

## OIL & GAS

### KEY INVESTMENT HIGHLIGHTS

- The National Energy Transition Roadmap (NETR) had been completed and launched on 29 August 2023, following the first Phase presented on 27 July 2023
- 3 low-carbon hydrogen hubs, 3 major CCUS hubs and 3 Carbon Capture hubs expected by 2050
- Challenge remain on cost, scalability, regulatory frameworks, public and industrial interest, and energy source availability

**Hydrogen's big footprint in Sarawak.** Malaysia has embarked on a strategic journey to harness the potential of hydrogen, a pursuit exemplified notably in Sarawak, under projects H2ornbill and H2biscus, which were executed in partnership with Japanese and South Korean entities respectively. These projects have made substantial advancements and harmonize seamlessly with Sarawak's Hydrogen Economy Roadmap, which revolves around leveraging hydrogen to elevate Sarawak into a developed state by 2030. As we look to the future, the forthcoming Hydrogen Economy Transition Roadmap (HETR) is poised to further amplify Malaysia's aspirations in the realm of hydrogen. As a major oil and gas state with the right expertise and manpower, Sarawak is capable to take up the Hydrogen initiative and pioneer the potentiality of Hydrogen as an alternative fuel.

In the latest edition of NETR, the following key targets for Hydrogen are proposed:

- **Blue Hydrogen:** By 2050, the complete phase-out of grey hydrogen as a feedstock is envisaged.
- **Green Hydrogen:** A production goal of up to 2.5MMtpa of green hydrogen by 2050 is set, sourced from renewable energy (RE) sources such as hydroelectric power and solar energy.
- **Low-carbon Hydrogen Hubs:** The ambition involves establishing one low-carbon hydrogen hub by 2030 and adding two more hubs by 2050.

**Storage and production remain as key challenges.** Adopting Hydrogen posed challenges on technical and commercial viability. Recall in "*NETR Part 1 - A Look in Hydrogen and CCUS*" report (dated 28 July 2023), Hydrogen storage is one of the many technical issues that could challenge not only the oil and gas sector, but also on construction and logistics. In terms of production, several challenges are recognised, including: (i) limited availability of electrolyzers globally, (ii) scarcity of technical experts in Hydrogen production, and (iii) the substantial capital expenditure required for generating green hydrogen. Electrolyzers alone account for roughly one-third of the overall hydrogen production cost. Nevertheless, we believe the proper focus on technological advancements could increase the efficiency of electrolyzers, subsequently providing a competitive edge to Malaysia.

### COMPANY IN FOCUS

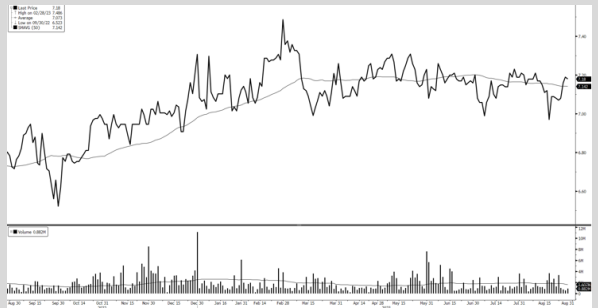
#### MISC Bhd

Maintain **BUY** | Target Price: RM8.16

Price @ 30<sup>th</sup> July 2023: RM7.20

- 5-Y CAGR of +15%
- Established in sea-borne gas transportation
- Involvement in Kasawari CCUS Project through MMHE
- 4/5 ESG Rating, Shariah compliant

