

OPPORTUNITIES AND CHALLENGES FOR OIL AND GAS IN SABAH'S WEST COAST

ECONOMIC BRIEF

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Key Facts on the Oil and Gas Industry in Sabah

- According to FACTS Global Energy, Sabah has approximately 11 trillion cubic feet (tcf) of gas and 1.5 billion barrels in oil reserves. This represents approximately 12% and 25% of Malaysia's total fossil fuel reserves respectively.
- The latest oil field discovery in 2011 is estimated at 227 million barrels in oil equivalent reserves. Indicating that there is more oil in the region than previously estimated¹.
- Sabah is Malaysia's top crude oil producer, with the Oil and Gas (O&G) sector contributing over 20% of the State's Gross Domestic Product (GDP)².
- In the Sabah State Budget 2018, total mining and quarrying activities were the second largest contributor to the state's economy, which had experienced a 180% increase since 2011, growing from RM12bil in 2011 to RM21.8bil in 2016. This was noted as entirely being due to the discovery of new oil fields.

Oil and Gas in Sabah's Economy

Among Asia-Pacific States, Malaysia held the fourth spot with 3.6 billion barrels as of January 2017, with Sabah State accounting the highest among all Malaysian States, making them a key component in Malaysia's hydrocarbons industry and a major driver of the overall economy. There are three major fossil fuel basins in Sabah, namely, the Sabah Basin, Sandakan Basin and Tarakan Basin. The Sabah Basin is the State's main oil field and is mostly offshore while the other two basins covering north and south eastern Sabah are mainly onshore extraction sites.

Sabah's Fossil Fuel Basins (Left) and Malaysia's Current Oil and Gas Fields, 2019 (Right)



Source: Research Gate, Sharif Moniruzzaman Shirazi

¹ <https://www.reuters.com/article/petronas/update-2-petronas-finds-significant-oil-off-malaysias-sabah-idUSL3E7MF0GF20111115>

² <https://www.theborneopost.com/2018/07/27/sabah-sets-up-taskforce-to-propel-oil-and-gas-sector-2/>

Sabah's immense level of oil and gas reserves has allowed the state to become the leading producer of hydrocarbons in the state, with 258,000 barrels of oil per day in 2017, representing 42% of Malaysia's daily oil production, with 32% produced in Peninsular Malaysia and 26% in Sarawak. In addition, Sarawak produced 61% of Malaysia's natural gas and Sabah by comparison produces 13% as summarized in the table below.

Reserves and Production of Oil as of 1st January 2017

Region	Reserves billion barrels			Production thousand barrels per day		
	Crude Oil	Condensates	Total	Crude Oil	Condensates	Total
Peninsular Malaysia	1.389	0.280	1.669	182.82	27.15	209.96
Sabah	1.647	0.121	1.767	258.12	18.61	276.74
Sarawak	0.809	0.481	1.290	113.54	59.81	173.35
Total	3.845	0.882	4.727	554.48	105.57	660.05

Source: National Energy Balance 2017

The abundance of fossil fuel reserves and high level of production has resulted in a large windfall of petroleum royalties throughout the years. In 2017, petroleum royalties accounted for RM1.24bil, exceeding the original estimate of RM0.98bil. In the year 2018, the budget estimated a petroleum royalty of RM1.32bil, in 2019, oil royalties amounted to RM1.70bil which is approximately 40% of the State's Revenue. The 2020 budget estimates a similar royalty payment of RM1.7bil. However, despite the drop in the global price of oil, the Sabah government still expects to offset the reduction in petrol royalties through the imposition of a petroleum sales tax which according to Chief Minister Shafie Adpal would collect RM50mil each month based on forecast price of US\$25 per barrel and US\$1.80 per million British thermal unit (MMBTU) for natural gas.³

Energy Sector in Sabah

According to the Sabah Electricity Supply Outlook 2019, published by Suruhanjaya Tenaga, Sabah's economy is primarily driven by services and primary industries such as mining (which includes petroleum extraction). The dependence on primary industry is due mainly to the infrastructure network of Sabah which does not reinforce the ability to improve downstream electricity supply across the state.

