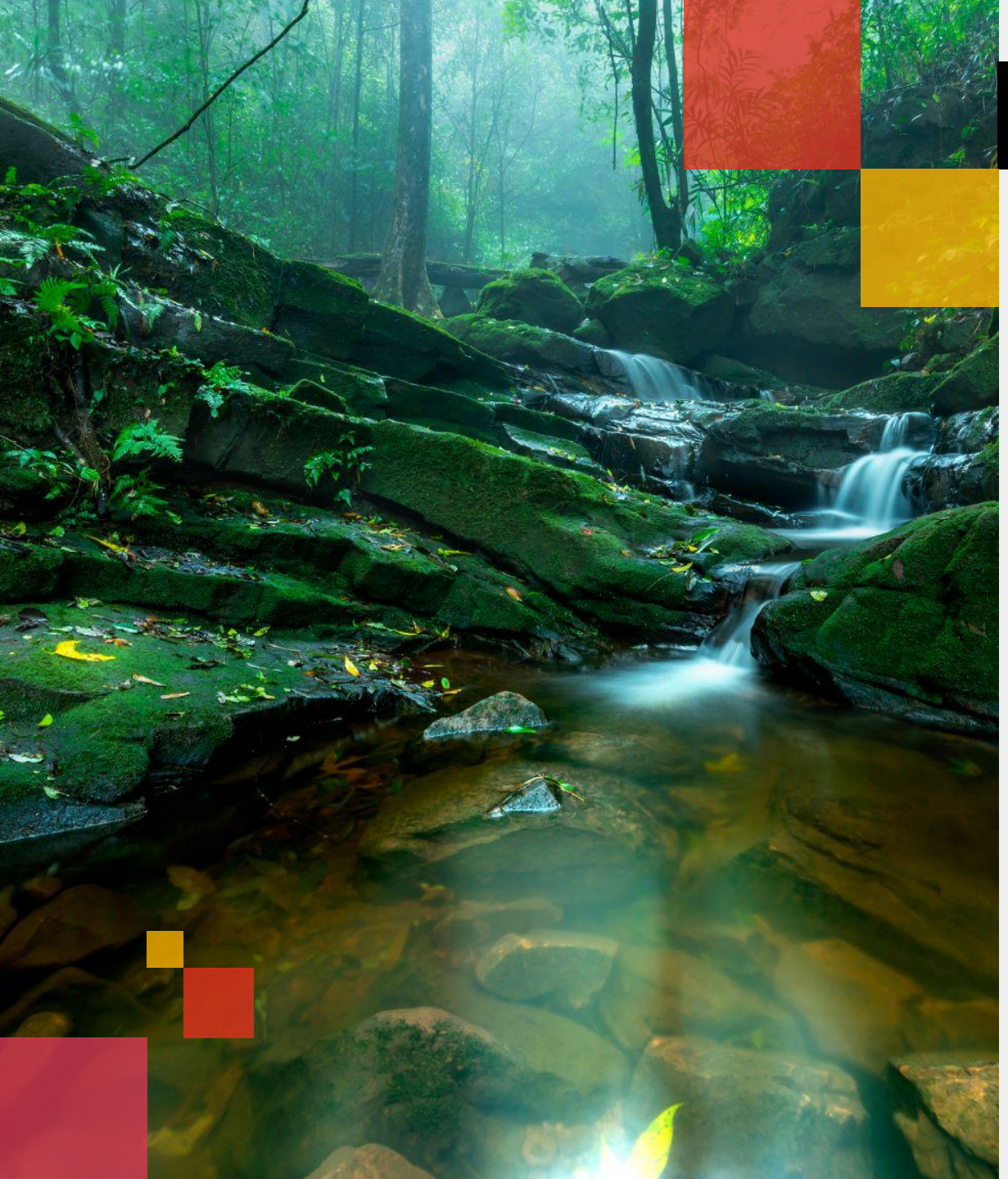
September 2023

Summary of the

National Energy Transition Roadmap

Navigating the transient stage

pwc



Contents

This summary document is mainly sourced from the National Energy Transition Roadmap (NETR) supplemented by further research and analysis.

Part 1:

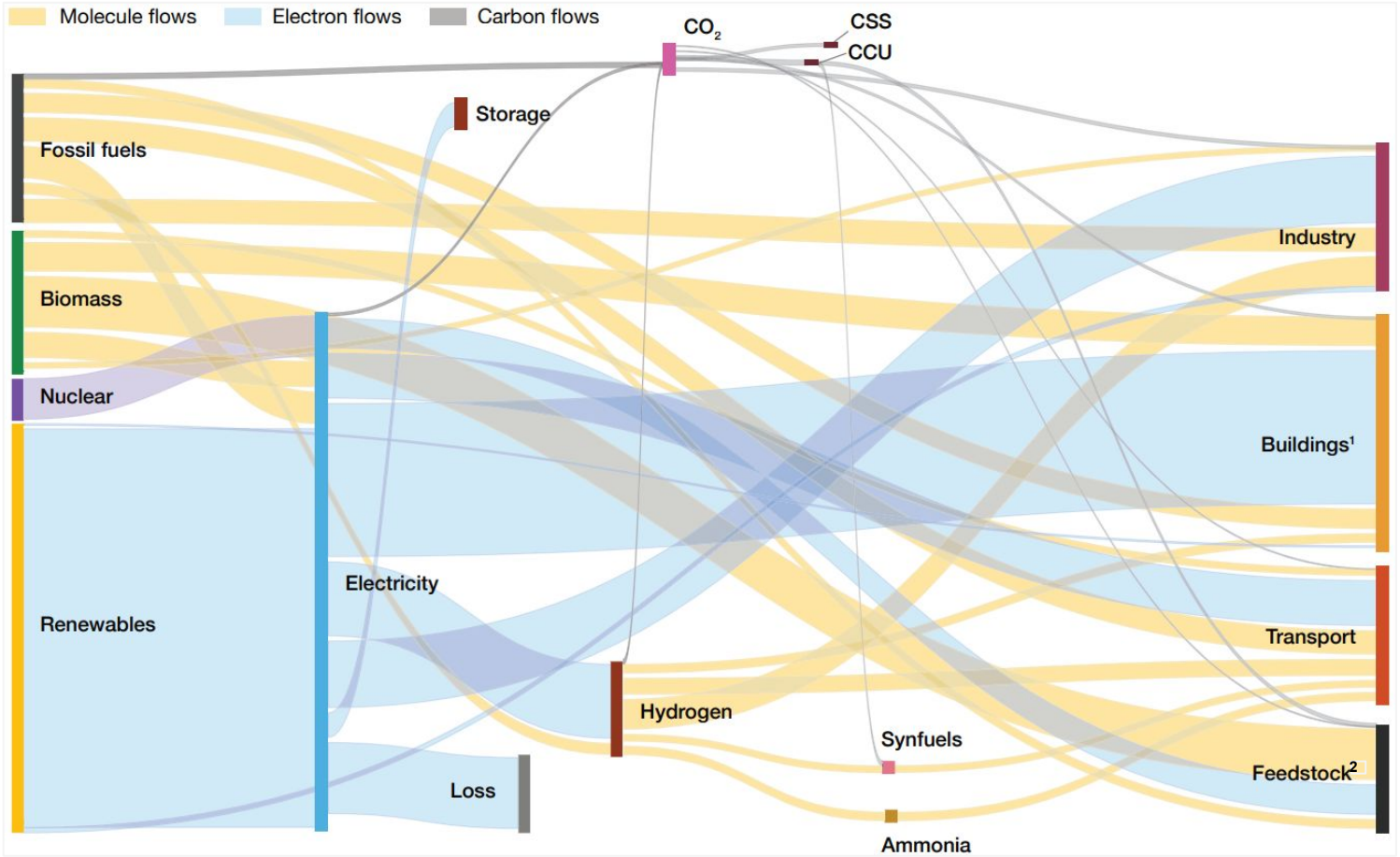
Capitalising on high-value green economy

Six energy transition levers and ten flagship projects

The first phase of the NETR has identified ten flagship catalyst projects based on six energy transition levers, crucial for navigating the complex shift from traditional fossil fuels to a thriving green economy.

Forecasted energy flows in 2050 shows that dependency on fossil fuels will reduce while renewable energy grows

PwC Strategy& illustration of energy source and target (2050) - Illustrative



By 2050,

low-carbon sources will account for more than 90% of energy, and fossil fuels will account for less than 10%.

