

Navigating Energy Trilemma in O&G Business

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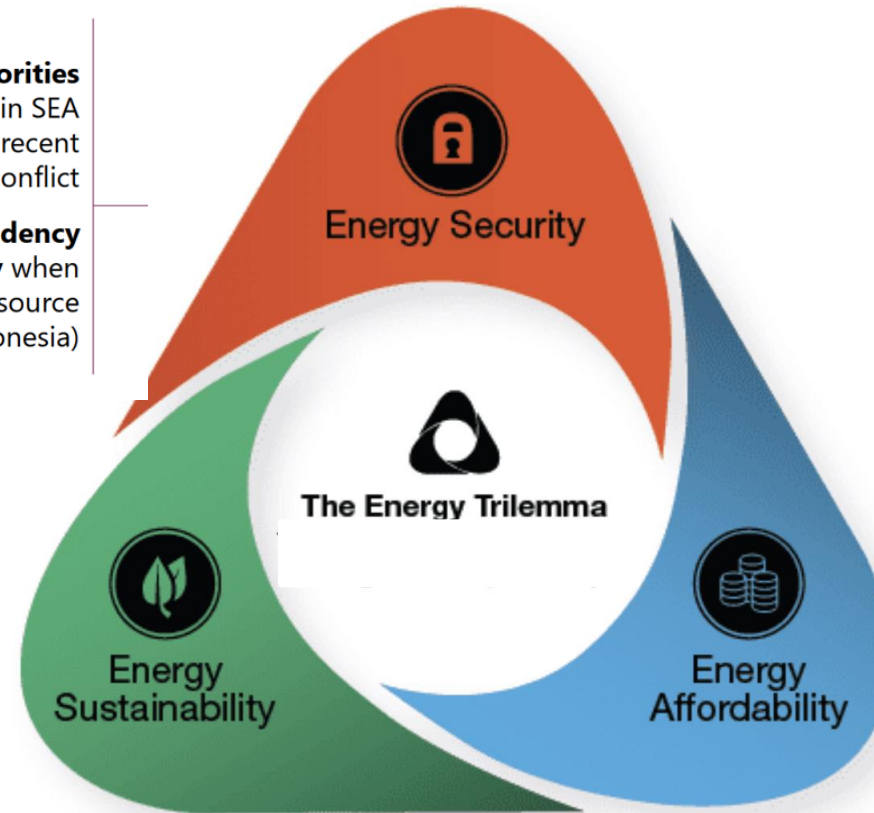


The Energy Trilemma

All governments, including in South East Asia, have been confronted in 2022 with the need to rebalance actions around energy security (given geopolitics conflict) and inflation vs. net zero promises

Energy security is one of the **top priorities for rapidly industrializing economies** in SEA – importance further escalated by recent Russia-Ukraine conflict

Concerns over **foreign resource dependency** and **supply chain volatility** when transitioning to alternative energy source from low-cost domestic coal (e.g., Indonesia)



While private sector green financing and capital is growing, **it is insufficient**. Public sector needs to play a bigger role to fill financing gaps

System costs are significant (e.g., renewables grid costs, EV infrastructure investment) and could impact national budget requirements

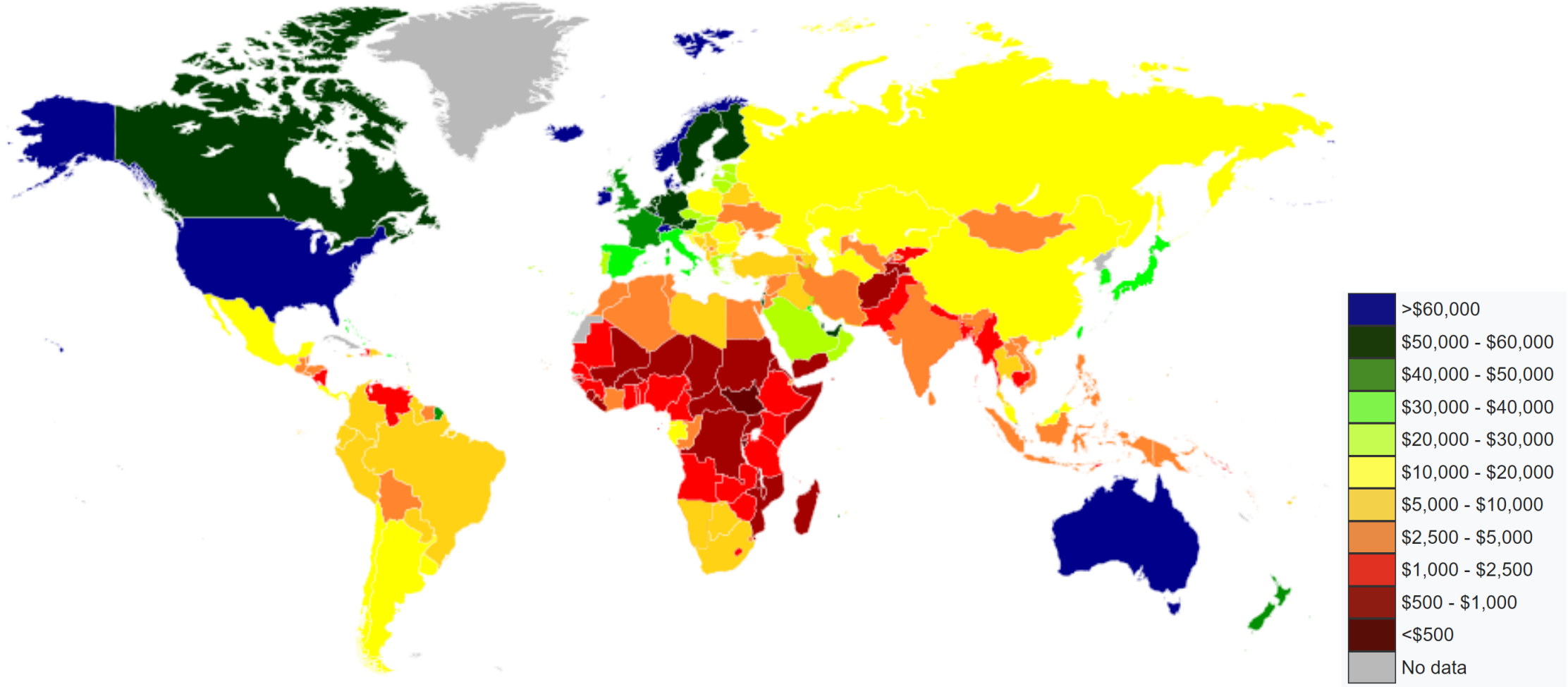
Despite renewed carbon ambitions, short-term **economic priorities and development goals could slow down progress** in driving decarbonization agenda

