce future

investments or excess capacity for plants which may give stability to the system, but which will only occasionally be called to generate and receive the SMP. Therefore, on top of SMP payment for the energy actually generated, a payment for the available capacity can also be made for the plants on standby.

The growth of intermittent sources has deep implications for this model because it can, from time to time, drive wholesale prices to zero or even negative, reducing the SMP on average. With a lower SMP, plants that used to be profitable under the old regime may no longer be commercially viable and are pushed out of the system, resulting in early retirement. As articulated by the energy economist, Dieter Helm, when referring to traditional utilities such as E.OM and RWE: "In effect, the renewables cannibalise the fossil fuel plant, and the lower prices that result expropriate the electric utilities' shareholders. They have to write off their assets" (Helm 2017, 210). **This suggests that utility companies, not subject to competition, social or strong regulatory pressure to decarbonise, will slow the pace of the adoption of renewables to prevent cannibalisation with their own legacy assets.**

One way to reduce the intermittency of renewables is by investing in grid integration and energy trade between regions and countries. Another is by incorporating utility-scale energy storage solutions, which can come in the form of batteries, pump-hydro, and heat storage, among others. These are solutions at the supply level. Technological advances are now allowing solutions at the demand level as well. Smart meters allow for real-time energy consumption data, which, together with real-time pricing regulations, would induce load-shifting.[2] Active demand management has the power to flatten the curve of energy consumption, further reducing the average SMP and the profitability of high-marginal cost plants. For it to work, however, it is necessary to transition from flat rates, normally readjusted only yearly, to time-variant pricing options such as real-time pricing (Badtke-Berkow, et al. 2015).

Integrating intermittent renewables in an existing grid is a challenging task. Nonetheless, there are technical solutions and innovative business models to do so. Power markets that have advanced the most in decarbonisation efforts, such as California in the U.S. and Germany in Europe, show that the barriers are not technical. In contrast, the experience in these markets shows that under a strong political backing of environmental policies, supportive policies, and enforceable regulations, the pace of the decarbonisation of power markets can accelerate, even if such efforts may run contrary to the interest of incumbent companies. As argued by the International Energy Agency (IEA), all the technologies needed to achieve deep cuts in global emissions already exist, as well as the menu of proven supportive policies (IEA 2021).

2. For example, electric vehicle (EV) users can opt to charge their vehicles when the real, instantaneous price is at its lowest, and even sell this energy back to the grid during peak demand. There are similar industrial applications involving heat and load shifting, and hydrogen production.

4. The Power Sector in Malaysia

Malaysia's existing electricity system can largely be characterised as centralised through the predominance of vertically integrated GLCs, with some variations between Peninsular Malaysia, Sarawak, and Sabah. It thus resembles the historical regime of electricity regulation, with the introduction of elements of competition and regulatory oversight beginning in the 1990s.

Before 1990, the government directly controlled the supply of electricity through the National Energy Board (NEB). However, in 1990, the Electricity Supply Act introduced a new framework for electricity delivery. Alongside market reforms, the NEB underwent corporatisation in the same year under the Electricity Supply (Successor Company) Act 1990. This led to the establishment of Tenaga Nasional Berhad (TNB), with Khazanah Nasional Berhad (Malaysia's sovereign fund) as the largest shareholder. The Electricity Supply Act 1990 brought about the liberalisation of electricity generation in Malaysia, while TNB maintained a monopoly over transmission, distribution, and retail supply in Peninsular Malaysia. In the 2010s, another package of reforms was introduced in the sector and named the Malaysia Electricity Supply Industry (MESI) 1.0 plan.[3] A MESI 2.0 liberalisation reform package was proposed in 2019, but later put on hold after a government change in 2020 (Yeo 2022). By the last quarter of 2023, MyPOWER, which is a special purpose agency created to study power sector reforms, had concluded a new study with policy suggestions called *Future-Proofing Peninsular Malaysia's MESI* but it has yet to be translated to policy changes.

The Energy Commission, or Suruhanjaya Tenaga (ST), established under the Energy Commission Act 2001, serves as the main regulatory body for energy and gas supply in Peninsular Malaysia. Its responsibilities encompass economic, technical, and safety regulations. ST was also in charge of regulating the sector in Sabah, but that authority is now being transferred to the newly created Energy Commission of Sabah (ECoS) which is scheduled to be operational by 2024. Sabah Electricity Sdn Bhd (SESB) and Sarawak Energy Berhad (SEB) are vertically integrated utility companies in their respective regions.

Per the terms of the Electricity Supply Act 1990, parties interested in engaging in electricity generation must obtain licences. Section 9(1) of the Act specifies that individuals or entities must be licensed to operate installations or supply electricity to others. The ST, with the Minister's approval, grants licences to these entities upon the payment of fees and fulfilment of necessary terms and conditions. These licence holders are known as Independent Power Producers (IPPs). In addition to IPPs, TNB directly operates several power plants and holds ownership interests in various IPPs through its subsidiaries and joint ventures. There are no IPPs in Sarawak as generation is controlled by SEB Power Sdn Bhd, a subsidiary of Sarawak Energy, which is owned by the state government.

3. See https://www.singlebuyer.com.my/MESI.php.

Table 1: Key Stakeholders and the Main Structure of Malaysia Electricity Market[4]

	Region		
	Peninsular Malaysia	**Sabah**	**Sarawak**
Federal policymaker	Ministry of Energy and Natural Resources (NRECC)		
Regulator	Energy Commission (ST)	Energy Commission of Sabah (ECoS)	Ministry of Utility and Telecommunication (Sarawak)
Generation	TNB; IPPs	SESB; IPPs	SEB
Offtaker	TNB (Single Buyer)	SESB (Department of Single Buyer)	
Transmission	TNB Grid; Grid System Operator	SESB	
Distribution	TNB		
Retail	TNB*		

Source: Adapted from Kumar, Rahmat, Amanuddin 2021 and WEF 2023
**With limited exceptions, such as islands and the Kulim High-Tech Park (Kedah)*

The Electricity Supply Act 1990 also allows for the licensing of private installations that generate electricity for self-consumption (SELCO). This self-generated energy is not available on the retail market and is not transported via the national grid. **Currently, there is no third-party access to the electricity grid, which limits corporate power purchase agreements (CPPAs) and energy export**.[5] This prevents, for instance, an industrial consumer from directly sourcing green energy from a new solar farm developer in another state, which would have been transmitted by the grid. As one example, a factory in Penang with a strong mandate to become 100% renewable, and which could be a member of the RE100 coalition committed to 100% renewable electricity usage, currently cannot sign a power purchase agreement with a solar farm developer in Kedah.

Government plans such as the National Energy Transition Roadmap (NETR) have recognised the importance of enabling third-party (TPA) access to the grid to promote competition among industry players and enable energy exports (Malaysia Ministry of Economy, 2023). It includes pledges to lifting a RE export ban and setting up a RE exchange hub to facilitate cross-border trade.[6]

TPA access is a critical piece of market reform that will require amendments to existing legislation. Accounts from lawmakers (Yeo, 2022) and information collected from industry players and

4. Other government entities also play a role in the power sector, including the Ministry of Economy, which is leading the National Energy Transition Roadmap (NETR), the Sustainable Energy Development Authority (SEDA), which was established in 2011 to implement the feed-in tariff mechanism under the Renewable Energy Act 2011, the Planning and Implementation Committee for Electricity and Supply Tariff of Malaysia (JPPPET) and MyPOWER

5. With the exception of the Laos-Thailand-Malaysia-Singapore power transmission pilot of 100 MW under the ASEAN Power Grid initiative.