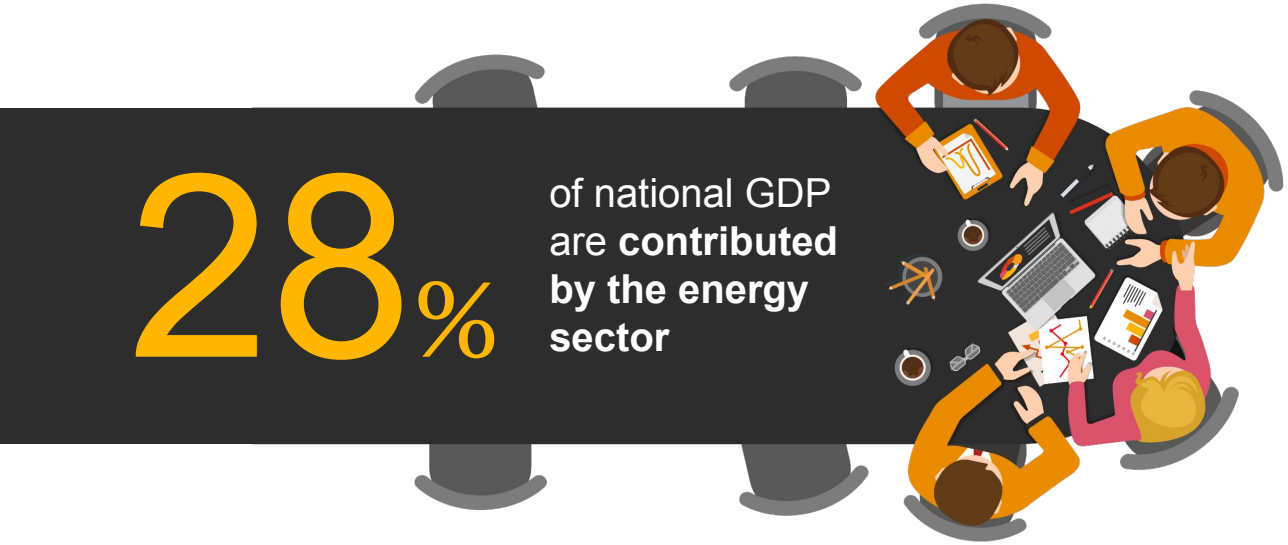
Renewable energy sources will be the main feedstock for the economy, while fossil fuels will be required for hard-to-decarbonise sectors.

Source: PwC's Inventing Tomorrow's Energy System (2021)

[1] *Buildings include residential, both commercial and public*
[2] *Feedstock include agriculture, forestry, fishing*

NETR recognises the current state and addresses challenges moving forward

Malaysia state of energy affairs

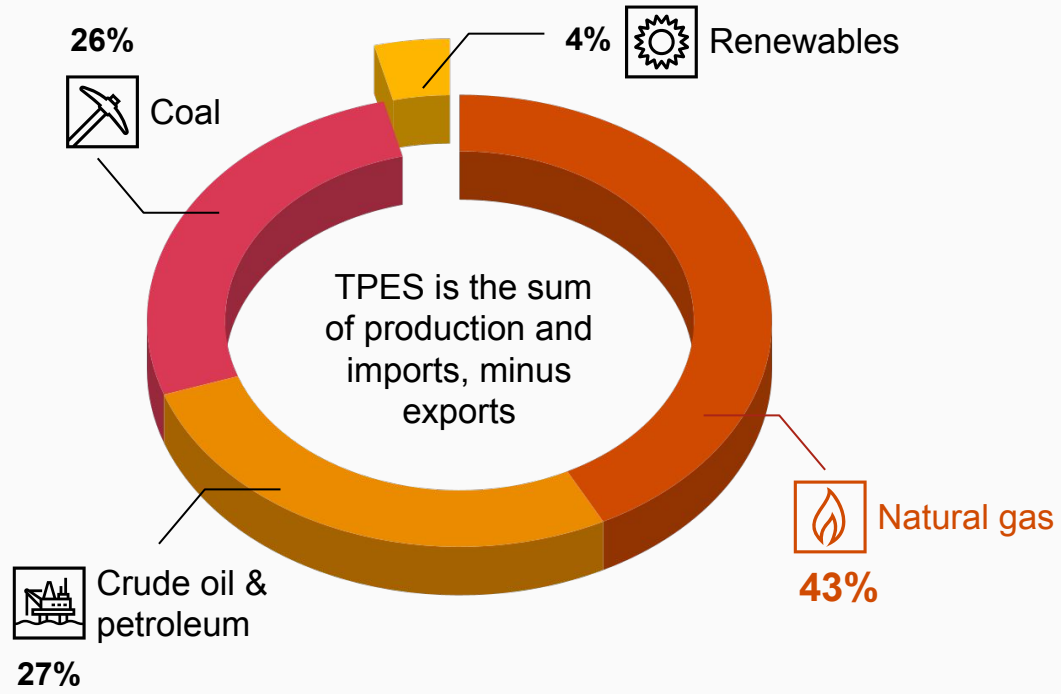


As such, **the transition** from a fossil fuel dependent economy to a high-value green economy **must be done meticulously**, to amplify positive impacts and reduce any ramifications to near zero, especially to the *Rakyat*.

1 out of 4
of total workforce in Malaysia is employed by the energy sector

Source: NETR (2023), Suruhanjaya Tenaga website (2023)

Total Primary Energy Supply (TPES), 2020



NETR highlights **natural gas as a vital transitional fuel** in ensuring energy security and affordability remain intact.

NETR doubles down on reducing greenhouse gases intensity against GDP by 45% by 2030 compared to 2005 baseline

Several risks which would delay the energy transition progress were identified

01 Malaysia's energy sector produced almost 80% of greenhouse gases (GHG) emissions which is approximately 259 Mt a year (2019).

02 Climate change poses a threat to the global economy, trade and financial system, with potential losses amounting to 10% - 46% of GDP by 2050.

03 The EU introduced the Carbon Border Adjustment Mechanism (CBAM), which could affect up to 57% of exports to the EU by 2026 comprising key industries such as iron, steel, aluminium and consumer appliances.

04 The US introduced the Inflation Reduction Act (IRA), which prioritises the production and demand for domestically produced clean energy goods and services over imported ones.

Source: NETR (2023), Swiss Re Press Release (2021)

NETR identifies six levers comprising ten flagship catalyst projects, reducing GHG emissions by at least 10 Mt per year

Optimise

- Energy efficiency (EE) — 1

Shift to Renewables

- Renewable energy (RE) — 2 3 4
- Hydrogen — 5 6
- Bioenergy — 7
- Green mobility — 8 9

Abate

- Carbon capture, utilisation and storage (CCUS) — 10

1 Efficient Switch

Energy Efficiency and Conservation Act (EECA) by NRECC

Energy Audit for Rail Sector by Ministry of Transport (MOT)

2 RE Zone

Integrated RE Zone by Khazanah Nasional

Solar park and hybrid hydro-floating solar PV by TNB

Residential Solar by Sime Darby Property

3 Energy Storage

Energy Storage System (ESS) by NRECC and Suruhanjaya Tenaga (ST)

4 Energy Secure

Sabah Energy Security Initiative by Energy Commision of Sabah (ECoS)

5 Green Hydrogen

Sarawak Hydrogen Hub by SEDC Energy

6 Hydrogen for Power

Co-firing of hydrogen and ammonia by TNB

7 Biomass Demand Creation

Biomass clustering by NRECC and SEDA

Biomass co-firing by Malakoff

8 Future Mobility

EV charging stations by MITI

Mobile hydrogen refuelling station by MOSTI

Public transport electrification by MOT and Prasarana

Solar PV for Rail by MOT

9 Future Fuel

Biofuels Hub by PETRONAS

10 CCS for Industry

Regulatory Framework by Ministry of Economy

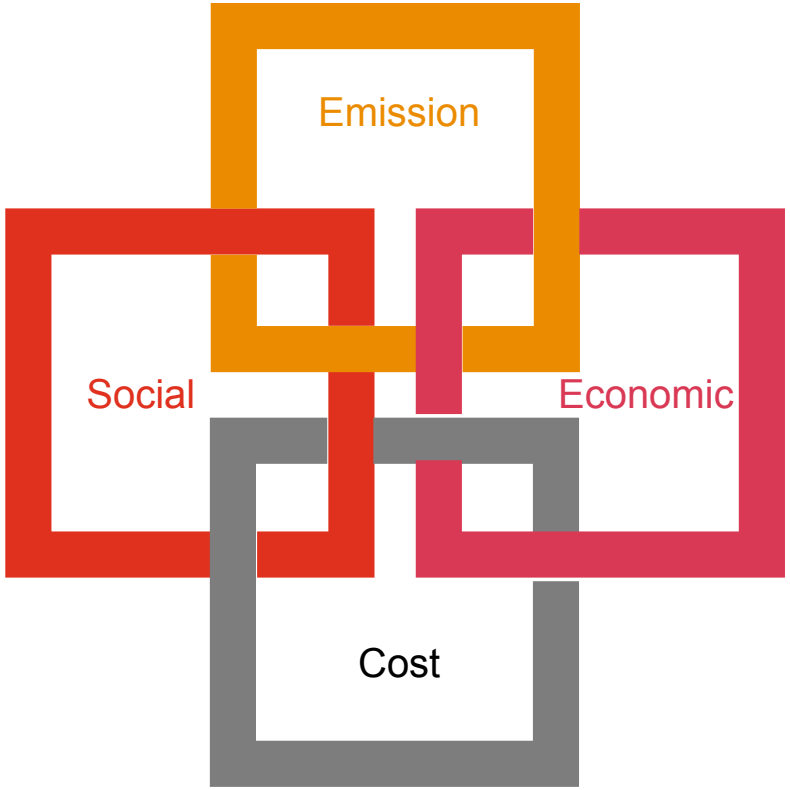
Kasawari carbon capture and storage (CCS) by PETRONAS

Source: NETR (2023) | Abbreviations: Ministry of Natural Resources, Energy and Climate Change (NRECC), Ministry of Investment, Trade and Industry (MITI), Ministry of Science and Technology (MOSTI)

NETR outlines the prioritisation criteria for energy transition initiatives

Understanding the four prioritisation criteria will allow players to evaluate projects that are impactful and aligned with national aspirations

