Invest Malaysia 2023 – Special Series

National Energy Transition Roadmap, Part 1

Taking Malaysia’s Sustainability Agenda to a new level

Invest Malaysia 2023’s Special Series on the National Energy Transition Roadmap (NETR; July 27) provided a clear narrative and practical pathway towards driving the country’s next phase of economic growth and long-term sustainability agenda, especially Malaysia’s commitment to achieve carbon neutrality by 2050. The transformative thinking underpinning the NETR underscores and reinforces the laudable ambitions of the recently-articulated MADANI Economy framework which emphasizes the leveraging of Malaysia’s many inherent strengths to be a leading Asian economy, by becoming a competitive and world class investment destination.

Key highlights of the NETR, Part 1

The NETR Part 1 contains 10 flagship-cum-catalytic initiatives (Fig 3) that have a total investment value of between MYR435b to MYR1.85tr by 2050, and will be offering 23,000 high-impact jobs. A cornerstone project is a 1GW large scale integrated RE zone (powered by solar) by UEM-INTRAMAS JV, to be the largest in ASEAN and having attracted MYR6b in foreign investments to-date. In addition to solar power, the NETR also opens up the hydrogen gateway in Sarawak, and puts in place the framework for carbon capture, utilisation & storage (CCUS), hence laying the foundations for the development of new, high value-add GDP growth drivers. Particularly noteworthy is the NETR’s explicit inclusion of households via offering an income opportunity from leasing out their rooftops for solar power generation – please see our note on Sime Darby Property (“Riding on the solar wave”, dated July 28) regarding its detailed, broadly income-generative plans to integrate solar solutions into its township projects.

Reinforcing the MADANI Economy framework

The innovation and pragmatism demonstrated by the NETR dovetails nicely with the ambitions of the MADANI Economy, principally to develop new secular growth engines for both broad economic growth as well as the creation of high-paying jobs by building on the country’s competitive strengths such as its’ abundance of natural resources, strategic geographic location and a pioneering, world-class energy industry. As articulated in our macro update report “MADANI Economy - Providing the Narrative”, on July 28, pending policy updates such as NETR Part 2, National Industrial Master Plan (NIMP) 2030, 12th Malaysia Plan mid-term review and Budget 2024 are expected to build on the positive leading edge tone set by NETR.

Reaffirming our positive 2H23 equity market outlook

As detailed in our 2H2023 Market Outlook report (“Clearer Skies Ahead, dated July 12), we are optimistic on improved market traction over 2H23 despite still-mixed earnings guidance. Besides peaking interest rates / inflation and softening USD, China’s growth outlook is seen to stabilize and US Fed’s narrative has turned more dovish. Against KLCI’s post-millennium forward PER low of c.12x, 2024E market earnings growth is forecast to accelerate to +13.3% (2023E: +6.5%) as ASP-driven sectors (Plantations, Gloves, Petrochem) improve while laggards like Telcos, Aviation extend on their earnings recovery. End-2023 KLCI target is 1,520 (13x fwd. PER; +5% upside), our preference being Financials, Tech (Software, EMS) and selective SMIDs.

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Keynote Address

YB Rafizi Ramli, Minister of Economy

Invest Malaysia 2023’s Special Series (on 27 Jul) on the National Energy Transition Roadmap (NETR) gave a clear narrative and a practical pathway in driving the country’s next phase of economic growth and long-term sustainability agenda, especially in the country’s commitment for carbon neutrality by 2050. The NETR Part 1, launched at Invest Malaysia, contains 10 flagship-cum-catalytic initiatives that are expected to define policy thinking and transform the economy. Besides substantial investment and job creation potential, an interesting proposition is an income opportunity to households. This, in turn, is also multi-pronged in lowering the Government’s subsidy bill and supports fiscal management, in our view.

Highlights of YB Minister’s Keynote Address:

- **Transforming the economy.** The NETR aims to change the economics of renewable energy (RE) into profitable ventures to enable the country to scale up on its installed capacity and reconfigure its energy/power mix with the right infrastructure and technology. The roadmap puts into action several RE policy milestones achieved over the past few months including 1) the lifting of export ban on RE, 2) the establishment of a central electricity exchange which is to be operated by a single-market aggregator to ensure fair and transparent pricing, and 3) a higher (and stretched) 70% RE capacity target (of total power capacity) by 2050, from 40% earlier.

