Resource-State and Market-State Governance in Natural Gas Regulation: A Comparative Legal Analysis of Malaysia and Singapore

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ABSTRACT

This paper compares the legal aspects of the regulation of natural gas in Malaysia and Singapore by exploring the influence of two contrasting models of governance on the determination of energy security, market performance and integration of sustainability. The research follows a doctrinal comparative approach, which examines statutory frameworks, regulatory agencies and policy instruments that regulate natural gas industries of the two jurisdictions. The concept of the study views Malaysia as a resource-state regime, which is characterised by centralised control and dominance by the state through PETRONAS and Singapore is a market-state regime that is characterised by liberalisation, diversification of imports and regulatory autonomy under the Energy Market Authority. The results indicate that the resource-based framework of Malaysia gives more emphasis to strategic control and export-oriented production but limits market competition and price openness. Conversely, the liberalised regulatory architecture in Singapore promotes efficiency, investment assurance and consumer involvement since it entirely relies on imported natural gas. Both nations use natural gas as an intermediate gas for decarbonisation. However, Singapore has been using this as part of a market oriented sustainability approach, compared to Malaysia, whose primary source of decarbonisation is mainly through state-imposed regulations. This research can benefit the field of Southeast Asian energy law by demonstrating that institutional design has a significant effect on regulation delivery and sustainable patterns. The discussion presents the significance of measured market liberalisation, consistency in regulations and independence in institutions as a way of attaining long-term energy security and the energy transition agenda in developing economies.

Keywords: Energy law; natural gas regulation; energy security; market liberalisation; sustainability; comparative analysis.

INTRODUCTION

Different countries worldwide have different approaches in terms of their energy policies; however, the regulation of natural gas resources serves a central and increasingly pivotal role. Transitioning to natural gas is instrumental in reducing the reliance on dirtier fuels, as we do now, such as coal, which can be categorised as a high-emission energy source (Chandler, 2019). At the same time, it contributes to the ideology of lowering greenhouse gas emissions whilst aiding the climate goals in Southeast Asia (Marquardt et al., 2021). Just like other worldwide nations, nations in Southeast Asia also struggle with unique challenges in terms of regulating their natural gas resources aligned with their significant energy demands and rapid economic growth, to ensure sustainability and efficiency are managed (Rasyikah & Maidin, 2022). In this regard, the nations to be compared in this study are Malaysia and Singapore, as both nations differ drastically in matters of geographical status, yet both nations share energy concerns of natural gas's market liberalisation and policy adaptation (Hung, 2024). Despite this, Malaysia and Singapore deviate substantially in regulatory approaches following their policy priorities and resource endowments (International Energy Agency, 2023; Association of Southeast Asian Nations, 2022).

Focusing on Malaysia, a nation with considerable wealth in natural gas reserves, has established a regulatory framework to capitalise on its natural gas reserves to meet its export demands and domestic needs. The framework is governed by the Energy Commission of Malaysia, controlled by the Gas Supply Act 1993, visibly emphasising conducting its natural gas resources, simultaneously responding to the framework of sustainable energy policies (Suruhanjaya Tenaga, 2024). Malaysia's method has been about balancing between state takeover and market trends, making their approach exclusive and cumulative. This resulted in state owned enterprises playing a dominant role, although reforms to liberalise the market have been introduced (Hung, 2024).

On the other hand, natural gas resources for Singapore are limited due to its geographical location and area. Thus, Singapore is highly dependent on imported natural gas and it is instrumental to its natural gas regulatory framework. Singapore's energy guidelines mainly focused on promoting market competition, validating reliable gas imports and securing the maintenance of energy security, controlled by the Gas Act 2001 and governed by the Energy Market Authority. Market liberalisation in Singapore has resulted in a more competitive market structure via the privatisation of the market to prevent regulatory hurdles.

Malaysia's framework of regulation for natural gas is predominantly utilised by its national oil and gas company, more commonly known as Petronas. While this promotes a few strategic advantages, there are important challenges faced by Malaysia due to this centralised model. Since the Natural Gas market is yet to be fully authorised, this has resulted in restricted market competition (Shamsudin et al., 2021). Over time, this could result in Malaysia's global competitiveness in the energy industry. The high level of government intervention in the Malaysian natural gas industry, especially Petronas, has long been a limiting factor to competition in the market, with structural dominance of the long-term contract situation restricting the significant involvement of the private and foreign firms (Kumar & Stern, 2020). This type of market structure has also resulted in inefficiency in the gas value chain and the longer time to convert to a fully liberalised market, with consequences on pricing transparency and consumer costs (Lim & Goh, 2019). Moreover, the changing policy directions, such as the implementation of the Third-Party Access in the amendments of the Gas Supply Act 1993, have influenced the gas market in Malaysia because of the previous arguments regarding investment challenges and market distortions (Halim, 2018). Nevertheless, the slow and irregular pace of such reforms is an example of how regulatory uncertainty and changes in policies by the government still threaten market stability and investor confidence (Kumar & Stern, 2020).

