



Future Outlook of Engineering Practices in Oil & Gas and Energy

“Energy Transition- Are we ready?”

Presented by:

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(Honorary Secretary, MOGSC)



“Energy Transition- Are we ready?”

26th Oct 2022
2 pm to 4.00 pm

Ts Anwarudin Saidu Mohamed





National-level industry association promoted and driven by the industry players. MOGSC's membership includes over 500 companies representing all sectors within the industry from downstream to upstream services and equipment players.

Our key mission is to promote the capabilities and expertise of the Oil, Gas & Energy Services and Equipment providers.

Engineers and Technologist in various lenses



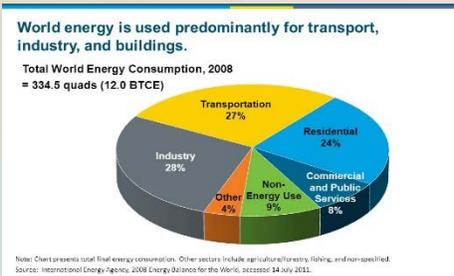
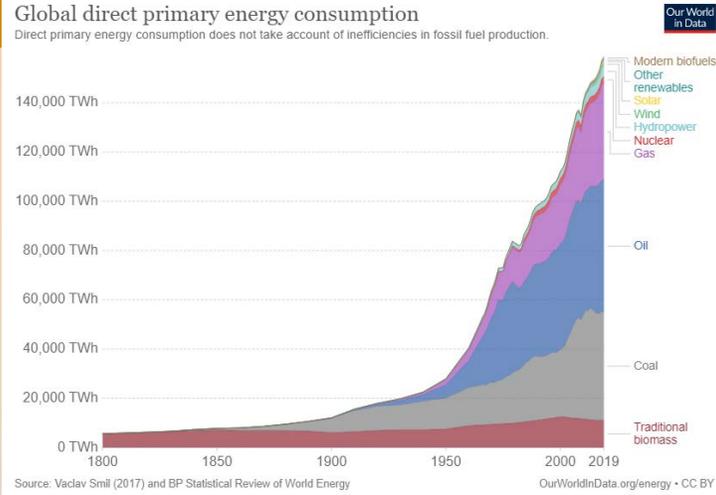


Table 1: Fuel shares of primary energy and contributions to growth in 2019

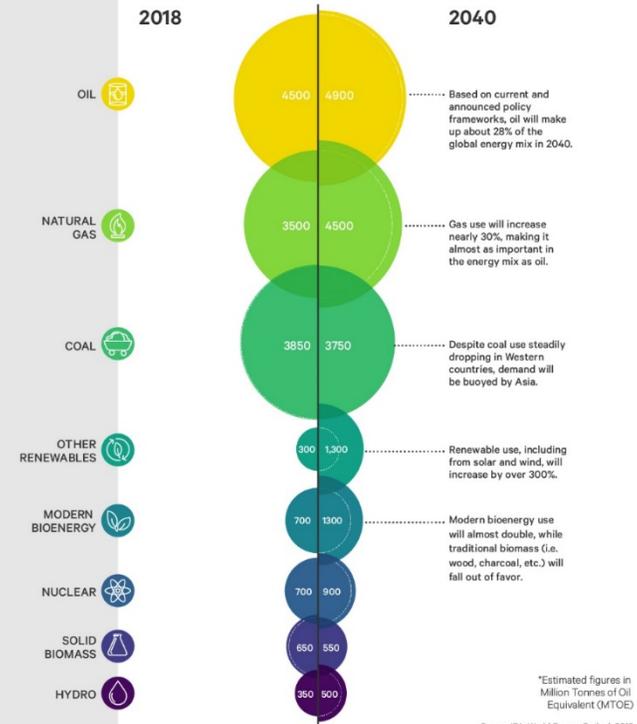
Energy source	Consumption (exajoules)	Annual change (exajoules)	Share of primary energy	Percentage point change in share from 2018
Oil	193.0	1.6	33.1%	-0.2%
Gas	141.5	2.8	24.2%	0.2%
Coal	157.9	-0.9	27.0%	-0.5%
Renewables*	29.0	3.2	5.0%	0.5%
Hydro	37.6	0.3	6.4%	-0.0%
Nuclear	24.9	0.8	4.3%	0.1%
Total	583.9	7.7		

*Renewable power (excluding hydro) plus biofuels

41%

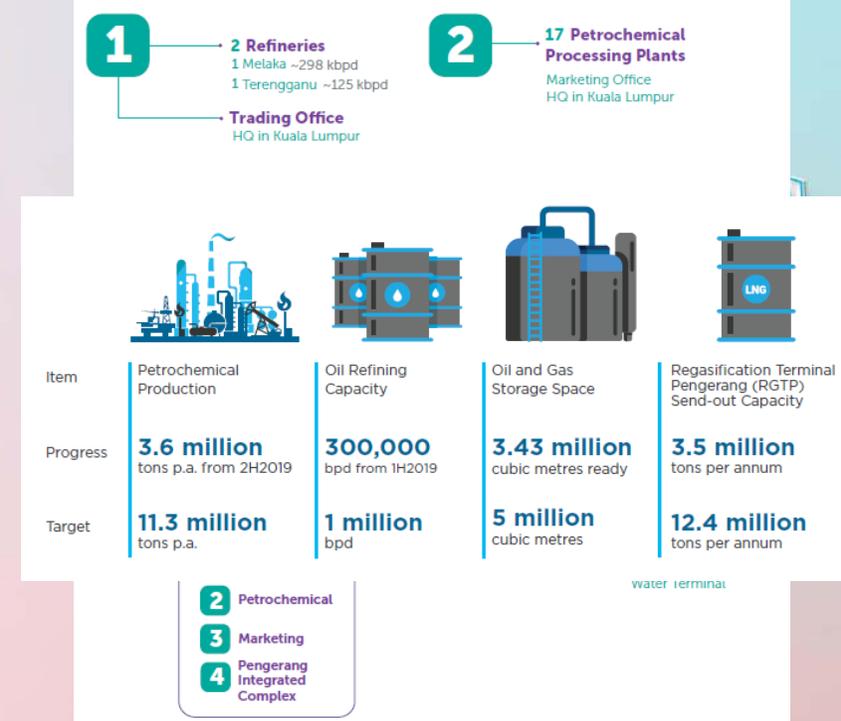
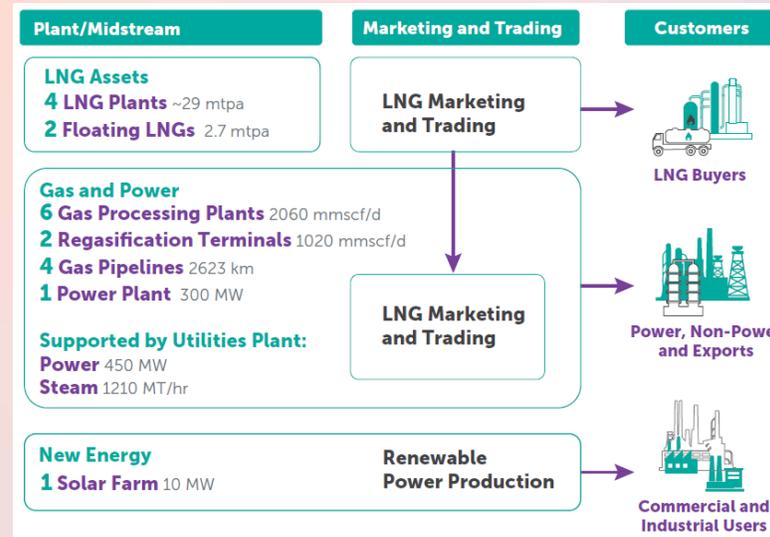
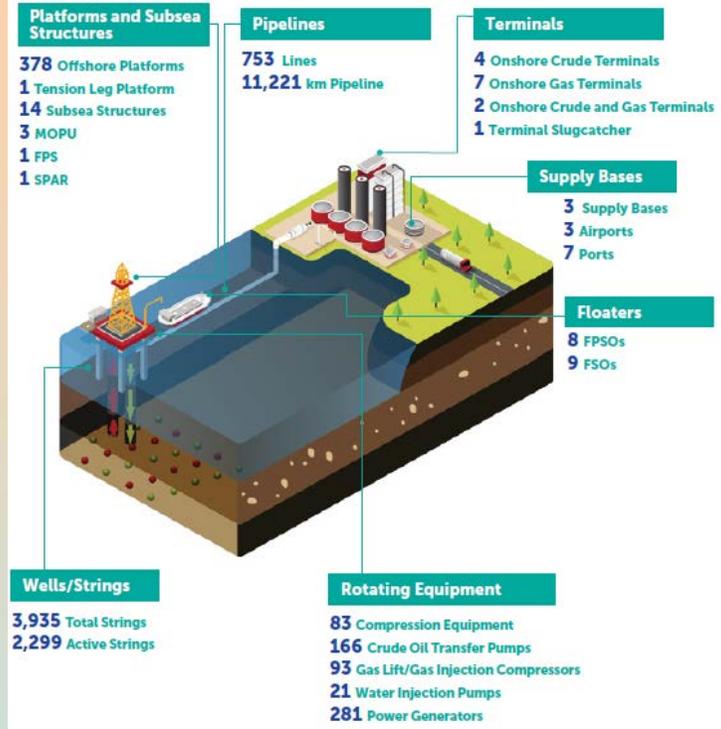
Renewables' contribution to the increase in energy demand, the largest of any energy source

Changes in the Global Energy Mix 2018 vs Stated Policies 2040
Measured in MTOE*



Fundamental of O&G Sector

Renewables taking commanding position?