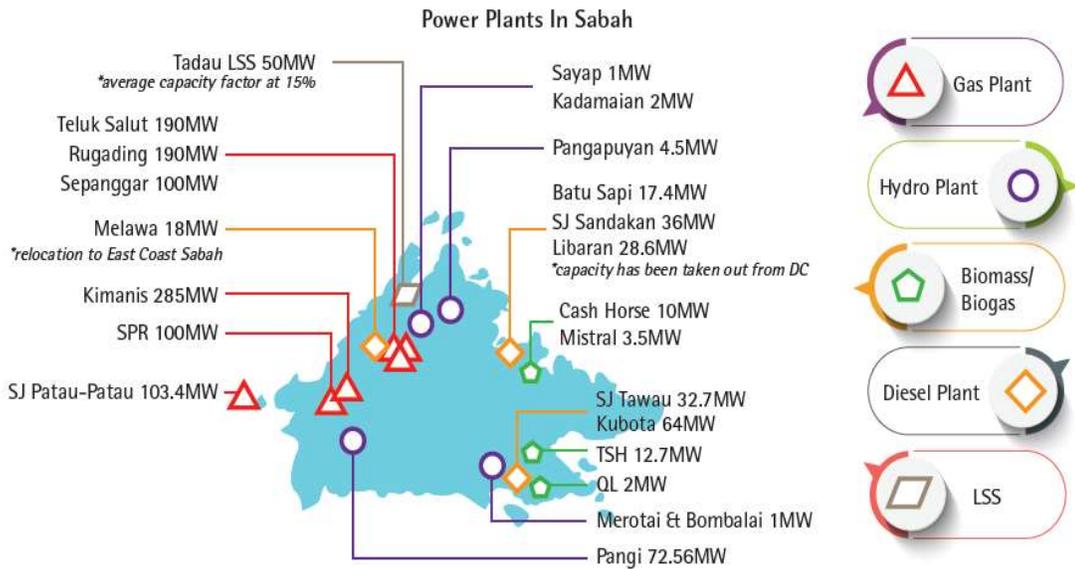
To examine further, Sabah's energy grid is divided into two parts, the West and East Coast Grid and there are significant gaps in supply and demand between the two coasts despite being connected via the Kolopis Segaliud transmission line with the grids recording a maximum of 651MW and 311MW respectively. The East Coast is highly dependent on electricity transfers from the West Coast, being unable to generate enough electricity to satisfy the power needs of its population. It should be noted that much of the interruption is attributable to the age (over 20 years) of the grid network that is fast approaching its load limits.

In addition, the disparities between the two coasts are also highlighted by differences in its generation mixes, with the West Coast being dependent on natural gas and the east coast on Diesel and Biogas. Overall, the total generation mix in Sabah is significantly dependent on natural gas, consisting of 86% gas, 7% hydro, 4% diesel, 2% biogas and 1% solar.

A strategy for long-term power generation is necessary to ensure that not only can future demand be adequately met but also to address the glaring disparity between the two Coasts. In short, the key issue in the West Coast

³ <https://www.freemalaysiatoday.com/category/opinion/2020/04/25/oil-royalties-for-sabah-and-sarawak-dead-on-arrival/>

Grid is that there are frequent occurrences of power outage and interruptions, while in the East Coast, diesel generator sets are both too costly and inefficient to produce the generational capacity that the grid requires. Compounding this, the frequent interruption from the West Coast spills over into the East Coast Grid through the electricity supply and renders the grid incapable of adequately satisfying the needs of the population.



Source: Sabah Electricity Supply Outlook, 2019, Suruhanjaya Tenaga

The forecast of electricity demand is set to grow along the state's economy. In 2018, electricity demand is projected to grow at an annual rate of 0.7% for peak demand and 1.6% for sales demand. Electricity usage will be mainly driven by the commercial sector at 44%, followed by the domestic (34%) and industrial (21%) sectors.