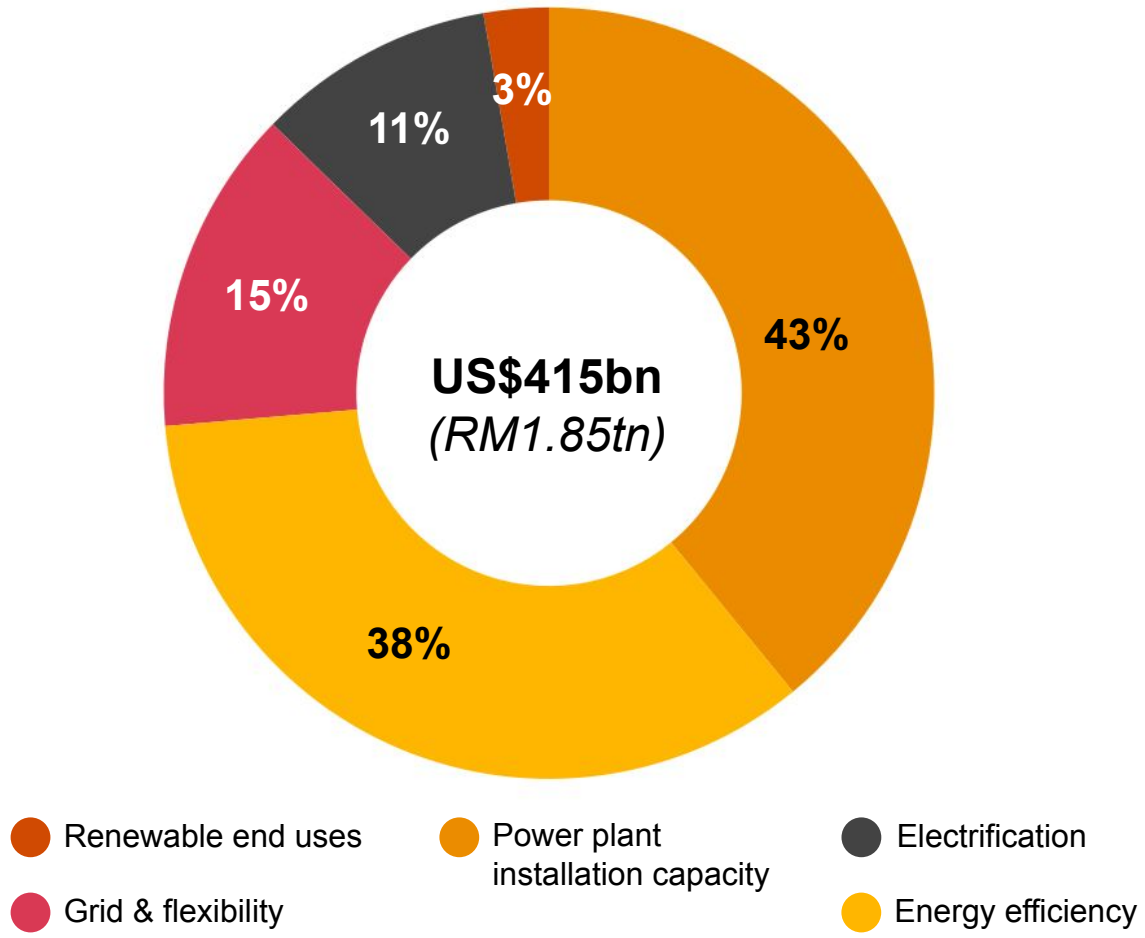
Prioritisation criteria



- **Emission reduction potential**
  Projects must have a measurable benefit in reducing GHG emissions to be considered as impactful.
- **Economic opportunities**
  Projects shall be able to propel high impact industries including micro, medium and small enterprises, attract investments and generate job opportunities.
- **Cost effectiveness**
  High upfront investments must be backed by reasonable long-term yield, especially on nascent technology, to ensure they are feasible.
- **Social inclusiveness**
  Initiatives shall take into account job security, job creation, wellbeing and its benefit to the communities and future generations.

Energy transition initiatives are estimated to require up to RM1.85tn in financing by 2050

Malaysia Energy Transition Outlook (METO) estimates US$415bn cumulative investments are required for the 1.5 Celsius with 100% RE generation scenario



Key takeaways

- To achieve the target of 70% RE capacity by 2050, **approximately RM637bn** in investments is required.
- The ten flagship projects listed in the NETR would generate **almost RM25bn** in investments.
- Opportunities worth **up to RM1tn** are up for grabs beyond the transition to renewable energy such as smart grid, energy efficiency initiatives and energy storage solutions.

Part 2:

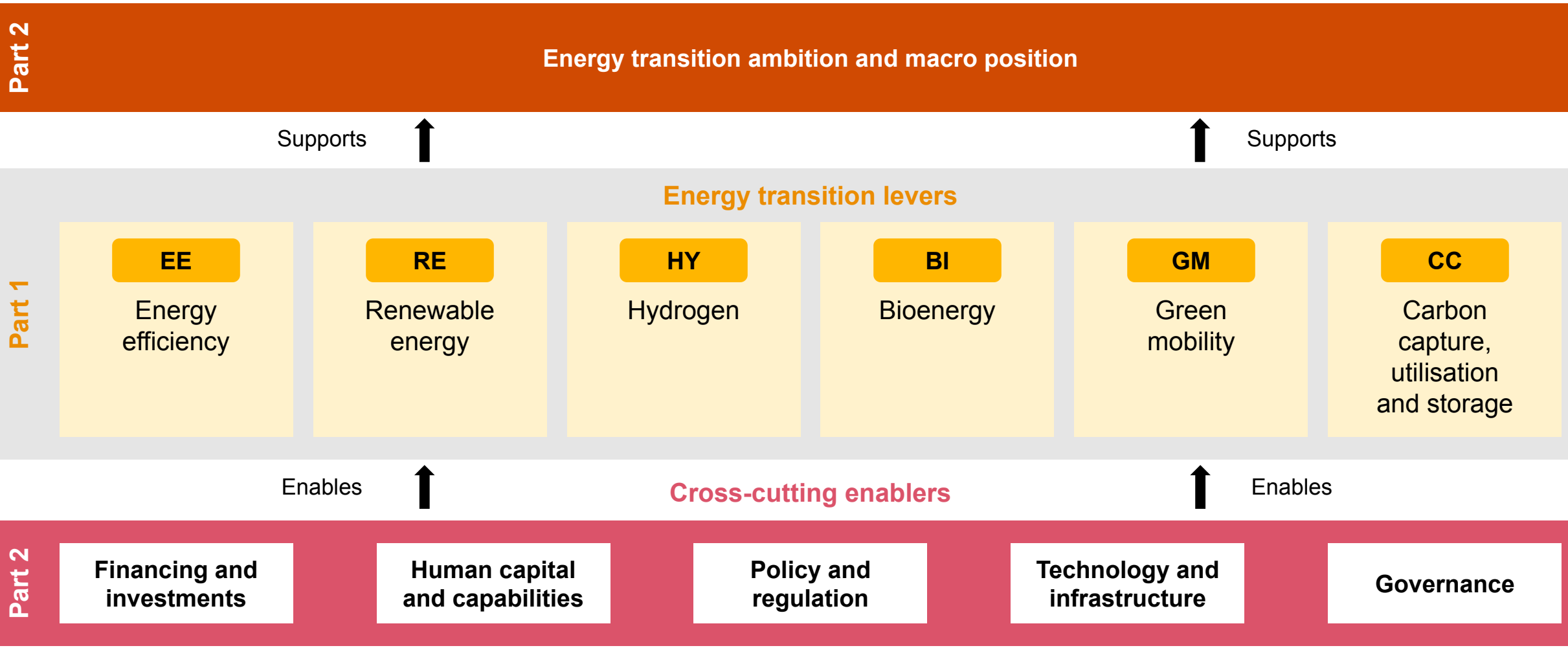
Establishing low-carbon pathway, energy mix and emission target reduction

Energy transition ambition, macro position and five cross-cutting enablers

Part 2 of NETR introduces the Responsible Transition (RT) targets and expands on two critical parts of the roadmap:

1) the **energy transition ambition and macro position** including the detailed targets
2) the **five cross-cutting enablers** which are relevant to Malaysia and its future outlook.