Malaysia O&G overview

Source: PETRONAS Activity Outlook 2021-2023

Oil & Gas Industry and OGSE sector- Economic Overview



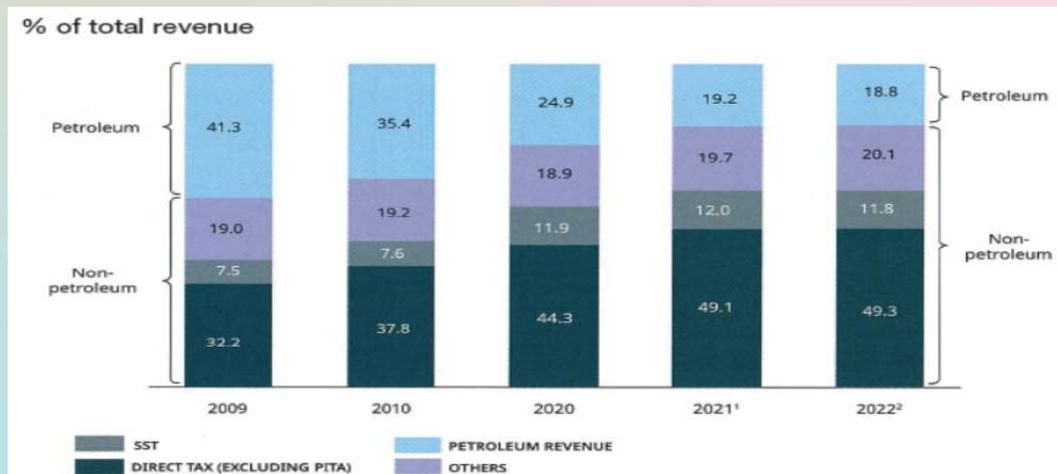
OGSE (2019)



Source: MPRC OGSE Blueprint

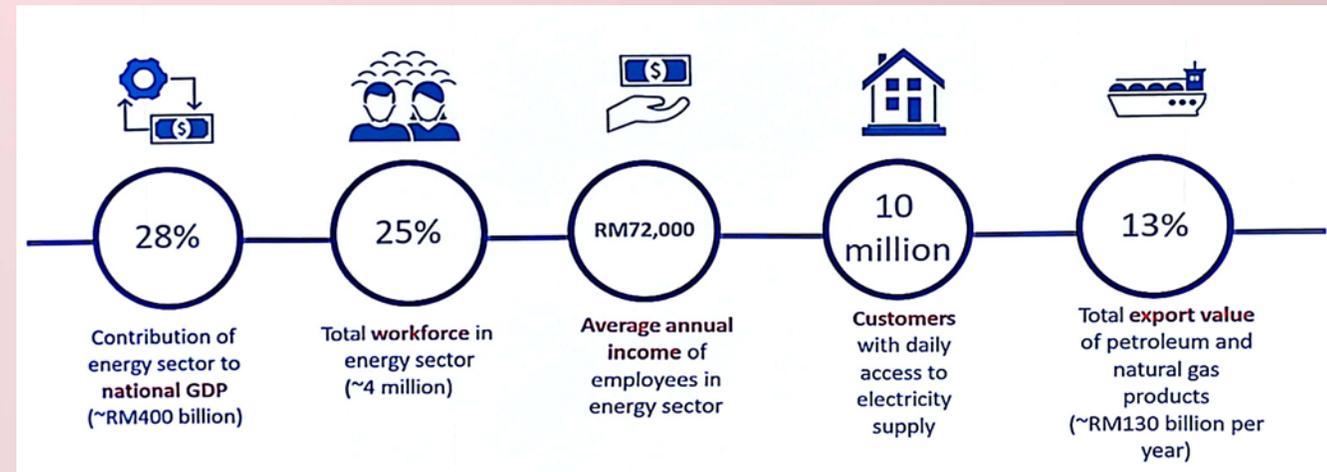
- ❑ Second-largest oil producer in Southeast Asia
- ❑ World's third largest exporter of liquefied natural gas (LNG)
- ❑ Proved oil reserves of 2.7 billion barrels and natural gas totalling 32.1 trillion cubic feet (2020).

O&G Industry



Source: Ministry of Finance, Malaysia

Energy Industry



Source: Department of statistics Malaysia (2019)

An offshore oil rig is shown at sunset or sunrise. The rig is a complex structure of steel beams and platforms, with several red lifeboats visible on the lower levels. The sky is a mix of orange, pink, and grey, and the sea is dark blue. The text "SETTING THE SCENE" is overlaid in the center in a bold, yellow, sans-serif font.

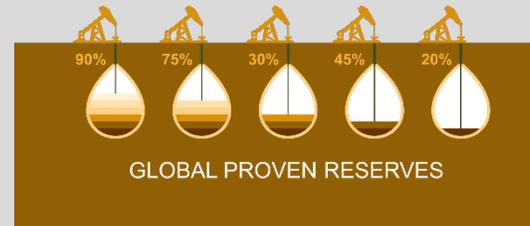
SETTING THE SCENE

Industry Current Landscape



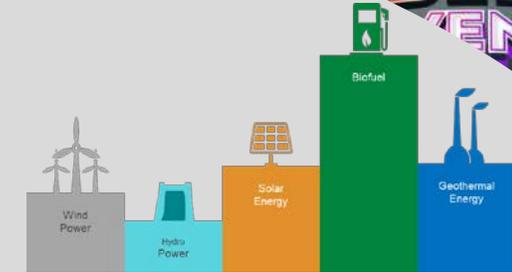
Suppressed Prices

Since the downturn of 2014, the prices have been volatile, lower investment. And it has further aggravated by pandemic and Oil price wars. O&G sector is still recovering since 2015!



Stagnant Reserves

Global proven reserves stagnant at approx. 1,500 bn b. No 'Elephant' discoveries. Guyana discovery the most significant in 2019.



Transition & Transformation

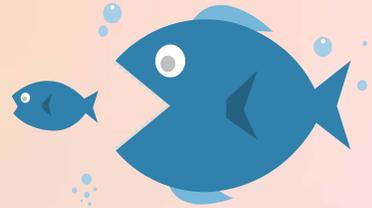
Competition from Renewable Green Energy Sources as energy costs are driven down with advancement in technologies.

