

OIL & GAS

KEY INVESTMENT HIGHLIGHTS

- The National Energy Transition Roadmap Part 1 had been launched on 27 July 2023 with 10 flagship initiatives based on 6 energy levers
- Hydrogen fuel will be championed by SEDC Sarawak, with 3 production plants and a green hydrogen hub in planning for domestic use and international export
- PETRONAS will be championing CCUS projects for its Kasawari and Lang Lebah gas fields

Hydrogen and CCUS part of NETR. The National Energy Transition Roadmap (NETR) Part 1 outlines 10 flagship catalyst projects and initiatives based on 6 energy transition levers: (i) energy efficiency (EE), (ii) renewable energy (RE), (iii) hydrogen, (iv) bioenergy, (v) green mobility, and (vi) carbon capture, utilisation and storage (CCUS) (see Table 1). In Part 2, the 6 levers will be further supported by 5 enablers, namely: (i) governance, (ii) policy and regulation, (iii) finance and investment, (iv) human capital and capabilities, and (v) technology and infrastructure.

For the oil and gas sector, emphasis will be given to hydrogen and CCUS projects.

Focus on green hydrogen and hydrogen refuelling. Hydrogen fuel comes in two versions, and NETR will be concentrating in the production of green hydrogen. Sarawak, under its Sarawak Economic Development Corporation (SEDC) will be implementing three integrated projects to produce green hydrogen and consequently transforming the state into a green hydrogen hub. These projects involve the development of a green hydrogen production plant in Kuching by 2025 for domestic use, and two similar plants in Bintulu for exports. We opine this is possible, as Sarawak had, as recent as 2022, commercialise hydrogen fuel for its public transportation. We believe Sarawak has the capacity to pioneer in hydrogen fuel, given that in Kuching, 6 hydrogen fuel refuelling pumps had been installed under Petroleum Sarawak's (PETROS) green initiative.

Two major CCUS projects in the works. Petroliaam Nasional (PETRONAS) will be overlooking two major CCUS projects for its Kasawari and Lang Lebah fields, which are high-CO₂-gas fields. The projects are expected to be in operation by CY26 and CY28 respectively. We believe that, given PETRONAS's expertise in the upstream and its vast exploration assets, as well as the Ministry of Economy's involvement in the regulation and policy framework for transboundary carbon movement, Malaysia could be a major player in the region for CCUS projects. We are also expecting that Oil and Gas Service & Equipment (OGSE) to benefit from the implementation of future CCUS in the construction of injection wells and liquified CO₂ transportation (see Appendix).

COMPANY IN FOCUS

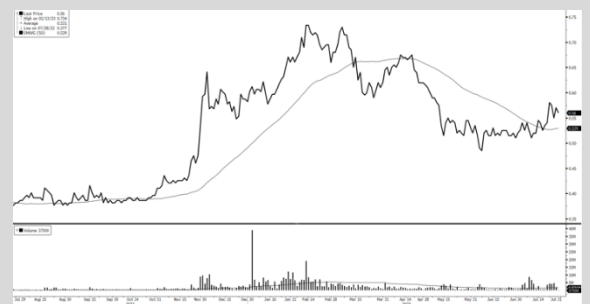
Malaysia Marine & Heavy Engineering

Maintain **BUY** | Target Price: RM0.81

Price @ 27th July 2023: RM0.57

- 5-Y CAGR of +14%
- Strong orderbook in Heavy Engineering
- Involvement in Kasawari CCUS Project
- 4/5 ESG Rating, Shariah compliant