#### SHARE PRICE CHART



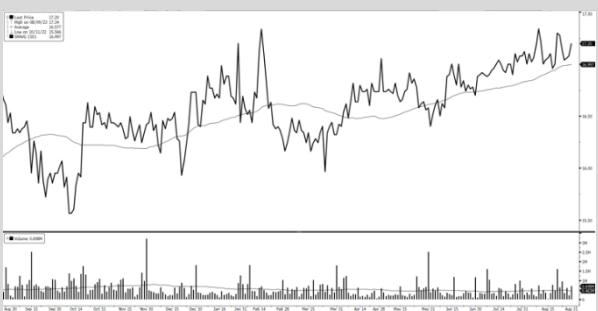
#### Petronas Gas Bhd

Maintain **BUY** | Target Price: RM18.79

Price @ 30<sup>th</sup> July 2023: RM17.02

- 5-Y CAGR of +6%
- Integration of utilities with CCUS projects
- Benefits from RE tariffs and hydrogen transportation & storage
- 4/5 ESG Rating, Shariah compliant

#### SHARE PRICE CHART



**TABLE 1: HYDROGEN (KEY INITIATIVES)**

Code	Initiatives	Champions	Our View
HY-1	Establish world-class low-carbon hydrogen standards and regulations, which include transportation and storage, and streamlining project permit	MOSTI	<p>As with many new industries, a comprehensive regulatory framework must be developed, to ensure a safe, transparent and technologically advanced approach to developing hydrogen fuel. It should be noted that hydrogen is highly flammable and can pose risk to handlers; hence the utmost importance in regulations and standards in transportation and storage of hydrogen fuel. We also believe with the initiative to simplify permitting processed for hydrogen projects will not only reduce administrative cost, but also accelerate implementation and subsequently encourages investments.</p> <p>We are at the opinion that a sound regulation framework is crucial in elevating the market's confidence and the interoperability among hydrogen technologies and infrastructures across all sectors., while promoting economic growth and technology developments for the energy fuel in the long run.</p>
HY-2	Develop domestic green electrolyser manufacturing capabilities through research and development (R&D) projects in local universities and private sectors	MOSTI	<p>The cost of a hydrogen electrolyser depends heavily on the technology, the raw materials used and production capacity. There are mainly three types of electrolysers: (i) alkaline electrolyzers, (ii) proton exchange membrane (PEM) electrolyzers, and (iii) solid oxide electrolyzers. Each differ in purpose, manufacturing complexity, production capacity and cost. Nevertheless, we believe cost of manufacturing the electrolysers had significantly decreased in line with the additional tech advancements and increasing interest in hydrogen.</p> <p>We are also at the opinion that Malaysia has the capacity to manufacture electrolysers, despite its need for precision engineering, high quality materials and additional safety regulations. As demand for hydrogen grows, we expect the manufacturing processes to be more streamlined and standardised.</p>
HY-3	Reduce Levelized Cost of Hydrogen (LCOH) for low-carbon hydrogen by establishing hydrogen hubs, financial incentives and partnerships	MOSTI MITI	<p>Hydrogen hubs and collaborations has the potential to consolidate production, storage, and distribution infrastructure. The shared facilities and resources can lead to cost savings due to optimized operations, while also sharing the risks among multiple stakeholders. Meanwhile, partnerships have the ability to bring together expertise from various sectors to foster technological advancement and efficiency improvements.</p> <p>In terms of financial incentives, a shared cluster for hydrogen production and development could not only bring in investments from various sectors, but also establish financial incentives under a shared regulatory framework. While the hubs are a great way to reduce the cost to develop hydrogen into a publicly available fuel, regulations continue to be the main priority.</p>
HY-4	Stimulate demand for low-carbon hydrogen via bilateral agreements, development incentives and co-firing with other fossil fuels	MOSTI MITI	<p>Bilateral Agreements are capable to stimulate demand for hydrogen through export to hydrogen-deficit countries or regions, ensuring energy security and a new trade stream. Additionally, technology transfer and R&amp;D can be facilitated and funded through such agreements, and in turn further fostering local demand and growth. Incentives also play a role in ensuring a growth in interest and an acceleration in market adoption. This is possible through governmental subsidies, tax incentives, grants and funding, and feed-in tariffs. The appeal of a reduced emission for traditional fossil fuel through co-firing, as well as positive infrastructure compatibility, could increase the market's awareness on the benefits and potential of hydrogen fuel. This could further encourage demand for hydrogen in the long term.</p>