- Shift to cleaner Energy mix
- Gas as Transition fuel



Oil and Gas Industry

Attempted Solutions



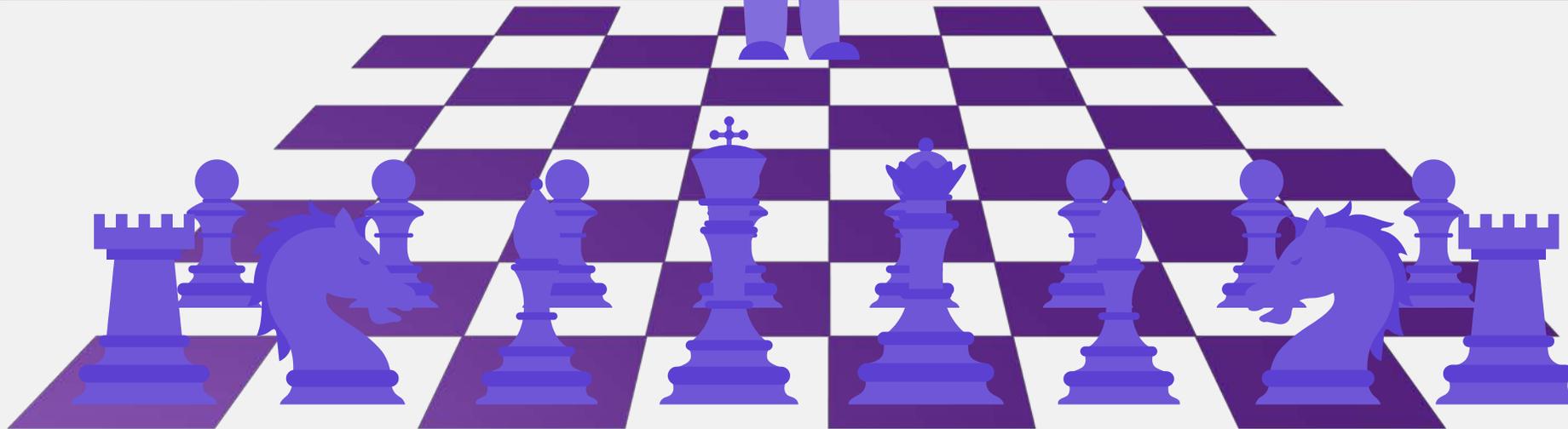
Corporate Strategies



Cost Cutting



Operational Performance



Innovation and Talent
(Data Driven Technologies)



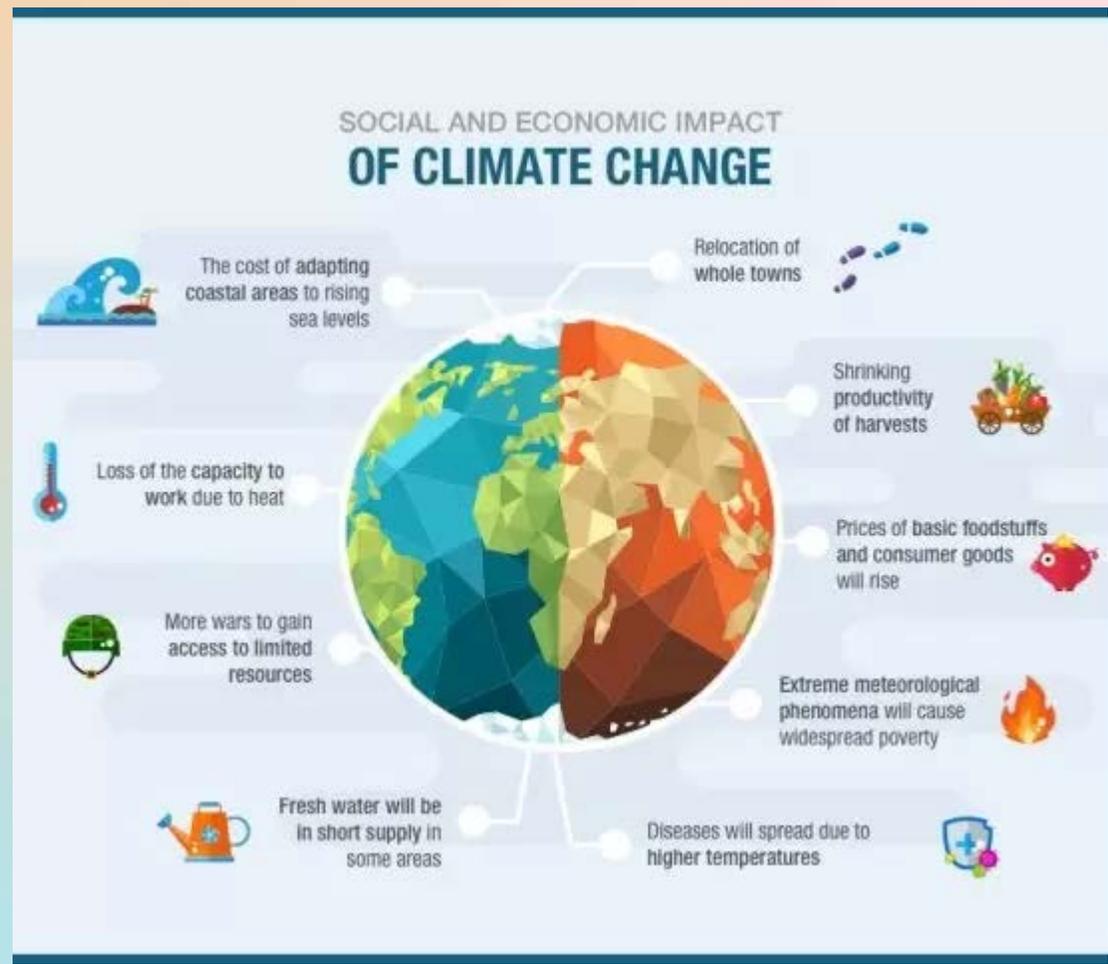
51 Billion

metric ton global CO₂
emissions





Temperature Rise 6 DegC



C	1.5°C	2°C	IMPACT of 2°C compared to 1.5°C
 LOSS OF PLANT SPECIES	8% of plants will lose 1/2 their habitable area	16% of plants will lose 1/2 their habitable area	2x worse
 LOSS OF INSECT SPECIES	6% of insects will lose 1/2 their habitable area	18% of insects will lose 1/2 their habitable area	3x worse
 FURTHER DECLINE IN CORAL REEFS	70% to 90%	99%	up to 29% worse
 EXTREME HEAT	14% of the global population exposed to severe heat every 1 in 5 years	37% of the global population exposed to severe heat every 1 in 5 years	2.6x worse
 SEA-ICE-FREE SUMMERS IN THE ARCTIC	At least once every 100 years	At least once every 10 years	10x worse