Global pressure exists to accelerate Net Zero ambitions and **start delivering carbon commitments** to meet 1.5°C targets

Natural disasters and climate hazards will increasingly impact community livelihoods unless tangible actions are taken

GDP per Capita (2022)

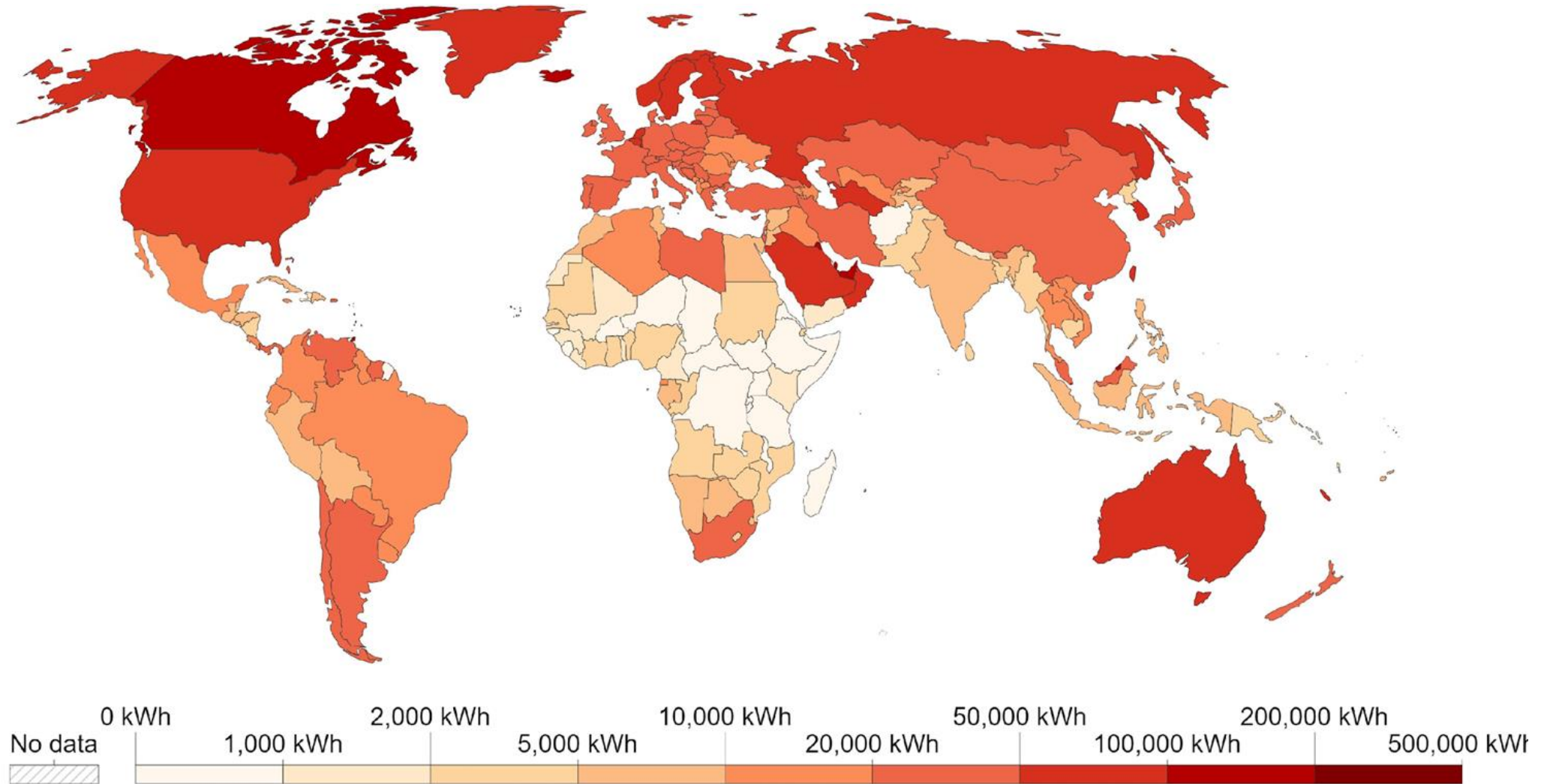
Higher levels of GDP are correlated with greater electricity use, access, reliability, and affordability. The affordability and availability of energy is strongly related to income. Poor energy access is strongly tied to having a low income.