SHARE PRICE CHART



Petronas Gas

Maintain **BUY** | Target Price: RM18.43

Price @ 27th 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

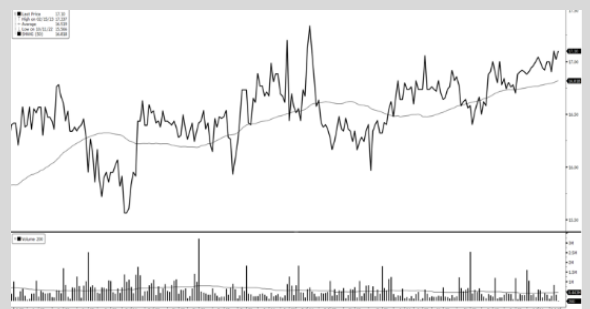
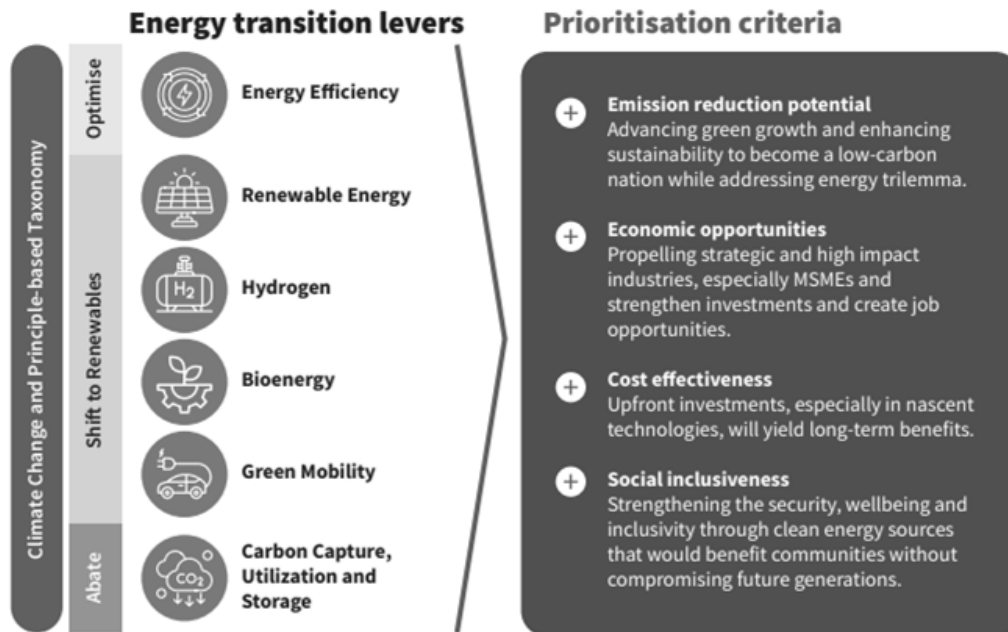


TABLE 1: The Six Energy Transition Levers

Source: NETR, MIDFR

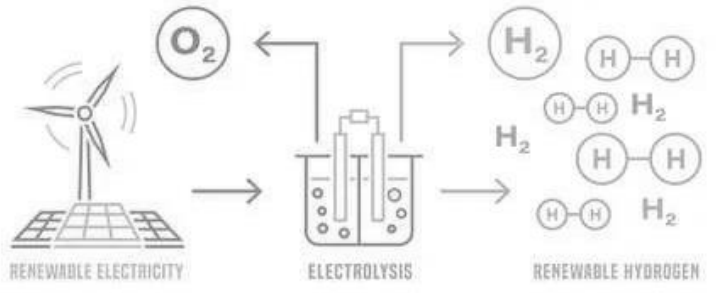
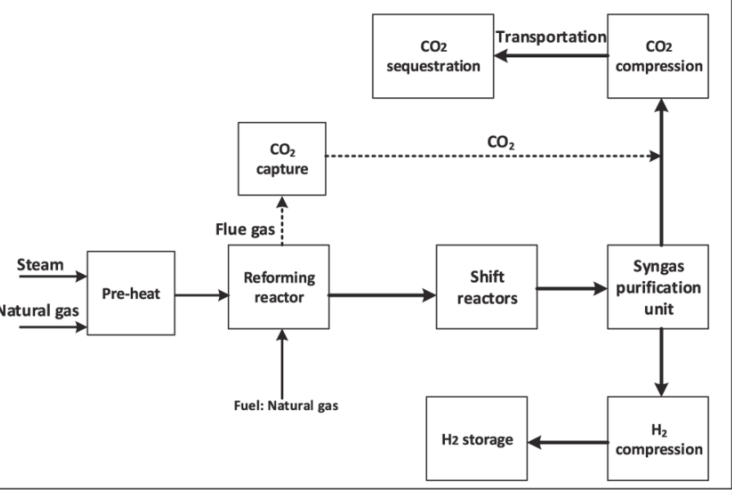
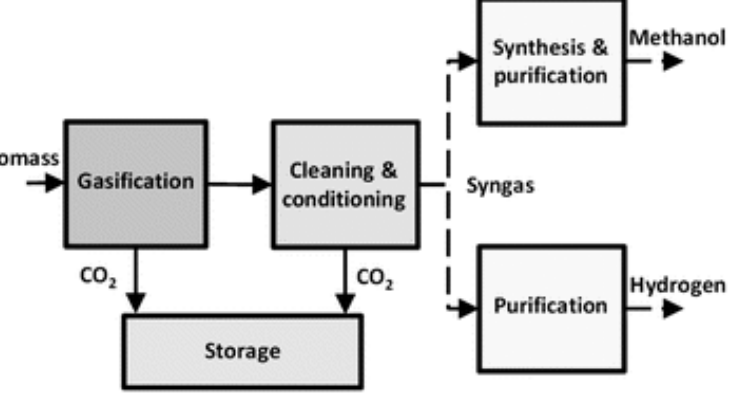
Hydrogen – the next clean fuel. Liquified natural gas (LNG) had been the main contender in championing clean fuel. Recently, hydrogen had come into play. Hydrogen fuel is a clean and versatile energy source, produced through a number of processes, including: (i) electrolysis, (ii) steam methane reforming (SMR), and (iii) biomass gasification (*see Table 2*). These result in a fuel with a high energy content per unit of weight. One of the key applications is in fuel cell technology, where hydrogen undergoes a chemical reaction with oxygen to produce electricity, emitting only water vapor as a by-product. This makes it an environmentally friendly option for electric vehicles. Hydrogen can also be utilized in industrial processes, as a feedstock for ammonia production, and as a source of clean energy for power generation and heating.