CLIMATECOUNCIL.ORG.AU | crowd-funded science information



6°C
by 2100



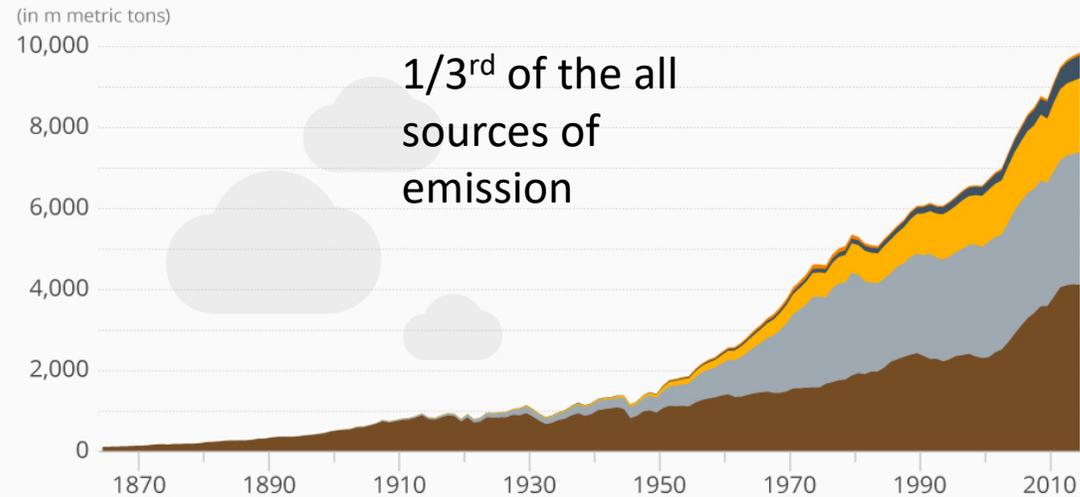


Emissions

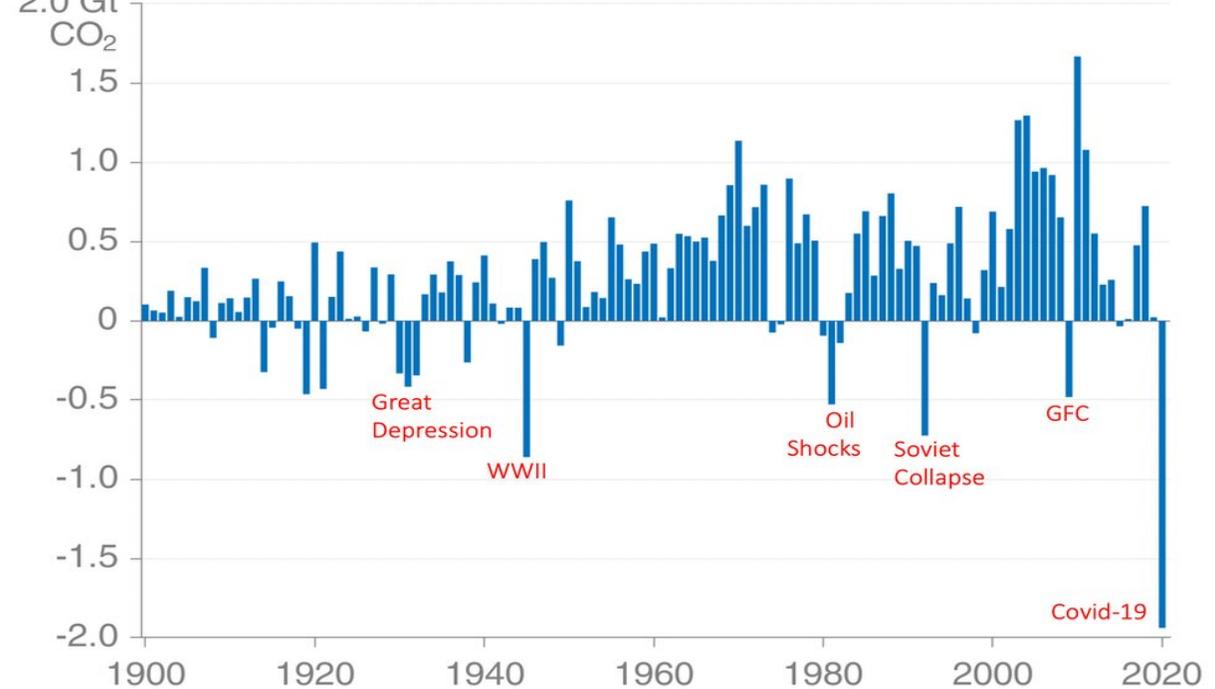
The Carbon Age: 150 Years of CO₂ Emissions

Worldwide carbon emissions from fossil fuel consumption and cement production

- Solid fuel
- Liquid fuel
- Gas fuel
- Cement production
- Gas flaring

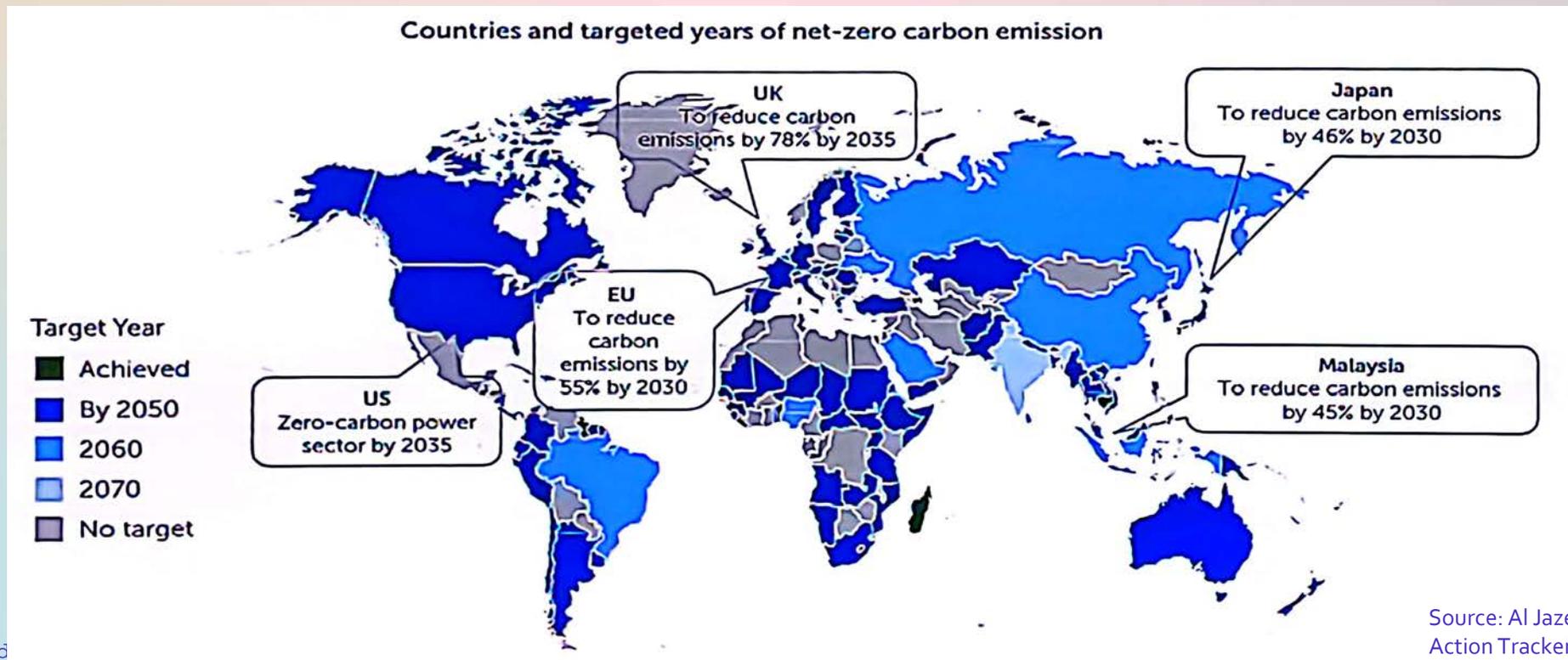


Global Fossil CO₂ Emissions Growth



90% of global emitters or more than 100 countries pledged towards to neutral carbon or net-zero target

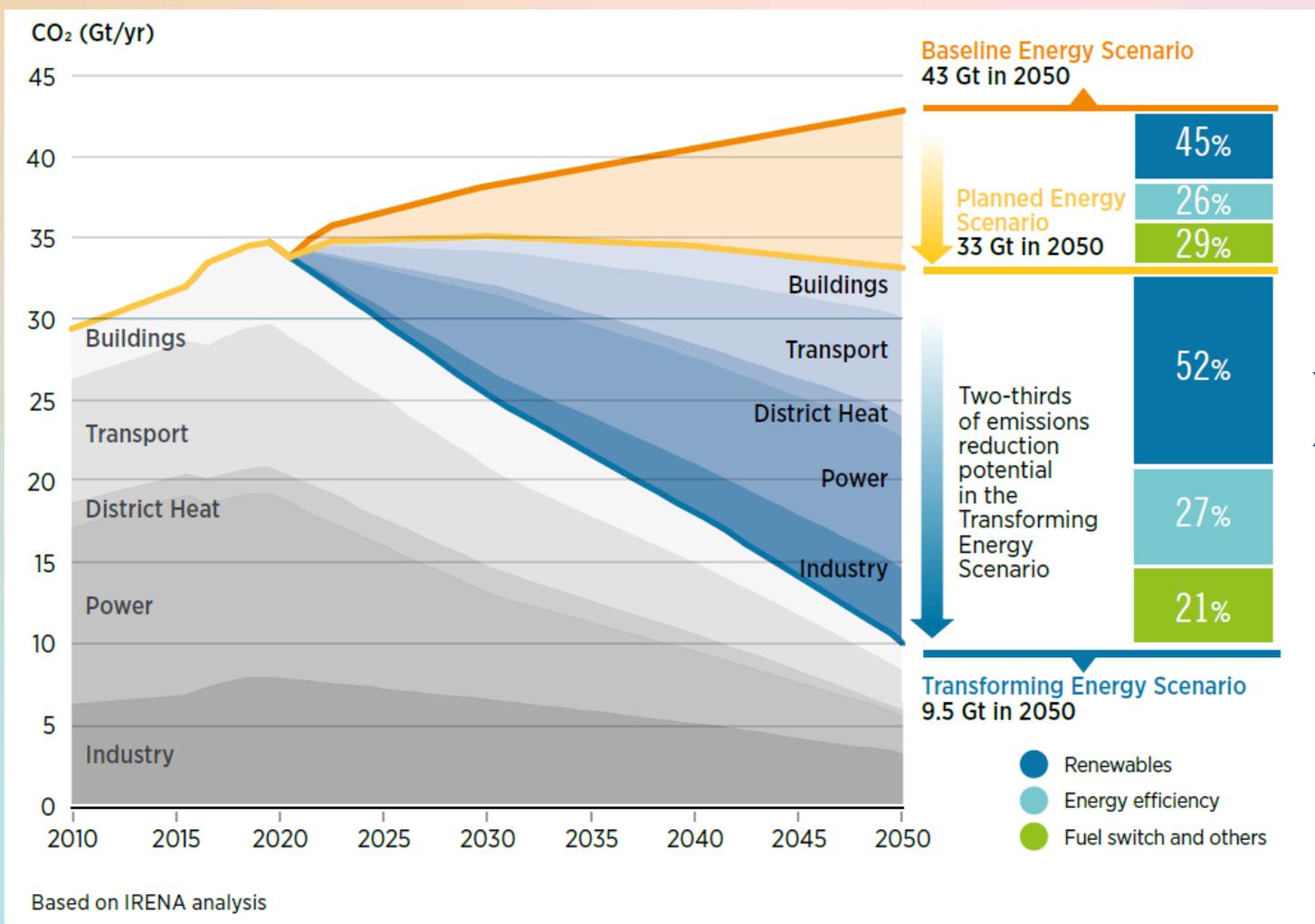
COP26 and in the run for COP27 in Nov 2022, more nations are expected to announce legislative, policy and governance commitments and targets