NETR Part 2 focuses on the energy transition aspiration, macro position, and the five cross-cutting enablers



Targets

NETR introduces Responsible Transition (RT) targets in 2050 corresponding to each energy transition lever

Energy transition levers	Key driver	RT 2050 targets
EE	Industry and commercial energy savings	23%[1]
	Residential energy savings	20%[1]
RE	Coal share of installed capacity	0%
	RE share of installed capacity	70%
HY	Green hydrogen production (MTPA[1])	Up to 2.5
	Grey hydrogen feedstock phase off	100%
	No. of hydrogen hubs	3
BI	Biofuel capacity (billion litres)	3.5
	Bioenergy power generation (GW)	1.4
GM	Urban public transport modal share	60%
	xEV (4W[4]) share of fleet	80%
	E2W[5] share of fleet	80%
	Light vehicle fuel economy	~30%
	Heavy transport fuel economy	~24%
	Biofuel blending for heavy transport	B30%
	Hydrogen penetration for heavy transport	5%
	Green fuel in marine transport	40%
	SAF[6] blending mandate by 2050	47%
CC	No. of CCUS clusters	3-6
	Co_2 storage capacity (MTPA)	40-80

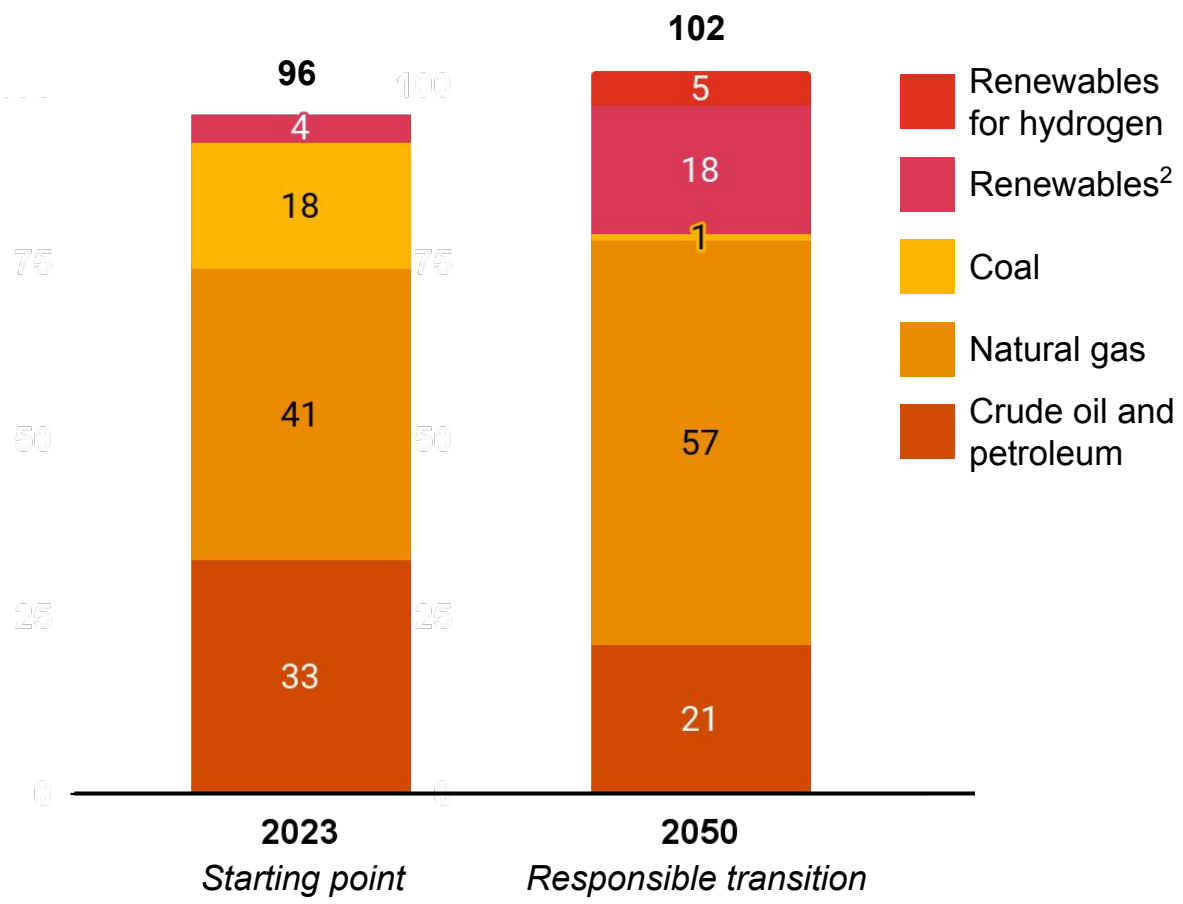
To achieve the targets set for 2050, we see extensive opportunities that industry players can leverage on

[1]Compared to business-as-usual scenario (BAU), [2] Million tonnes per annum, [3] Plug-in hybrid electric vehicle (PHEV), Battery Electric Vehicles (BEV), etc. [4]4-wheeler, [5]electric 2-wheeler, [6]Sustainable aviation fuel (SAF)

Targets

RT targets rely on energy produced from natural gas to provide baseload demand, complemented by renewable energy

Total Primary Energy Supply (TPES) in Mtoe[1]



[1]Million tonnes of oil equivalent, [2] compound annual growth rate, [3] includes bioenergy, solar, hydropower and hydrogen

Responsible transition (RT) scenario estimates TPES to increase to 102 Mtoe in 2050 from 96 Mtoe in 2023, a 2% CAGR[2].

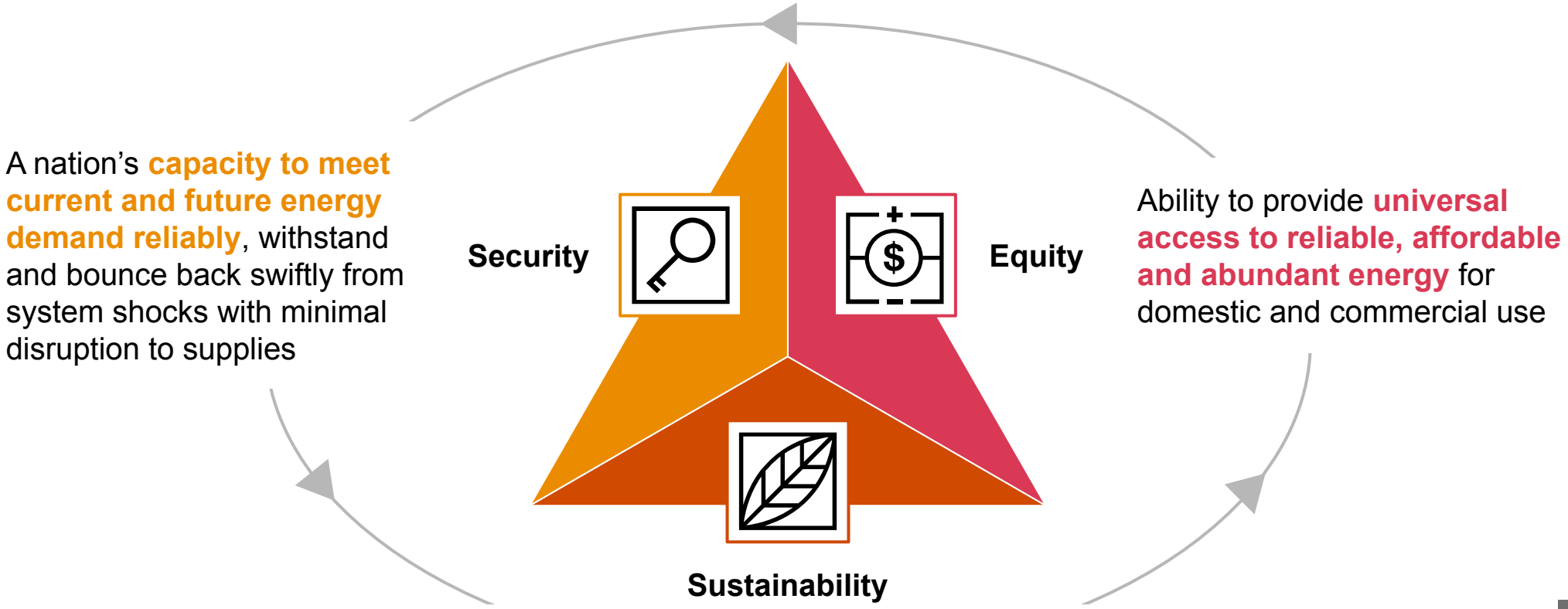
National Energy Policy 2040 scenario estimates TPES at 117 Mtoe, which is higher than RT 2050. Energy efficiency initiatives play an important role in reducing national energy demand.

Key observations

1. The government is **phasing out coal** as an energy source by 2050, which is complemented by the increase in dependency on natural gas.
2. To reduce high **reliance on natural gas** (extracted or imported), renewable energy should be scaled up to 70% of installed capacity of the power mix.
3. RE readiness will also be complemented with **energy storage solutions, RE imports and other non-carbon energy sources**.