Data from IMF: March 2023 World Economic Outlook Database, October 2022. World Economic Outlook. International Monetary Fund (October 2022).

Energy Consumption per Capita (2022)

Developed countries tend to have higher per capita energy consumption when compared to developing countries. This is largely due to higher incomes, better access to technology, and greater access to energy sources in developed countries.



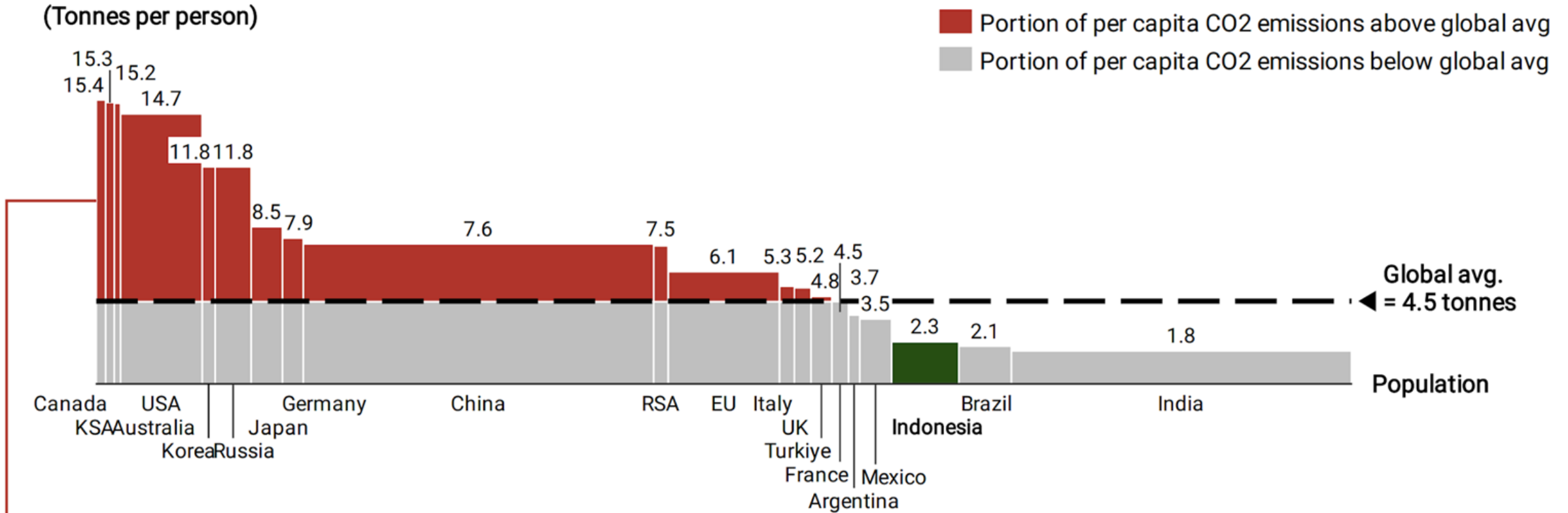
Source: U.S. Energy Information Administration (EIA); Energy Institute Statistical Review of World Energy (2023)

Note: Energy refers to primary energy – the energy input before the transformation to forms of energy for end-use (such as electricity or petrol for transport).

OurWorldInData.org/energy • CC BY

Per Capita CO₂ Emission & Population of G20 Members (2019)

The average global temperature in 2021 was about 1.1°C above pre-industrial levels, and it was the seventh consecutive year in which global temperature had been over 1°C above these levels. Emissions among the G20 members, accounting for 75% of global emissions.