3 Levers to decarbonize our energy systems

The bulk of emission reductions: Renewables and efficiency
 Energy-related CO₂ emissions, 2010 - 2050



- 1 Shift towards renewables and low carbon electricity**
- 2 Electrify economic sectors (E.g., EV)**
- 3 Optimize energy consumption and improve energy efficiency**



RE MIX TARGET FOR MALAYSIA



PROGRAMMES BY GOVERNMENT TO SPUR SOLAR GROWTH



Residential + Commercial and Industrial

- SARE -Supply Agreement of Renewable Energy
- NEM -Net Energy Metering



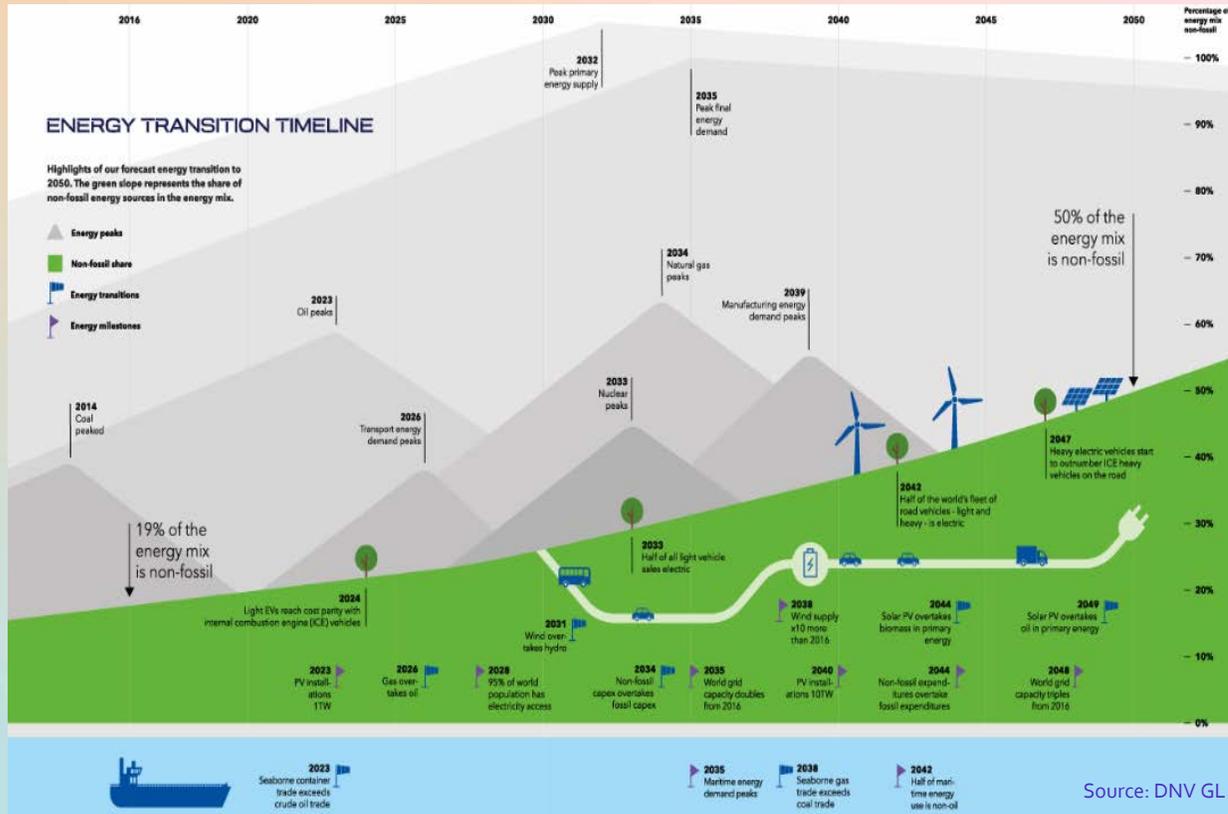
Large Scale Solar PV

- LSS@MEntARI/ LSS4
- NEDA - Single buyer programme

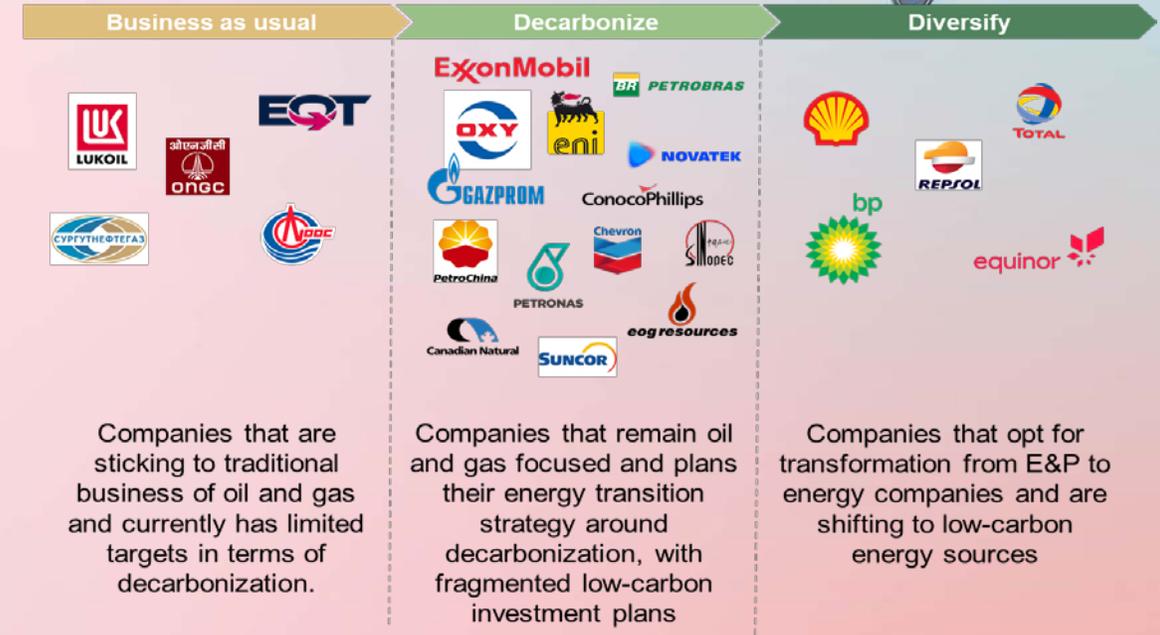


Green Incentives

- Green Investment Tax Allowances (GITA) – Assets
- Green Investment Tax Allowances (GITA) – Projects
- Green Income Tax Exemption (GITE) - Services