6. Singapore is expected to be the buyer of green energy from other ASEAN markets and pay a premium price over domestic markets, which could thus enable additional investments specifically for energy exports.

policymakers as part of this research estimate the approval process to be lengthy, technically complex, and subject to consultations with multiple stakeholders. At the time of writing this study, a bill enabling TPA had yet to be presented to the Parliament.

Regarding the provision of fuel- to fossil-fuel-powered power plants, two channels are utilised. The national oil company (NOC), PETRONAS, directly supplies natural gas through gas supply agreements. In this regard, third party access to existing, PETRONAS-owned pipelines has been implemented thanks to a lengthy process of opening up the gas supply to competition and reducing domestic subsidies (Lim and Goh, 2019). TNB Fuel Services Sdn Bhd, a subsidiary of TNB, handles the sourcing of other fuel sources, primarily coal.

In Peninsular Malaysia, following an amendment to the Electricity Supply Act 1990 in 2015, the single buyer is "ring-fenced" within TNB and purchases all electricity generated by IPPs at government-controlled prices. In theory, ring-fencing helps with the separation of accounts and reduction of conflict of interest between the different units within TNB (such as the single buyer and the grid system operator). The power purchaser (or off-taker) enters into power purchase agreements (PPAs) with IPPs and service level agreements (SLAs) with TNB-owned generation entities. These agreements are regulated by ST under the incentive-based regulation (IBR).

The transmission network, or the grid system, is owned and maintained by TNB and operated by the Transmission Division, referred to as the Grid System Operator (GSO). The GSO coordinates all parties connected to the grid system, and no other entities operate transmission networks.

4. 1 Renewables

Large hydropower follows a similar management approach, with both TNB and IPP-owned hydro plants generating energy supplied to the grid and single buyer. To promote the use of other renewable energy (RE, hereafter) sources, including mini hydro, several schemes have been introduced over the years:

- The Renewable Energy Act 2011 introduced the Feed-in Tariff (FiT), allowing approved holders (including homes and businesses) to supply RE to the grid.

- In 2016, the government introduced the Net Energy Metering (NEM) Scheme, enabling consumers who generate electricity from renewable sources to offset their total energy consumption. This encourages the uptake of renewables, which can be intermittent in nature.

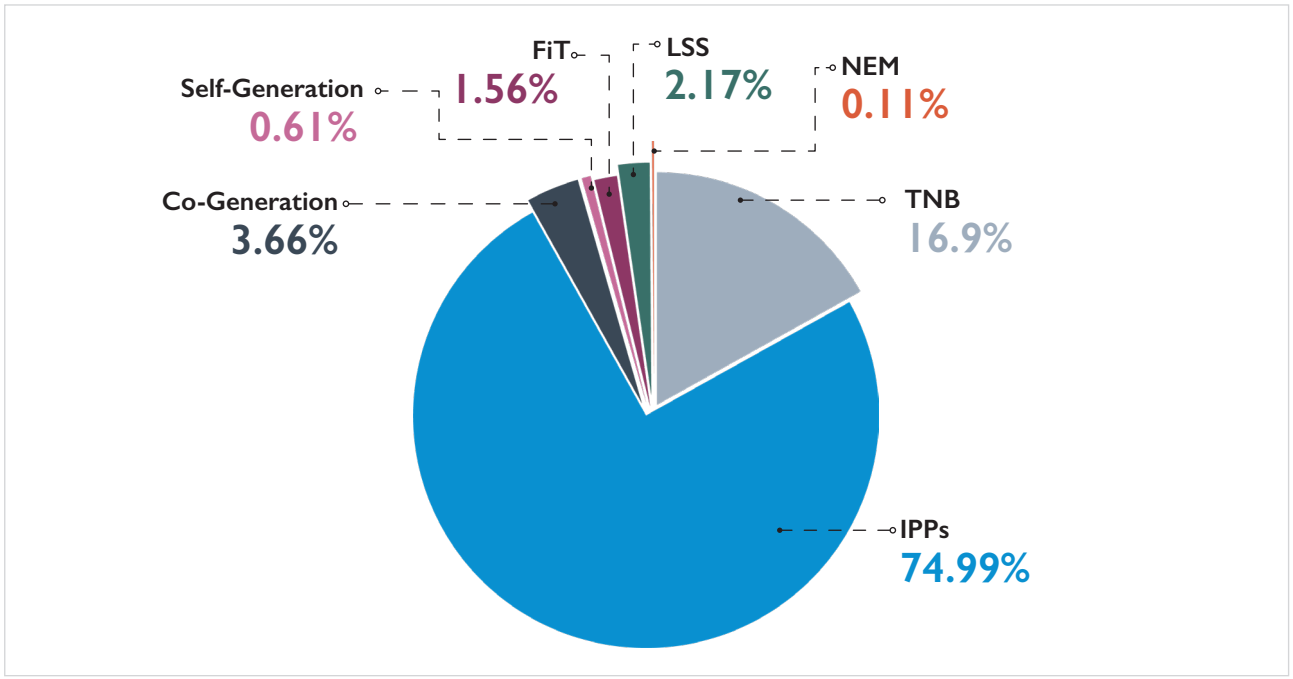
- In 2016, the government introduced the Large Scale Solar scheme (LSS), which has facilitated the widespread installation of photovoltaic power systems. Under the LSS, solar providers bid to supply energy to the grid through auctions administered by the ST.

- The National Energy Policy (2022-2040) and National Energy Transition Roadmap (NETR 2023) set aspirational targets of renewable share penetration and a list of projects and initiatives to boost green energy in the country. It sets a target of achieving 40% RE capacity by 2035 and 70% by 2050 and relies heavily on projects championed by government entities and GLCs (such as RE zones led by Khazanah, TNB, and Sime Darby Property). A 70%

capacity target would still fall far short of decarbonising Malaysia's power sector, as actual energy generation (in contrast to capacity) would primarily come from natural gas plants in this roadmap. Furthermore, there is no penalty announced if utility companies (e.g. TNB) miss such stated targets, unlike jurisdictions operating under a renewable portfolio standard (RPS).

About 78% of the country's installed generation capacity is located in Peninsular Malaysia (IRENA 2023). The majority of installed capacity in this region is provided by IPPs (74.99%), although this includes IPPs which are in fact TNB subsidiaries and joint ventures, which will be discussed further below.

Figure 1: Installed Capacity by Source Type in Peninsular Malaysia



Source: Energy Commission, Malaysia Energy Statistics Handbook 2021

4.2 Market Structure in East Malaysia

It is important to note that there are variations within the structure of the electricity supply industry in Sarawak and Sabah. In Sarawak, there are no licensed IPPs, and all energy generated and transported via the grid is directly owned and operated by the state-owned SEB. SEB-owned power plants include coal- and gas-powered plants and Malaysia's largest hydro plants.

