KEMENTERIAN SUMBER ASLI,
ALAM SEKITAR & PERUBAHAN IKLIM
MINISTRY OF NATURAL RESOURCES,
ENVIRONMENT & CLIMATE CHANGE

MALAYSIA

TECHNOLOGY INNOVATION

Ms. Siti Sarah Sharuddin
Assistant Secretary, Ministry of Natural Resources, Environment and Climate Change

Mr. Norazrin Rupadi
Assistant Director, Energy Commission

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ENERGY GOVERNANCE LANDSCAPE

MINISTRY OF NATURAL RESOURCES, ENVIRONMENT & CLIMATE CHANGE (NRECC)

KEY ENERGY-RELATED MINISTRIES

Ministries with direct energy-related responsibilities

- Economic Planning Unit, Prime Minister's Department (EPU)
- Ministry of Energy and Natural Resources (KeTSA)
- Ministry of Primary Industry and Commodities (MPIC)
- Ministry of Domestic Trade and Consumer Affairs (KPDNHEP)

Ministries related to key final energy demand sectors

- Ministry of Transport (MOT)
- Ministry of International Trade and Industry (MITI)
- Ministry of Federal Territories (KWP)
- Ministry of Housing and Local Government (KPKT)
- Ministry of Rural Development (KPLB)
- Ministry of Agriculture and Food Industry (MAFI)

Cross-cutting influence

- Ministry of Finance (MOF)
- Ministry of Water and Environment (KASA)
- Ministry of Science, Technology, and Innovation (MOSTI)

State-specific entities

- State Economic Planning Unit (UPEN) Sabah
- State Economic Planning Unit (UPEN) Sarawak
- Ministry of Utility and Telecommunication (Sarawak)

KEY ENERGY-RELATED ORGANISATIONS

Power-related

- Single Buyer (SB)
- Grid System Operator (GSO)
- MyPOWER

Oil and gas-related

- Malaysia Petroleum Resources Corporation (MPRC)

Renewable energy-related

- Sustainable Energy Development Authority (SEDA)

Cross-cutting influence

- Malaysian Green Technology and Climate Change Corporation (MGTC)
- Malaysian Investment Development Authority (MIDA)
- Malaysia Automotive, Robotics and IoT Institute (MARii)

REGULATORS

Electricity and piped gas

- Suruhanjaya Tenaga (ST)

Upstream oil and gas

- Petroliam Nasional Berhad (PETRONAS)

New investment priorities: renewables, efficiency and electrification – global outlook

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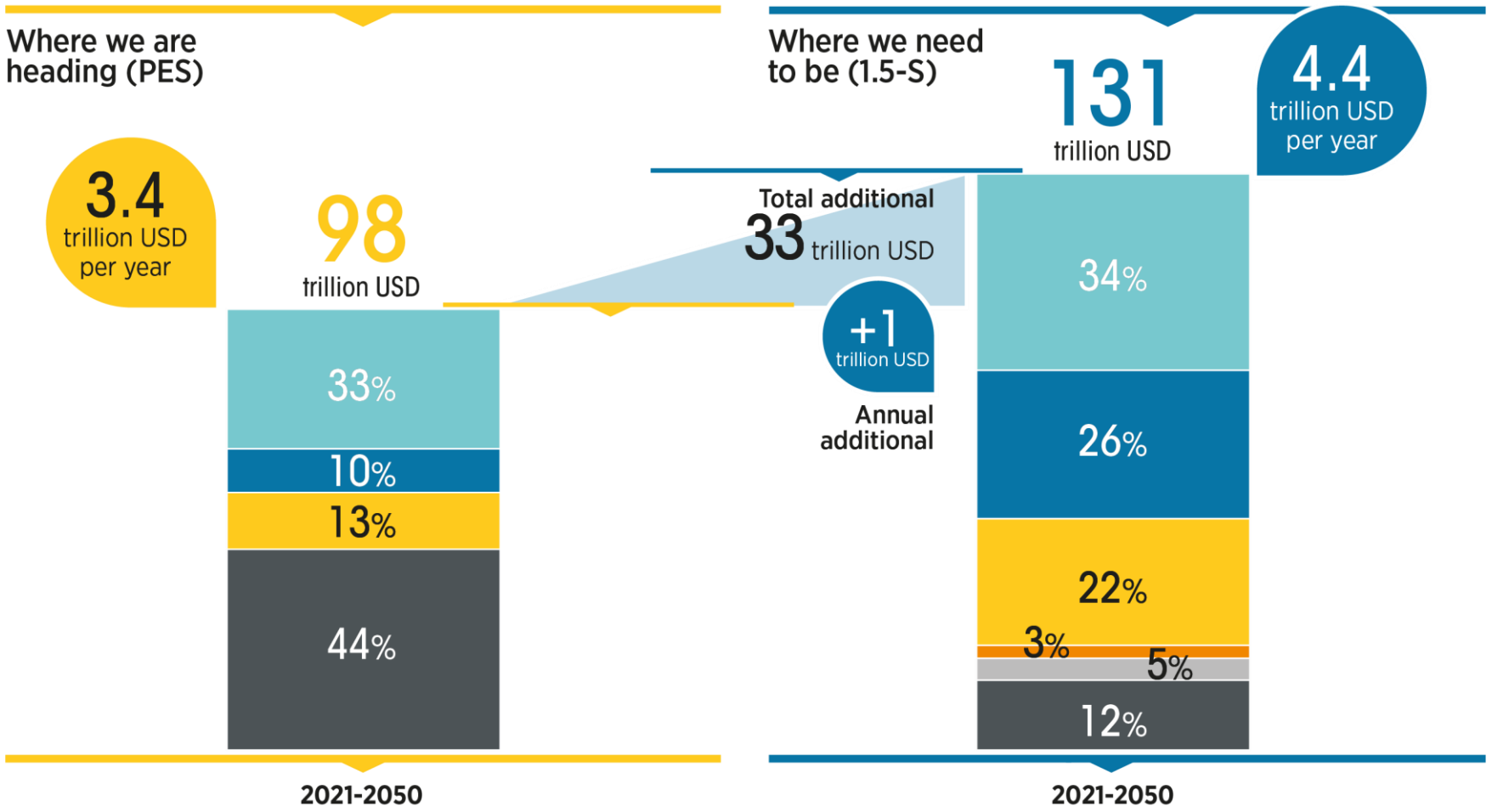