Energy Transition for E&Ps
 Pathways to navigate energy transition



Credit: Rystad

The Trend: Transition & Transformation

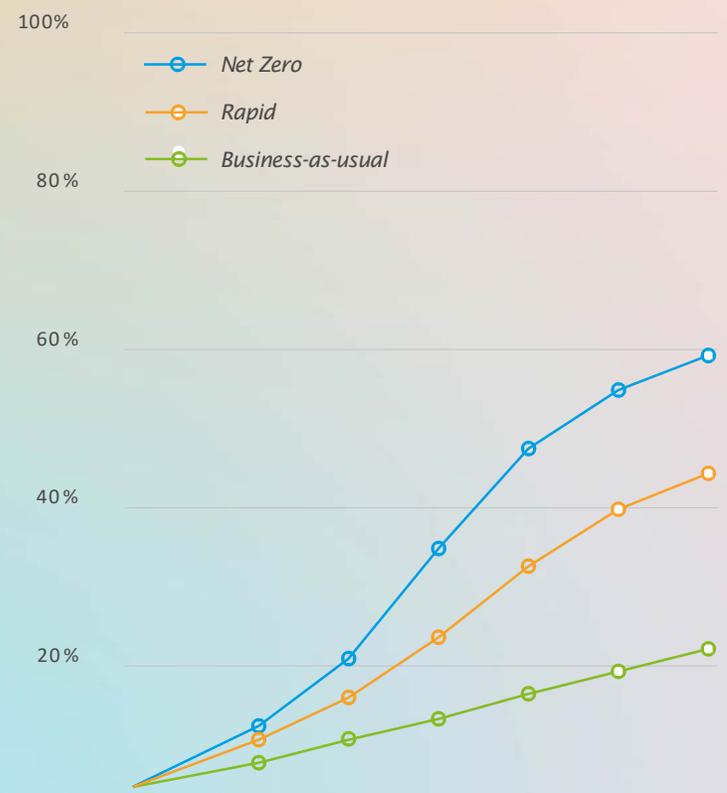


Carbon Scenario; hype & the hope

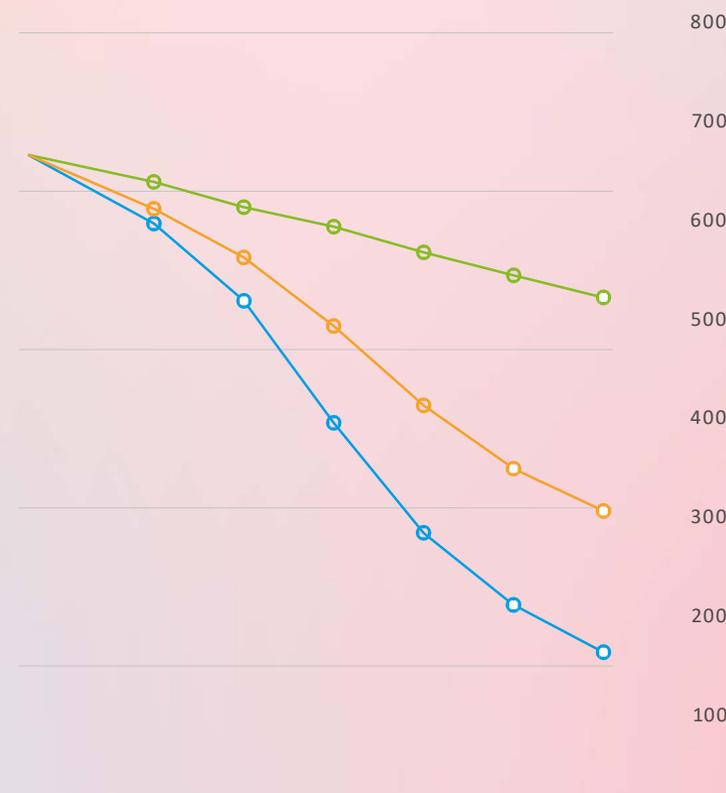
Shares of primary energy



Renewables

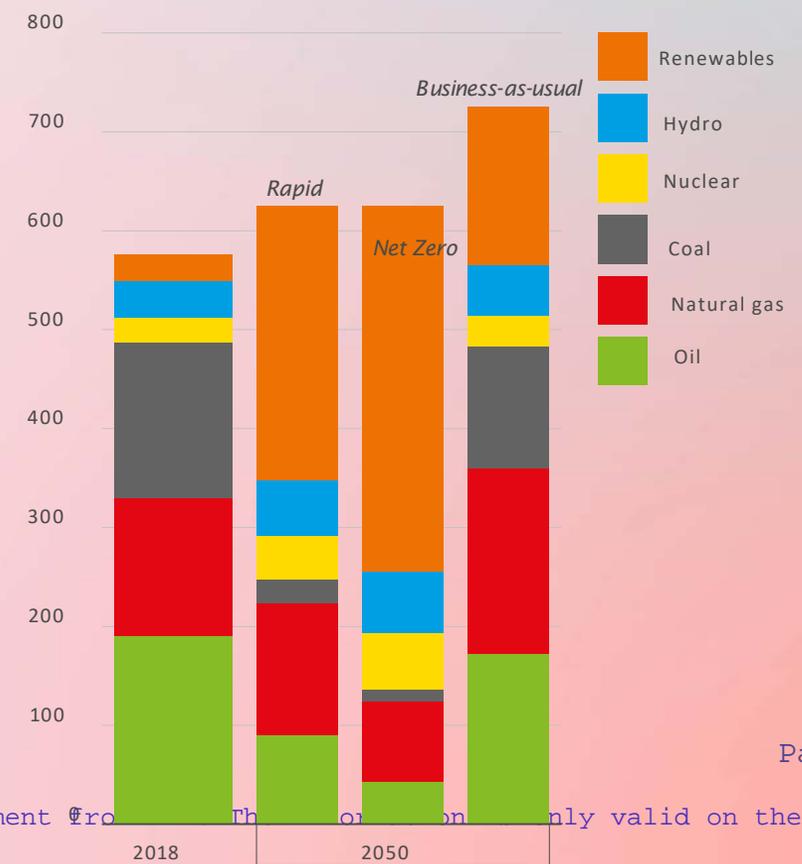


Hydrocarbons



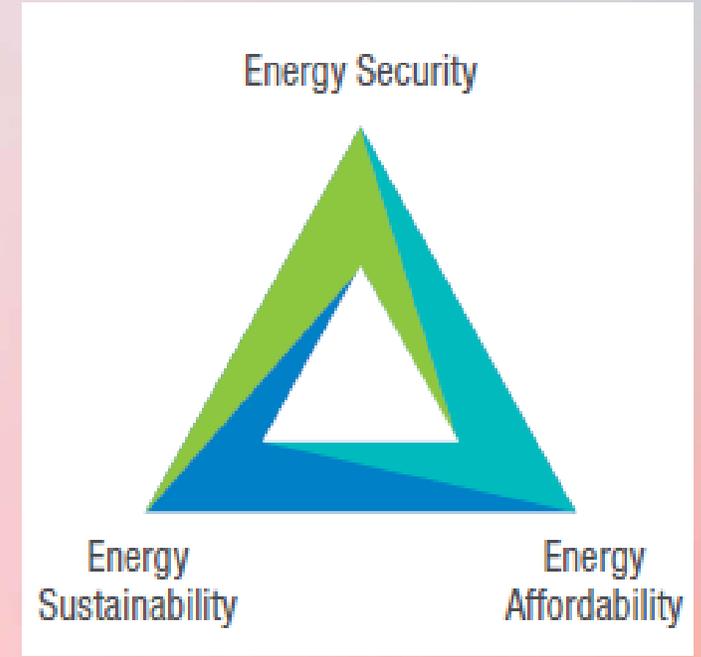
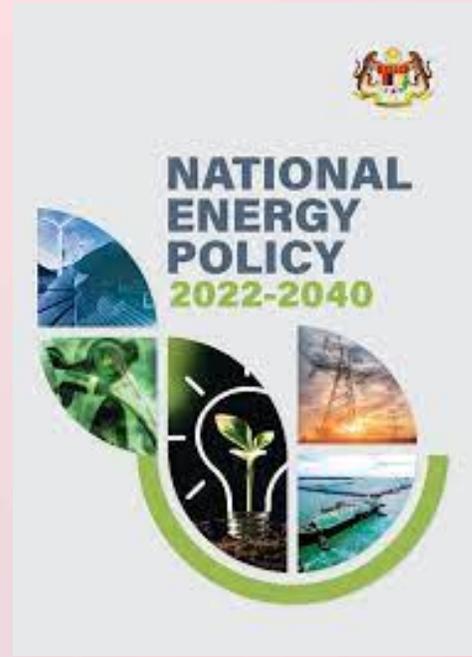
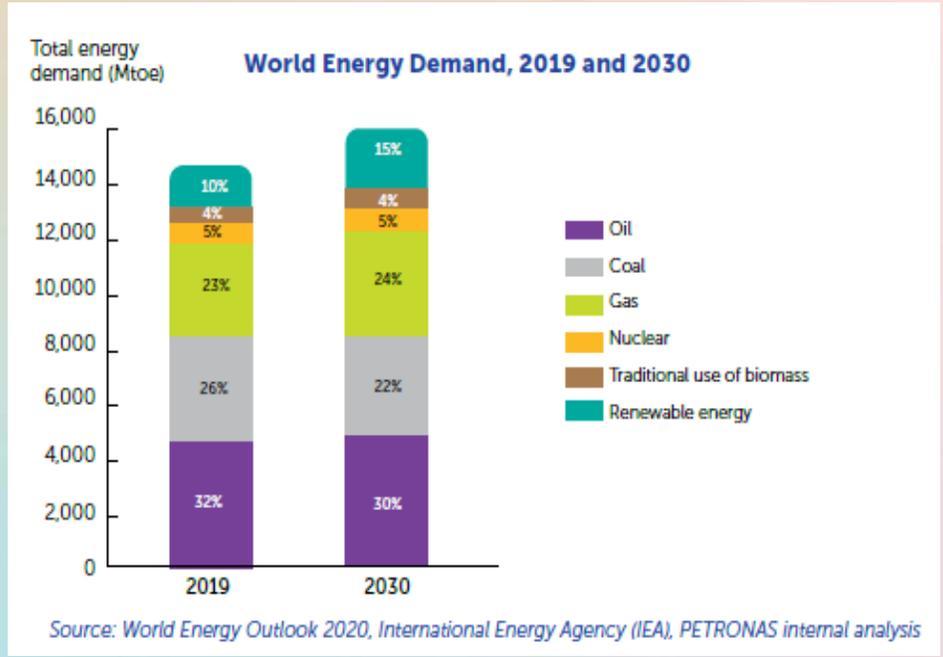
Primary energy consumption by source