Hence, Malaysia and Singapore address their unique challenges when it comes to ensuring stability and continuity of the natural gas supply to their people. The research highlights how each nation secures energy access while balancing economic and policy priorities by comparing Malaysia's resource-driven framework with Singapore's import-reliant market liberalisation. This alignment underscores the critical role of legal frameworks in managing energy supply chains and adapting to evolving international energy dynamics.

Theoretical Framework: The Resource-State and the Market-State Gas Governance.

This paper utilises comparative regulatory governance to examine the natural gas regulation in Malaysia and Singapore through conceptualising the two systems as the embodiment of two types of energy governance: the resource-state model and the market-state model. The resource-state model views the resources of energy as national strategic assets that are controlled mainly by the state institutions that take part in market activities to a minimal extent. This approach applies to Malaysia and the Petroleum Development Act 1974 and the Gas Supply Act 1993, which give PETRONAS dominant control over upstream and midstream gas operations and consolidate regulatory control to the Energy Commission. This arrangement puts national resource security and earnings as the first priority but limits the competition and responsiveness to prices in the market.

In contrast, Singapore is a case of a market-state form of governance, which is typified by liberalised energy markets, regulatory independence of ownership and oversight and dependence upon international supply chains. The Gas Act 2001 places the regulatory power in the hands of the Energy Market Authority and opens gas procurement and electricity retailing to competition. Instead of depending on resources domestically, Singapore ensures energy security by diversifying imports, investments in infrastructure, e.g. LNG terminals and open pricing.

The conceptual difference makes it possible to derive the comparative analysis of the descriptive difference in law and proceed to the examination of how the design of an institution impacts the results in energy security, market efficiency, consumer price and the sustainability transitions. The analysis of Malaysia and Singapore as these two governance archetypes helps the study to measure the impacts of varying regulatory frameworks on policy responsiveness, investment friendliness and renewable energy integration. This framework gives a systematic guideline on whether centralised resource regulation or liberalised market regulation gives better sustainability in addressing modern energy issues in Southeast Asia.

LITERATURE REVIEW

The Principle of Energy Security and Natural Gas Regulation

The principles of energy security are the foundation for reliable energy governance. Different approaches are taken by the governments of Malaysia and Singapore in regulating their energy markets while implementing the principle of energy security.

A conceptual overview by the Multidisciplinary Digital Publishing Institute (MDPI) stated that energy security is a multidimensional concept and introduced the '4As framework'. The framework constitutes the elements of availability, affordability, acceptability and accountability (Strojny et al., 2023). Energy security in Malaysia is strongly related to the management of its abundant natural resources of gas. The regulatory framework in Malaysia tries to ensure that energy is available and affordable for its domestic population while meeting export demands (Gas Supply Act, 1993). Nevertheless, the all-embracing approach to energy security is burdened with the difficulties in market dominance by the state and policy instability, the primary one pertaining to market competitiveness and resilience (Arezki & Matsumoto, 2017).

On the contrary, the natural gas system of Singapore emphasised another dimension of energy security because the energy market is import-based (Gas Act 2001). Considering its few domestic resources, Singapore is engaged in energy import diversification and strongly seeks market liberalisation to ensure the provision of energy in a reliable and competitive manner. This can be seen as an affordability and resilience implementation into its regulation system, which creates a strategic intersection with the overall goals of energy security, given the geographical constraints (Strojny et al., 2023).

The Australian Business Review discusses how green technology and the modification of policies are crucial to solving the energy and environmental problems in Malaysia (Kitney, 2024). Particularly, it describes the role of the country relying on non-renewable sources of energy in the degradation of the environment and states how strongly the transition to renewable sources of energy is needed. Natural gas regulation in Malaysia and Singapore raises the concern that national and regional policies should be oriented to the broader sustainability objective.

Malaysia continues to pursue energy security through the strategic utilisation of its remaining natural gas resources while progressively accelerating its transition toward cleaner energy consumption. This approach reflects broader international priorities that emphasise maintaining a reliable energy supply alongside environmental protection and climate commitments (Aziz et al., 2024). At the same time, policy assessments highlight the long-term decline of domestic fossil fuel reserves and the risks associated with continued dependence on oil and gas amid rising demand, reinforcing the urgency of diversifying Malaysia's energy mix (International Energy Agency, 2024).