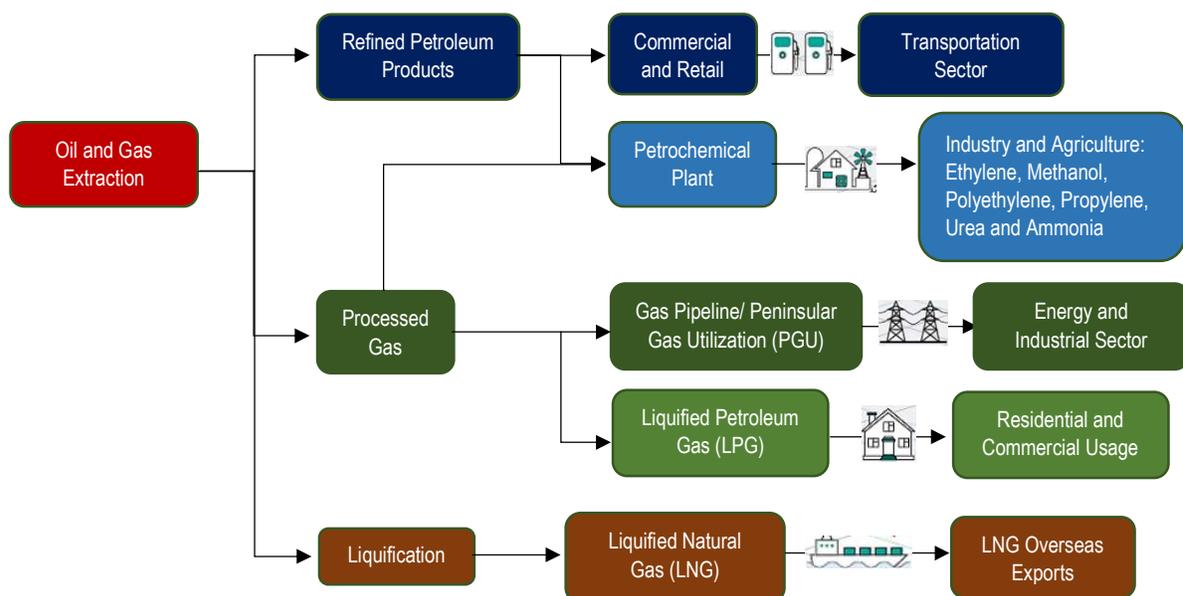


Source: Sabah Electricity Supply Outlook, 2019, Suruhanjaya Tenaga

Due to the increasing demand for electricity, there is a need to expand current generation capacity, however this is unlikely to materialize due to the heavy network and infrastructure investment required. However, there are initiatives to enhance total electricity connectivity and output hence increasing the demand for gas and electricity in Sabah.

Downstream Opportunities in Oil and Gas

Fossil fuels can be useful for a variety of downstream activities and opportunities are aplenty. The chart below shows the processing possibility available in oil and gas.



Sabah's downstream oil and gas opportunities are however limited due to the structural restrictions placed on them despite the abundance of hydrocarbons, where processing and refining is limited to the state's energy production. This is due in large part to a severe lack of efficient transport infrastructure and high-skilled local personnel. Moreover, the presence of a well-established LNG hub in Bintulu, Sarawak has caused a shift in economic trade-offs within the state, where despite the abundance of LNG in Sabah, it became more economically efficient to transfer resources to Bintulu through pipelines to be further refined, with Sabah merely serving as a storage terminal, resulting in little value-added activities in the state.

For illustration, suppose hypothetically the Malaysian State Oil Company Petronas were to decide to invest in an LNG and Oil refinement plant in Sabah, the initial start-up investment costs will not only be tremendously high but higher costs will exist in the form of production inefficiency from the lack of efficient transportation services and a scarcity of skilled labour, thus limiting the plant's ability to achieve economies of scale and moreover, will not be economically viable, especially in an environment of low historical petroleum prices.

The above economic sentiments were echoed in a news article by the Borneo Post in December 2013, where the managing director of Malaysia LNG Sdn Bhd (a subsidiary of Petronas), Zakariah Kasah opined that to build an LNG plant in Sabah, the total investment cost of such a venture is estimated at US\$4bil (RM16.8bil) and is from a commercial viewpoint, not economically feasible⁴. Instead, Zakaria pointed to an upgrade in the Bintulu production facility from its current 25.7 million tonnes per annum to 29.8 tonnes by 2016. In addition, he praised the progress of the RM4.6bil Sabah-Sarawak Gas Pipeline (SSGP) that had started transporting gas from the main LNG terminal in Kimanis to supply the MLNG complex in Bintulu that became fully operational in 2014.

⁴ <https://www.theborneopost.com/2013/10/05/sabah-sarawak-gas-pipeline-to-start-operating-by-january-2014/>

Key Oil and Gas Facilities in Sabah

Sabah has several key Oil and Gas projects in the state, most of which are concentrated in upstream and midstream operations with little downstream activity. The lack of efficient infrastructure networks and low downstream investment into the state has led to lower GDP contribution for the state. Nevertheless, opportunities exist on upgrading the capacity of upper to mid-stream processing should the necessary energy infrastructure networks be implemented.