EJ





Projection of Energy Play vs. Energy Trilemma

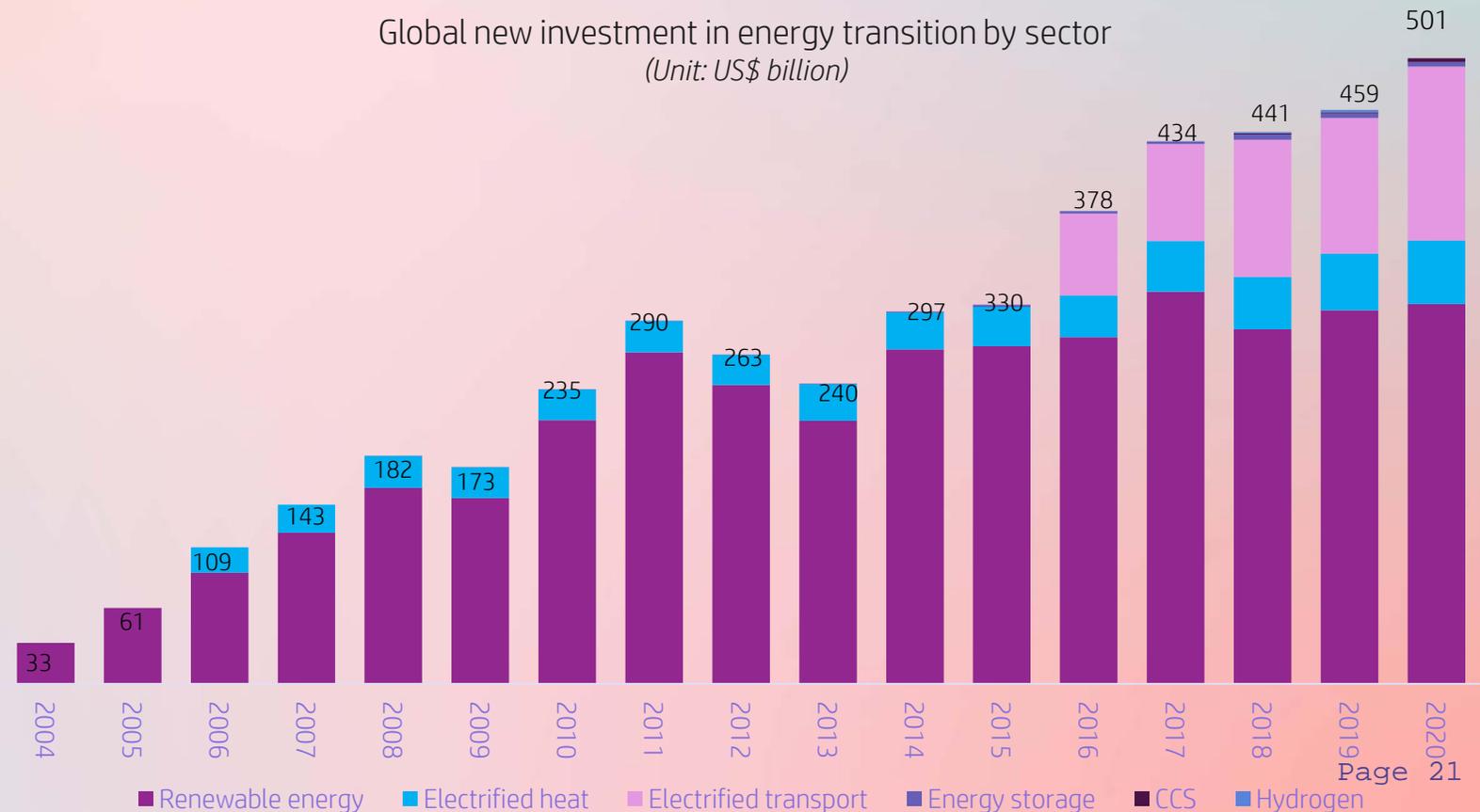




The world has reached half a trillion dollars a year in its investment to decarbonise the energy system



Global new investment in energy transition by sector
(Unit: US\$ billion)



Kasawari- Largest offshore CCS corridor



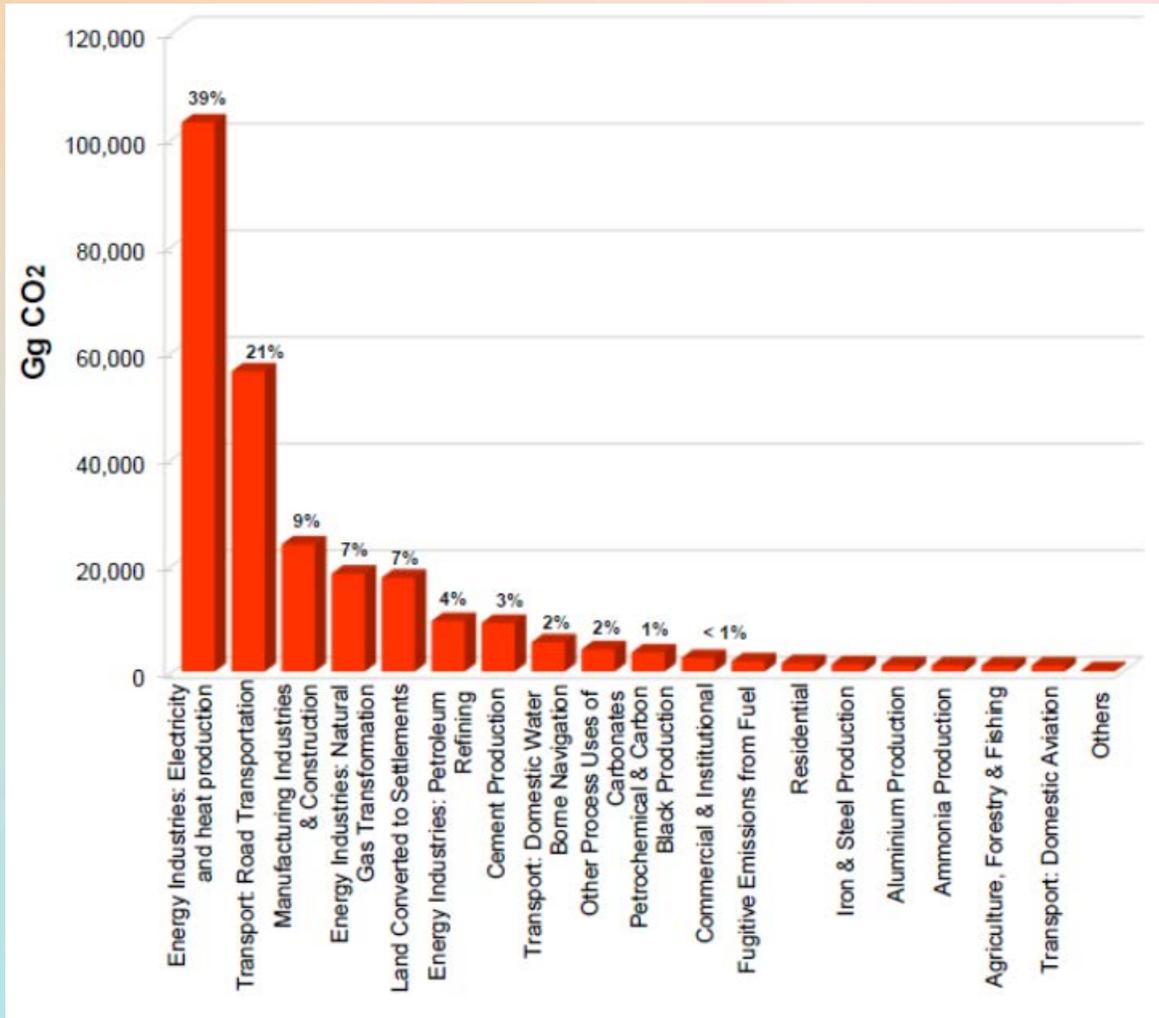
Malaysia revs up carbon, capture and storage developments

Malaysia's CCS project, billed as the world's largest, is targeting first injection in 2025



Tan (right) and Adif showing the JSCA to jointly collaborate on CCS opportunities, particularly in the study for suitable carbon dioxide storage locations in Malaysia.