  The 10 catalytic projects/initiatives under NETR Part 1 have a total investment value of between MYR435b to MYR1.85tr by 2050, and offer 23,000 high-impact jobs. One of the projects is a 1GW large scale integrated RE zone (powered by solar) by UEM-INTRAMAS JV which would be the largest in Southeast Asia, which has attracted MYR6b in foreign investments. In addition to solar power, the NETR also opens up the hydrogen gateway in Sarawak, and puts in place the framework of carbon capture, utilisation and storage (CCUS).

- **Transforming Malaysia’s regional / global positioning.** The NETR offers an opportunity for the country to lead as a regional powerhouse in RE (in Southeast Asia); key supporting factors include the country’s strategic location in the RE demand-supply chain, and an experienced talent pool. Malaysia’s high ranking in the most recent Energy Transition Index by World Economic Forum – no. 1 in Southeast Asia, no. 2 in Emerging Asia, no. 35 in the world – implies that it should be able to make the energy transition in a comfortable manner.

- **Transforming people’s livelihoods.** The NETR is designed to make clean energy a financially viable option to households by offering an income opportunity for the households to lease out their rooftops for solar power generation which would, in turn, lower their electricity bills. In addition, households could also contribute used cooking oil and waste as feedstock for biomass and biofuels under the NETR. Relating to mobility, 10,000 charging stations would be installed along highways and commercial buildings by 2050, and the first- and last-mile of public transport would also be electrified under the NETR.
NETR in Propelling Malaysia’s Economic Growth & Sustainability Agenda

Panelists:
- YB Rafizi Ramli, Minister of Economy
- YB Nik Nazmi Nik Ahmad, Minister of Natural Resources, Environment & Climate Change
- Mohammed Rashdan Mohd Yusof, Chairman, Energy Commission

Moderator: Datuk Muhamad Umar Swift, CEO, Bursa Malaysia

Key message from the panelists. Energy transition, while being necessary, also offers an opportunity for Malaysia to take a leadership narrative for the region. A revised and stretched target of 70% RE capacity by 2050 is now in place, which balances the practicalities of RE capacity addition with the required scale for tangible multiplier effects. The 10 flagship-cum-catalytic projects listed in the NETR are not constrained to solar and hydro. Regarding the mechanics, a single market aggregator is needed to efficiently match supply with demand.

Highlights of the panel discussion:

- Initial thoughts about NETR. The Government has been busy with the energy sector, having 1) addressed targeted subsidies, 2) is working towards the enabling of renewable energy trading, and 3) relaxing selected solar policy restrictions (high-voltage consumers are now eligible for solar, no capacity limit for residential installations). The NETR is a progression of the Government’s efforts, and could potentially address the economics in relation to energy transition. This, in turn, could crystalize large tangible projects that encapsulates the vision of Malaysia’s transition journey.

NETR is necessary for Malaysia to be a part of the global economy. Global capacity plant-up is already skewed towards renewables, but is concentrated in China, US and the EU. Malaysia has the opportunity to take the lead with renewable transition in ASEAN. The Energy Commission aspires to be involved in the ASEAN Power Grid in the future.

- How is the revised 70% RE target derived? The overarching aspiration is to insulate Malaysia from future energy price shocks, given that Malaysia faces the possibility of having to import gas in the future. Malaysia’s relatively healthy reserve margin also allows a more aggressive pace of renewable transition. Overall, the 70% target represents a sweet spot, which balances 1) the practicalities of RE capacity addition with the use of gas as a transitionary fuel, and 2) the required scale of the green economy to achieve tangible multiplier effects. Overall, the 70% RE capacity represents a stretched target that sets Malaysia’s ambition high.

- Not all about solar and hydro. Malaysia has experience in building up the total value chain of the LNG industry in the past. This experience can potentially be replicated in the hydrogen space, which is still at its nascent stage. The Government is contemplating facilitating and funding the development of hydrogen use cases in the future. Malaysia also has an advantage with carbon capture, utilisation and storage (CCUS). YB Minister Rafizi foresees an inflexion point where CCUS will be a permanent feature in the global economy as countries strive towards meeting their emission targets. The Government needs to introduce applicable policies and rules. On electric vehicles (EV), the Government is committed to increasing charging infrastructure.
The 10 flagship projects represent committed investments. The Government aims to expedite policy changes and incentives to allow these projects to take off as scheduled. The Government is quite agnostic on foreign participation in these flagship projects. Malaysia does not have all the required capabilities, thus some level of international collaboration is required.