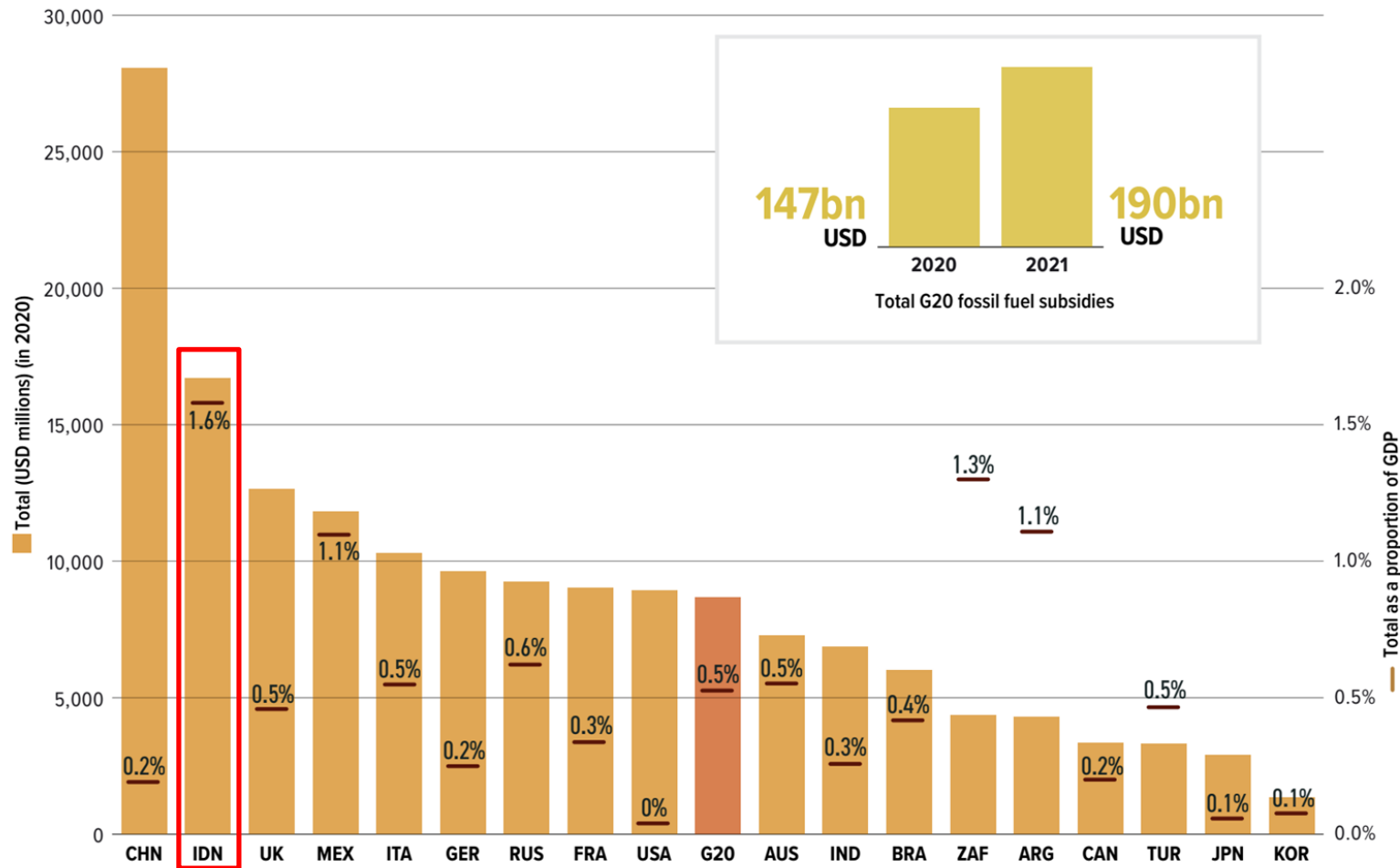


The area showing emissions above the global average represents ~34% of global CO₂ emissions in 2019

Fossil Fuel Subsidies

Affordability still one of main issue, especially in developing countries. Subsidies for fossil fuels – in the form of budgetary support and tax exemptions – encourage levels of production and consumption, although incompatible with climate goals.

G20 fossil fuel subsidies




There is no comparative data for Saudi Arabia. According to a different ('price-gap') methodology used by the International Energy Agency (IEA), Saudi Arabia provided USD 17bn of subsidies to fossil fuel consumption in 2020.¹¹⁸


OECD-IEA Fossil Fuel Support Database, 2022¹¹⁹

Indonesia Role in Global Energy Transition & Decarbonization (1/2)


Indonesia Is A Key Player On The Global Stage Due To Its Large Size, Strategic Location, And Rich Natural Resource Endowment