Source: NETR, MIDFR

**CCUS plays crucial role to achieve net-zero emissions.** The adoption of Carbon Capture, Utilization, and Storage (CCUS) technology is crucial for achieving the country's goal of net-zero emissions, especially in industries that are difficult to decarbonize. By capturing and using CO<sub>2</sub> emissions, Malaysia has the potential to: (i) reduce its carbon footprint, (ii) stimulate the growth of new green industries, (iii) promoting sustainable economic development and, (iv) improving resilience to climate change effects. The 2023 budget has introduced tax incentives to encourage companies to engage in on-site carbon capture activities and use CCUS services. This approach not only acknowledges CCUS as a driver of economic growth but also recognizes its importance in reaching the net-zero greenhouse gas emissions target.

Aligned with the latest NETR addition, the following timeline for CCUS development was proposed:

- By 2030, Malaysia is expected to set up 3 CCUS hubs with a total storage capacity of up to 15MMtpa.
- By 2050, Malaysia is expected to set up 3 Carbon Capture hubs with a total storage capacity of up to 40-80Mtpa.

**Cost management and regulatory framework are the main focus.** CCUS is expected to cover a wide range of sectors, in tandem with the growth of technological advancements and improvements in cost-efficiency. However, the adoption of CCUS across different industries rely heavily on an established regulatory framework. In order to initiate a proper integration of CCUS into the local economic network, adaptation of similar laws such as The London Protocol and the EU CCS Directive is crucial as the first step to provide CCUS beyond just the oil and gas sector. In terms of cost efficiency, CCUS can be feasible through CO<sub>2</sub> utilisation in petrochemical products and hydrogen storage, given the right technology development. Additionally, CCUS in Malaysia is expected to be adopted through a cluster/hub where multiple emitters will invest in and use shared CCUS infrastructure, with the aim to lower the overall expenses in its implementation while generating profit.

**TABLE 2: CARBON CAPTURE, UTILISATION AND STORAGE (KEY INITIATIVES)**

Code	Initiatives	Champions	Our View
CC1	Develop CCUS-specific policies and regulations to facilitate the implementation of CCUS projects through various agencies and ministries	Ministry of Economy	CCUS-specific policies can provide a clear guidance that addresses the unique challenges and opportunities associated with CCUS projects. Through these policies, uncertainties on CCUS reliability can be reduced and provide clarification pertaining permits, monitoring, reporting, and compliance; subsequently streamlining the process of developing a CCUS project. Additionally, an incentive mechanism can be included to offset the high cost of CCUS implementation and thus encourage other industries to invest in CCUS technologies and partnerships. Additionally, established policies allow a long-term stewardship for the stored CO <sub>2</sub> , ensuring a well-managed storage site and a safeguard for the environment. Given that the storage sites are depleted hydrocarbon fields, the risks of events such as blowouts and leakage remain. We also are at the opinion that these policies can encourage public engagement, offer support for R&D and gain international cooperation, which in turn will further accelerate the market's interest in CCUS.
CC2	Strengthen CCUS adoption through provision of incentives across all relevant sectors and facilitate hub development by establishing carbon pricing, as well as enhancing incentives to reduce cost, enable funding and encourage adoption	MOF Ministry of Economy	The adoption of CCUS across all relevant sectors involves a multi-pronged approach. Incentives can be established through tax benefits for companies investing in CCUS projects. Not only can this offset the higher cost of CCUS, but it can also ensure a smooth integration of a shared net-zero carbon emission goals. The implementation of a carbon pricing mechanism and creating CCUS hubs where multiple industries collaborate will also make CCUS more economically attractive. Additionally, CCUS adoption can be encouraged through low interest loans, long-term contracts and training programmes. The combined approach addresses both economic and environmental aspects, aligning with climate goals and promoting collaboration between industries, governments, and research institutions; subsequently fostering a collaborative and holistic approach to addressing climate change via CCUS.