Challenge remains on storage availability. In theory, hydrogen can be easily stored and transported. Storage of hydrogen as a gas typically requires high-pressure tanks (approximately 5,000-10,000psi), while as a liquid, it requires cryogenic temperatures due to its very low boiling point (-253°C). In contrast, natural gas can be stored under the pressure range of 500-5,500psi, and liquified natural gas (LNG) requires low temperatures at only -162°C. This made the building and maintaining of infrastructure for hydrogen production, storage, and transportation to be a significant challenge moving forward. Additionally, hydrogen has a low volumetric energy density, requiring larger storage tanks than the existing infrastructure and reducing the overall efficiency of transportation and storage systems.

CCUS – the net-zero carbon emission solution. CCUS had been designed to mitigate greenhouse gas emissions, particularly CO₂, from oil and gas refining, industrial processes and power generation. CCUS involves capturing CO₂ emissions, utilizing CO₂ for productive purposes, and safely storing the captured CO₂ underground to prevent it from entering the atmosphere. CCUS is vital in assisting various sectors to reach net-zero carbon and carbon neutrality goals, as well as a bridge to compliment other renewable energy sources. However, CCUS is still considered a costly operation due to its technical complexity and less commercial value.

Synergy with blue hydrogen production. Despite the small market products derived from CCUS, there is a high potential to incorporate CCUS in the production of blue hydrogen through steam methane reforming and biomass gasification. We believe the synergy of both energy transition levers will make CCUS a high potential revenue stream for O&G major players and OGSE firms involved in the construction and operations of the CCUS facilities moving forward into the energy transition phase. We also believe that Malaysia has the potential to continue pioneering for CCUS, as it is reported that 46 tcf of potential CCS capacity in 16 depleted fields were discovered, which is more than ample for the nation's upstream CO₂ emissions reduction goals.

TABLE 2: Production of Hydrogen


Production Method	Process	Process Flow
<p>Electrolysis</p> <p>Industries involved:</p> <ul style="list-style-type: none"> - renewable energy - automotive - utilities - tech - construction 	<p>An electric current splits water into hydrogen and oxygen. Electricity is produced by renewable sources, such as solar or wind. Produces green hydrogen.</p>	
<p>Steam methane reforming</p> <p>Industries involved:</p> <ul style="list-style-type: none"> - oil and gas - chemicals - CCUS - utilities - tech - transportation - construction 	<p>Methane (natural gas) reacts with steam under 44–363psi in the presence of a catalyst to produce hydrogen, carbon monoxide, and a relatively small amount of carbon dioxide. Produces blue hydrogen.</p>	
<p>Biomass gasification</p> <p>Industries involved:</p> <ul style="list-style-type: none"> - plantation - chemicals - CCUS - utilities - tech - transportation - construction 	<p>Converts organic or fossil-based carbonaceous materials at high temperatures (>700°C), without combustion, with a controlled amount of oxygen and/or steam to produce carbon monoxide, hydrogen, and carbon dioxide. Produces blue hydrogen.</p>	

Source: US Department of Energy, MIDFR

Investments in oil and gas still crucial. Globally, the oil and gas sector had suffered divestments in favour of renewable energy and cleaner fuel. However, in relative to the speed of adoption of renewable energy, we believe that the pace of divestment from oil and gas maybe faster than required. As of July CY23, approximately USD40.5 trillion had been divested from the sector, since CY14. We believe hydrogen fuel and CCUS projects could assist in the reinvestment in the oil and gas sector to ensure a smooth and orderly energy transition, in line with the aspirations for net-zero carbon and carbon neutrality across various markets. With the available CCUS technology, along with the depleted gas reservoirs in our local front, we believe that these could help Malaysia to pioneer the utilization of hydrogen fuel in industrials and power generation, beyond its current usage as transportation fuel. While the utilization of hydrogen fuel is still in its early stage, we opine with given time for the rapid advancement of new technologies and the utilization of A.I. and digital tech in the infrastructure for the

processing, storage, transportation and combustion of hydrogen, this energy source will be crucial in realizing the energy transition agenda in the near future.