Understanding the energy trilemma, a key challenge for energy transition

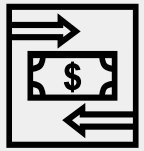
Key challenges are centred around the energy trilemma



Sustainability of energy systems represents the transition of a country's energy system towards mitigating and **avoiding potential environmental harm and climate change impacts**

Targets

RT addresses the impact on energy trilemma challenges

		2023	2030	2050	Analysis
 **Energy security**	**Power system HHI[1]**	0.36	0.32	**0.30**	Our power mix is only slightly diversified by 2050 compared to 2030
	Import dependence	-	Reduced imported coal with indigenous natural gas	Increased import of natural gas (and potentially RE)	
 **Energy equity and economic development**	**Incremental system costs** *(RM per kW)*	-	1,476	**1,924**	System costs are expected to increase over time
	Total investment required *(RM b)*	~10-20	~200-220	**~560-580**	
	Direct job creation vs 2022 *(jobs)*	~110,000	~270,000	**~310,000**	
	GDP impact vs 2022 *(RM b)*	~20-25	~60-80	**~200-220**	
 **Environmental sustainability**	**GHG emissions reduction** *(% $MtCO_2eq$ reduced vs 2019)*	-	(4%)	**(32%)**	GHG emissions from energy is decreased significantly
	Emissions per capita *($MtCO_2$ eq per capita)*	7.5	6.8	**4.3**	Emissions per capita almost halved in 2050

[1] Herfindahl-Hirschman Index measures the market concentration. Lower number indicates higher diversity in power system mix

Levers

Six energy transition levers:

Key initiatives and challenges

Levers

Lever 1: Energy efficiency (EE)

Reducing energy consumption from the end uses via regulations, standards and aggregator platform

Key initiatives

Code	Initiatives
EE1	Improve EE awareness
EE2	Improve existing MEPS[1] and 5-star rating brands
EE3	Enforce mandatory audits for large commercial and industrial buildings
EE4	Establish green buildings codes for energy-intensive residential and commercial buildings
EE5	Establish an Energy Service Companies (ESCO) platform - Coordinate government projects with private ESCOs - Streamlines funding by using a revolving fund through the ESCO platform
EE6	Launch a major EE retrofit initiative amongst government buildings

Key challenges

1. **Lack of awareness** of benefits and availability of EE
2. Absence of **viable funding options** from scarcity of demand and supply
3. **Financial burden** of EE upgrades for building owners
4. **Narrow range of appliances** encompassed by MEPS constrains the potential for **comprehensive energy savings**

[1] Minimum Energy Performance Standards

Source: Malaysian Green Technology And Climate Change Corporation (2023), Green Practices Guideline for Manufacturing Sector

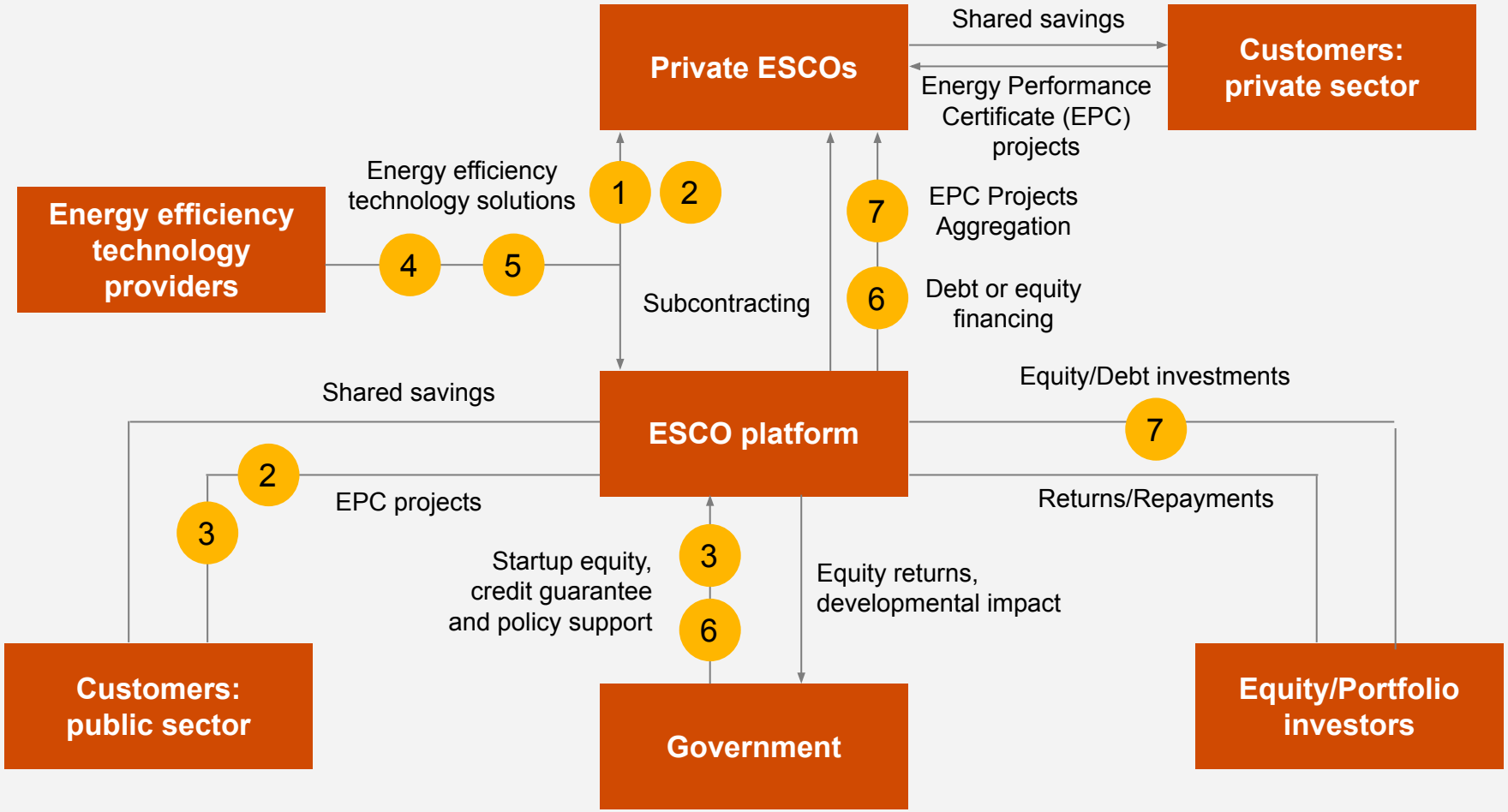
Our views

- EE benefits come from cost reduction accumulated over time against an initial capital expenditure. Economies of scale need to be achieved to ensure feasibility.
- The Green Building Index (GBI) can be further effectively utilised for buildings in the country.

Note: Based on the Green Practices Guideline for Manufacturing Sector, GHG emissions from manufacturing industries and construction contribute to 9% of Malaysia's GHG emissions

Energy Service Company (ESCO) as a platform to leverage on economies of scale

Proposed ESCO platform to interface with stakeholders



Measures that can benefit from this

1. Knowledge sharing platform
2. Streamlined process
3. EE Government Buildings
4. Bulk purchase
5. Encourage local production
6. Guarantee fund
7. Portfolio investments

Levers

Lever 2: Renewable energy (RE)

Solar as the dominant source of renewable energy through mass installation, while considering the need for grid stability and energy storage solutions

Key initiatives

Code	Initiatives
RE1	Establish solar parks for accelerated deployment of utility-scale solar
RE2	Promote floating solar and agrivoltaic technology
RE3	Expand virtual aggregation model for rooftop solar - Scale up corporate and industrial solar rooftop programme
RE4	Develop plan for accelerated investments of transmission and distribution - Establish amount, timing and mode of funding for grid infrastructure investment to reduce grid constraints while balancing energy trilemma
RE5	Develop Third-Party Administrator (TPA) framework for sourcing of RE
RE6	Set up RE exchange hub to enable cross-border RE trading

Key challenges

1	**Large scale solar (LSS)** development **limits scalability and efficiency**
2	Need for **more streamlined and supportive framework** to encourage adoption of RE
3	**Grid limitations** for RE
4	Lack of **TPA regulatory framework** to address mismatches in supply-demand
5	Absence of **RE exchange platform** inhibits the potential to capitalise on export price premiums

Our views

- The scattered development approach of LSS diminishes scale economies, leading to higher development costs.
- Intergovernmental collaboration might allow Malaysia to benefit from other renewable sources such as wind and hydro.

Levers

Lever 3: Hydrogen (HY)

Make hydrogen viable and competitive through policies and innovation while securing long-term offtakes through bilateral agreements with importing countries

Key initiatives

Code	Initiatives
HY-1	Establish low-carbon hydrogen standards and regulations
HY-2	Develop domestic green electrolyser manufacturing capabilities
HY-3	Reduce Levelised Cost of Hydrogen (LCOH) for low-carbon hydrogen - Establish hydrogen hubs to optimise economics of low-carbon hydrogen
HY-4	Stimulate demand for low-carbon hydrogen - Explore bilateral agreements with key importing countries to develop low-carbon hydrogen value chain, catalyse project development and secure long-term green hydrogen offtakes

Key challenges

1. **Limited supply** of **electrolysers** in the global market
2. **Lack of technical expertise** to produce green hydrogen
3. **Low competitive advantage** from high capital expenditure and low electrolyser efficiency
4. **Absence** of **policy support** and defined standards

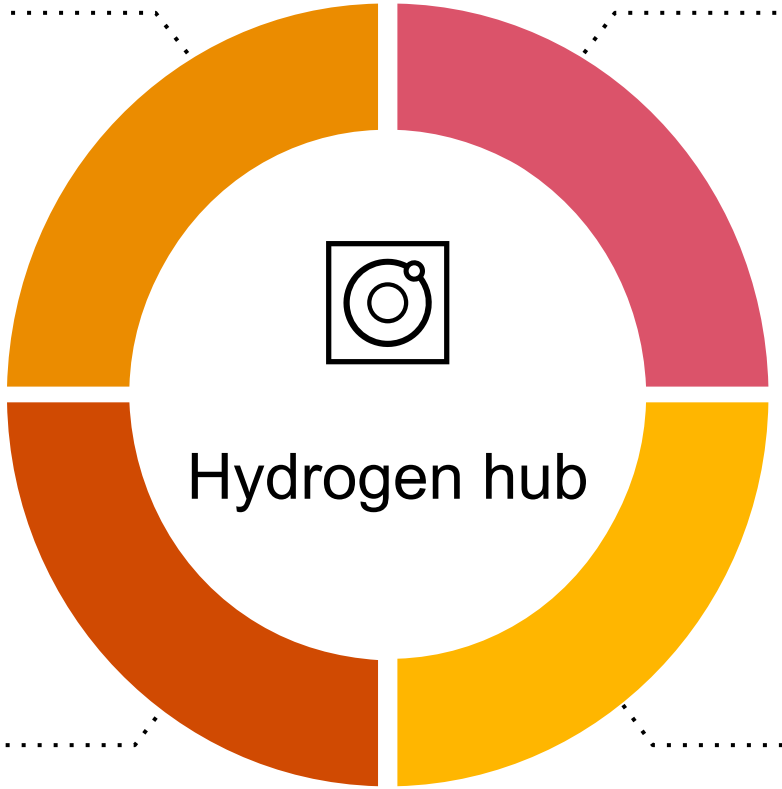
Our views

- Nascent technology requires extensive feasibility study enabled by proven technologies, which may include partnering with leading companies globally.
- Production of green hydrogen is nearing commercial feasibility, driven by scale (larger projects, more capital) and lower renewable energy costs due to bigger availability on a global level.
- The usage of hydrogen in transportation will contribute to the lowering of Scope 3 emissions.