In response, Malaysia has adopted an integrated policy framework through the National Energy Transition Roadmap, which promotes large-scale renewable energy deployment, energy efficiency measures and low carbon technologies while positioning natural gas as a transition fuel to safeguard system reliability during decarbonisation (Ministry of Economy Malaysia, 2023). These measures are further aligned with Malaysia's emissions reduction objectives, which prioritise expanding renewable capacity and reducing carbon intensity across the power sector as part of its broader sustainability strategy (International Energy Agency, 2023).

In sharp contrast, Singapore relies heavily on imported natural gas for its energy supply, reflecting both its lack of domestic fossil fuel resources and the need for market diversification to enhance energy security (Energy in Singapore, 2025). Natural gas accounts for the vast majority of electricity generation in the city-state and

Singapore has continued to expand its liquefied natural gas (LNG) import infrastructure, including plans for additional LNG receiving capacity to support long-term fuel supply reliability (Energy in Singapore, 2025; Singapore Gas Co to Seek LNG Offers, 2025). To further diversify its energy mix and strengthen resilience, Singapore is also pursuing cross-border low-carbon electricity imports. As part of its long-term energy strategy, the city-state aims to import several gigawatts of low-carbon electricity from regional partners by 2035, with initial targets of around 4 GW and more recent policy frameworks extending up to approximately 6 GW of low-carbon imports to cover roughly one-third of future electricity demand (Energy in Singapore, 2025; Green Plan & Regional Power Grids, 2025). These measures are intended to reduce the risks associated with supply volatility and price fluctuations while supporting Singapore's broader decarbonisation and sustainability goals.

Natural Gas Market Reforms: Market Liberalisation

In addressing inefficiencies and ensuring energy security, a nation should consider how it regulates its energy markets. The APEC studies have shown how liberalising an energy market improves regional energy security by examining natural gas market reforms in member countries. Starting with Singapore's natural gas markets, it is highly liberalised with very minimal government control, encouraging a competitive structure through privatisation and diversifying its natural gas imports (EMA) (Gas Act 2001). Singapore does not own any natural gas reserves. However, its liberalised market has nurtured efficiency and ensured energy security by significantly investing in its energy infrastructure, such as the LNG terminals, allowing reliance on long-term LNG contracts on natural gas imports to the nation (ICLG). Furthermore, market liberalisation in Singapore leads to better and more transparent pricing, as well as improved service quality for consumers due to the competition structure in the industry (Ali et al., 2022). Last but not least, clear policies and minimum government control resulted in Singapore's energy market being flexible, confident and stable, attracting investors to invest in their energy infrastructure and technology.

Next, Malaysia, the neighbouring country of Singapore, adopted a whole different regulatory framework and system for their energy markets. Malaysia's approach is focusing more on the state-owned energy market(Reuters Staff, 2007). Petronas is the state-owned natural gas company that owns most of Malaysia's natural gas reserves (Reuters Staff, 2007). Hence, since the natural gas market in Malaysia is dominantly owned by the state and under the government's control, minimal participation from the private sector is allowed access to these reserves. This limited privatisation makes Malaysia's energy market lack competition (Kumar, 2020). Maximum control from the government on its energy market results in instability in the market due to frequent changes in energy policy, aligning with the regulatory reforms and subsidy adjustments in accordance with the ruling government at the time. This instability creates uncertainty for foreign investors and decreases the market's confidence (Vagliasindi, 2025). Furthermore, this energy market model in Malaysia is rigid toward global energy transition because, in any global transition case, Malaysia has to go through stringent government procedures(Kumar, 2020).

In contrast to Singapore, Malaysia possesses considerable natural gas reserves and has conventionally based its energy market (both domestic and export) on them, at some stages focusing on foreign sales, rather than developing domestic competition and supply diversity. Nevertheless, the lack of competition in the market and the dominance of the state-associated units in the past have limited the overall efficiency of the market, and the stakeholders of the gas industry promote gas market reforms to improve their competitiveness and sustainability (Malaysian Gas Association, 2024; Energy in Malaysia, 2025).

APEC studies urge Malaysia to accelerate market liberalisation efforts to build up a competitive structure, attract foreign investors and meet domestic needs while also being able to better adapt to the global energy transition (APEC). Despite the big difference in geological location and resources of Malaysia and Singapore, Singapore has proven that the most important ways to ensure efficiency and energy security rely significantly on how the nation sets up its system in managing its energy market.