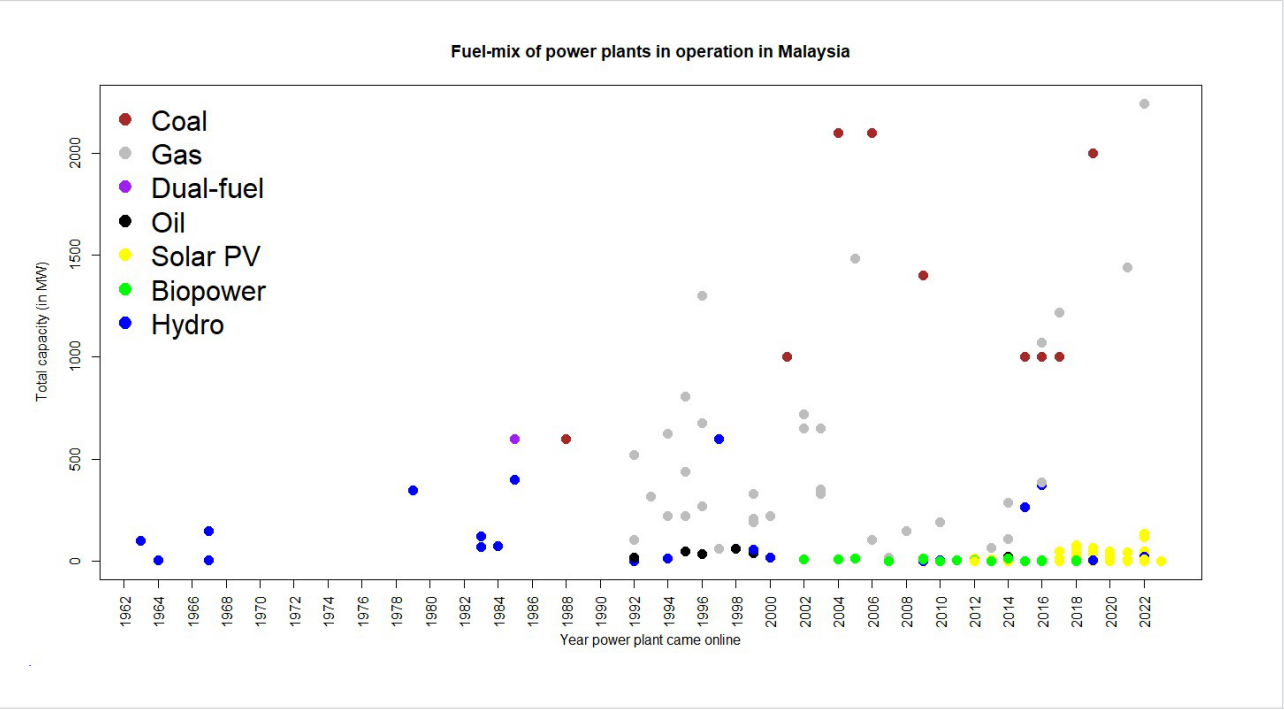
The electricity supply industry in Sabah mostly follows the industry in Peninsular Malaysia, with the SESB as the single buyer and GSO sourcing energy from IPPs and SESB-owned facilities. In Sabah, IPPs have the largest share of installed capacity, followed by SESB installations. The LSS auctions have also deployed solar capacity in Sabah. The state is in the process of directly managing the industry with the passing of new legislation[7] and creation of its own regulatory entity, ECoS. Both Borneo states have

[7] See https://www.nst.com.my/news/nation/2023/07/926052/two-bills-passed-address-electricity-crisis-sabah

also announced their own energy plans and initiatives, with a strong emphasis on leveraging on RE to achieve broader societal goals, such as job creation and energy inclusion.

Figure 2 below shows existing power plants in Malaysia according to their fuel sources and initial year of operation. As it is possible to observe, fossil fuel plants dominate the sector in Malaysia and have much larger capacity. They also have a higher *capacity factor*: the actual energy produced relative to its total capacity. Solar plants came to be part of the energy mix only over the last decade, and they are mostly of a small capacity. In fact, LSS auctions limited capacity to 100 MW as a way to promote new entrants to the sector. 4.3 Players in the Electricity Supply Industry

Figure 2: Fuel-mix of Power Plants in Operation in Malaysia



4.3 Players in the Electricity Supply Industry

Market Players in Peninsular Malaysia

The electricity generation industry comprises TNB installations and IPPs. The ownership and control of fossil fuel generated electricity is detailed in Table 2. TNB operates directly, or via subsidiaries, the majority of the installed capacity in Peninsular. Finally, TNB also has ownership interests in a number of joint ventures, including Kapar Energy Ventures, which is jointly owned by the Malakoff Group and Jimah Energy, which is in turn jointly owned by Edra Power holdings.

In addition to TNB, there are a number of other notable players:

- Edra Power Holdings Sdn Bhd and Malakoff Group are the two most important IPP owners in Malaysia with a similar market share. Edra was originally formed in 2014 from the consolidation of three major IPPs in Malaysia: Powertek Energy Group, KLPP Group, and Jimah Energy

Group. On 23 March 2016, Edra became a subsidiary of China General Nuclear Power Corporation following the acquisition of the Edra Group. Following the acquisition, Edra Power Holdings Sdn Bhd became the new holding company for these operating companies, comprising Edra Solar Sdn Bhd, Edra Energy Sdn Bhd, Powertek Energy Sdn Bhd, Jimah Teknik Sdn Bhd, Jimah O&M Sdn Bhd, and Tiara Tanah Sdn Bhd.

- The Malakoff Group is a subsidiary of the MMC Corporation, of which Syed Mokhtar Al-Bukhary is the company's biggest shareholder at 51%, while several government-linked investment companies own over 30%.

- YTL (Yeoh Tiong Lay) Power Generation Sdn Bhd, a wholly-owned subsidiary of YTL Power International, was Malaysia's first IPP when it was awarded its licence in 1993, which has since expired: the last of its PPA ended in June 2021. More recently, the group has been investing in a 500 MW solar farm development to supply a data centre in Johor, with a broader ambition to use Malaysia as an export base of green energy to Singapore.[8]

- Finally, PETRONAS also owns and operates a gas power plant in Pengerang, Johor.