Source: PwC (2020), The Dawn of Green Hydrogen
PwC (2021), Inventing Tomorrow's Energy System

Levers

Key characteristics of a hydrogen hub



Significant scale

Embarking on double-digit multi-million ringgit investments projects that extend beyond the pilot stages and demonstrations

Multi-sector supply

Showcasing the versatility of hydrogen by catering to more than one end sector or application in the transport, industry and power sectors

Broad value chain coverage

Covering multiple steps in the value chain, from hydrogen production to storage, transport and off-take

Define geographical scope

Establish hydrogen ecosystems that cover specific geographical areas, from local/regional activities to international outreach

Looking above and beyond

Many chemical companies identify hydrogen as an important production feedstock, energy source and business opportunity for their applications, with focus on harvesting, creating, capturing and recycling electrons and molecules in a circular fashion.

As renewable energy gains popularity, this dynamic new force will forge new paths and businesses must reinvent themselves.

A major challenge for usage of hydrogen is the transportation which needs to be cryogenic. For distances that fall below 1,800km, transporting hydrogen through pipelines is the lowest cost and recommended while for further distances, ammonia ships will be the most economical solution.

Source: PwC's Inventing Tomorrow's Energy System (2021)

Levers

Lever 4: Bioenergy (BI)

Address the supply risk and limited domestic demand by exploring alternative feedstock and blend mandates, while acknowledging the role of palm oil biomass

Key initiatives

Code	Initiatives
BI-1	Explore alternative bioenergy feedstock
BI-2	Enhance attractiveness of palm oil biomass
BI-3	Address challenge of supply security - Scale-up UCO[1] collection via awareness campaigns and UCO collection facilities
BI-4	Catalyse local demand for bioenergy
BI-5	Improve solid waste management policies - Explore expansion of de-risking revenue sources and co-funding of waste-to-energy plants to ensure financial sustainability

Key Challenges

1	**Supply security** of biomass and bioenergy feedstock
2	**Negative perception** of palm oil biomass globally
3	**High aggregation cost** of bio-based feedstock
4	**Limited domestic demand** for bioenergy

[1] Used Cooking Oil

PwC

Our views

- Bioenergy feasibility may be impacted by inadequate enforcement of our waste management policy such as separation at source. Regulation is present but enforcement is key.
- Targeting the end-users of bioenergy could be a lucrative venture within different sectors.
- Key points for execution: Lock in pricing via long term contracts to secure availability of biomass and bioenergy feedstock.

Levers

Lever 5: Green mobility (GM)

Promote the transition to EV for light vehicles and to biodiesel for heavy vehicles via infrastructure, incentives and blend mandates

Key initiatives

Code	Initiatives
GM-LV1	Drive public transport modal share shift to 40% by 2040 and 60% by 2050
GM-LV2	Improve light vehicle fuel economy
GM-LV3	Accelerate electrification of light vehicles segment (E4W)
GM-LV4	Accelerate electrification of light vehicles segment (E2W)
GM-HV1	Enhance demand-side management with fuel economy
GM-HV2	Implement B30 biodiesel blending mandate
GM-HV3	Introduce future powertrains for heavy vehicles

Source: PwC (2023), Powertrain Study 2023 (Strategy&)
SCMP (2023), Technology adoption: electric cars pass 5% crucial tipping point in 23 countries

Key Challenges

Light vehicles

1. Inadequate **public transport infrastructure** and connectivity
2. Need to comply with the **ASEAN fuel economy standards**
3. Slow expansion of **affordable EVs** and **charging infrastructure**

Heavy vehicles

1. Increasing mandated biodiesel blend rates could **affect industry player uptake ability**
2. **Limited visibility** into optimal heavy vehicle **powertrain**

Our views

- Subsidised petrol in Malaysia has made green mobility less attractive in comparison. With the ambitious targets for EV adoption and PT ridership, a more aligned strategy is required across the GOM.
- Powertrains for EVs are moving from premium to mass market and we expect the inflection point of mass market adoption to happen soon. In developed countries, sales of EVs as a percentage of the Total Industry Volume has increased - with 19 countries passing the inflection point i.e. 5% of EV sales.

Levers

Lever 5: Green mobility (GM)

Promote the transition to EV for light vehicles and to biodiesel for heavy vehicles via infrastructure, incentives and blend mandates

Key initiatives

Code	Initiatives
GM-MA1	Unlock market opportunity of biofuel in marine bunkering
GM-MA2	Unlock market opportunity of future fuels in marine bunkering - Enhance competitiveness of domestic ports in future fuel marine bunkering by providing incentives
GM-AV1	Establish overarching decarbonisation roadmap
GM-AV2	Implement Sustainable Aviation Fuel (SAF) blending mandate
GM-AV3	Undertake palm oil-feedstock emission study

Key Challenges

Marine

1. **Limited capacity** for biofuel production despite **growing demand**
2. Limited viability of **e-ammonia** and **hydrogen** fuel
3. Alternative fuels necessitates **adjustments in vessel and engine design**

Aviation

1. **Lack of guidance** on the implementation of **decarbonisation levers**
2. Limited demand signals that incentivise **domestic SAF production**

Our views

- Decarbonisation of marine transport focuses on freight and logistic segment.
- Decarbonisation of aviation transport seems to only have one solution at this juncture, which is SAF. The plantation players can leverage this as the major ingredient to produce SAF is ethanol which will require downstream investments.
- Currently, biofuels are more viable than batteries for large scale transport due to the sheer size required.

Levers

Lever 6: Carbon capture, utilisation and storage

Encourage the implementation of CCUS by industry through incentives, trade agreements and regulations

Key initiatives

Code	Initiatives
CC1	Develop CCUS-specific policies and regulations
CC2	Strengthen CCUS adoption through provision of incentives across all relevant sectors and facilitate hub development
CC3	Facilitate CCUS Hub infrastructure development
CC4	Establish transboundary CO_2 agreement for transportation and storage of CO_2 - Develop liability framework to protect against environmental damage arising from CCS activities
CC5	Promote local utilisation of CO_2 in industry

Key challenges

1. **Lack of regulatory framework and governance** to catalyse CCUS development
2. **High costs of CCUS technology** necessitate incentives and competitive funding rates
3. **Undeveloped transboundary and domestic policy** for transportation and storage of CO_2
4. **Absence of viable utilisation opportunities** such as urea production and precast concrete

Our views

- To be economically viable, CCUS must outweigh the expected environmental cost of releasing the CO_2 into the atmosphere.
- The costs of the capital and energy intensive CCUS for industrial plants burden the entire supply chain.
- As CCUS technology is relatively new in Malaysia, the regulatory environment and commercial feasibility are key factors that need to take shape for CCUS to be effective in net zero strategies.

Five cross-cutting enablers:

Key initiatives and challenges

Enablers

Enabler 1: Financing and investments

Achieve energy transition targets while looking at fiscal suitability through identifying current financing gaps and recommending initiatives to increase capital investments

Key initiatives

Code	Initiatives
EN1	Launch a National Energy Transition Facility (NETF) - The Ministry of Economy to launch NETF with an initial seed funding amounting to RM2bn
EN2	Mobilise and attract private capital for energy transition sectors - Scale-up sustainable finance literacy, awareness programmes and technical capacity building targeting small and medium enterprises (SMEs)
EN3	Roll out carbon pricing mechanism - Implement a carbon pricing mechanism that sends clear signals on decarbonisation while simultaneously creating additional capital for investments in energy transition

Key challenges

1. **Commercial viability** from **technologically immature** initiatives with **limited scale** (i.e. CCUS, green hydrogen, SAF)
2. Small scale initiatives **fail to attract investors**, translating to **higher development costs**
3. **Implementation risks** complicate project roll out
4. **Scarcity** of viable projects

Our views

- Reliance on capital investments and sustainability of fiscal support has to be examined to safeguard the country's long term economic development. For example, following Norway's recent clawback on its subsidy for EVs, it leaves a question to many adopting countries on the sustainability of such incentives.
- Organisations could consider an Internal Carbon Pricing strategy to encourage behavioural changes in preparation for carbon trading on the voluntary markets.