Sustainability and Renewable Energy Integration

The change to renewable energy (RE) is important for meeting long-term sustainability targets, especially in energy systems. To smooth the change by reducing reliance on coal while spreading awareness of the integration of renewable energy sources, natural gas is used as a significant "bridge fuel".(The Uncertain Role of Natural Gas in the Transition to Clean Energy, 2019) This analysis seeks to understand how Malaysia and

Singapore settle the sustainability and renewable energy integration within their respective regulatory frameworks, emphasising their distinct energy policies and strategies.

Natural gas is often described as a transitional or bridge fuel since it can decrease the use of coal and gradually replace it with the cleaner systems, whereas its role in decarbonisation is debated over time, due to lifecycle emissions and leaks of Methane (MIT News Office, 2019). Natural gas has been formally identified as a prominent transition fuel in the National Energy Transition Roadmap in Malaysia, where it will help to protect energy security and affordability and support the gradual increase in renewable energy and lower-carbon technologies (Ministry of Economy Malaysia, 2023). The roadmap realises that natural gas will still be a significant constituent in the national energy mix over the transition period as Malaysia tries to balance between sustainability goals and reliability of the system.

Comparatively, Singapore has no domestic sources of fossil fuel. It is nearly entirely dependent on imported natural gas, which is carried to the country by pipes and liquefied natural gas (LNG) to power electricity generation. The vast proportion of the power generation in Singapore consists of natural gas, indicating structural obstacles to developing large-scale renewables and the preference of the city-state to have abundant external sources of energy and focus on decarbonisation strategies in the long term (Energy Market Authority, 2025; International Energy Agency, 2023). This reliance on foreign gas highlights the energy security concerns of Singapore, despite the ongoing policy work to investigate the possibilities of importing renewable energy and other low-carbon solutions (New Zealand Ministry of Foreign Affairs and Trade, 2023).

Malaysia is a country with a moderate regulatory approach which aims at balancing the use of resources with environmental safety by means of a mixture of state stewardship and the encouragement of renewable energy. PETRONAS, under the Petroleum Development Act 1974, is endowed with ownership and management of the petroleum and natural gas resources in Malaysia, which facilitates the coherent governance of the resources, in support of the national energy security goals (Petroleum Development Act 1974). In addition to this centralised structure, Malaysia has established incentives on renewable energy via the Renewable Energy Act 2011 and Feed-in Tariff (FiT) system by the Sustainable Energy Development Authority to promote the use of renewable energy sources in the form of solar, biomass, biogas and small hydropower projects in an attempt to diversify the energy portfolio and eliminate reliance on coal (Sustainable Energy Development Authority Malaysia, 2025).

More recently, the National Energy Transition Roadmap officially places natural gas as a transition fuel and expedites the adoption of renewable energy and the reduction of emissions as part of an integrated policy approach to balance the focus on energy security, affordability and environmental sustainability (Ministry of Economy Malaysia, 2023). These policy and regulatory initiatives are also in line with the overall decarbonisation pledges of Malaysia, which focus on greenhouse gas reduction via increased renewable potential and energy efficiency, as well as low-carbon technologies (International Energy Agency, 2023). Collectively, these legal and policy tools can be used to explain how Malaysia is pragmatic in the management of natural gas resources as well as the development of renewable energy sources in the name of sustainable growth.

The support structure in Singapore is relaxed on the integration of renewable energy and natural gas; on the other hand, Singapore's energy policy is proactive and its natural gas is integrated with renewable energy and imported natural gas. By setting up an energy market structure, the Energy Market Authority promotes the idea of sustainability. Singapore has zero natural gas resources locally and it is very reliant on the imports of LNG, which happens to be a greener substitute for coal. The EMA has controlled initiatives to diversify energy sources, including solar energy, carbon price and energy efficiency initiatives and has ensured a stable and low-carbon energy future (Hung, 2024).

Natural gas is an intermediate energy source required by both countries, whereas the regulatory strategies are different. Using PETRONAS as a tool of resource management and promoting renewable energy with FiT schemes, Malaysia makes its point. Contrarily, Singapore is concerned with LNG imports and renewable energy to achieve sustainability objectives with the assistance of market-oriented policies of the EMA. Both countries are interested in lessening dependence on fossil fuels, but with different regulations, depending on their peculiarities in energy.