17,500 islands with **+108,000 km** of coastline



Population of **282 million** people



Located along major sea lanes connecting East Asia, South Asia and Oceania

Rich in energy transition mineral reserves and high RE potential



World's biggest nickel reserves



World's 2nd biggest tin reserves



6th biggest bauxite reserves



7th biggest copper reserves



437.4 GW of potential RE¹

1. Renewable energy includes solar, hydro, wind, bioenergy, geothermal, and Ocean
Source: Dukcapil, ESDM, Statista

2nd largest global low-cost NCS potential

#1

of world fauna species

15%

Share of global NCS potential



#2

largest mangrove cover

~300

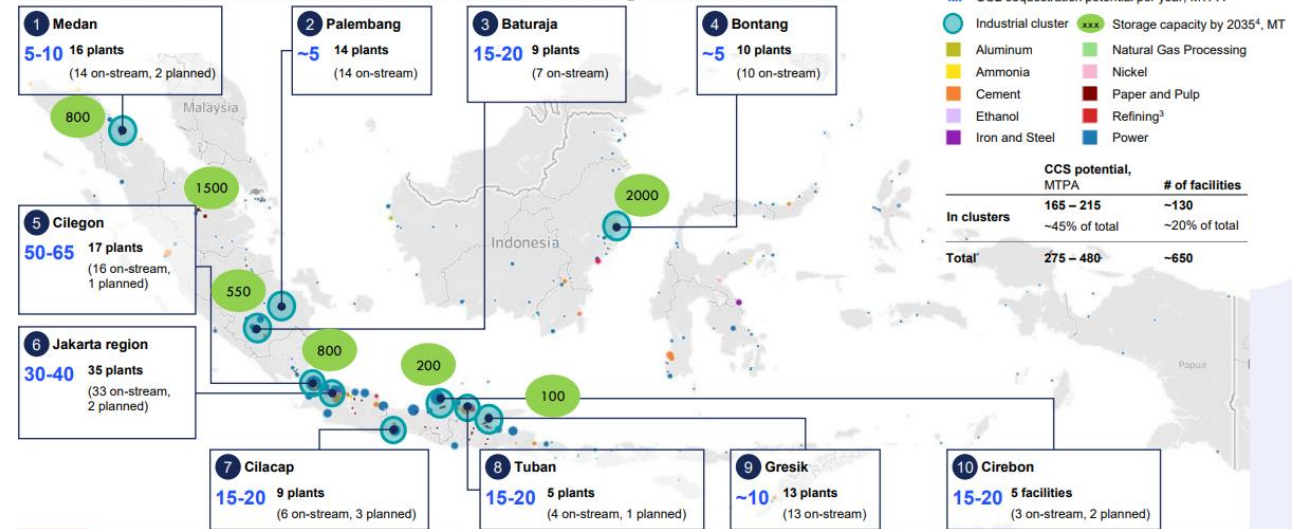
BtCO₂ carbon stored in Indonesian land

2nd

largest global low-cost Nature Climate Solutions (NCS) potential¹

~400 Giga Tons CCUS potential

Potential industrial CCS clusters in Indonesia and their estimated CO₂ sequestration potential



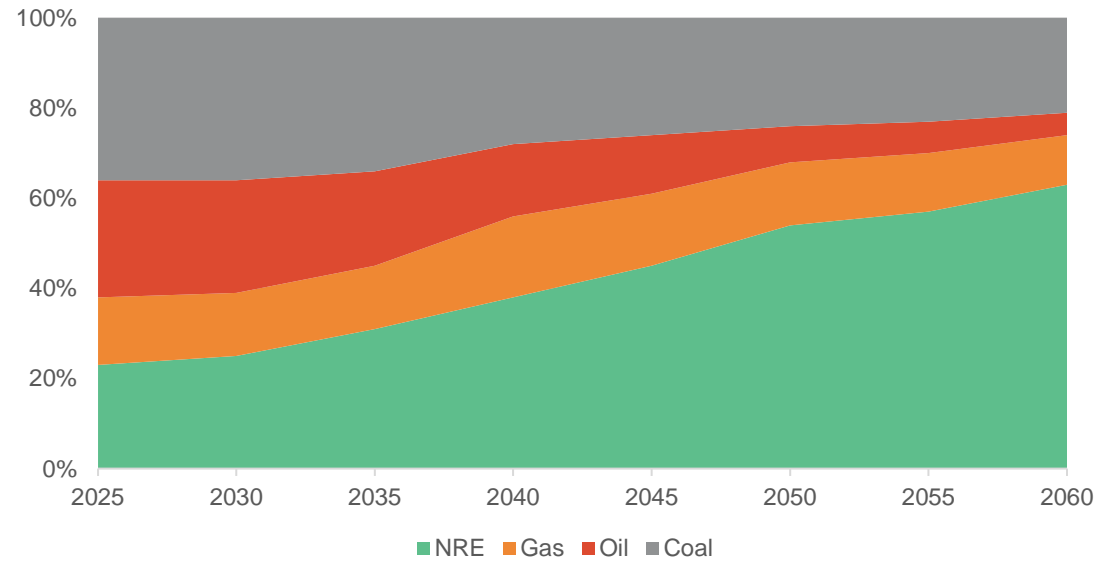
Potential CCS clusters

Integrate clusters for end-to-end CCUS and innovate as green energy provider in the clusters