Source: CleanTechnica (2022), Norway Rethinks Its Incentive Package For Electric Cars
NewsinEnglish (2020), Norway pulls plug on el-car incentives

Enablers

Enabler 2: Policy and regulations

Strengthening governance and regulatory frameworks to bolster continued growth and innovation in the market

Key initiatives

Code	Initiatives
EN4	Rationalise energy subsidies
EN5	Launch the Natural Gas Roadmap (NGR) - Enhance competitiveness of upstream oil and gas to meet domestic demand and energy transition needs for sustainability and security

Key challenges

1. **Economic distortions** arising from energy subsidies can hinder adoption of sustainable energy
2. Balancing **energy equity** for **low-income households**
3. Addressing **increasing demand for natural gas** while striving for **reduced reliance on fossil fuels**

Source: PwC (2021), Inventing Tomorrow's Energy System

Our views

- While designing policies that support green industries and technological advancements, policymakers should consider the opportunity costs, consequential impact and equitability to the public.
- The road to net zero requires commitments and concerted effort by the public sector
- Three general models we foresee being adopted by governments around the world
  - Policy driver
  - Strategic infrastructure investor
  - Co-investor

Enablers

Enabler 3: Human capital and just transition

Adopting green skills in the energy sector's workforce, and the coordination from the local government

Key initiatives

Code	Initiatives
EN6	Establish green skills taxonomy and ensure strategic workforce planning
EN7	Develop and roll out targeted green skilling programmes
EN8	Develop and implement community support programmes
EN9	Enhance energy literacy and energy efficiency awareness among students, SMEs and consumers - Strengthen the MELP[1] to catalyse a paradigm shift in public perception and behaviour towards energy utilisation - Implement energy literacy and awareness programmes at educational institutions

[1] Malaysia Energy Literacy Program

Source: IRENA (2022), Renewable Energy and Jobs

Key challenges

1. Strategies required to **transition workers** in GHG-intensive sectors to **new employment opportunities**
2. **Targeted training** and **upskilling initiatives** required to incorporate **green skills** to the existing workforce skill sets
3. Addressing **low energy literacy** levels to ensure **informed decision-making** and **active participation in sustainable energy transition**

Our views

- Timeline for implementation of green education and training programmes might be lengthy and expensive, which might discourage industries from making the long term investment.
- Productive workforce trained in green skills will be essential to implement the NETR initiatives and flagship projects.
- The International Renewable Energy Agency (IRENA) predicts that jobs in the renewable energy field will increase significantly from now until 2050. Solid workforce planning and strategy are required to advance employment in the decades ahead.

Enablers

Enabler 4: Technology and infrastructure

Supportive environment and financial investments to enhance the technological landscape in the energy sector

Key initiatives

Code	Initiatives
EN10	Accelerate development of domestic industries for green manufacturing and adoption of green technologies
EN11	Develop a National Energy Knowledge Hub for public access - Establish a one-stop centre for energy transition data, information and programmes under the National Energy Council

Key challenges

1. **Slow gradual uptake of sustainable practices** within domestic industries
2. **Absence** of a robust **energy knowledge platform** tailored for **SMEs** and **businesses**

Our views

- Being an energy-intensive country, industries need enabling environments to operate in as they work towards net zero commitments.
- SMEs grapple with resource limitations (e.g. funding, skills, people), hindering their ability to undertake sustainability initiatives, notably in transitioning to cleaner energy sources.

Enablers

Enabler 5: Governance and implementation

Promotes cross-sector collaboration in energy supply planning

Key initiatives

Code	Initiatives
EN12	Establish National Committee on Energy Transition under the National Energy Council - The National Energy Council will act to monitor the progress of the NETR

Key challenges

1 **Fragmented governance** of energy which leads o **inefficient energy planning** and **decision-making**

Our views

- The establishment of the National Energy Council underscores the importance of comprehensive planning to ensures continuity of energy transition initiatives.
- Financing structures could take the form of public-private partnerships with further assessment of risk sharing required.
- There is a need for clear legislation and governance models with feedback loops to support energy transition efforts.

What we are hearing

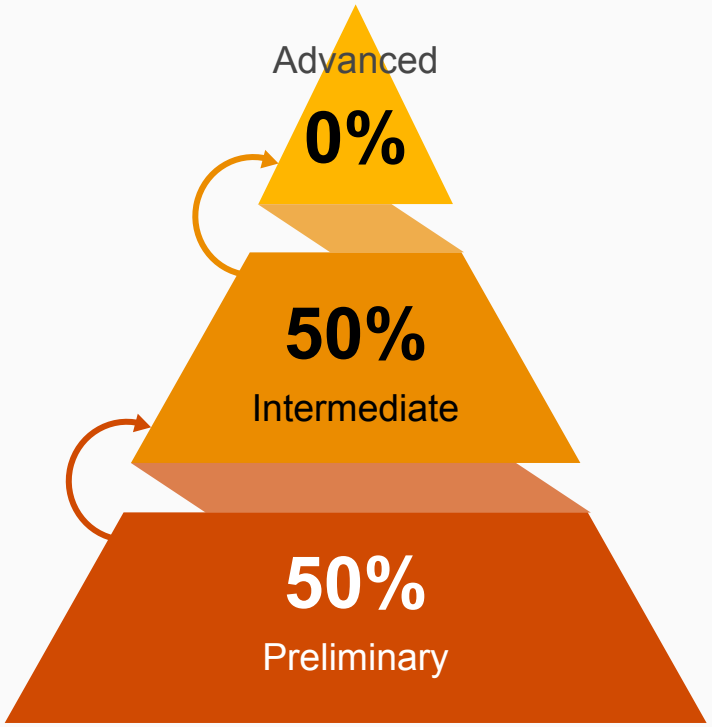
Survey on market player's position on energy transition and net zero initiatives

We conducted a survey to gauge perspectives on net zero and energy transition initiatives amongst clients from a diverse range of sectors, such as healthcare, public sector, financial services, manufacturing, infrastructure and others.

Malaysian organisations are at early stages of energy transition journey. Some are ahead than their peers, but still far from global standards

Exhibit 1

Market players position on energy transition



We begin the survey by categorising the players in the markets into three categories with respect to their position on energy transition.

Category	Definition
Advanced	Implemented several initiatives with a comprehensive plan for energy transition and decarbonisation including allocating adequate resources to achieve a specific timeline
Intermediate	Have a timeline and strategy and are in the process of planning on how to transition to low-carbon operations/high energy efficiency
Preliminary	Have only heard about energy transition/net zero, with either no or very broad strategy and commitments

Our respondents categorised 50% of their clients as preliminary organisations, followed by 50% as intermediate organisations.

It is clear that no organisations are currently perceived as being advanced in their energy transition initiatives or net zero commitments. Throughout this section, we will delve deeper into the key challenges and the enablers required to elevate them to the advanced category.

Preliminary organisations often exhibit high inertia, showing resistance to exploring further or being less susceptible to energy transition initiatives unless required

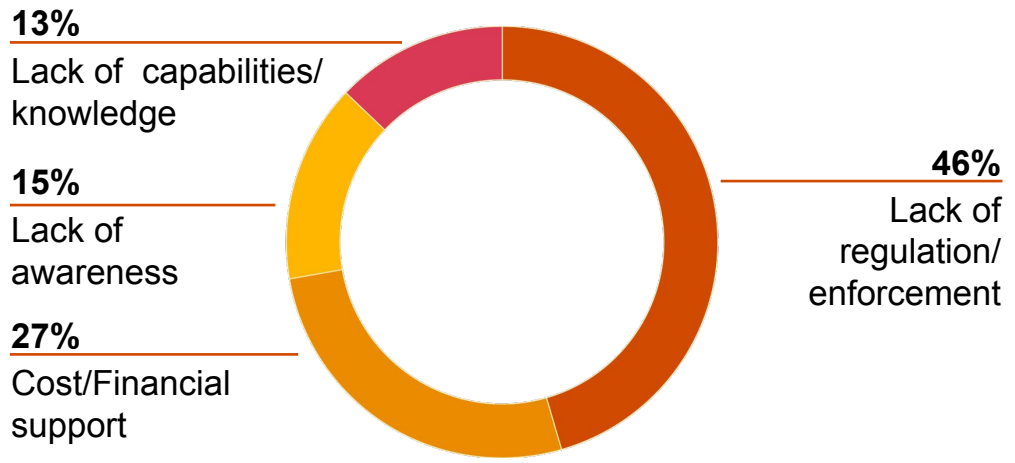
Exhibit 2

69%

of preliminary companies **are not looking further** to understand their role in energy transition

Exhibit 3

What are the key factors anchoring preliminary companies' position on not supporting energy transition efforts?