KUCHING (January 11): Sarawak Shell Bhd (Sarawak Shell) and Petronas have signed a Joint Study and Collaboration Agreement (JSCA) to jointly collaborate on carbon capture and storage (CCS) opportunities, particularly in the study for suitable carbon dioxide storage locations in Malaysia.



Embedding Intelligence in Business Processes & Operations



Projects

Exploration

Well construction

End Users

Big Data And Analytics Services

- Advisory Services
- Digital transformation
- Enterprise Data Strategy
- Data Governance
- Information Management
- Master Data Management

Hyper-Converged Data & Analytics platform

- Automation
- End-to-End DATA solutions
- Plugins extensions
- Systems Integration

Consulting

- Analytics Maturity Assessment
- Vision and Strategy
- Big Data Architecture
- Data Lakes
- Visual Analytics
- Advanced Analytics
- Machine Learning
- Training Services

Workflow Automation

- Better Data. Better Insights. Better Decisions.
- A Futuristic Machine Learning Platform.

Production

Asset Integrity Management

Health, Safety and Environment

End Users

		Exploration			Development			Production		
Phases		Geological prospectivity	Seismic imaging	Exploratory drilling	Field planning	Engineering & construction	Development drilling	Well completion	Production operations	Well interventions/workover
Stages										
Physical to digital	Mechanize									
	Sensorize									
	Transmit									
Digital	Integrate									
	Analyze									
	Visualize									
Digital to physical	Augment									
	Robotize									
	Craft									
	Virtualize									

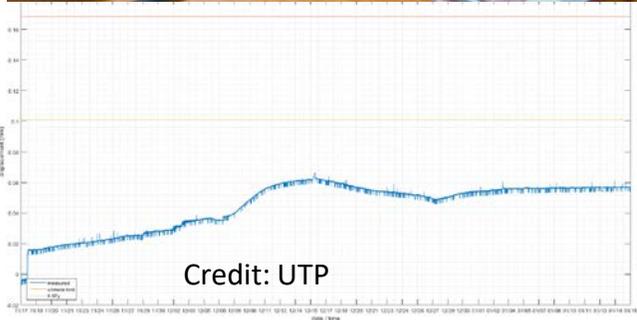
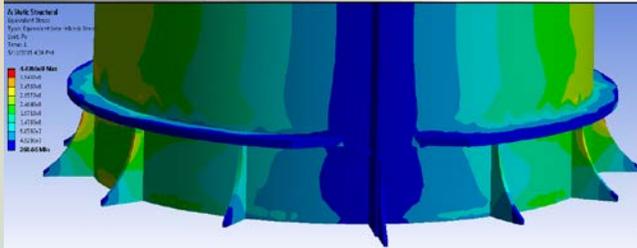
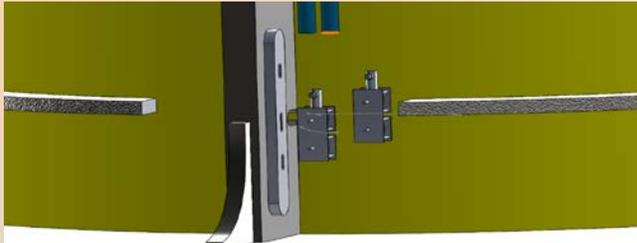
● Current digital standing of the industry
● Suggested digital leap in the short to medium term (2-3 years)

Source: Deloitte.com

from BEM. The information is only valid on the date of



Autonomous Integrity Monitoring



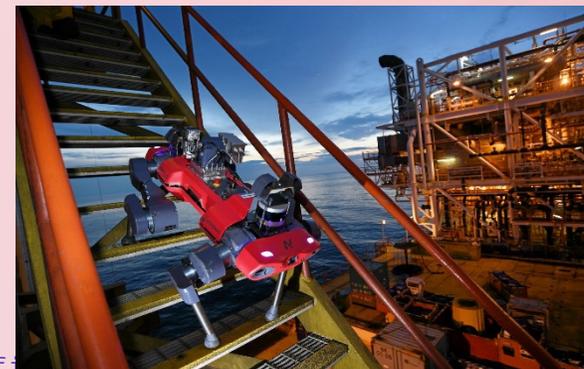
Credit: UTP

Autonomous Subsea Gliders



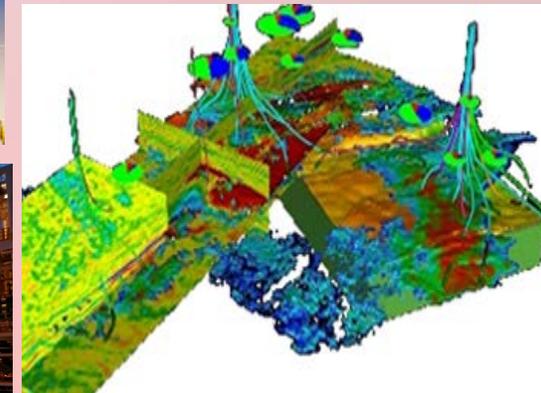
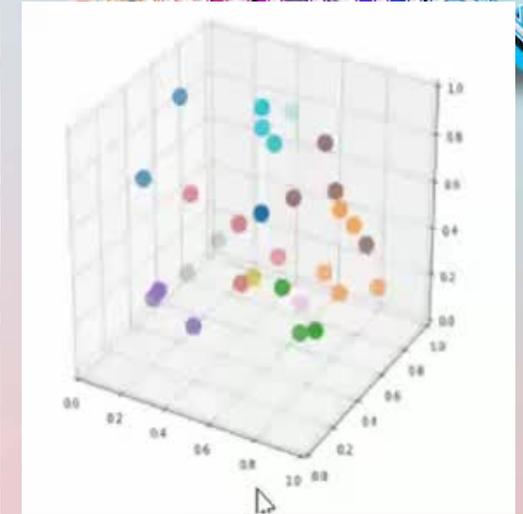
Credit: Blue Ocean

Project surveillance



Credit: Aerodyne

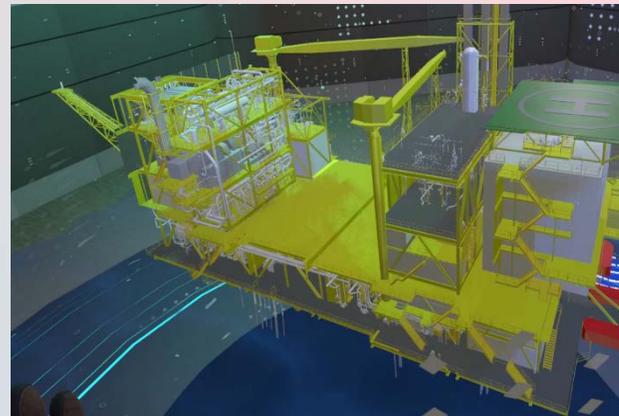
AI and machine learning for wells/ Reservoir



Credit: Reservoir Link

Petrabyte

Mixed Reality for collaboration



Credit: Innoveam

Journey Continues...



The is no universal formula for sustainability

Every region, country have its unique socio-economic obligation and its own way to manage its energy sources to ensure balanced & practical development and equitable growth to everyone.



Thank You



• Let's think about this....

- Where do we see ourself in next decade, next century?
- How do we position ourself in the context of energy transition (energy balance), while global economic landscape, technological disruptions are taking shape?
- How can we leverage on our collective strength?
- How can technologies and innovation address the current business climate and pivot to sail the transformation?
- How can we have greater meaningful collaboration btwn various parties? (unis, policymakers, industry)
- How do re-tool, reskill , reshape our human capital to be able to cope with the transformation?
- How can we ensure the progress among all patrons of the industry are with Equality?



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Technopreneur | Social
advocator | Research Enthusiast





THANK YOU



Committed to Engineering Excellence

BOARD OF ENGINEERS MALAYSIA

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