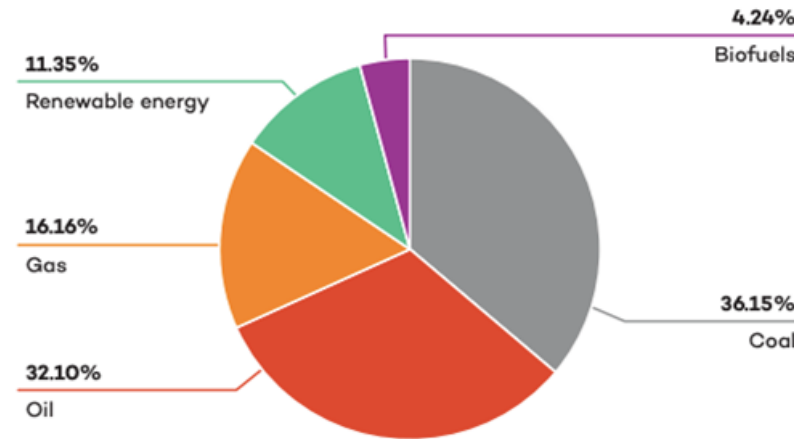
1. After Brazil

Source: US NASA Goddard Institute for Space Studies (GISS) GISTEMP Reanalysis dataset, World Resources Institute

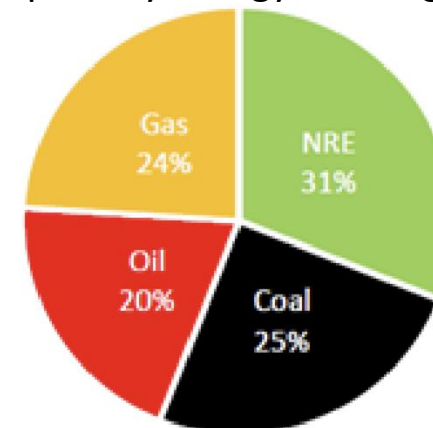
The Indonesian Government will set the target of Renewable Energy Mix of 23% by 2025 and 60% - 61% by 2060*



Indonesia's primary energy supply by source, 2021

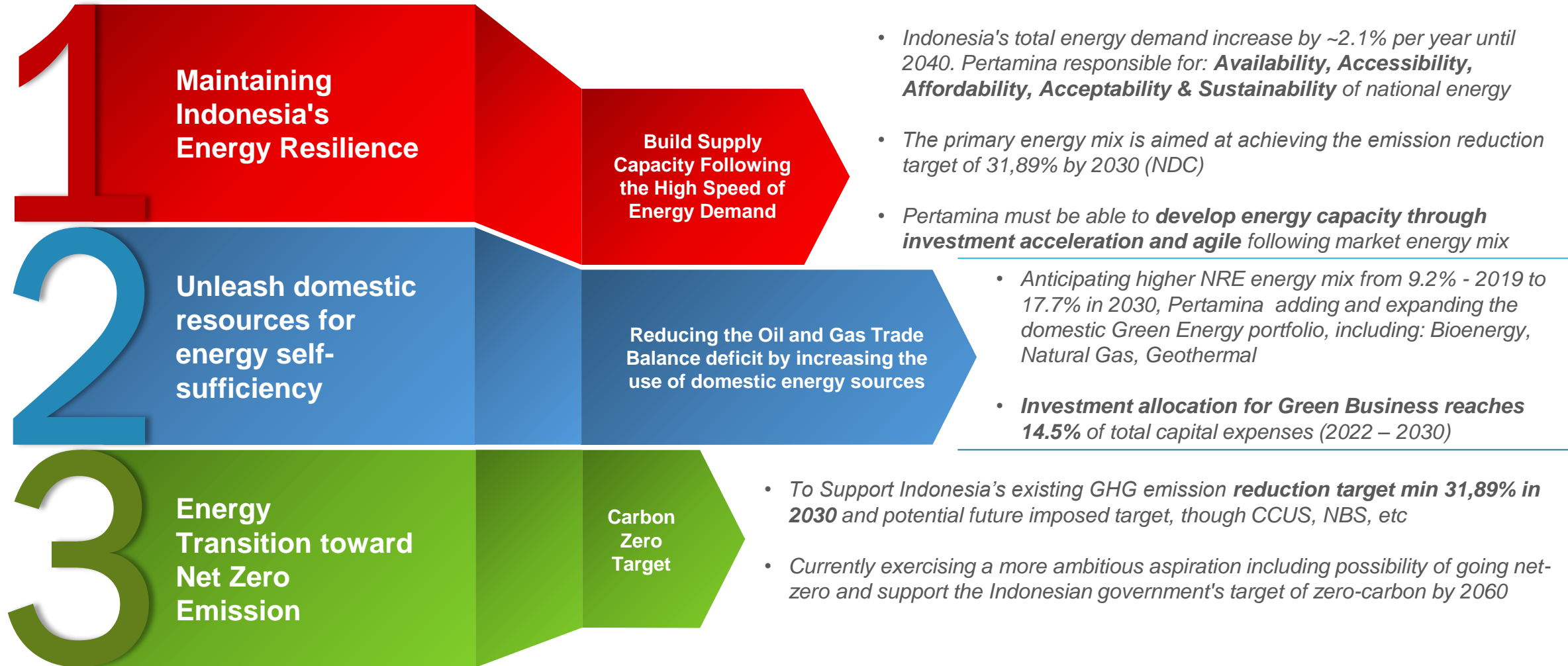


Indonesia's primary energy mix target by 2050



Government Regulation Draft of National Energy Policy:

