High Costs of Electricity and Critical Supply in Solomon Islands – What Caused It?

Blog Post | W. *Kadi (Chevening Scholar 2022/2023, University of Aberdeen, UK).*

Energy Crisis in Brief.

As the demand for achieving long term climate resilience, energy affordability, energy security, and the SDGs are discussed repeatedly in the global narrative around climate change and decarbonization, island countries including Solomon Islands still face numerous challenges in the present to meet the energy needs of its people and small-scale industries.

The ongoing energy supply crisis in Solomon Islands is not isolated. In fact, it is part of a much broader Global Energy Crisis. A survey carried out by the Global Risks Report 2023 identified energy crisis as one of the top 5 current global risks. Yet, the context of energy crisis in Solomon Islands is unique and different in both scale and size from the energy supply crisis in developed countries where the energy markets are mature, and also comparatively distinct from the energy crisis in other developing countries. A UNDP report 2007 carried out under the Regional Energy Program and Poverty Reduction (REP PoR) outlined some challenges and the way forward for energy in the Pacific, including Solomon Islands.

This summary viewpoint is not intended to provide a full scope into the level of energy poverty faced in Solomon Islands. Instead, the discussions would focus on the regulatory framework, electricity tariff, demand and supply of electricity in the Honiara grid, and a brief insight into some reports and policies with an attempt to find out why the costs of electricity is much higher and what caused the demand and supply imbalances.

The current framework.

The Solomon Islands Electricity Authority (SIEA) trading as Solomon Power (SP) is a State-Owned Enterprise (SOE) created by the Electricity Act (as amended) with its regulations. The State Owned Enterprises Act 2007 (as amended) with its regulations, regulates the manner in which SP operates as an SOE, guiding SP's establishment and roles under the Electricity Act.

The current framework provides SP with the power to (i) establish, (ii) manage, and (iii) operate plants or generators for the production and supply of electricity, together with the right to determine its price for electricity that the responsible Minister would regulate for.

SP is positioned in an intersection where it functions in the private sector space through corporatization but remains an SOE. This allowed it to control the business of electricity trade yet continues to enjoy exemption from income tax in particular, as provided under the Electricity Act. SP is also accountable to the government as the owner of the entity, for instance, through its duty to prepare financial reports annually with an aim for profit.

SP performs multiple roles and bundles all services in the energy sector with exclusive control of the electricity market. The SOE Act also entrusted SP with the regulatory function to hold paramount oversight in regulating the business of electricity supply and trade – the very service it performs.

The supply chain for fuel import and export is regulated under the Petroleum Act and the Customs Act. The international price of fuel that SP rely on for its generation of electricity is determined by the OPEC and other factors beyond the control of SP, for instance logistics, and existing port arrangements regulated under the Customs Act.

One of SP's role in policy development can be interpreted from the requirement under the Electricity Act which calls for SP to secure supply of electricity at *reasonable prices* and for *generation of electricity with a view to economic development*. These aspirations require a collaborative web of policies that should link the national development strategy of Solomon Islands 2016-2035, relevant policies under the Ministry of Mines and Energy and Rural Electrification (MMERE), and alignment of policies among other key institutions and stakeholders that consequentially have a role to play in improving the energy sector.

Relevant national energy policies including Solomon Islands National Energy Policy (SINEP) 2014 with its subsequent reviews in 2019 and more recently the national energy strategy, the renewable energy roadmap, and other specific policies on the supply chain that would enable energy security; all these policies require a high priority reviewed implementation strategy which would also demand an extensive evaluation of the short term challenges, medium term goals, and long term goals for Solomon Islands in the energy sector.

Brief overview and discussion of gaps under the framework.

The Electricity Act does provide a licensing regime which permits a successful applicant to "work" or "operate" an installation, which created room for independent power production (IPP). Yet, the IPP aspect lacks clarity under the regulatory framework. Generally, the Electricity Act does not provide adequate scope to clarify procedures for license application and license modification, arrangements for integration of independent generators and suppliers into the electricity wholesale market, and the absence of clear provisions to protect the public interest to mention a few.