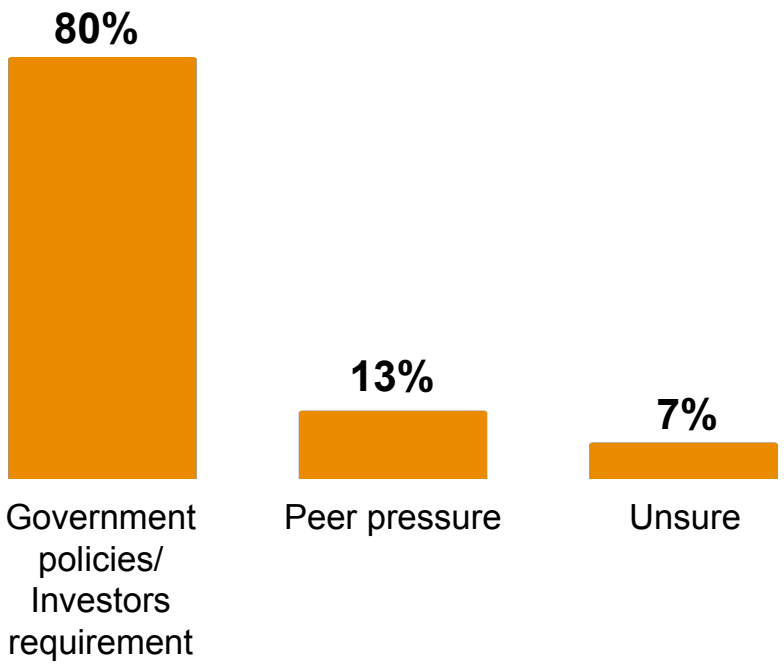


Almost half of our clients' inaction towards supporting energy transition can be attributed to lack of regulation and enforcement, while 27% are due to high cost or lack of financial support either by stakeholders or tax authorities. So, how do we address these factors and support their journey towards future sustainability?

For the intermediate companies, several common attributes solidify their position as first movers on transitioning to low-carbon operating model

Exhibit 4

Why are intermediate companies where they are today?



External factors, such as government policies and investor demands are the main forces pushing companies towards energy transition. Notably, peer pressure among companies in the same sector also encourages a shift towards more sustainable operating practices.

Exhibit 5

- **76%** of companies at this stage have net zero/energy transition as their **key strategic goals/priorities** within the next five years
- The rest targets for a **longer lead time**, between 2030 and 2040

Intermediate companies tend to have specific, measurable, actionable and relevant timelines to achieve their net zero commitments. Goal-setting and high-level roadmap are one of the key enablers to come up with a detailed step-by-step action plan during the transition period.

Implementing sustainability governance, reporting structure and allocating adequate resources would allow intermediate companies to move towards advanced stage

Exhibit 6

Intermediate companies' sustainability governance and reporting structure

37% have a person in charge e.g. Chief Sustainability Officer, Corporate Sustainability Department etc.

39% have a person in charge but are unsure whether they have the necessary capability for execution

24% have no such structure

Companies with a person in charge would induce a more effective implementation of net zero commitments and energy transition initiatives. The person in charge, who acts as the champion, must also attempt to continuously upskill and stay up-to-date with the dynamic regulatory environment and technological advancements.

Exhibit 7

Have adequate resources been allocated?

24% have allocated adequate resources

22% have just started

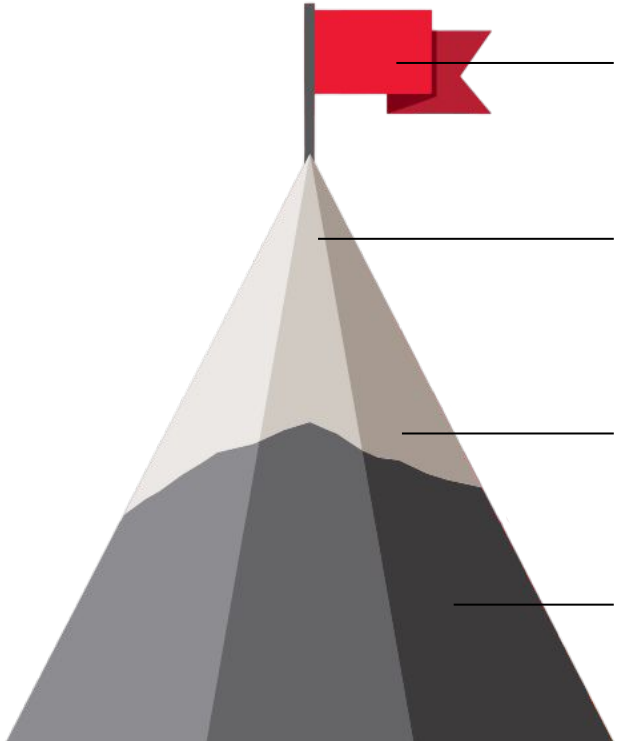
52% have not put aside enough resources

Resources can refer to investments, changes in internal processes and digitalisation that are necessary to ensure roadmaps can be achieved and plan can be executed. Some companies might struggle to allocate such resources, so how do we solve this complication?

Market players agree on common key challenges and external support needed for the energy transition journey

Exhibit 8

Key challenges faced by companies in intermediate stage of energy transition journey



48% Knowledge and capability

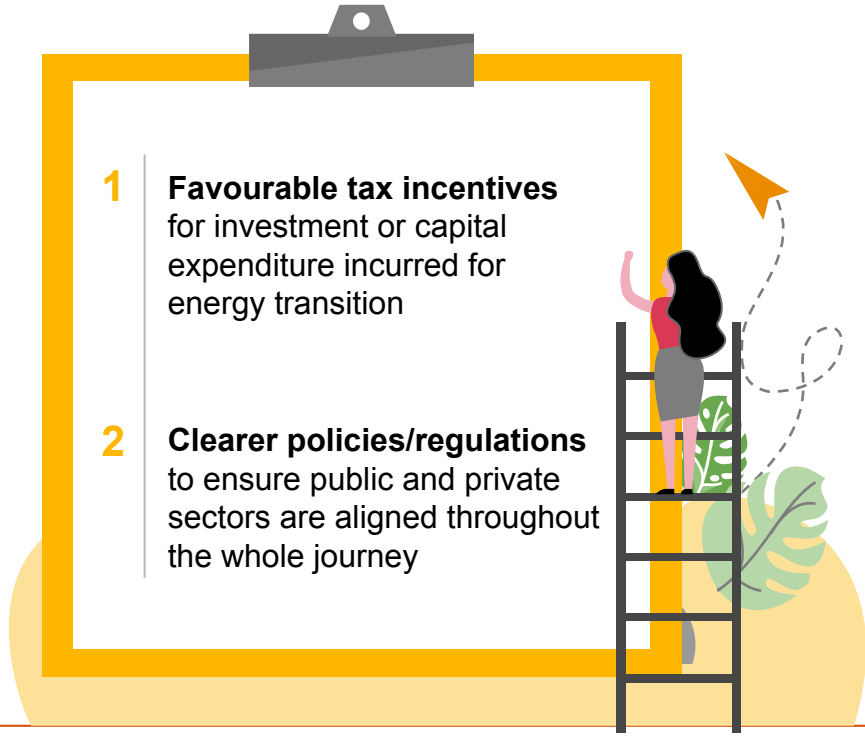
30% Cost

20% Unclear regulations

2% Technological limitations

Exhibit 9

Almost all companies demand support from the government, in the form of...



1 **Favourable tax incentives** for investment or capital expenditure incurred for energy transition

2 **Clearer policies/regulations** to ensure public and private sectors are aligned throughout the whole journey

How we can help

Navigating the market

Takeaways for businesses

1. **Authenticity and the courage to be bold**

Sustainability vision and goals need to be authentic and seamlessly integrated into an organisation's business strategy, practices and culture. **Energy transition should form the core of any strategy with a view on long term sustainability**. Investments that move the needle are needed to create the momentum required.

2. **Strategic trade-offs may be required**

Leaders need to make **important decisions that may require trade-offs.** These trade-offs depend on your sustainability vision, mission and goals, and anticipated developments in the macro environment and your respective industries, balanced with commercial perspectives.

3. **Getting the timing right**

The technologies required to enable energy transition may be reaching an inflection point soon and different technologies are becoming available and commercially viable at different stages. A comprehensive framework such as a **capabilities-driven strategy complemented by financial projections clearly demonstrating financial impact** are important to help an organisation be ahead of the curve.

4. **Cross-functional team for integrated sustainability implementation**

Implementing sustainability in any organisation **requires an effective cross-functional team as sustainability initiatives cut across multiple activities**. This is essential for successful transition and implementation of any sustainability initiatives as transition can be complex and multi-layered.

5. **Holistic approach to the entire ecosystem**

Achieving net zero requires a substantial commitment to transform various industrial models, via a comprehensive approach across the entire business ecosystem. **A people-centered change management approach is essential** during this intricate and lengthy transition. This entails envisioning and formulating strategies for a future aligned with the people's aspirations, rather than relying solely on historical metrics.

Takeaways for businesses (continued)

6

Just transition pathways

There is a need to **balance the environmental impact with commercial feasibility and the impact to all stakeholders** while transitioning towards net zero. This transition should embed social inclusion, contribute to sustainable employment and development of resilient communities to create a more sustainable global economy.

7

Making the math work

To fund the shift to cleaner energy, organisations must **find the right mix of debt and equity financing**. Currently, companies have varying investor value propositions, each with its own mix of growth, risks and returns. Businesses need to assess how to **balance shareholder returns against energy transition investments**.

For instance, revamping existing facilities can prolong their lifespan and generate profits, which can then be reinvested in eco-friendly projects. Carbon markets could play a vital role by focusing on projects that lower emissions responsibly.

Ultimately, navigating this energy transition through all the macroeconomic and geopolitical uncertainties is inevitable.

The support from energy transition levers and enabling cross-cutting enablers is therefore more important now than ever to attain Malaysia's energy transition ambition and macro position.

Let’s have a chat

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