- **Single aggregator.** Malaysia already has a single buyer, which, while not completely independent, is operationally ring-fenced. There is no urgent push for the single buyer to be totally independent. Longer term, there is an aspiration to move the utilities sector to be more market-based and liberalized.

  Given the focus on rooftop solar (households effectively become prosumers), a mechanism needs to be in place to match potential supply with aggregate demand (as Malaysia does not operate a merchant market). An aggregator can fulfill this role efficiently, so that large customers (local and cross-border) are able to receive GW-levels of RE and pay much higher tariffs. In addition, there is the technical aspect in relation to intra-day load matching (solar is intermittent and Malaysia has no wind potential) to be managed, which requires hefty investments (for grid enhancement and battery systems), and necessitates a market aggregator.

- **Allowing a self-contained system.** The Government will allow a willing buyer-willing seller, self-contained system for RE generation. This will allow the township property developers to bypass the current quota system, and develop RE for the whole township (lease rooftops from houseowners) for their internal use (until the single aggregator takes off). This could give rise to more RE-powered townships or industrial parks.

- **Challenges in implementation.** Among the challenges listed by the panel include getting the grid being ready to support RE requirements (in terms of capacity and interconnection points), a change in mindset for all involved, and the Government to deliver on the required policy adjustments (including addressing sensitive issues such as subsidy re-targeting).
NETR Part 1: Flagship Catalyst Projects and Initiatives

Highlights of the NETR Part 1 blueprint, by Ministry of Economy

Key takeaway from the blueprint. The NETR aims to accelerate Malaysia’s energy transition and shift the economy from one that is fossil fuel based to a high-value green economy. The roadmap outlines Malaysia’s approach to manage the energy transition (ET) which needs a whole-of-nation approach, together with the international partners. The NETR comprises 2 parts: 1) Part 1 outlines 10 flagship catalyst projects/initiatives based on 6 ET levers – energy efficiency, renewable energy (RE), hydrogen, bioenergy, green mobility, and carbon capture, utilisation and storage (CCUS); 2) Part 2 will focus on establishing the low-carbon pathway, national energy mix and emissions reduction targets, and the enablers.

Highlights of the NETR Par 1 blueprint:

- **ET as a mean of transforming the economy.** The national total primary energy supply (TPES) mix is made up of 4 energy sources in 2020: natural gas (42.4%), crude oil & petroleum products (27.3%), coal (26.4%) and renewables (hydro, solar & bioenergy; 3.9%). As natural gas takes on a “transitional fuel” role in the country’s ET journey, the Government plans to transform the power sector and embark on electricity tariff restructuring to ensure cost reflective pricing, enable high penetration of RE, and enhance Malaysia’s competitive advantage.

- **Energy transition also offers Malaysia an opportunity to transform its economy and maximise the potential for green growth.** The NETR, which will accelerate the country’s ET, also takes into consideration the economic challenges ahead in terms of growing demand for energy, rising subsidy burden, declining oil & gas resources, and rising energy costs.

- **The need to meet carbon intensity commitment.** The energy sector is the largest contributor to the country’s greenhouse gas (GHG) emissions, at 78.5% of total emissions in 2019. As energy demand rises alongside economic growth, there is an urgent need to transition towards clean energy to meet Malaysia’s climate commitment to cut 45% carbon intensity against GDP by 2030 from 2005’s baseline. In addition, large-scale ET is a necessity as c.57% of Malaysia’s total exports will be affected by the implementation of EU’s Carbon Border Adjustment Mechanism (CBAM), aimed at preventing carbon leakage in the trade value chain.