Code	Initiatives	Champions	Our View
CC3	Facilitate CCUS Hub infrastructure development through collaboration with investors	Ministry of Economy	<p>In consideration that NETR has a clear strategy and roadmap to develop CCUS projects locally, we believe the next step is to identify and engage potential investors who have a stake in emissions reduction, sustainable energy, or related industries. This could include energy companies, financial institutions, venture capital firms, and private equity investors. With a well-established regulatory framework, we expect that investors collaborations can provide necessary capital to fund CCUS projects, as well as the proper expertise and connections with other industrial players directly and indirectly involved in the main operations of a CCUS field.</p> <p>By fostering collaboration with investors, governments and industry stakeholders can create a strong foundation for the successful development of CCUS hub infrastructure, accelerating the transition to a more sustainable energy future.</p>
CC4	Establish transboundary CO2 agreement, encompassing the provisions on transboundary movement and storage of carbon, risk and cost sharing	Ministry of Economy	<p>A transboundary CO2 agreement is crucial in addressing the complexities of cross-border carbon storage. With the creation of a platform for negotiations and shared foundation to CCUS implementation, coupled with a clear provision for transboundary movement including transportation methods, standards, and monitoring and reporting compliances, we believe the risk and cost of CCUS can be shared and reduced more efficiently on an international level. This will also provide a new trading stream that could be beneficial for the nation's economy in the long run. By working together, the transboundary CO2 agreement can leverage each other's strengths and resources to create a more sustainable and effective framework to implement CCUS in Malaysia.</p>
CC5	Promote local utilisation of CO2 in industry	MITI	<p>We believe the following sectors will benefit from the utilisation of CO2:</p> <ul style="list-style-type: none"> <li>• <b>Manufacturing and Construction:</b> Production of building materials such as concrete, where it reacts with calcium to form calcium carbonate, a key component of cement</li> <li>• <b>Chemical Industry:</b> Feedstock for chemical reactions, creating products such as polymers and plastics.</li> <li>• <b>Fuel Production:</b> Synthetic fuels like methane</li> <li>• <b>Agriculture:</b> Enhance plant growth and crop yields, improving agricultural productivity</li> <li>• <b>Food and Beverage Industry:</b> Carbonation processes for beverages and as a part of controlled atmosphere storage for perishable foods</li> <li>• <b>Carbon Mineralization:</b> Fusion with minerals to create solid carbonates that can be used in construction or as a raw material</li> </ul> <p>We believe through a proper support for pilot projects, clear regulations, efficient funding, private-public sector collaborations and market access, the promotion of CO2 utilisation is a key component in promoting CCUS. By creating a conducive environment for CO2 utilization, Malaysia can leverage CO2 as a resource to drive sustainable economic growth and contribute to climate goals.</p>

Source: NETR, MIDFR

**Hydrogen and CCUS – doable with the right infrastructure and technology.** In "NETR Part 1 - A Look in Hydrogen and CCUS", we have established that both hydrogen fuel production and CCUS are technically feasible and have the potential to play a significant role in the transition to a low-carbon and sustainable energy future. Hydrogen production has become more efficient, affordable and environmentally friendly as the technology to produce and develop the fuel continue to

advance. Additionally, the technology and infrastructure of developing production facilities, transportation networks, storage systems, and refuelling stations are already available for hydrogen fuel.