Table 2: Ownership and Control of Fossil Fuel Generated Electricity in Peninsular Malaysia

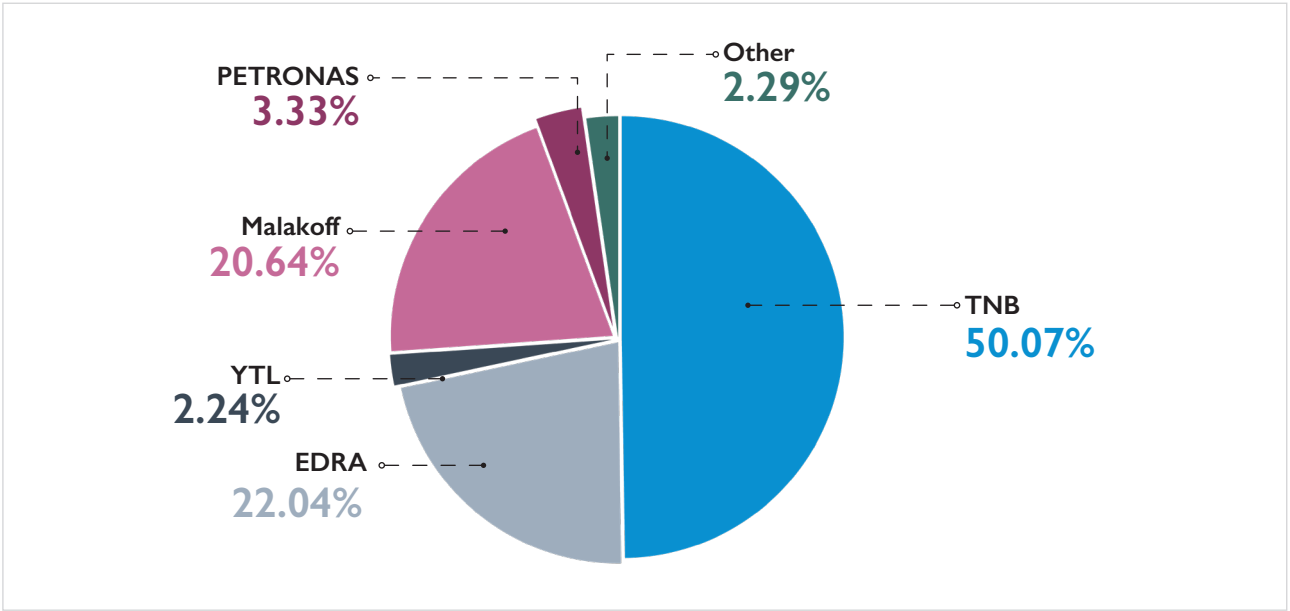
Name	Fuel	Capacity (MW)	PPA expire year	Owner
S.J Putrajaya	Gas	249	2025 Aug	TNB
S.J Gelugor	Gas	310	2024 Aug	TNB
S.J Tuanku Jaafar, Port Dickson	Gas	703	2028 Aug	TNB
S.J Tuanku Jaafar, Port Dickson	Gas	708	2030 Jan	TNB
TNB Pasir Gudang Energy Sdn Bhd	Gas	275	2022 Aug	TNB
TNB Janamanjung Sdn Bhd (M123)	Coal	2070	2030 Aug	TNB
TNB Prai Sdn Bhd	Gas	1071.43	2036 Feb	TNB
TNB Connaught Bridge Sdn Bhd	Gas	375	2037 Feb	TNB
TNB Janamanjung Sdn Bhd (M4)	Coal	1010	2040 Mar	TNB
TNB Manjung Five Sdn Bhd	Coal	1000	2042 Sep	TNB
Pahlawan Power Sdn Bhd	Gas	322	2020 Aug	Powertek (subsidiary of Edra)
YTL Power Generation Sdn Bhd	Gas	585	2021 Jun	YTL
GB3 Sdn Bhd	Gas	640	2022 Dec	Malakoff Group (subsidiary of MMC Corporation)
Panglima Power Sdn Bhd	Gas	720	2023 Feb	Powertek (subsidiary of Edra)
Teknologi Tenaga Perlis Consortium Sdn Bhd	Gas	650	2024 Mar	jati Cakerawala Sdn Bhd (80%), TNB (20%)
Prai Power Sdn Bhd	Gas	350	2024 Jun	Malakoff Group (subsidiary of MMC Corporation)

8. See https://ytldatacenters.com/locations/malaysia/ and https://theedgemalaysia.com/node/674332

Name	Fuel	Capacity (MW)	PPA expire year	Owner
Kuala Langat Power Plant Sdn. Bhd. (KLPP)	Gas	675	2026 Feb	EDRA
Segari Energy Ventures Sdn Bhd	Gas	1303	2027 Jun	Malakoff Group (subsidiary of MMC Corporation)
Kapar Energy Ventures Sdn Bhd	Gas	578	2029 Jul	Malakoff Group (40%), TNB (60%)
Kapar Energy Ventures Sdn Bhd	Coal	1474	2029 Jul	Malakoff Group (40%), TNB (60%)
Tanjung Bin Power Sdn Bhd	Coal	2100	2031 Sep	Malakoff Group (subsidiary of MMC Corporation)
Jimah Energy Ventures Sdn Bhd	Coal	1400	2033 Dec	TNB (20%), Edra (65%)
Pengerang Power Sdn Bhd	Gas	600	2038 May	PETRONAS
Tanjung Bin Energy Sdn Bhd	Coal	1000	2041 Mar	Malakoff Group (subsidiary of MMC Corporation)
Southern Power Generation Sdn. Bhd. (SPGP)	Gas	1440	2042 Jan	SIPP Energy Sdn Bhd (30%); Tenaga Nasional Bhd (70%)
Edra Melaka Power Plant (Block 1, 2, 3)	Gas	2242	2042 Dec	EDRA
Jimah East Power Sdn Bhd	Coal	2000	2044 May	TNB (70%); Mitsui & Co Ltd (15%); The Chugoku Electric Power Co Inc (15%)
NUR Generation Sdn Bhd	Gas	220		Rantai Wawasan Sdn Bhd

Source: ST Peninsular Malaysia Electricity Supply Outlook, GSO Operational Power Plants, Global Data, individual checks (various years)

Figure 3: Ownership of Electricity Generation Capacity



Source: Authors' calculation based on data from Table 2. Majority owned TNB plants were added to the total TNB's share

The hydropower market in Peninsular Malaysia is governed according to the same structures as for fossil fuels. Hydropower comprises a relatively small proportion of installed capacity in Peninsular Malaysia, with the vast majority of capacity directly owned and operated by TNB, with the exception of one mini-hydro facility.

Table 3: Ownership and Control of Hydroelectricity in Peninsular Malaysia

Name	Fuel	Capacity (MW)	Owner
TNB Installations			
SJ Temenggor	Hydro	348	TNB
SJ Bersia	Hydro	72	TNB
SJ Kenering	Hydro	120	TNB
SJ Chenderoh	Hydro	52	TNB
SJ Sungai Piah	Hydro	70	TNB
SJ Pergau	Hydro	600	TNB
SJ Kenyir	Hydro	400	TNB
SJ Sultan Yussuf	Hydro	100	TNB
SJ Sultan Idris	Hydro	150	TNB
SJ Hulu Terengganu	Hydro	265	TNB
SJ Tembat	Hydro	15	TNB
SJ Ulu Jelai	Hydro	372	TNB
IPPs (including TNB subsidiaries and Joint Ventures)			
Musteq Hydro Sdn Bhd	Hydro	20	Eden Inc Berhad