**Fig 1: Malaysia’s GHG inventory in 2019**

![Graph showing Malaysia's GHG inventory in 2019](Source: NETR Part 1 blueprint)
The country’s policy responses. While the 12th Malaysia Plan (2021-2025) outlines the country’s aspiration to achieve net-zero GHG emissions by 2050, the National Energy Policy, 2022-2040 lays the groundwork to transform the energy landscape. The latter’s Low Carbon Nation Aspiration 2040 aims to transform the primary energy supply, as it moves towards cleaner, RE sources. The NETR Part 1 identifies 10 flagship catalyst projects and initiatives to accelerate the pace of ET.

National Energy Transition Roadmap

Guiding principles. There are four guiding principles behind the NETR: 1) alignment to the country’s aspirations and commitments to sustainable development; 2) energy transition must be just, inclusive and cost effective; 3) effective governance and whole of nation approach: and 4) create high-value employment for the people and generate high-impact economic opportunities for SMEs. The NETR subscribes to the Climate Change and Principle-Based Taxonomy defined by Bank Negara. The proposals are accessed in accordance to the themes of the 12th Malaysia Plan (2021-2025).

Six energy transition levers. Based on the roadmap design, six energy transition levers have been identified, namely 1) energy efficiency, 2) renewable energy, 3) hydrogen, 4) bioenergy, 5) green mobility and 6) carbon capture, utilization and storage.

Updated renewable energy policies. The target for installed RE capacity has been increased from 40% in 2035 to 70% by 2050. The Government will allow RE development based on a self-contained “willing buyer, willing seller” model to encourage investment and diversify RE programs. The installation of solar systems in government buildings will be scaled up, and cross-border RE trade will be allowed through the establishment of an electricity exchange system.

RE exchange system. The establishment of an RE exchange system will position Malaysia as a regional hub for RE, while providing added impetus to the ASEAN Power Grid initiative. Malaysia is presently one of the participants of the Lao PDR-Thailand-Malaysia-Singapore Power Integration Project.
Grid enhancement. The Government is cognizant of the need to enhance the national grid to accommodate higher RE update. This may involve the introduction of smart grid features and enabling the grid for third party access.

Complementary policies. In line with the whole-of-nation approach, there has been a steady development of new complimentary policies and strategies by various Ministries to complement Malaysia’s low-carbon transition. With gas continuing to play a pivotal role in the energy landscape, a Natural Gas Roadmap is in the midst of being developed.

Flagship catalyst projects and initiatives. 10 flagship projects have been identified which are expected to generate total investment of c.MYR25b (through a combination of private and public funding), create 23,000 jobs opportunities, and reduce GHG emissions by >10,000 Gg CO₂ annually.

Financing requirements. An estimated MYR637b is required to achieve the 70% RE capacity target by 2050. This consists of investment in solar capacity and transmission grid and distribution network reinforcement.

Carbon trading. Bursa M’sia has launched its voluntary carbon market to enable voluntary purchases of carbon credits. A feasibility study for carbon pricing instruments is now being conducted, and is expected to be completed in 2025.

Source: NETR Part 1 blueprint
Fig 4: NETR Part 1’s 10 flagship catalyst projects and initiatives and implementation modalities (continued)

<table>
<thead>
<tr>
<th>Renewable Energy (RE)</th>
<th>Renewable Energy Zone (RE Zone)</th>
<th>Hybrid Hydro-Floating Solar PV (HHFS)</th>
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<td></td>
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<td>Development of 2500 MW HHFS potential at TNB hydro dam reservoirs will increase RE generation close to 24-hour availability. The hydro plant acts as energy storage by conserving the water in the reservoir during peak hours and discharging it during non-peak, while providing quick response to the duck curve. Reduce investment by utilising existing hydro infrastructure as compared to BESS + solar PV. Potential scaling up for future green hydrogen feedstock in collaboration with other hydrogen producers such as Gentari as the green electron ofaker.</td>
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<td>Sime Darby Property</td>
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<td>NRECC Energy Commission (ST)</td>
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<td>Energy Storage</td>
<td>Energy Storage System (ESS)</td>
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<td>Development of utility-scale ESS to enable higher penetration of variable RE in Malaysia.</td>
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<td>NRECC Energy Commission (ST)</td>
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<td>Energy Secure</td>
<td>Sabah Energy Security Initiative</td>
<td>An integrated initiative is underway to secure the long-term energy supply and support the socioeconomic development of the state. This includes: the development of large-scale solar (LSS) and small hydropower plants; the formulation of policy and regulatory framework on biowaste to ensure a consistent supply of feedstock; and the feasibility of geothermal power generation.</td>
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<td>Energy Commission of Sabah (EcoS)</td>
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<td>Hydrogen</td>
<td>Green Hydrogen</td>
<td>Sarawak Hydrogen Hub</td>
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<td>Implementation of three integrated projects to produce green hydrogen will propel Sarawak as a regional green hydrogen hub. These projects involve the development of a green hydrogen production plant in Kuching by 2025 for domestic use, and two plants in Bintulu by 2027, mainly for export purposes. Sarawak State Government through SEDC Energy is collaborating with strategic partners to develop the state into a green hydrogen hub.</td>
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<td>SEDC Energy</td>
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<td>Co-Firing of Hydrogen and Ammonia</td>
<td>Green hydrogen and ammonia co-firing in collaboration with PETRONAS to decarbonise TNB generation plants.</td>
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<td>TNB</td>
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Source: NETR Part 1 blueprint
### Fig 5: NETR Part 1’s 10 flagship catalyst projects and initiatives and implementation modalities (continued)