Sabah Oil and Gas Terminal and the Sabah-Sarawak Gas Pipeline

The Sabah Oil and Gas Terminal (SOGT) was announced in 2007 by former Prime Minister Abdullah Badawi to serve as an onshore storage facility for offshore oil and gas fields off the coast of the Sabah Basin and as an entry point to be exported to Bintulu, Sarawak or the Malaysia LNG Sdn Bhd (MLNG) plant through the 500-km long, Sabah-Sarawak Gas Pipeline. The SOGT was designed as part of the Sabah-Sarawak Intergrated Oil and Gas Project (SOGIP) undertaken by Petronas Carigali and covers an area of 250 acres, with a capacity to handle up to 300,000 barrels of crude oil and 1.0 billion standard cubic feet of gas per day, this is equivalent to 40% of Malaysia's total crude oil production.⁵

The Sabah-Sarawak Gas Pipeline (SSGP) is a 500-km pipeline connecting the SOGT in Kimanis to Petronas's LNG facility in Bintulu, Sarawak. This is meant to serve as a constant flow of refined gas to the Sarawak facility with branching pipes to the Sabah Oil and Gas Industrial Park in Sipitang for Urea and Ammonium processing.

The SOGT was designed to provide refined gas mainly to Petronas through its two LNG facilities, Malaysia LNG Sdn Bhd (MLNG) which is a subsidiary of Petronas Carigali Sdn Bhd according to the group's latest audited financial statements and Kimanis Power Sdn Bhd – a 60% owned subsidiary under Petronas Gas Berhad.

Since 2014, the SOGT no longer had the need for further processing on site, rather, Petronas had performed its processing offshore, on floating refineries off the coast of Sabah, under its floating platform project in the Keabangan cluster off the coast of Kimanis⁶. The platform is a consortium of Petronas (40%), ConocoPhillips (30%) and Shell (30%), it has the capacity to process 825 million cubic feet of gas and 22,000 barrels of condensate per day.

The platform project removes the commercial incentive to build an onshore processing plant and gives Petronas, its biggest client, significant bargaining power in the SOGT project and to Sabah's economy in general, giving Petronas immense influence to decide on whether the Kimanis facility will receive upgrades to its refinery industry. It should be noted that the SOGT and all its surrounding spin-offs are all majority-owned and operated by Petronas, thus leaving the economic prospects of local community at the mercy of corporate interests. As the SOGT has been relegated to serving as simply a storage facility, its potential in economic value-addition is limited as further processing facilities are performed elsewhere, with the majority going to MLNG⁷ in Bintulu.

One of the key challenges in estimating the monetary impact of the oil and gas industry in Sabah and especially for the SOGT and SSGP projects are that upstream and midstream oil and gas companies are not required to submit any data to Suruhanjaya Tenaga, whereas only downstream production data is compulsory for submission.

⁵ <https://sogip.com.my/>

⁶ <https://www.offshore-technology.com/projects/keabangan-field/>

⁷ http://www.sedia.com.my/SDC_EPP/OGE_EPPs.pdf

The Sipitang Oil and Gas Industrial Park (SOGIP) and the Sabah Ammonia-Urea (SAMUR)

The SOGIP is the first oil and gas industrial park in Sabah focusing on hydrocarbon processing with aims to develop itself into one of the catalysts for the development of Sabah along its west coast. The park's development was launched as part of the Economic Transformation Programme (ETP) and the Sabah Development Corridor (SDC) in the State.

The intention behind the project was to create a value-added supply chain cluster in Sabah to support its domestic requirements in Palm Oil-Agro Industries, increase employment and GDP growth, develop downstream business chains and encourage research and development (R&D) centres for petrochemical production intended to make Sabah's economic development sustainable and self-sufficient in energy and hydrocarbon production.

Located within the Sabah-Brunei-Labuan economic triangle, it aims to become a new focal point of oil and gas investments in the region. According to the Sabah state government, the 1,600-hectare SOGIP site expects to attract investments totalling RM12bil creating 30,000 new jobs. The availability of natural gas from Sabah's offshore platform previously mentioned will act as the feedstock for the facility, potentially being supplied by the SOGT and SSGP from Kimanis. In addition to refinery infrastructure, deep sea jetties for importing raw materials will also be built to provide access for its export to global markets.⁸

The availability and abundance of hydrocarbons will likely attract multinational firms in various industries such as in petrochemicals, liquid-bulk storage, hydrocarbon product fabrication, R&D, port and jetty services, heavy chemicals industries, upstream support services and renewable energy sectors.