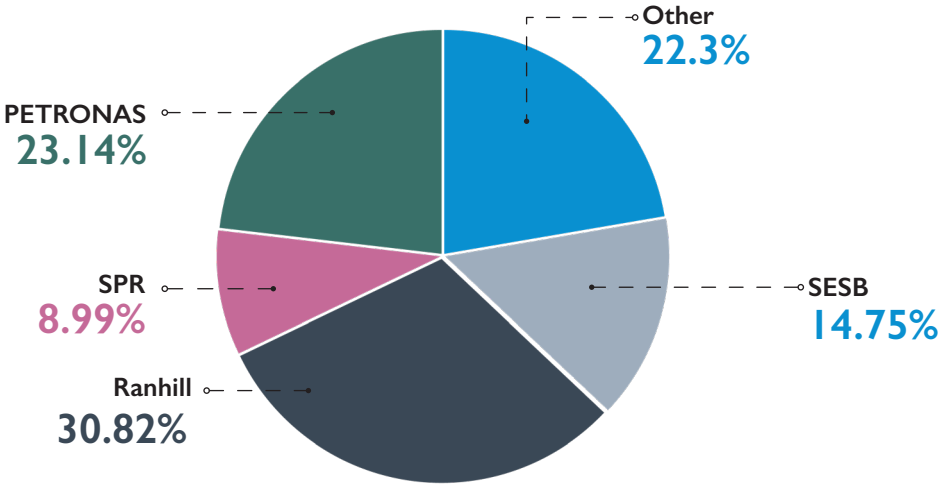
4.4 Market Players in East Malaysia

There are no IPPs in Sarawak, and hence all power plants (both fossil fuel and hydro) are directly owned and operated by SEB. In Sabah, SESB directly owns and operates a number of gas and diesel fuelled power plants. There are also a number of IPPs in Sabah. Most significant among these is the Ranhill Group, which operates two gas facilities and PETRONAS with one gas facility. The largest shareholder in the Ranhill Group is the Malaysian businessman, Hamdan Mohamad.

Table 4: Ownership and Control of Fossil Fuel Generated Electricity in Sabah

Name	Fuel	Capacity (MW)	Owner
Sutera Harbor Power Station	Oil	24	*
Labuk Canopy Power Plant	Oil	7.2	SESB
Lahat Datu Diesel Fired Power Plant	Oil	6.2	SESB
POIC Lahat Datu Power Plant	Oil	11.3	SESB
SESB Melawa Power Plant	Oil	18	SESB
SESB Gantisan Power Plant	Oil	34	SESB
Melawa Diesel Power Plant	Oil	50	ARL Power Sdn Bhd
Rugading (Ranhill II) Power Plant	Gas	190	Ranhill Power Berhad
SPR Gas Fired Power Plant	Gas	110.6	SPR Energy (M) Sdn Bhd
Kubota Power Station	Gas	64	SESB
Kimanis Combined Cycle Gas Fired Power Plant	Gas	285	PETRONAS
Batu Sapi Power Station	Oil	40	SESB
Sepangar Bay Combined Cycle Power Plant	Gas	105	Sepangar Bay Power Corporation Sdn Bhd
Libaran Power Plant	Oil	60	Stratavest Sdn. Bhd.
Teluk Salut (Ranhill I) Power Plant	Gas	190	Ranhill Power Berhad
Tawau Diesel Power Plant	Oil	36	Serudong Power Sdn Bhd

Figure 4: Share of Fossil Fuel Installed Capacity by Owner in Sabah



Most hydro facilities in Sabah are owned and operated directly by SESB, but are mostly mini-hydro facilities with low levels of capacity. The state government also participates in the sector through Yayasan Sabah, which has participation in the Inno Hydropower plants (of 40 MW).

4.5 Market Players in Solar (Peninsular Malaysia and Sabah)

Besides hydropower, the major source of RE in Malaysia is solar energy. A study done by the Sustainable Energy Development Authority (SEDA) of Malaysia estimates the total potential for solar photovoltaic (PV) to be 269 GW – including ground-mounted (210 GW), rooftop (42GW), and floating (17 GW) installations. These are orders of magnitude above the estimated potential for large hydro (13.6 GW), bioenergy (3.6 GW), and small hydro (2.5 GW) (SEDA 2021), making clear that **the future of Malaysia's RE is in solar.**

From a market perspective, the LSS scheme is the focus of this study, since it shows the highest growth potential. While important, the FiT and NEM are not competitive markets in the same sense, but rather incentive-driven investments, and they are expected to be less significant in the long term, relative to the capacity that can be provided by LSS.

To date, there have been four rounds of auctions administered by the Energy Commission, with 95 firms shortlisted to provide solar capacity to the grid of Peninsular Malaysia and Sabah. **As a result, solar is emerging as a more plural and diverse market than traditional fossil fuels and hydropower,** both of which normally have higher absolute capital costs (and MW capacity).

4.6 Government Control in the Electricity Supply Industry

As addressed before, governments have historically been active participants in the electricity market due to their role of providing utilities and the industry's high barriers to entry. This is particularly true for traditional fossil fuel powered installations, large hydropower plants, and nuclear plants, which require large scale investment.

In Malaysia, the state's presence across the electricity supply industry is particularly high, as well as diverse. The Malaysian state is present in the market in various forms, including through wholly-owned companies, statutory corporations, and as an investor, even in the emerging solar sector.

The table details the nature of government ownership across all the major market players identified for fossil fuel and hydro-generated electricity.

Table 5: Government Control of the Fossil Fuel and Hydro Electricity Industry

Name	Largest Shareholder	Other Notable Shareholders	Comments
Tenaga Nasional Berhad (TNB)	Khazanah Nasional Berhad (25%)	EPF (15%); ASB (10%); KWAP (7%); PNB (3%)	State-Controlled Firm
PETRONAS	Ministry of Finance (99%+)	Federal Land Commissioner (1 share)	State-Controlled Firm
Sabah Electricity Sdn Bhd (SESB)	Khazanah Nasional Berhad via TNB (80%) (in process of acquisition by the Sabah State Government)	Sabah State government (20%)	State-Controlled Firm
Sarawak Energy Berhad (SEB)	Sarawak State government (100%)	-	State-Controlled Firm
MMC Corporation	Tan Sri Syed Mokhtar Albukhary (52%), via Seaport Terminal (Johore) Sdn Bhd (100%)	ASB (20%); EPF (2%)	State-Linked Firm
Edra Power Holdings Sdn Bhd	China General Nuclear Power Corporation (100%)	-	Foreign Controlled Firm (Chinese SOE)
YTL Power Corporation (decommissioned PPP)	Yeoh Tiong Lay & Sons Holdings Sdn Bhd (44%), via YTL Corporation (42%)	EPF (5.4%)	State-Linked Firm
Ranhill Corporation	Tan Sri Hamdan Mohamad (22%), via via Ranhill Group	State Government of Johor (11%), via State Secretary of Johor Incorporated (100%); Lembaga Tabung Haji (6%)	State-Linked Firm

Source: Annual Reports of firms named

All firms engaged in non-renewable and hydroelectricity production are either state-controlled or state-linked. The only exception is Edra Power Holdings Sdn Bhd, which is now a subsidiary of a Chinese SOE.

The solar industry is composed of more firms and a more diversified ownership pattern. To date, close to 100 firms have been successfully shortlisted under the LSS scheme. This includes a number of private firms with diverse patterns of ownership and control. However, assessment of underlying ownership and control patterns identifies that the state is also present in the emerging large scale solar sector.

Table 6 below identifies some players from the shortlisted LSS providers in which the state—either federal or state government—have a significant ownership interest.