POSITIVE outlook for NETR from sector's perspective. All in, we are positive with the government's initiatives for an orderly energy transition for the nation through the launching of its NETR Part 1, 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.

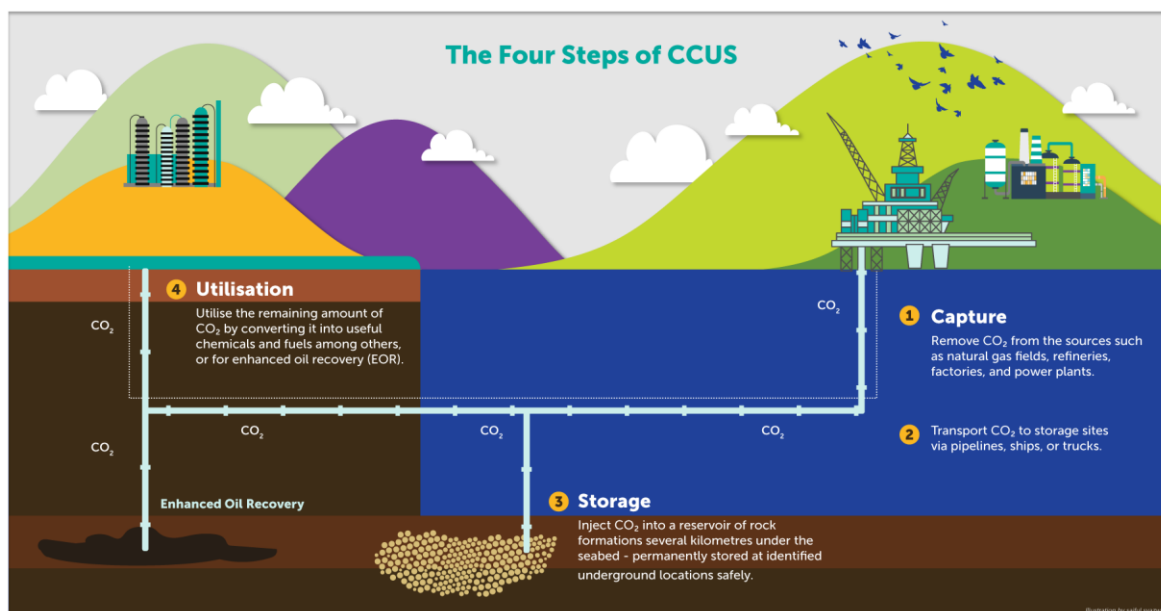
Our Top Picks for the sector in line with the release of NETR Part 1 are **MMHE (BUY, TP: RM0.81)** and **Petronas Gas (BUY, TP: RM18.43)**. We like MMHE for its involvement in the Kasawari CCUS Project in offshore Sarawak. While MMHE is not the main operator of the project, its expertise as an OGSE company to construct and maintain offshore platform jackets paves the way for other OGSE companies to find revenue in future CCUS projects, particularly in construction and transportation sectors. 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 bulk storage issues, as well as giving a proper regulation in the refinery aspects of blue hydrogen management for future hydrogen exploration and development. 

APPENDIX

Kasawari CCUS Project

Carbon Capture and Storage (CCS) is part of the decarbonisation solution by Petroleum Nasional (PETRONAS), which involves the physical reduction of carbon dioxide (CO₂) by capturing the gas and reinjecting it into depleted oil and gas fields offshore. According to Petronas, CCS is part of the net-zero carbon emission solution for industries that emit large amounts of CO₂. The industries to benefit from CCS would include, but not limited to: (i) steel manufacturing, (ii) cement manufacturing, (iii) plantation, (iv) oil and gas refinery, (v) petrochemical production, and (vi) power generation. Production of clean energy sources such as biofuel and hydrogen fuel are also expected to benefit from CCUS.

The Kasawari CCUS flow begins from the Kasawari gas field, located about 200km offshore from the Bintulu LNG Complex in Sarawak. Captured CO₂ will be gathered at the gathering terminal and transported via a 135km pipeline to the M1 storage field which was previously a depleted gas field. The first injection is expected to commence in June CY26 with an estimated emission reduction of 3.3 mil tCO₂e per year. The total injection capacity of M1 field is approximated at 1Tcf with the capability to reduce a total of 76 mil tCO₂e of emission reduction.



Source: PETRONAS

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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