One of the key challenges to the development plan however is the lack of basic infrastructure and public amenities, such as road drainage, water and electricity, making it difficult for businesses to connect to their supply chains. Compounding this is the lack of residential and commercial facilities needed to attract private investment and an unclear direction on how to attract private investors while guaranteeing a consistent gas supply. To remedy these setbacks, the SOGIP has pledged a massive infrastructure package to build new residential, commercial and retail developments concurrently. To enhance the attractiveness in the SOGIP project, the park's management had offered attractive investment schemes such as a 10-year tax free period, however, the economic growth of the park remains slow.

To allay fears of the economic viability of the site, Petronas Chemicals Group (PCG) has built a RM4.6bil ammonia and urea manufacturing plant as a show of confidence. As the first major client of the park, the Sabah Ammonia-Urea (SAMUR) project is one Petronas's leading initiatives to monetize natural gas obtained from Sabah's offshore refinery facilities and is one of the most recent and strategic developments supporting the oil and gas industry in Sabah, housing not only an Ammonia-Urea plant, but also a granulation plant as well as an integrated utility unit system and jetty facilities with the plant expected to produce an estimated 2,100 metric tonnes of liquid ammonia and 3,500 tonnes of granulated urea per day.

In more recent developments, in December 2019, the state-owned Sabah Oil and Gas Development Corporation (SOGDC) Sdn Bhd has signed an agreement with Petroventure Energy Sdn Bhd supported by Chinese firm China CACS Investment Group Company Limited to build Sabah's first petroleum oil storage and refinery worth over RM9.5bil with construction to take place between three to five years. The venture is expected to create up to 3,500 new jobs and paves the way for more diverse downstream activities in the state. In addition, the plant is

⁸ <https://sogip.com.my/sogip/>

expected to have a storage capacity for 2 million cubic tonnes of petroleum products and the refinery will have the capacity to produce 3.5 million tonnes annually, with the main products being diesel and gasoline.⁹

So far however, the SAMUR plant is the only downstream plant in the whole of Sabah by Petronas and its previous promises to build a second downstream plant facility in Sabah has not materialized. In addition, all of SAMUR production is exported elsewhere with none being used to develop the agriculture industry in the state. This effectively makes Sabah only a transit point for hydrocarbon activity and does not gain anything besides the 5% royalty to the state's fiscal budget, despite being the nation's top producer of hydrocarbons¹⁰.

Economic Considerations of the SSGP

Despite the vast economic benefits of the SSGP, setbacks such as supply disruptions and blowouts continue to plague the economic viability of the project. In a statement released by Bank Negara (BNM), the GDP Year-on-Year (YoY) decline in 4Q19 to 3.6% was partly due to a sharp decline in crude oil and natural gas production. GDP growth in crude oil and natural gas output contracted as production was deeply affected by temporary facility closures with several industry sources indicating a 6.2% YoY decline and 1.2% YoY decline respectively¹¹.

Most notably, the declines were due to both planned and unplanned maintenance works in Sabah and Sarawak, particularly on the SSGP in the Lawas district in Limbang, Sarawak. According to a 2020 report by Wood Mackenzie, the pipeline has a capacity of **750 million cubic feet per day** (mmcf) but will be expanded to 1,100 mmcf with the addition of extra compression capabilities planned in the future. The disruption along the pipe route resulted in a 35-day hiatus in operations, with translates to approximately 26.25 billion cubic feet of gas, or roughly 4% of Malaysia's quarterly gas production. Approximations here are important as estimates for oil and gas in Malaysia are complicated by the reluctance of Petronas to publicly share its oil and gas production data.

This was not the first disruption to the pipeline however, there has been several rounds of unplanned maintenance work on the SSGP since it commenced operations in early 2014. In June 2014, an explosion ripped apart a section of the pipeline between Lanang and Long Sukang, with full operations being only restored in 2016. In January 2018, a gas leak had occurred in the Lawas district which fortunately did not fully obstruct the delivery of the LNG cargo. In May 2019, a fire had broken out, also in the Lawas district to which Petronas had shut down the pipeline for two months. The most recent disruption occurred in January of this year, with a rupture in the northern district of Marudi, Sarawak, it is unclear how long the pipeline's operations will be back to full operation. CIMB market analysts expect that the disruption caused by the rupture will weigh on mining sector-led GDP growth for 1Q2020.