Regardless of the regulatory efforts, the overall situation with regard to sustainability integration has its challenges and opportunities, whereby the problems are still present in Malaysia and Singapore. Otherwise, the utilisation of natural gas in Malaysia may curtail the growth of renewable energy sources (Hung, 2024). This creates a problem of availability of LNG supply in the long run, as well as the achievement of carbon reduction levels, since Singapore does not have local natural gas resources. Careful improvements in legislative frameworks, increased cooperation between the countries and technical innovations can encourage the integration of RE in both countries.

METHODOLOGY

The approach to analysis used in this study involves a doctrinal approach to the study of the legal frameworks that regulate natural gas in Malaysia and Singapore. The methodology is reliant on the systematic review and critical analysis of the primary legal documents, such as the Act of Parliament and Subsidiary Legislation and their use to determine the strong and weak points of the legal frameworks of individual jurisdictions. Moreover, secondary data in the form of scholarly literature and policy reports are also included to put findings in greater theoretical and practical perspectives. The comparative character of the research also puts a special focus on the comprehension of the specific regulatory practices in Malaysia and Singapore. The resource-based model of Malaysia and the import-based liberalisation of Singapore are critically examined to establish the legal and policy loopholes and the effectiveness of the implementation of the regulations. Through this methodology, the study aims to suggest practical solutions based on the principles of law and comparative knowledge, which will provide a systematic discussion of energy security, market liberalisation and environmental sustainability in the natural gas industry of the two countries.

FINDINGS

The countries of Malaysia and Singapore have different strategies for controlling natural gas because of the institutional design and the motivation of the energy security interests. The centralised control via PETRONAS and the statutory control in Malaysia and liberalisation, competitive participation and diversification of imports in Singapore, respectively define the resource state model and the market state model. The contradictory paradigms deliver varying findings on the effectiveness of the market, price transparency and sustainability incorporation. A summary of the comparative findings is in Table 1.

Table 1. Comparative Regulatory Models of Natural Gas Governance in Malaysia and Singapore

Dimension	**Malaysia (Resource-State Model)**	**Singapore (Market-State Model)**
Legal Framework	Gas Supply Act 1993; Petroleum Development Act 1974	Gas Act 2001
Institutional Structure	Centralised governance dominated by PETRONAS and the Energy	Independent regulation by the Energy Market Authority with competitive market
	Commission	participation
Resource Base	Domestic natural gas reserves	No domestic reserves; fully import dependent
Market Structure	State-controlled with limited private participation	Liberalised market with private sector competition
Energy Security Strategy	Resource management and export oriented production	Import diversification via LNG terminals and regional electricity trade
Pricing Mechanism	Administratively influenced tariffs and subsidies	Market-driven pricing under the Open Electricity Market
Sustainability Integration	Renewable Energy Act 2011; FiT schemes; CCS initiatives	Carbon tax; LNG transition; solar deployment

Consumer Impact	Limited supplier choice; exposure to tariff adjustments	Retail competition; greater price transparency
Policy Flexibility	Subject to government policy shifts	High regulatory stability and investment certainty

Table 1 contains the fundamental legal and institutional differences between the markets in Malaysia and Singapore and it can be seen that the ownership of resources, market regulation and market structure are divergent in their outcomes in energy security, their system of prices and their sustainability integration. This analogy is indicative of the structural connotations of centralised and liberalised market regimes during the process of natural gas transition management.

The cases of Malaysia and Singapore are two different ways of regulating natural gas based on different priorities in energy security. The gas supply downstream in Malaysia is regulated by the Gas Supply Act 1993 (Act 501) according to which the Energy Commission is authorized to issue and oversee gas supply licenses via pipelines, which is indicative of a centrally administered regulatory framework historically consistent with the dominance of the national oil and gas company, PETRONAS, in the entire gas value chain (Gas Supply Act 1993, 2020; PETRONAS, 2024). Although such a structure is capable of supporting coordination and delivery assurance, Malaysia has also implemented market-opening steps under the Third Party Access (TPA) framework, which is supposed to help allow access to major gas infrastructure by various entities based on similar terms and encourage competition (Energy Commission, 2025). Simultaneously, the National Energy Transition Roadmap (NETR) of Malaysia also makes natural gas an intermediate transition fuel as it seeks a slow transition to lower-carbon energy channels without causing destabilisation of supply reliability (Ministry of Economy Malaysia, 2023). However, the policy argument of a better and more effective liberalisation and access policy has been strengthened by external price volatility and investment signals, especially when it comes to LNG import and terminal access, so that market participation and competitive procurement may evolve in a more credible way (PwC Malaysia, 2024; S&P Global Commodity Insights, 2023). In comparison, the gas industry of Singapore has been linked to proactive market development policies and institutional control by the Energy Market Authority, such as price-setting and procurement reforms, to a system that continues to rely heavily on natural gas as a source of power generation (Energy Market Authority, 2025; International Energy Agency, 2026).