For CCUS, on top of the existing expertise, technology and assets from the oil and gas sector, various capture technologies had already been established, including post-combustion, pre-combustion, and oxy-fuel combustion capture, which can capture CO<sub>2</sub> from power plants and industrial facilities. CO<sub>2</sub> had been used in many manufacturing activities as well, including but not limited to enhanced oil recovery, concrete production, and plastics and chemicals production. Nevertheless, challenges in terms of cost, scalability, regulatory frameworks, public and industrial interest, and energy source availability remain. We believe with the first step of establishing a clear roadmap and eventual regulation and policy for the implementation of the roadmap, as well as a proper investment and ongoing R&D, hydrogen fuel production and CCUS can become integral components of Malaysia's aim in achieving a more sustainable and cleaner future, while leveraging on its potentiality for the nation's economy in the future.

**POSITIVE outlook for NETR from sector's perspective.** All in, we reiterate our optimism with the government's initiatives for an orderly energy transition for the nation through the launching of it's the second part of NETR, from the oil and gas sector's perspective. We are confident that Malaysia has the right tools, assets and skillset to pioneer hydrogen fuel and carbon capture and storage in the region. Despite the infrastructural and regulatory challenges, we believe the existing assets that the nation has in pioneering hydrogen as an alternative fuel as well as establishing CCUS projects on depleted hydrocarbon fields are good indicators that Malaysia has the capability to implement NETR through the oil and gas sector efficiently, consequently ensuring an orderly energy transition across all sectors.

Our Top Picks for the sector in line with the full release of NETR Part 2 is MISC (**BUY, TP: RM8.16**) and **Petronas Gas (BUY, TP: RM18.79)**. We like MISC for its involvement in the Kasawari CCUS Project in offshore Sarawak, through its subsidiary Malaysia Marine and Heavy Engineering (MMHE). While MMHE is not the main operator of the project, its expertise as an OGSE company to construct and maintain offshore platform jackets paves the way for other OGSE companies to find revenue in future CCUS projects. Additionally, MISC has the capacity to be involved in the transportation of both hydrogen and CO<sub>2</sub>, given its expertise in marine and transportation subsectors. We also like Petronas Gas for its expertise in gas transportation and regasification operations, which could benefit both hydrogen fuel and CCUS operations. Petronas Gas has the potential to invest and develop better solutions to overcome the hydrogen storage issues, as well as giving a proper regulatory framework in the refinery aspects of hydrogen management for future hydrogen production and development.



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### MIDF AMANAH INVESTMENT BANK : GUIDE TO RECOMMENDATIONS

#### STOCK RECOMMENDATIONS

BUY	Total return is expected to be >10% over the next 12 months.
TRADING BUY	Stock price is expected to <i>rise</i> by >10% within 3-months after a Trading Buy rating has been assigned due to positive newsflow.
NEUTRAL	Total return is expected to be between -10% and +10% over the next 12 months.
SELL	Total return is expected to be <-10% over the next 12 months.
TRADING SELL	Stock price is expected to <i>fall</i> by >10% within 3-months after a Trading Sell rating has been assigned due to negative newsflow.

#### SECTOR RECOMMENDATIONS

POSITIVE	The sector is expected to outperform the overall market over the next 12 months.
NEUTRAL	The sector is to perform in line with the overall market over the next 12 months.
NEGATIVE	The sector is expected to underperform the overall market over the next 12 months.

#### ESG RECOMMENDATIONS\* - source Bursa Malaysia and FTSE Russell

☆☆☆☆	Top 25% by ESG Ratings amongst PLCs in FBM EMAS that have been assessed by FTSE Russell
☆☆☆	Top 26-50% by ESG Ratings amongst PLCs in FBM EMAS that have been assessed by FTSE Russell
☆☆	Top 51%- 75% by ESG Ratings amongst PLCs in FBM EMAS that have been assessed by FTSE Russell
☆	Bottom 25% by ESG Ratings amongst PLCs in FBM EMAS that have been assessed by FTSE Russell

\* ESG Ratings of PLCs in FBM EMAS that have been assessed by FTSE Russell in accordance with FTSE Russell ESG Ratings Methodology