In December 2019, Gas Malaysia Bhd had obtained government approval to set the selling price of natural gas at RM33.65 per million british thermal units (MMBtu) until next year, from 1 Jan 2020 to 31 Dec 2021, with an annual review of the average natural gas selling price. This is 2.91% lower than the December rate of RM34.66/MMBtu.¹²

By assuming the 750 mmcf full operating capacity of the pipeline, which approximates to 780,000 MMBtu¹³ and at RM33.65/MMBtu, we can approximate the total implied economic impact from the SSGP to be **RM26.25mil per day**, generating an approximate monthly revenue flow of **RM787.4mil monthly** and **RM9.45bil yearly**.

⁹ <https://sogip.com.my/heads-of-agreement-signed-with-petroventure-energy/>

¹⁰ <http://www.dailyexpress.com.my/read/3202/time-for-sabah-to-step-up-/>

¹¹ <https://www.theedgemarkets.com/article/cover-story-gas-pipelines-costly-malfunction>

¹² <https://www.theedgemarkets.com/article/natural-gas-average-selling-price-rm3365mmbtu-next-year>

¹³ <https://www.traditionaloven.com/tutorials/gas-flows/convert-gas-flow-mmcf-to-gas-flow-mmbtu-day.html>

Realistically however, the actual economic impact would be impacted by the frequency and the degree of supply disruptions to the project.

gas flow from Million standard cubic feet per day to Million British thermal units conversion results	
Amount :	750 Millions standard cubic feet per day (MMSCFD of gas flow)
Equals :	780 000 Millions British thermal units (MMBtu/day / gas flow)
Enter a new Million standard cubic feet per day number to convert	
* Whole numbers, decimals or fractions (ie: 6, 5.33, 17 3/8)	
* Precision is how many digits after decimal point (1 - 9)	
Enter Amount :	<input type="text" value="750"/>

Source: Traditionaloven.com

Sabah State Government's Fiscal Response to Hydrocarbon Resources

In response to Sabah's inability to profit from its abundant hydrocarbon potential, the Sabah State Government had imposed a tax on crude petroleum oil and liquified natural gas based on the Sales Tax Order 2018, gazetted on 6 December 2018 and came into force in April 2020 before being published in the Government Gazette dated 2 April 2020¹⁴.

The Sabah Finance Ministry through a letter dated 1 April 2020, had notified nine companies that were the beneficial owners of the state's Production Sharing Contracts (PSC) including Petronas Carigali, Petronas Floating LNG Ltd of the tax imposition. Other companies are Sabah Shell Petroleum Company Ltd, Shell Energy Asia Ltd, Hibiscus Petroleum Bhd, Repsol oil and Gas Malaysia Ltd, PTTEP Sabah Oil Ltd, PT Pertamina Malaysia Explosari Produksi and ConocoPhilips Sabah Ltd.

The State Government had estimated that assuming a crude oil price of US\$24 per barrel, Sabah is expected to collect RM50mil per month, amounting to RM1.6bil from both oil royalty and sales tax by year-end. This tax is expected to apply to all hydrocarbon exports. This move by the Sabah State Government to impose a 5% sales tax on petroleum exports follows the federal government's reluctance to increase current oil royalties from 5% to 20%.¹⁵ Applying the calculations performed in the previous section, the state's RM50mil target is entirely possible, as a 5% tax on RM787.4mil in monthly revenue would approximate to a monthly state revenue stream of RM39.4mil from the export of LNG resources alone.

Political Issues in Downstream Processing in Sabah

The Sabah Warisan government in recent times has been using the issue of outsourcing downstream production in fossil fuels away from Sabah as a political talking point. They argue that despite the abundance in fossil fuels, the local economy does not take part in and benefit from job creation related to downstream hydrocarbon production.

In the Kimanis by-election that took place in January, the Warisan candidate, Datuk Karim Bujang mooted the establishment of a small gas refinery to be set up in Kimanis to provide job opportunities to the local community

¹⁴ <https://www.thestar.com.my/business/business-news/2020/04/21/sabah-to-start-collecting-5-sales-tax-on-petroleum-products>

¹⁵ <https://www.thestar.com.my/news/nation/2020/04/07/sabah-imposes-5-sales-tax-on-petroleum-products>

as there is still leftover gas in the SOGT that can be processed within the state itself.¹⁶ The SOGT itself channels the vast majority of its gas to the Bintulu facility with a minority being bought directly by Independent Power Producers (IPP).