Due to a lack of natural gas reserves in Singapore, it has established a growing dependency on external supplies, which has consequently led to a plan of market liberalisation and diversification. The Singapore LNG terminal enables the city-state to hedge the supplies of various nations, which will minimise the risks and promote energy security. The Gas Act of 2001, regulated by the Energy Market Authority, shows the promotion of a market environment that embraces competition and simplifies the entry of the private sector into the field. This flexibility enhances the capacity of Singapore to absorb external shocks and this falls in line with its bigger energy plan of integrating carbon pricing with renewable energy, such as solar power. This plan supports Singapore to be sustainable, energy-efficient and ensure there is a reliable electricity supply.

Both countries indeed have unique challenges and policy priorities that are reflected in their strategies. Malaysia seeks to create a balance of both domestic and export demands at a slow transition to cleaner energies. Meanwhile, Singapore develops a robust energy infrastructure as a result of the liberalisation process and connection with renewable energy sources. These differences help to explain how legal systems can be realigned to the various energy environments. Malaysia is preparing to take a more centralised approach to energy governance, while Singapore is preparing to take a competitive approach to market regulation. Both strategies are being pursued in order to ensure energy security and to facilitate sustainability goals.

The opening up of the energy market, as witnessed in Singapore, has limitless advantages and affects the country positively. To give an example, the liberalisation of the market results in privatisation and this affects the energy in a lot of ways, including competitive prices, greater efficiency of operations, consumer involvement and diversification of supplies, etc. Singapore has managed to prosper in the energy sector despite having no natural energy sources since the country has diversified its imports of LNG and promoted privatisation in the electricity sector and in the process, has decreased its dependency on a single supply chain. This is the complete opposite of what happens in the neighbouring countries of Singapore and Malaysia. Malaysia is more state-controlled and centralised and primarily controlled by PETRONAS.

Pricing of natural energy in this country is unpredictable and more costly in the centralised market in Malaysia. On 26th December 2024, Tenaga Nasional Berhad (TNB) announced an increase in its energy tariff that will be used in Peninsular Malaysia and the effective date will be 1st July 2025. The change is 14.2 per cent, which increases it to 45.62 sen/kWh as compared to 39.95 sen/kWh. This is to be adjusted during the Regulatory Period 4 (RP4), which will be between January and December of 2025 to 2027. The leading causes of this tariff hike are the expected increases in the price of fuel, especially coal and liquefied natural gas (LNG), which are the primary sources of electricity generation in Malaysia (Singh, 2025). In short, the suggested rate of electricity tariff increment is one of the attempts of TNB to provide the population in Peninsular Malaysia with a stable and sustainable supply of electricity, in the face of increased fuel prices and around 22 billion of the planned investments in the Malaysian energy infrastructure.

In Singapore, the electricity tariff was cut between January and March 2025, where it was reduced by 3.4 per cent to 28.12 cents per kilowatt-hour, mainly because global fuel prices had fallen (Electricity Tariff Singapore, 2020). Similar to Malaysia, the cost of electricity in Singapore is also pegged to the prices of fuel globally and, in particular, to liquefied natural gas (LNG) that generates 94.3 per cent of electricity (Romero, 2024). Nevertheless, the results of its energy market liberalisation can be traced in its cut of electricity tariff in Q1 2025 (Electricity Tariff Singapore, 2020). This liberalisation was carried out in 2018 under the efforts of the Open Energy Market (OEM). The OEM system enables electricity consumers, such as households and companies, to select the electricity provider of their choice and promotes competition, which would ensure that all retailers will offer a lower price and improve efficiency in their operations (Rollout of the Open Electricity Market (OEM), 2023).

Other than OEM, Singapore also has a Wholesale Electricity Market (WEM) where generators compete to provide the least expensive electricity. The efficiencies are directly connected with the fact that the market is capable of rapid incorporation of lower production costs of energy into tariffs (EMA | Electricity Market, 2018). As much as the carbon tax increase scheduled in 2024 is likely to increase prices, the present tariff cut shows that a liberalised market guarantees the consumer will be positively impacted by the cost adjustments (NCCS, 2023). It is this electricity cut that SP Group transfers to consumers by updating quarterly tariffs under the supervision of the Energy Market Authority (Energy Market Singapore, 2018), making it transparent and cost-congruent (Electricity Tariff Singapore, 2020).