The generation, supply, and distribution of electricity need to be regulated under two separate markets – wholesale and retail electricity market. A wholesale electricity market is designed to accommodate trade among utilities. It facilitates the supply and sale of electricity between the generator and the distributor through the transmission system operator. The PPA between SP and Tinahydro is one example of such an arrangement in the wholesale market. The retail electricity market is the sale of electricity to consumers. This can be maintained by SP since it owns the existing transmission system which the wholesale generator can feed in to, while at the same time remain as the distributor for electricity to consumers based on its experience, and until further adjustments to the framework may be introduced to allow for competition in all aspects of the electricity trade.

The manner in which the Electricity Act was designed left out significant components that are vital to create a conducive and competitive environment for the trade of electricity. A re-evaluation of SP's role as the national electricity utility and the broader energy sector requires a holistic review of the existing framework, analysis of the current and potential market – including the possible integration of rural off-grid system into a coordinated national energy strategy and creating an economic environment that could be adequately measured as a demand factor which hopefully can drive the electricity market into expansion.

Challenges and Complexity: tariff regulation and demand and supply of electricity.

Tariffs are regulated under the Electricity Act. It provides that the Minister, on the recommendation of the authority (SP), sets the rates for sale of electricity. The Tariff Regulations apply all throughout Solomon Islands and also sets out the formula for calculating tariff rates. Rates may vary over time and these changes are affected by several factors including: operational factors, supply chain factors (considering logistics to avail fuel supply), and the complementary technology and innovative factors that drive the growth of renewable energy source, however slow it may be to develop fully in Solomon Islands.

Some more challenges affecting the determination of tariff and the stability of electricity supply include operational risks faced by SP as a corporate entity together with demand and supply factors, government support schemes (if any), generation capacity, supply chain disruptions, and market arrangements with IPPs.

Operational Risks Overview.

1. The scope of operational risks from 2010 to 2021 includes aging generators and transmission lines which are prone to system failure and downtime. These need to be improved to meet the ongoing demand for energy.
2. Data collection, management, storage, and control are some of the technical challenges in SP's operation. This requires quality assurance processes and software to assist in data management. There is also a high challenge of illegal electricity connectivity.
3. Natural disasters, pandemics, and fuel price volatility also pose huge risks to the operation of SP.
4. Process failure in customer service management and in its role as a regulator is also another operational risk. Faulty meter readings and handling frustrated customer matters is also an ongoing challenge in the management of customer service.
5. Other challenges including contractual disputes and litigation also pose more challenges in SP's operation.

On another note, the operational risks and challenges call for urgent government support schemes and political will. There is little evidence of government support schemes from the 2010-2021 annual reports of SP. Yet there is also ongoing policy development and review of energy strategic plans, and hopefully, strong government incentives would follow suit.

Most of the financing support to SP is through international finance mechanisms, especially under the World Bank.

Interestingly, the customer by tariff category in 2021 highlighted that the industry customer only comprised of 0.13% of the electricity consumption. Domestic customers form the majority 78.8% of total electricity consumption in 2021, while the commercial customer is on a low of 21% of the total category. This outlined an alarming gap and a rarely discussed issue of how the industrial and commercial sector is regulated in the light of electricity consumption and how that should be reflected in the country's energy strategy. One of the key reasons by observation is that majority of the primary industries in Solomon Islands – logging and mining, operate in an off-grid environment, where there seems to have been a lack of oversight and regulatory approach to it.

This article discussing impacts of electricity demand pattern on electricity system cost and the electricity supply mix does provide some insights to understanding how demand patterns and costs correlate. However, it was based on studies from a mature electricity market, Europe. The conclusion drawn from the article suggested that models can be used to investigate demand patterns. For its analysis, it used a techno-economic cost optimization model to study its case.

Outlined below are some generic factors determining demand and supply of electricity. These factors can be assessed in a localized context.

1. Population growth.
2. Expansion and Economic growth.
3. Climate change.
4. Technological innovation.
5. Generation capacity (MW/h).
6. Supply chain disruption and cost elements.
7. Energy mix.

Some technical factors determining electricity demand and supply are also listed below.

1. Regulatory constraints.
2. Public policy.
3. GNP (determining income).
4. Productivity growth.
5. Sound decision making.
6. Sound monitoring and evaluation system with improved technology.
7. Capacity and efficiency of the electricity market.

Summary Discussion.