In this regard, Karim Bujang was reported to have said that he would negotiate with Petronas to set up a gas processing plant in Kimanis to improve job opportunities in the west coast as the number of locals working in the oil and gas sector is miniscule. This was in response to Chief Minister Datuk Seri Mohd Shafie Apdal's threat to stop sending gas to Sarawak for processing.

Despite the proximity of oil facilities in Kimanis, Petronas is not likely to shift its downstream operations to Sabah due to a variety of factors. Notably, Petronas like any other mega-corporation is motivated by profit maximization, not political interests and is therefore not likely to concede to Sabah's demands even in spite of Sabah's threat to cut the flow of hydrocarbons to its Sarawak plant as Petronas knows that Sabah will not benefit from such a move and will be met with massive legal repercussions from not only Petronas but also large multinational fossil fuel companies who have PSC's with Petronas.

Kimanis Training Centre

As a way to mitigate the negative perceptions on Petronas's exploitative practices in Sabah, the company has built a local training centre in Kimanis within the SOGT compound directed to the local youth in Sabah. This is also in part to support the expansion of Petronas operations in Sabah requiring more skilled manpower and experts in the industry. The Kimanis Training Centre (KTC) was built at the expense of Petronas themselves and provides specialized training in instrumentation and controls for locals.

In 2015, it was reported that KTC has a capacity of 62 full time students and can accommodate 100 short course participants whereby 2-year training programs for its students with full certificated courses for the sector fully sponsored by Petronas. At the same time, Sipitang MP Datuk Sapawi Ahmad called for a need to set up a higher learning and skills training institute in Sipitang to ensure sufficient skilled manpower for the industry. In this way, the populations of both Kimanis and Sipitang are being groomed to support the local Oil and Gas hub industry in Sabah¹⁷.

Apart from Petronas's investments into downstream activities, Petronas also pledged to care for the environment in Sabah by funding the construction of a study centre to be operated by Yayasan Sabah (YS) in Imbak Canyon in Tongod, Ulu Kinabatangan dubbed the Imbak Canyon Studies Centre (ICSC) costing RM77mil which is poised to become a central hub for research and development into environmental biodiversity, housing office complexes, laboratories, research stations, educational complexes and other related facilities.

Despite the generosity shown by Petronas in fully sponsoring the education for the locals in Sabah, the educational opportunities from this institution unfortunately stops here. The KTC does not provide training in other vocations necessary for a fully functioning state economy such as in business and accounting, education, medicine and etc. In order to maximize the economic growth opportunities in Sabah and become attractive for foreign investment, more diversified education needs to be established before any plan for foreign investment clusters can properly reap benefits.

¹⁶ <https://www.nst.com.my/news/politics/2020/01/553686/karim-wants-kimanis-have-own-gas-processing-plant-provide-jobs>

¹⁷ <http://www.dailyexpress.com.my/news.cfm?NewsID=95890>

Recommendations for Sabah's Oil and Gas Industry

Despite the challenges faced by the state, there are opportunities available for Sabah to become a player in the oil and gas industry. The following are recommendations for Sabah to develop the economy of its west coast.

- **Infrastructure Investment** - Importantly, Sabah needs to upgrade its infrastructure network to attract the levels of investment necessary to become competitive in the industry. In this regard, heavy capital injection is necessary especially in the expansion of roads and highways for the efficient transportation of hydrocarbon resources and internet cable networking to enhance the uptake of new technologies and create opportunities for R&D projects in the State.
The lack of an efficient transportation infrastructure network is an extremely adverse feature of the state, with private investors knowing that they are can invest elsewhere, much closer to sizable population centres with better infrastructure networks and opportunities to develop integrated supply chains and hire well trained locals. Therefore, for any development plan to be successful, this needs to be high on the state's agenda.
- **Comprehensive Downstream Strategy** - It is unfortunate for Sabah that despite having an abundance of hydrocarbon resources are not able to fully capitalize on this advantageous position, the reasons for which have been discussed abundantly above.

In this regard, Sabah must design a well-equipped development strategy to secure its position in its oil and gas production capability. The state should focus on expanding its horizontal production line to accommodate a wider variety of different products as well as increasing the value of downstream production channels. Currently, Sabah primarily serves as a terminal for LNG and LPG gas, with only recent ventures into Ammonia and Urea processing through SAMUR.