Overall, the liberalised energy market structure in Singapore allows for maintaining an appropriate balance of cost efficiency, reliability and sustainability, providing equitable pricing changes in accordance with the real market trends.

Natural gas is used by both Malaysia and Singapore as a ‘ transitional fuel’ as they transit from coal to cleaner renewable energy sources (Chandler, 2019). In Malaysia, the country utilises its ample resources of natural gas to balance energy supply and fund renewable energy under the Renewable Energy Act 2011 and in FiT, solar and biomass projects (FIT – Renewable Energy Malaysia, n.d.). Being an unplanned city without a natural gas resource base, Singapore relies on the importation of liquefied natural gas (LNG), where the terminal in Jurong Island provides a diversification from piped gas imports from neighbours (Energy Market Authority, 2023).

It can be seen from the figures above that both nations feel the benefits of utilising natural gas in substantially lowering their emission of greenhouse gases. To date, Malaysia has been able to decrease its coal utilisation due to the accessibility of energy resources and diversify into biomass and solar power ventures (Awosushi et al., 2024). Singapore balances its LNG reliance with carbon pricing begun in 2019 at SGD 5 per tonne, raised to SGD 50–80 per tonne by 2030 to encourage alternative, cleaner technologies and decreased emissions (NCCS, 2023).

FiT maintains a fixed tariff of payments to energy producers, thereby fostering the use of renewable energy sources such as solar, Biomass and small-scale hydropower. The project scores high tariff rates to counterbalance start-up costs and provide economic engagement opportunities for SMEs and large companies involved in delivering solar photovoltaic (PV) ventures. Through the quotas and market flexibility that can be addressed through the Sustainable Energy Development Authority, the take-up of renewable energy is promoted and employment opportunities in the green technology industry are supported (MIDA, 2024; Sustainable Energy Development Authority Malaysia, 2025).

Through the Petroleum Development Act (1974), PETRONAS oversees the exploration, production and sale of Malaysia's oil and natural gas in a sustainable way in the interest of energy security. Also, in 2021, PETRONAS implemented carbon capture, storage and utilisation (CCSU), consisting of CCS undertaking the Kasawari CCS project, which captures 3.3 million tonnes of CO_2 per year. It is on green hydrogen acting as a catalyst on the National Energy Transition Roadmap (NETR) to stimulate emissions reduction and the formation of diverse energy (PETRONAS, 2023; Hung, 2024).

Singapore is interested in diversification of sources of power as part of the overall energy supply strategy. Hedging energy insecurity from piped natural gas through the Jurong Island LNG terminal; up to 4,000MW of imported low-carbon electricity from regional renewable initiatives planned by 2035 (Energy Market Authority, 2023). The carbon tax redistributes the collected funds back into subsidising and promoting new environmentally friendly technologies and providing assistance to companies regarding embracing low-carbon business models. These measures support Singapore's position as a pioneer of sustainable energy supply (NCCS, 2023). This comparison proves that market liberalisation helps ensure the certainty that energy prices align with trends of global fuel prices, without any interruption from politics and the state(Kumar, 2020). When Singapore can reduce their electricity tariff from January to March, due to the reduction of global fuel prices, Malaysia is silent on the matter and only reassured that during this period of time, there will be no increment yet. In Malaysia, the energy sector is centralised and state control discourages consumers' empowerment in many aspects of energy consumption, such as the high prices, the lack of options of suppliers due to a lack of privatisation and so on. Consumers in Malaysia have minimal options for their energy suppliers, which looks pretty inconvenient because, like in the case where TNB announces an increase in electricity tariff, consumers do not have other options to resort to.

RECOMMENDATIONS

In this regard, the proposed regulatory reform in Malaysia must focus on the implementation of market-based restrictions to improve the transparency of prices and efficiency of operation and enable the fluctuations in the cost of generation to be translated more consistently to the consumer level (Kumar, 2020). The existing centralised system of governance, whereby state actors, including TNB and PETRONAS, control the market, limits competition dynamics and could be one of the reasons why the cost of the system increases and less innovation is realised (Hon et al., 2015). Instead of wholesale privatisation, Malaysia may consider selective institutional reforms that are based on the Wholesale Electricity Market and the Open Electricity Market in Singapore, which encourage competitiveness in retail markets whilst maintaining regulatory control. These mechanisms would ensure increased consumer involvement, encourage energy-efficient behaviour and enhance service quality.