<table>
<thead>
<tr>
<th>Bioenergy</th>
<th>Biomass Demand Creation</th>
<th>Biomass Clustering</th>
<th>NRRECC SEDA</th>
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<td>Development of potential biomass clusters with a centralised plant using aggregated feedstock from multiple neighbouring mills. Biomass clustering is expected to improve economies of scale as well as securing larger and more reliable feedstock.</td>
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<tr>
<th>Bioenergy</th>
<th>Biomass Co-firing</th>
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<td>Co-firing initiative at the existing 2100MW Tanjung Bin Power Plant by burning biomass along with coal. Biomass sources include Empty Fruit Bunch (EFB), pellets, wood chips, wood pellets, bamboo pellets, coconut husk and rice husk. A pilot phase of co-firing will commence in 2024 with a view to scale up to a minimum of 1.5% biomass co-firing capacity by 2027.</td>
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<th>Green mobility</th>
<th>Future Mobility</th>
<th>EV Charging Stations</th>
<th>NITI</th>
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<tr>
<td></td>
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<td>Installation of 10,000 EV charging stations by 2025 along highways and at selected commercial buildings in collaboration with strategic partners, among others, TNB, Plus Malaysia Berhad (PLUS), Permodalan Nasional Berhad (PNB), Gentari and Sunway Group.</td>
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<th>Green mobility</th>
<th>Future Mobility</th>
<th>Mobile Hydrogen Refuelling Station</th>
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<td>Introduction of the first mobile hydrogen refuelling station for transportation in Peninsular Malaysia, in collaboration with NanoMalaysia Berhad, PETRONAS, United Motor Works (UMW) and the MSTC.</td>
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<th>Green mobility</th>
<th>Future Mobility</th>
<th>Public Transport Electrification</th>
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<td></td>
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<td>This project involves electrification of first and last mile public transport and upgrading infrastructure and electrical lines at bus depots for charging, with maintenance, repair and overhaul (MRO) opportunities for local SMEs.</td>
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<tr>
<th>Green mobility</th>
<th>Future Mobility</th>
<th>Solar Photovoltaic (PV) Installation for Rail Operations</th>
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<td></td>
<td></td>
<td>The Rail Sector Energy Management and Renewable Energy (EMRE) Action Plan entails the installation of Solar Photovoltaic (PV) systems for non-traction electricity usage in rail operations such as stations and depots.</td>
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<tr>
<th>Future Fuel</th>
<th>Biofuels Hub</th>
<th>PETRONAS</th>
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<td>A bio-refinery will be developed in Pontian, Johor, to serve as a catalyst for creating hubs to produce a range of bio-based products, including sustainable aviation fuel (SAF), hydrotreated vegetable oil (HVO), advanced sustainable fuel (ASF) and biochemicals</td>
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*Source: NETR Part 1 blueprint*
Fig 6: NETR Part 1’s 10 flagship catalyst projects and initiatives and implementation modalities (continued)

Source: NETR Part 1 blueprint
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APPENDIX I: TERMS FOR PROVISION OF REPORT, DISCLAIMERS AND DISCLOSURES

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July 28, 2023