Despite these recent developments, Sabah should seek expand its petroleum and LNG by-products in methanol, plastic production and propylene manufacturing if possible. This strategy will need to be coupled with enhancements in its infrastructure networking and education as the diversification of petroleum production will have various positive knock-on effects capable of establishing a more efficient supply chain.

- **Encourage Petronas to Expand its Education Sponsorship Program** – The KTC established by Petronas to accommodate the increasing demand for skilled manpower and experts in the oil and gas industry in Sabah as it expands its operations in the state is a commendable one.

However, there are several issues with this arrangement. Importantly, the sponsorship only applies to courses in the oil and gas sector, with a total capacity of 62 full time students in 2015. In addition, on their main website, it was reported that a total of 46 students have graduated since 2016, meaning that the training centre is operating at far below capacity. This is hardly enough to provide the level of skilled workers necessary to bring the state out of poverty and increase their income levels. Moreover, due to the narrow scope of training programs, graduates will be specialized totally in the oil and gas industry and will not be able to transition their skills to other sectors in the market such as financial services, agriculture or manufacturing sectors necessary to diversify the state's economy.

It is recommended that there should be a two-pronged strategy, firstly, KTC needs to expand their capacity for producing graduates. However, due to the nature of the oil and gas industry employing far fewer people than other sectors, the KTC program should be expanded and its graduates able to work

in production facilities outside of Sabah including in facilities in Johor, Pahang and Sarawak as well as their drilling facilities all over the world.

Secondly, Petronas should increase the educational offerings to include diploma and degree qualifications in areas outside of oil and gas, in areas such as accounting, commerce and agricultural science. This will enhance the economic capability and skilled labour pool of local Sabahans making the state more attractive for foreign and private investments even for players outside of oil and gas.

- **Greater Commercial Initiatives for Private and Foreign Investment** – The State needs greater private sector investment in developing downstream activities in oil and gas which it has a great abundance of. The reluctance of private and foreign investment is largely due to the fact that Sabah has a severe lack of proper infrastructure and skilled workers. Therefore, while investments into state infrastructure and education are enhanced, commercial initiatives should be mooted, such as a moratorium on taxation for a set number of years and a skills training programme for workers in downstream production.

In addition, the administration should likewise incentivize investments from non-oil and gas players such as in agro-tech, manufacturing, tourism and financial services. This will ensure that the state has an adequate platform to attract private investments as infrastructure projects are being constructed.

- **Capitalize on the Usage of Palm Oil to Produce Biofuels** – Palm oil forms an integral part of the state's economy, being Malaysia's largest palm oil-producing state, producing 25% of the nation's total palm oil. Recent government efforts had sought to increase the usage of palm oil through the B20 biofuel programme (20% of the admixture consisting of palm oil and 80% petroleum diesel), replacing the B7 biofuel programme.

Though a commendable move, it has recently been stifled by the coronavirus pandemic. Therefore, special effort must be made to ensure that the move to B20 biofuel commences immediately after the crisis subsides. It is estimated that palm oil consumption can be increased by 534,000 tonnes per annum with the implementation of B20 biodiesel from the state's 35 biodiesel refineries. This adds a boost to Sabah's value-added GDP growth and employment opportunities.

- **Utilization of Chemical Fertilizer to be Used Domestically** – Special effort should be made to ensure that a percentage of chemical fertilizer produced from the SAMUR plant in Sipitang is sold domestically at a rate that is partially subsidized by the proceeds of the 5% tax on the export of hydrocarbons. This will help to increase the economic efficiency of the agriculture sector within the state.

In this regard, it is also important to diversify Sabah's agricultural produce to reduce its reliance on the importation of foodstuffs. This can be done with subsidies for domestic food production from subsidized fertilizer from the SAMUR plant to reduce the marginal cost of production hence encouraging the growth of the local agriculture industry.

Final Thoughts

The issue of oil and gas rights in Sabah is a thorny one, with local Sabahans feeling that their local hydrocarbon resources are being exploited by Petronas without enjoying much economic opportunity or social benefit in return despite being the largest producer of hydrocarbons in the country. Therefore, anyone who wishes to improve Sabah's economic conditions should be mindful of the negative local sentiments towards Petronas and should seek to maximize concessions from Petronas in the areas of local infrastructure, increasing social mobility and

better downstream economic opportunity where commercially viable. Although this may not undo decades of resource exploitation and poverty in the state, it would help to build a more stable economic foundation for future generations to recover.