Regulatory sequencing is important in addition to the market design. Liberalisation should be done step by step and accompanied by the creation of greater institutional capability at the Energy Commission so that there is effective monitoring, intervention and resolution of disputes. Staged adoption ensures that regulatory bodies are able to deal with the transitional risks, whilst mitigating the stability of the systems. Policies should have precise legal requirements and regular regulatory cues to avoid policy discontinuities that can undermine investor confidence and slow down infrastructural development.

Simultaneously, strengthening the law by using clear tariff-setting procedures and predictable subsidy rationalisation systems would diminish market instability and enhance long-term planning. Explicit statutory directives on how to adjust the price of fuel and how to pass through costs might also help reduce the opposition of the population towards the tariff reforms, as it will make the regulators, the utilities and the consumers more responsible and in touch.

Malaysia can also gain by strengthening the regional energy cooperation, especially by electricity trading, as well as the diversification of the liquefied natural gas supply in the region through ASEAN. The supply resilience, price volatility moderation and renewable energy balancing across interconnected grids can be enhanced by regional integration. This kind of cooperation also correlates with the long-term energy transition goals in the Southeast Asian region and provides the chance to share the risks of infrastructure investments.

Regulatory reform should also include social considerations. Selective protection schemes such as income based subsidies and energy assistance schemes would assist in cushioning vulnerable households against transitional price increases to maintain the efficiency gains offered by market-based pricing. The incorporation

of social protections in energy laws means that the results of the reforms are reasonable and sustainable politically.

Lastly, the management of the energy shift needs to be more integrated between the natural gas regulation and the renewable energy policy. Natural gas needs to be put explicitly in the context of a transitional fuel in the legal framework of Malaysia, with more precise timelines and performance sets that establish the connection between gas usage and the implementation of renewable energy. Tightening the linkage between the Gas Supply Act 1993, Renewable Energy Act 2011 and National Energy Transition Roadmap would help to contribute to consistent decarbonisation policies and eliminate regulatory fragmentation.

Together, these initiatives underscore institutional change, legal transparency, regional collaboration and social insurance as supplementary elements of sustainable energy regulation. Instead of emphasising an exclusive market opening, the regulatory transformation in Malaysia must be incorporated in a blended approach that is balanced between efficiency, equity and environmental goals without jeopardising national energy security.

CONCLUSION

This paper has analysed the natural gas regulation in Malaysia and Singapore using a comparative governance perspective, which conceptualises both systems as being either resource-state or market-state regulatory models. The paper explains the varying results of different governance methods through statutory frameworks, market structures and sustainability mechanisms in terms of energy security, pricing transparency and renewable energy integration.

The centralised, resource-based structure, which the Gas Supply Act 1993 and Petroleum Development Act 1974 in Malaysia help to establish, places the focus on national control and export-related production via PETRONAS. Although this model would guarantee strategic management of resources, it would inhibit competition in the market, constrain consumer choice and responsiveness of the policy to world energy dynamics. On the contrary, the liberalised regulatory framework in Singapore, exemplified by the Gas Act 2001 under the Energy Market Authority, demonstrates how diversification of imports, competitive retail markets and regulatory stability can lead to efficiency, investment and facilitate adaptive energy transitions in the face of the lack of domestic natural gas resources.

The relative results indicate that institutional design is a determining factor of energy. The market-oriented structure in Singapore has proven to be more resilient to price fluctuations and costs can be more easily transferred to consumers. In contrast, the centralised structure of Malaysia is susceptible to policy change and uncertainty in investment. Natural gas is used in both countries as an intermediate step to decarbonisation. However, in Singapore, this process is incorporated in a more general market competitiveness approach, whereas in Malaysia, it is better organised in terms of state-driven plans and regulatory interventions.

Outside of the context of Malaysia-Singapore, this analysis adds value to the regulatory governance models of Southeast Asia by demonstrating how regulatory models affect market performance as well as sustainability patterns. The resource-state and market-state difference provides a transferable analytical tool for analysing natural gas regulation in other emerging economies. The paper highlights the significance of measured market liberalisation, institutional autonomy and regulatory unity in the realisation of long-term energy security as well as the promotion of the environmental agenda.

Even though the experience in Singapore can contribute to the significance of regulatory stability and continuous investment in renewable energy and the integration of the power systems regionally, the introduction of selective market-based mechanisms to increase the effect of competition and consumer empowerment in future regulatory reforms in Malaysia can be valuable. All these observations together attract the impression that adaptive legal systems have a central role to play in the management of energy transition in the global energy environment that is progressively being integrated.

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