Table 6: Government Control of Large-scale Solar Firms

Nature of State Ownership	Shortlisted LSS Providers
Federal Government Controlled (defined as entities in which either the Federal Government or Government	TNB Renewables Sdn Bhd, a subsidiary of TNB in which Khazanah is the largest shareholder. SESB, jointly owned by TNB and the Sabah state government. Suria Capital Holdings Berhad, in which the largest shareholder is Qhazanah Sabah..
Linked Investment Company is the sole owner or is the largest shareholder)	IL Solar Sdn Bhd, a wholly-owned subsidiary of Integrated Logistics Bhd, in which Urusharta Jamaah Sdn Bhd is the largest shareholder. Lembaga Tabung Angkatan Tentera, a statutory body under the Tabung Angkatan Tentera Act 1973 (Armed Forces Fund Board). Serves as a pension fund for serving members of the Malaysian armed forces.
State Government Controlled (defined as entities in which either the State Government or Government Linked Investment Company is the sole owner or largest shareholder)	SESB, jointly owned by TNB and the Sabah state government. Sabah Development Energy Sdn Bhd, wholly owned by the Ministry of Finance Sabah. Tesdec Services Sdn Bhd, a subsidiary of Terengganu Skills Development Centre (TESDEC), established under State of Terengganu Economic Planning Unit (UPENT). Eastern Pacific Industrial Corp (EPIC) Solar Sdn Bhd, a holding company for various other subsidiaries and part of Terengganu Incorporated. Perbadanan Kemajuan Negeri Pahang, in collaboration with KPower Berhad.
Statutory Bodies (defined as entities in which a Statutory Body is the sole owner / largest shareholder)	UiTM Solar Power Sdn Bhd a part of UiTM Holdings Group, wholly owned by the Universiti Teknologi MARA (UiTM).
State-Linked (defined as entities in which any government entity is listed among the top 30 shareholders)	Consortium Malakoff Corporation Bhd, a subsidiary of Malakoff Corporation Berhad, in which the MMC Group is the largest shareholder and various GLICs are shareholders (collectively over 20%). Ranhill Utilities Berhad in which various GLICs are shareholders (collectively over 10%). Cypark Renewable Energy Sdn Bhd, a wholly owned subsidiary of Cypark Resources Berhad in which various GLICs are shareholders (collectively over 10%) and former diplomat Tan Sri Razali Bin Ismail is a former chairman and executive director. Advancecon Solar Sdn Bhd, a wholly owned subsidiary of Advancecon Holdings Bhd, in which various GLICs are shareholders (collectively over 5%). Uzma Environergy Sdn Bhd, a wholly owned subsidiary of Uzma Berhad in which various GLICs are shareholders (collectively, less than 5%).

The solar industry is significantly more diverse than traditional electricity sectors. The government is also a less significant player, with interest in about a dozen of close to 100 firms. However, it should be noted that these dozen firms are generally larger, and therefore, in terms of total capacity, the share of state-controlled or state-linked firms is larger. Furthermore, new initiatives, like the NETR, rely heavily on state companies and agencies to lead flagship RE projects, which could later lead to a market concentration in this emerging sector.

The solar industry is also diversified in scale and geographical location across the country. Typically, northern states in Malaysia such as Kedah have a higher solar irradiance and have therefore attracted more investments. However, future expansion will require further investments in grid capability to ease transmission congestion issues (IRENA 2023). Sarawak is absent from the list as it does not participate in the LSS scheme.

5. Competitive Neutrality in the Electricity Generation Industry

The previous section showed that the bulk of energy generation in Malaysia is concentrated in carbon-heavy assets, dominated by SOEs. The recent diversification towards solar energy has allowed new entrants into the market, although government-linked firms are not entirely absent. This section will explore why it is important to ensure there is a level playing field between SOEs and private firms, and to then apply the OECD competitive neutrality framework (OECD 2012) to the Malaysian energy sector.

An extension of the competition framework is the issue of competitive neutrality, which can be defined, following OECD (2009 p11; 2012) as a principle according to which all enterprises—public or private, domestic or foreign—face the same set of rules, and where the government's contact, ownership, or involvement in the marketplace, in fact or in law, does not confer an undue competitive advantage on any actual or potential market participant.

Given the high presence of state-controlled and state-linked firms in the electricity generation sector, the application of the competitive neutrality principle is particularly pertinent. Unlike some other jurisdictions, Malaysia does not currently have an explicit competitive neutrality framework. The nation has made progressive steps to reduce and regulate the role of the state in the economy through initiatives over the years such as the GLC Transformation Programme. These steps are consistent with principles of competitive neutrality and, when combined with the implementation of generic competition legislation, help to ensure SOEs are on the same footing as private enterprises. However, given the significant extent and complexity of SOEs in Malaysia, the full implementation of competitive neutrality across all sectors of the economy requires further efforts. In this section, we will consider the potential risks to competitive neutrality in Malaysia—specifically, how they manifest in the electricity generation industry, based on the necessary features for competitive neutrality identified by the OECD.

5.1 Streamlining the Operational Form of Government in Business

The OECD has found that an important aspect in addressing competitive neutrality is the degree of corporatisation of government business activities, and the extent to which commercial and non-commercial activities are structurally separated (OECD 2012). In Malaysia, there is no single

framework for the operational form of government in business, and SOEs can take many forms, including the form of statutory corporations and companies incorporated under the Companies Act 2016. SOEs can be ascribed both commercial and non-commercial functions, and these are not always clearly defined. For example, statutory corporations have functions that are specified in their respective legislation but these objectives—which are typically non-commercial—can be very broad, and have not prevented statutory corporations from establishing subsidiaries engaged in commercial activities across different industries.[9] This trend can be observed in the electricity generation sector with statutory bodies now engaging in the provision of solar energy (such as MARA).

All companies incorporated under the Companies Act 2016 (in which the government has an interest) should be commercial in nature. However, these entities can also be mandated with non-commercial functions. For example, GLCs are expected to contribute to Bumiputera development, a policy priority of uplifting the living standards of the "sons of the soil" which has been in place since the launch of the New Economic Policy (NEP) in 1971. However, the exact nature and extent of this commitment is not explicit. The lack of clarity with regard to the extent of the developmental roles of GLCs, and therefore the extent of their interaction and coordination with the government, may undermine effective implementation of competitive neutrality principles. Major GLCs such as TNB and PETRONAS are expected to play a significant role in Bumiputera development through vendor development programmes, hiring practices, and other routes. However, the extent and nature of actions taken to achieve these broadly defined goals are not explicit, which makes it harder to assess their effectiveness.

5.2 Identifying the Costs of Any Given Function and Accounting for Public Service Obligations

Identifying the costs of any given function of commercial government activity is essential if competitive neutrality is to be credibly enforced (OECD 2012). This is demonstrated in the electricity supply industry, where the single buyer and GSO are ring-fenced within TNB. However, not all TNB segments are separated in this way: for example, TNB Fuel Services (which enjoys a *de facto* monopoly position) is not ring-fenced from TNB Generation (which competes with other IPPs). In fact, under the existing regulatory regime, there is no incentive for IPPs to procure cheaper fuel than provided by TNB Fuel, since any potential savings cannot be internalised by generators (Kumar, Poudineh and Shamsuddin 2021; Yeo 2022).