- NRE is trending up to 23% in 2025 and 60% - 61% in 2060.
- Gas has an increasing trend until 2040 as a bridge for the energy transition to replace oil and coal.
- Crude oil has a decreasing trend from 2040 to 2060 (Crude oil will gradually be replaced by Biofuel B30 to B50)



Pertamina's Commitment to Sustainability

Sustainability Policy



“PERTAMINA’s ambition is to be a leading and reputable Global Energy Company and to be recognized as:



Environmentally Friendly Company



Socially Responsible Company

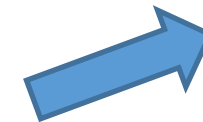


Good Governance Company”

End-to-end GHG emission reduction achieved 2010-2022

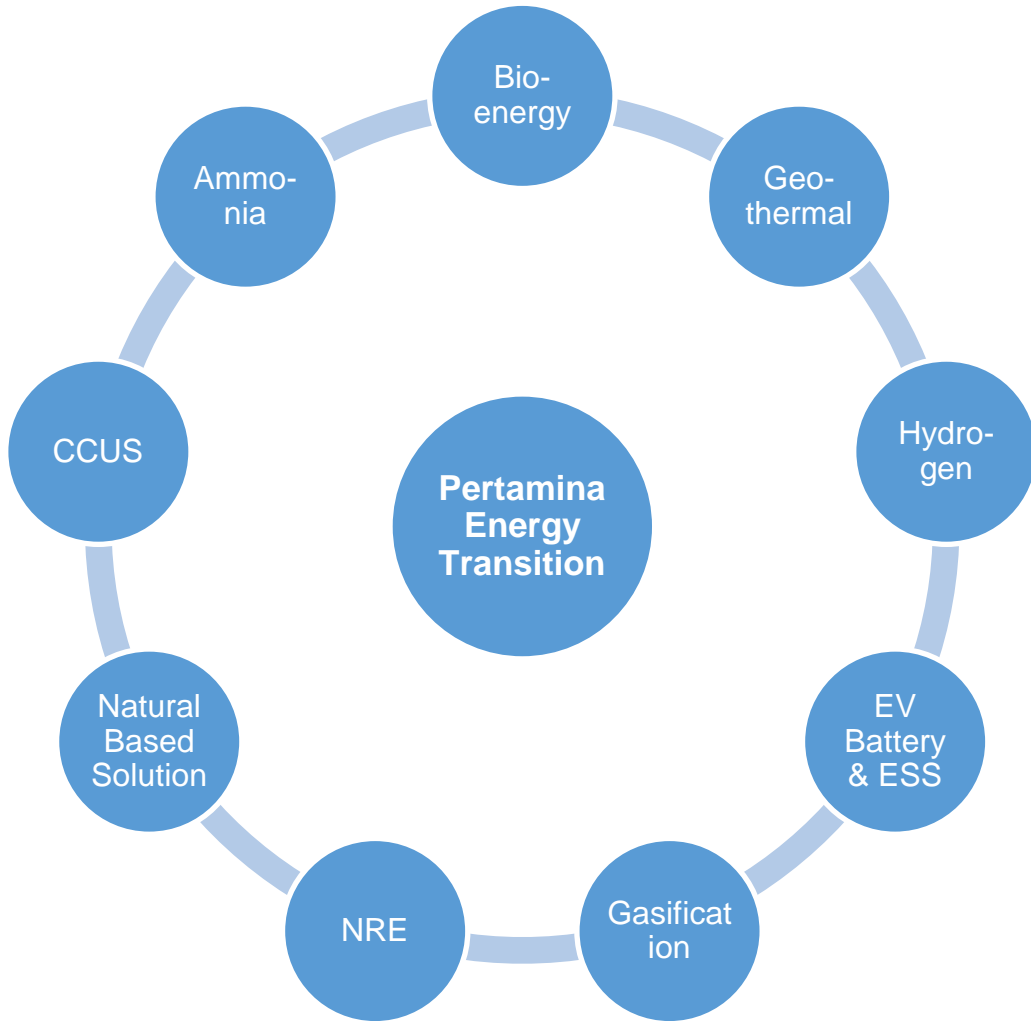


ESG Performance



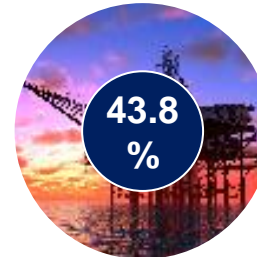
Rank: 15	Oil & Gas Industry	Rank: 7
Rank: 7	Integrated Oil & Gas	Rank: 2