The summary for the demand and supply gap can be described in one sentence – suppliers need to generate more electricity when demand is high, and less when demand is low.

The approach to achieve this suggestion requires an overhaul of the regulatory framework of the electricity market to deal with supply chain disruptions, enabling a reliable and consistent energy mix, an innovative approach to tackle grid connectivity challenges whilst also introducing efficient grid-fills and considering off-grid options, with clear legal and effective policies to guide the energy sector and its market forward.

As (in)actions are happening on the ground to resolve the demand and supply gap in the short term, SP would play a key role at the negotiation table to start considering the option of unbundling of the multiple roles it tightly gripped with firm hands as the responsible SOE.

Exploring Opportunities and the Way Forward.

Apart from the general functions of SP to generate, supply, and distribute electricity, there is an inadequate track record of independent power production (IPP). SP's 2019 Annual Report highlighted that supply from IPP in 2017 is 0.94GW while there is no data or otherwise no supply recorded in 2018 and 2019 which could be due to licensing issues or lack of expertise in developing IPP. This discussion would not delve into understanding IPP further, however, the record shows that IPP arrangements have somehow connected into the grid, despite so little.

This is an opportunity to further explore the potential of IPP capacity and connection to the grid and it requires immediate attention. Medium-term and long-term policy focus would still review the framework at large and integrate more renewable energy as expansion of the grid continues, but the immediate demand for electricity growing every year requires urgent action to identify and deliver available arrangements which can be entered into under the current framework.

Some barriers to IPP development which must be addressed include the following (summary note only and not exhaustive).

1. Regulatory instability and uncertainty, and lack of political will to develop IPP.
2. Shortage of skilled workers.
3. Lack of transparency, poor coordination of IPP and SP, and potential opposition to IPP due to the overall power of SP in electricity production and regulation.

That said, it must also be acknowledged that SP did enter into a Power Purchase Agreement (PPA) with Tinahydro which is expected to generate 5MW each from the three generator units. In the medium term it would relieve the ongoing demand, but it must be noted for consideration that the electricity regulatory framework may change dramatically during the same medium term when the PPA would operate, and towards the long term.

On a broader outlook, the vulnerability of Solomon Islands due to supply chain disruptions affecting energy security must be re-assessed. As a non-exporting petroleum country, it is vital to understand the country's location and potential in the context of the petroleum supply chain and explore the opportunities to participate in it. Detailed study is required with focus on the South-East Asia supply chain, and a re-assessment of trade ties with Papua New Guinea – particularly in the petroleum industry.

Final Thoughts.

The high cost of electricity and critical supply instability faced in Solomon Islands signals that immediate effort to pursue energy access, efficiency of supply, and energy security is critical for

consumer demand and economic development. Inclusive with the generic and technical factors determining supply and demand as outlined above, immediate government intervention and partnership with the private sector requires a focused action plan to leverage resources that would support and provide urgent capacity for SP. Involvement of other key government institutions and key stakeholders along the supply chain is necessary and must be in tune with any action plan developed.

Tariff and costs incidental to the supply of electricity may continue to rise and challenge the affordability of consumers. This summary analysis does not detail into the financial forecasts of SP but based on a quick glance into SP's financial highlights of 2017-2021, there is an indication of a fair amount of returns from its operations. What is interesting though is that SP's asset utilization appears at an average of 53% over the same period. Low asset utilization is a result of supply and demand factors, and government's controlling capacity. To compel asset utilization, optimize capacity and increase demand, review the type of industries the economy depends on and create the environment where downstream niche markets can thrive. That should result in increased demand and new opportunities, while at the same time it explains the logic for unbundling of key elements of the market as suggested above. In short, improve consumer and consumption capacity to accommodate supply capacity, and that should compel the supplier to improve asset utilization.

On a final note, national priority to improve the energy sector is crucial – not only for economic development and decarbonization, but more so to ensure that Solomon Islands is prepared to deal as the global market evolves and diversifies, disrupting and changing critical supply chain continues to shift, and an unprecedented generation of new technology and innovation towards renewable energy takes centre stage as the goal towards net zero.

Disclaimer:

The author is not responsible for any loss suffered by any person or entity on reliance of the contents discussed above. This summary opinion is not intended to be used for advice other than for the purposes of interpreting information which is already out there.