5.3 Achieving a Commercial Rate of Return

Achieving a commercial rate of return is an important aspect in ensuring that government business activities are indeed operating like comparable businesses (OECD 2012). However, statutory corporations are not required to achieve a commercial rate of return.[10] The GLC Transformation

[9] For example, the Majlis Amanah Rakyat (MARA) is a statutory corporation established under the MARA Act 1966. The duty of the Majlis is defined in Section 6 as "*to promote, stimulate, facilitate and undertake economic and social development in Malaysia and more particularly in the rural areas thereof.*" However, the precise extent of this duty is not clearly defined, as the Act also grants broad powers to MARA to establish subsidiaries and undertake other commercial activities. MARA has been criticised for establishing subsidiaries in a diverse range of areas, including international real estate, which would not seem to align with the mandate defined in the Act. See (IDEAS 2020).

[10] No such requirement could be identified from publicly available sources.

Program included guidelines for GLCs to optimise their capital structure (Putrajaya Governance Committee 2006). Besides that, there is no legislative or regulatory requirement for SOEs to behave in certain ways with respect to a commercial rate of return. As such, GLCs and statutory corporations are not prevented from making unproductive investments, which can enable patronage. Indeed, this is consistent with the fact that many GLCs are implied to have broader, non-commercial mandates.

5.4 Tax Neutrality

The equal tax treatment of public and private business activities is important for competitive neutrality (OECD 2012). This paper has been unable to identify differential treatment of GLCs under the tax regime in the power sector.

5.5 Regulatory Neutrality

For competitive neutrality, it is essential that all entities are treated neutrally by regulators. The nature and implementation of regulatory neutrality can vary significantly across sectors. In the energy sector, there is no explicit preferential treatment for certain firms. However, given the high barriers to entry and the significant gatekeeping role occupied by the government and the ST, there is a risk of a lack of neutrality in how the licensing regime is applied. All power installations must be licensed under the Electricity Supply Act 1990, and all licences are awarded by the Minister on the advice of the ST. It is notable that virtually all IPPs are either directly state controlled or are state linked. Although this reflects the fact that IPPs are typically among the largest firms in Malaysia and therefore likely to attract institutional investors, it may also reflect ongoing patronage practices in the industry. While recollecting her time in office, former energy minister Yeo Bee Yin mentions the lobbying of well-connected companies to receive direct awards of IPPs (Yeo 2022), and how the practice leads to rent-seeking.

Another example of a politicisation of the licensing regime is in the differential treatment of foreign IPPs. Prior to 2015, no PPAs had ever been granted to a foreign company (a company owned and controlled by non-Malaysians). Indeed, IPPs are required to have no more than 49% of foreign owned equity. In 2015, however, the government made an exception for the acquisition of 1Malaysia Development Bhd's power assets by China General Nuclear for nearly RM 10 billion ringgit, making it the largest acquisition by value in the history of Malaysia's energy industry and the only time the Malaysian government has ever made an exception to the foreign equity rule and allowed a non-Malaysian entity to acquire 100% of the equity in an IPP. This exceptional decision was linked to the closer political, economic, and industrial co-operation between Malaysia and China as part of China's expansive Belt and Road Initiative (BRI), which in many cases has manifested in an increased presence of Chinese SOEs, either alone or in partnership with Malaysian GLCs (Gomez, et al. 2020). The LSS program currently limits foreign participation in projects, which is another source of regulatory barrier (WEF 2023).

These examples suggest a politicisation of the licensing regime, which is not consistent with the principles of regulatory neutrality.

5.6 Public Procurement

To support competitive neutrality, procurement policies and procedures should be competitive, non-discriminatory, and maintain high standards of transparency (OECD 2012). Although there are no specific provisions which favour SOEs in public procurement, one common criticism of IPPs has been the direct award of licences (Yeo 2022).

The process for LSS auctions can arguably be considered a form of public procurement. There have not yet been any specific allegations of discriminatory practice, but the auction is nonetheless administrative (rather than market-based) and therefore at greater risk of non-neutral outcomes.

5.7 Debt Neutrality and Outright Subsidies

According to the OECD, the need to avoid concessionary financing of SOEs is commonly accepted, as most policymakers recognise the importance of subjecting state-owned businesses to financial market disciplines (OECD 2012). In Malaysia, SOEs (both statutory corporations and GLCs) enjoy significant financial support from the government in the form of soft loans and statutory guarantees: in 2021 the federal government extended financial guarantees of over RM310 billion.[11] Specifically in the energy sector, Suria Strategic Energy Resources Sdn Bhd had a debt guarantee of RM7.1 billion in 2021.[12] This access to financial support presents a challenge to the full implementation of competitive neutrality in Malaysia.

Outright subsidies also need to be accounted for, to ensure they do not distort competition. In Malaysia, statutory corporations are subject to the reporting requirements specified in Treasury Circular PA 3.1 (2). This includes the requirement that statutory corporations separately report any financial assistance received from the government and report on their performance benchmarked against their objectives.[13] However, the transparency and timeliness of reporting varies across statutory bodies.[14] GLCs are subject to the reporting requirements of the Companies Act 2016 and—if they are listed—the Securities Commission, but this does not include any specific provisions relating to subsidies. Specific and ongoing public service obligations are generally subject to reporting requirements (such as universal service provision in the postal sector) but there are also examples of ad hoc subsidies provided with relatively low levels of transparency. For example, as part of the allocation from the COVID-19 fund, TNB was provided with RM500 million towards "electricity bill discounts." The precise accounting on the use of these funds – in the past and in the future – would be an important step towards transparency and accountability.

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11. Federal Government Financial Statements, 2021. Available at: https://www.anm.gov.my/images/JANM/Webmaster/BPOPA/Penyata-Kewangan/PENYATA_KEWANGAN_KERAJAAN_PERSEKUTUAN_2021.pdf

12. Reference to audited financial statements

13. Ministry of Finance, PA 3.1(2). Available at: https://ppp.treasury.gov.my/

14. Statutory corporations are not subject to the provisions of the Companies Act and the enforcement of the Companies Commission. Instead, reports are laid before Parliament.

5.8 Overview of Competitive Neutrality

The application of competitive neutrality may be particularly challenging in the electricity sector, given the small number of players, high degree of interaction with the state, and the significant presence of SOEs. However, application of the competitive neutrality framework can help to identify areas which may be a cause for concern. Table 7 below summarises the current state of competitive neutrality in the electricity generation sector in Malaysia.