Pertamina's Steps to Achieve NZE through Energy Transition

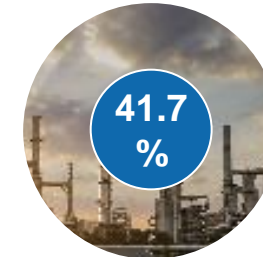


Investment Strategy

Based on NZE Roadmap 2022-2030



Fossil Fuel

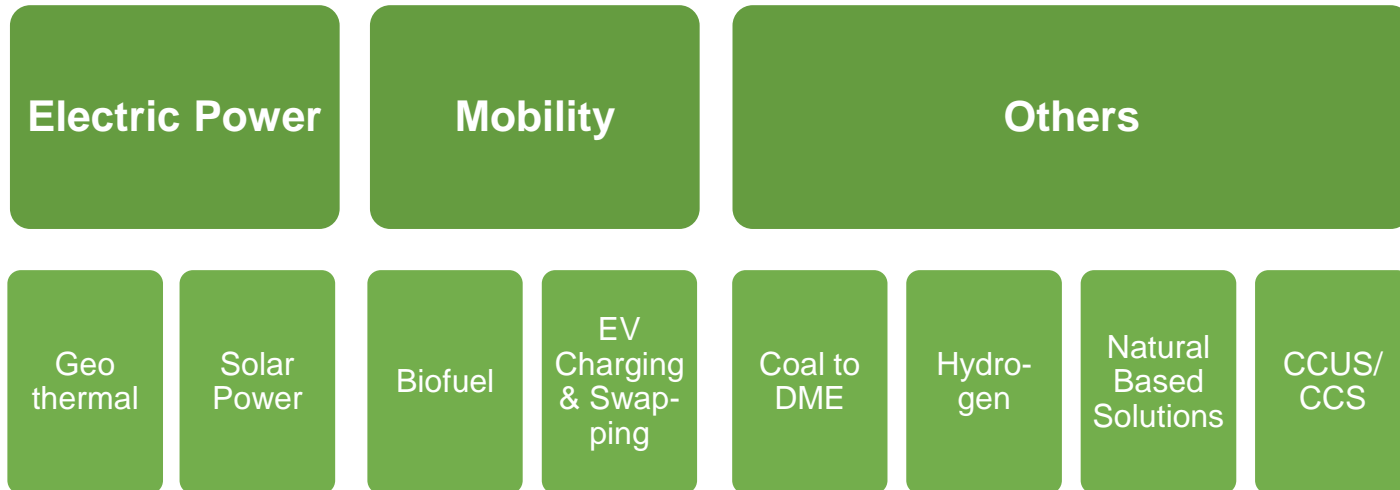


Petrochemical



Green Business

Investment by the oil and gas industry in low-emissions sources of energy is **less than 5%** of its upstream investment*)



Global Collaboration is The Key to Tackle The Challenge

If not managed properly, the transition to low-carbon energy could bring high costs and inequities for the world's most vulnerable populations. In developing countries, the energy transition must also ensure the affordability of energy for the people.

Challenges Forward

1. Technology Readiness

- Technology and materials for renewable energy such as solar, wind and tidal are still dependent on foreign parties
- Cost of technology still higher than fossil fuels

2. Economic Feasibility & Financing

- Renewable energy prices that are not yet competitive compared to non-renewable energy prices in Indonesia
- Economic of Scale has not yet developed domestically

3. Equitable Employment

- Low carbon energy will require new skill sets and specializations
- It may also cause the loss of million jobs in fossil fuel industries

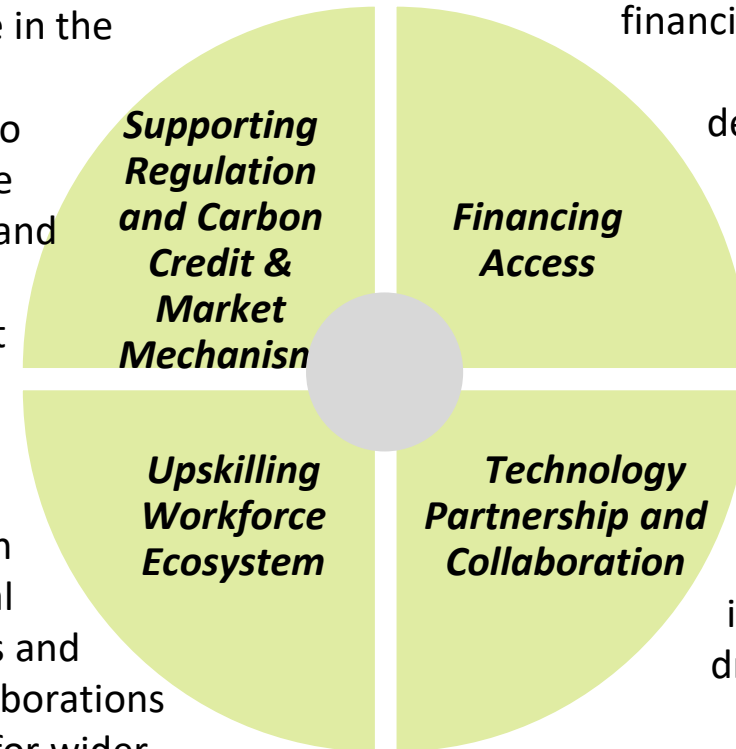
Drivers to support

Policies and incentives to be competitive in the market and regulation to leverage the economics and accelerate deployment

Intra-nation institutional ecosystems and global collaborations incentives for wider upskilling in the public and private sectors

Enhancing global financing mechanism to support decarbonization projects

Partnership to encourage innovation and drive down cost of technology





thank you



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Yours

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