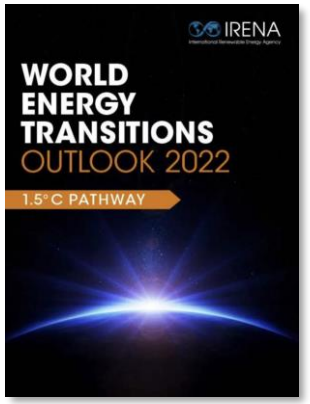

A climate-safe future calls for the scale-up and redirection of investments towards energy transition technologies and away from fossil fuels.

Malaysia's total final energy consumption will change

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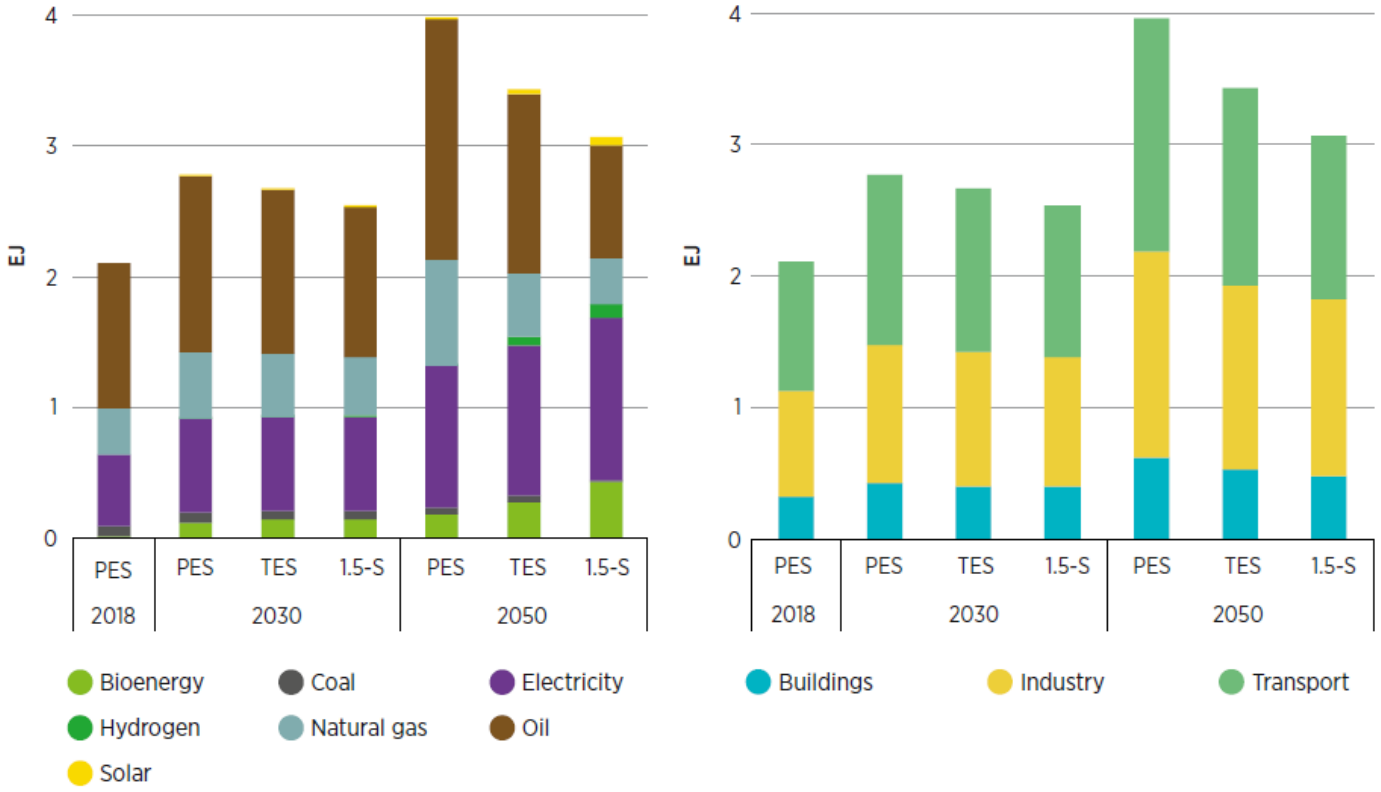