Table 7: Competitive Neutrality Principles and Assessment of Status and Impact

CN Principle	Status	Impact Assessment
Streamlining the Form of Government in Business	The major GLC in the energy sector (TNB) is incorporated as a company and is publicly listed. However, other state-owned enterprises in the energy sector are statutory bodies (including state development corporations) and thus not legal companies. Non-commercial functions of GLCs, such as Bumiputera development, are not clearly specified.	
Identifying the Costs of Any Given Function	The costs associated with TNB's grid management and single buyer functions are identified according to the ring-fencing regulations. However, not all TNB operations across market segments are ring-fenced.	
Achieving a Commercial Rate of Return	The GLC Transformation Programme Purple Book establishes guidelines for SOEs to optimise their capital structure. However, GLCs are not subject to any specific requirements to achieve commercial rates of return, which could result in unproductive investments, including for state-controlled firms or state-linked firms investing in energy generation.	
Tax Neutrality	No evidence of discriminatory tax treatment	
Regulatory Neutrality	Evidence of politicising the licensing of IPPs	
Public Procurement	Scope to improve transparency in the awarding of contracts from the single buyer	
Debt Neutrality and Outright Subsidies	Extensive debt guarantees provided to GLCs, including in energy sectors. Insufficient financial reporting on subsidies received.	

5.9 Recommendations

Developing competition in the electricity sector is challenging, given the high barriers to entry and the significant role of the state. On the other hand, the risks associated with insufficient competition can be particularly pronounced in sectors with these characteristics. As observed in the sections above, the regulatory framework for competition in Malaysia's electricity sector could be further developed towards that direction, which would also contribute to unlocking new investment opportunities and promoting green growth. This study proposes policy recommendations in two areas:

- Reform of the electricity supply industry to increase the share of renewable energy and develop a more competitive market, in line with key principles of the NETR.

- Action to improve competitive neutrality both generally across the GLC landscape and specifically within the electricity supply industry.

Ongoing reform of the electricity supply industry

The precise design of the electricity supply industry is beyond the scope of this study, and is subject to a range of other factors including ensuring the security of supply and regional variation between Peninsular and East Malaysia. However, what is clear from the review of the international experience and Malaysia's regulatory reform attempts is that the government should clarify the direction of travel with industry reforms—whether embracing the latest study from MyPOWER, called Future-Proofing Peninsular MESI, or another reform framework—and that reforms should include clear steps to strengthen competition in the generation market and increase transparency and public participation in decision making (Hermann et al. 2022). Specifically, it is worth considering:

- Introducing competition into the retail segment and transitioning to a wholesale market for electricity supply

- Adopting clear guidelines and regulatory action to enforce competition in the electricity generation industry, including with respect to market dominance and concentration

- Establishing a fully independent single buyer and independent Grid System Operator through full structural separation from other TNB entities

- Implementing the TPA framework for grid access and moving away from TNB's de facto monopoly on fuel imports to introduce competition into the provision of fuel for electricity generation.

Table 8: Policy Recommendations Towards Achieving Competitive Neutrality in Malaysia

Competitive Neutrality	All sectors	Energy specific
Streamlining the Form of Government in Business	• Reverse proliferation of statutory corporations. • Introduce explicit mandates (legal or regulatory) for all non-commercial functions and expectations, including Bumiputera development	• GLCs in the energy sector including TNB and PETRONAS to provide detailed breakdown of action in support of non-commercial objectives, including Bumiputera development.
Identifying the Costs of Any Given Function	• Implement separate reporting of any non-commercial functions across all GLCs and statutory corporations	–
Achieving a Commercial Rate of Return	• Consider adoption of commercial rate of return requirements for all commercial GLCs and GLICs	–
Tax Neutrality	–	–
Regulatory Neutrality	• Review extent of regulatory neutrality in all sectors, prioritising sectors in which GLCs are present	• Adopt rigorous, transparent, and objective criteria for awarding licences
Public Procurement	• Abolish the use of direct negotiation, or use this method only for very rare, emergency occurrences (e.g. blackout risk) • Publish details of all GLCs awarded public procurement contracts	• Adopt rigorous and objective criteria for awarding licences • Publish transparent and objective merit criteria for LSS auctions
Debt Neutrality and Outright Subsidies	• Limit the use of statutory guarantees	• Any entities responsible for disbursing aid funds to provide detailed accounts

6. Promoting a fair, inclusive, and green power sector in Malaysia

The power sector has undergone significant transformations over the course of the 20th century, evolving from a vertically integrated model dominated by state-owned enterprises to a new regime characterised by the emergence of VERs and a growing emphasis on environmental sustainability. The historical treatment of electricity as a natural monopoly necessitated government intervention to ensure reliability and affordability. However, the transition to an emerging regime, driven by the proliferation of renewable energy sources and changing consumer dynamics, is presenting both challenges and opportunities.

The shift towards renewables is imperative for decarbonising our energy systems and meeting net-zero commitments. It challenges established players by disrupting traditional business models and

calls for significant investments in grid infrastructure and energy storage. While the existing regulatory framework in Malaysia has served well in providing affordable and reliable energy, it may no longer be suitable for fostering innovation, energy efficiency, and decarbonisation. Policymakers must consider reforms that promote competition, attract private investment in renewables, and reduce fossil fuel subsidies to mobilise the necessary funds for a sustainable energy transition, estimated to be up to US$ 415 billion until 2050 (IRENA 2023).

Renewable energy sources such as solar and wind are transforming the energy landscape by offering cost-effective solutions. However, their intermittent nature introduces new complexities into the power sector, including the potential for negative wholesale prices and the need for grid integration and energy storage solutions. These challenges underscore the importance of regulatory reforms and innovative business models that can adapt to the evolving energy landscape.

This study presented data on market structure and asset ownership in the energy generation sector and, based on OECD-identified features for competitive neutrality (OECD 2012), analysed the potential risks of a tilted level playing field in this sector. It discussed the concept of competitive neutrality, which is the principle that all enterprises—whether public or private, domestic or foreign—should operate under the same set of rules, and government involvement should not grant any undue competitive advantage. In Malaysia's context, competitive neutrality is particularly relevant due to the significant presence of SOEs and state-linked firms in the electricity generation sector. While Malaysia has taken steps to reduce the state's role in the economy, there is no explicit competitive neutrality framework in place.

In Malaysia, there is ambiguity in the roles and functions of SOEs. Statutory corporations, for example, can have broad and non-commercial objectives but may establish subsidiaries engaged in commercial activities. Similarly, companies incorporated under the Companies Act 2016 with government interest may also be mandated with non-commercial functions, lacking clarity in their developmental roles.

The National Energy Policy (2022-2040) and NETR (2023) rightfully argue that the energy transition is an opportunity to restructure Malaysia's economy by creating new businesses and jobs in the RE sector. It will be challenging to build a new economy on the basis of the old political economy. In the Malaysian case, the heavy presence of SOEs and state-linked firms in carbon-heavy sectors may slow down the energy transition.

This work emphasises the need for ongoing reforms in Malaysia's electricity sector to enhance competition, including introducing competition in the retail segment and enforcing competition in electricity generation. Even though the Malaysian government has been very active in publishing documents listing policy objectives and initiatives, a structural institutional reform of the power sector is yet to be presented to parliament. Meanwhile, enabling grid access through a TPA framework and fair wheeling charges is immediately critical to unlock private investments in the sector and energy exports.

This study also proposes measures to improve competitive neutrality, such as streamlining the form of government in business, identifying the costs of non-commercial functions, and adopting rigorous criteria for public procurement and licensing to reduce political influence and improve transparency.

As the world grapples with the sustainability imperative, the power sector must embrace change. The path forward involves a delicate balance between government intervention and market forces, with a focus on competition, innovation, and environmental responsibility.

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