- **With higher energy efficiency, electrification, and renewables use,** Malaysia's **energy consumption can be reduced by 25%** in the 1.5-S
- **Oil use in the energy mix will halve** from today, where **electricity** will comprise 40% of total final energy consumption in 1.5-S, compared to around 21% in 2018
- **Renewable direct use** is also important, comprising 20% of final energy consumption by 2050 in 1.5-S. The **production of clean hydrogen and its derivative fuels** must ramp up to at least 1.5 million tonnes by 2050.

Malaysia Energy Transition Outlook - Key Messages

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With the energy efficiency measures and use of renewables, Malaysia can reduce its energy demand by 25% and increase its share of RE mix from 5% today to almost 60% by 2050 in 1.5-S.

In the 1.5-S, electricity will make up to 40% of final energy consumption by 2050 from 21% today - doubling electricity demand to 348 TWh by 2050. The majority of new capacity will need to be from renewables.

In the near term to 2030, Malaysia will need to scale up its solar PV to 17 GW and EVs to over 3 million. Overall investment in energy transition technologies amount to USD 50 billion to 2030.

In the longer term to 2050 cumulative energy transition investment in Malaysia will reach at least USD 375 billion, including installing RE capacity & infrastructure and EE – phasing out the need for fossil fuel subsidies.

Transitioning towards the energy transition technologies in the 1.5-S will save Malaysia between USD 9 - 13 billion annually in avoided cumulative energy, climate and health costs. Energy-related emissions be reduced up to 60% in the 1.5-S compared to PES by 2050.

TECHNOLOGIES WITH PRESENCE IN MALAYSIA

- Artificial intelligence
- Internet of things
- Advanced materials
- Automation and Robotics
- Drones
- Blockchain
- Cloud computing and Big data analytics (BDA)
- Genetic engineering
- Bioprinting
- Augmented reality
- Sensor technology
- Biotechnology
- Virtual reality
- Battery and Energy storage
- Super computing
- Neurotechnology
- Autonomous vehicles
- Synthetic biology
- 3D printing

TECHNOLOGIES OF THE FUTURE

- 4D or 5D printing
- Metalenses
- Social robots
- Generative artificial intelligence
- DNA data storage
- Private 5th generation (5G) mobile network
- Biodegradable sensors
- Collaborative telepresence
- Health passports
- Ingestible robots
- Smart clothing
- Photonics in space
- Genetic computing
- Geoengineering
- Biomimetic materials
- Carbon-breathing batteries

PRESENT YEAR → **BEYOND 2020**

Source: Academy of Sciences Malaysia (2020), 10-10 Science, Technology, Innovation and Economic (STIE) Framework; WEF (2019), Top 10 Emerging Technologies; Futurism (2019), Things to Come: A Timeline of Future Technology