



The 48th

IPA

CONVENTION
& EXHIBITION
14-16 MAY 2024
ICE BSD CITY

**GAINING MOMENTUM TO ADVANCE
SUSTAINABLE ENERGY SECURITY
IN INDONESIA AND THE REGION**

IPAINFOGRAPHIC BOOKLET



Ministry of Energy and Coal of Indonesia



PT PLN (Persero)

Infographic Regarding "IPIP&P for Indonesia's Sustainable Energy Security and Stronger Economy" By Global IPI Institute

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Infographic Regarding "Securing Indonesia's Upstream Investment" By Wood Mackenzie

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GLOBAL CCS
INSTITUTE

Indonesia is well positioned to be a regional leader in Carbon Capture and Storage (CCS), helping the Asia region decarbonise while boosting its domestic industries and economy to achieve Indonesia's net-zero and a net-zero emissions (NZE) future.

To achieve Indonesia's net-zero, growth in heavy-duty industries such as steel and cement is necessary to meet the rising demand for National Strategic Projects. CCS technology is crucial to balancing industry growth with the emission reduction needed to meet NZE targets. Ignoring CCS could cost Indonesia an additional US\$ 1.1 trillion. CCS will also enable the development of new low-emissions industries such as blue hydrogen and bio-ammonia.

With its vast geological storage potential and wealth of oil and gas industry expertise, Indonesia can take advantage of its strategic location to develop CCS hubs and become a regional hub leader. These hubs would attract the growing regional CO₂ market, with neighbours prepared to pay a fee for CO₂ storage.

As the CO₂ market in the region gains momentum, Indonesia must act swiftly and decisively. By accelerating the development of CCS, Indonesia can secure its leadership position and ensure a sustainable future. Indonesia's GDP is projected to increase by approximately US\$ 270 billion, with more than 15,000 jobs per annum created up to 2050 by CCS hubs, benefiting the entire country.

This IPPS infographic outlines the Indonesian government's role in developing CCS hubs in Indonesia, based on recommendations from the IPPS IP-Action Paper. It calls for a collaborative approach between the government and industry to improve the ease of doing business, investor confidence, and stakeholder trust.

With strategic interventions and concerted efforts, Indonesia can navigate the energy transition landscape, achieve net-zero, secure its economic future, and significantly contribute to global emissions reduction goals.



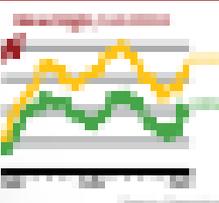
CO₂ emissions are causing global warming

Global temperatures are rising

Temperature is rising most severely in the tropics and the Arctic region



Source: NASA/NOAA



Source: NASA

Sea surface temperatures are rising



Source: National Oceanic and Atmospheric Administration

Business as usual is not enough.

Action needed now to limit warming to 1.5°C



Source: International Energy Agency (IEA)

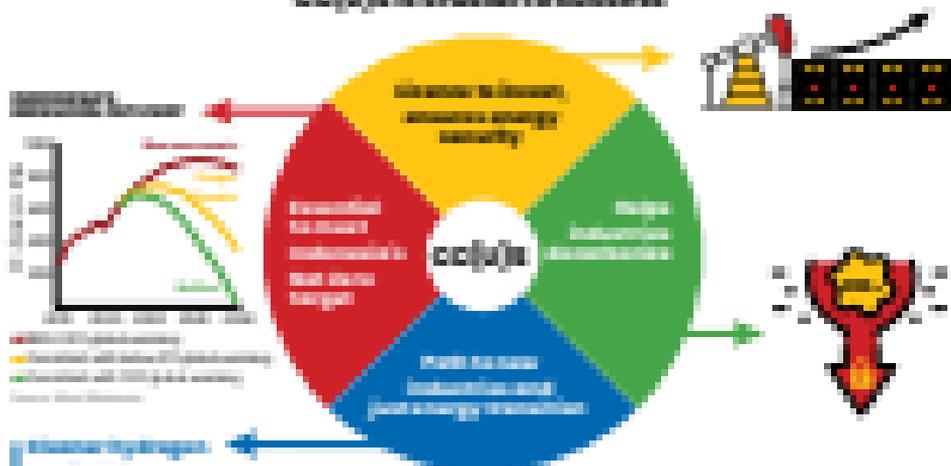
Carbon capture utilization and storage (CCUS) helps industry reduce CO₂ emissions



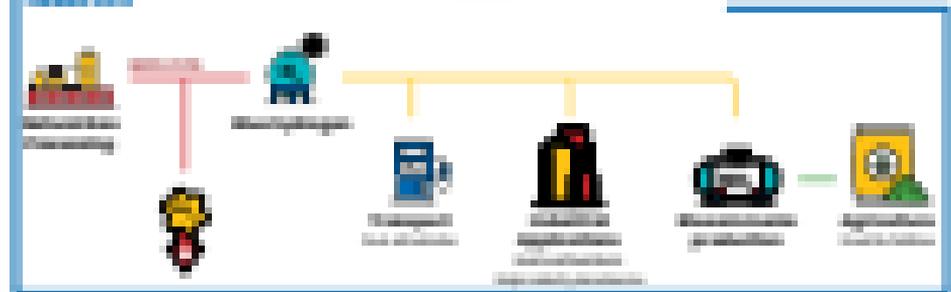
National Strategic Projects (PNS)
driving demand for industry



Indonesia Energy needs four-to-six times industries to grow.
CCU(x) is crucial to success



Blower Hydrogen
ready 2025



Indonesia has abundant CO₂ storage potential to meet domestic requirements and CO₂ flows elsewhere



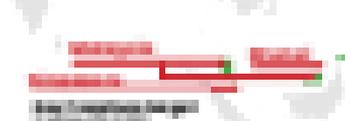
Indonesia has abundant CO₂ storage potential to meet domestic requirements and CO₂ flows elsewhere



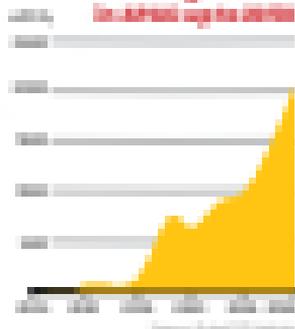
Indonesia has abundant CO₂ storage potential to meet domestic requirements and CO₂ flows elsewhere



Indonesia has abundant CO₂ storage potential to meet domestic requirements and CO₂ flows elsewhere



Potential CO₂ storage market in 2050 up to 2050



Wellness to reduce carbon emissions... Indonesia already developing well-to-well natural gas pipelines



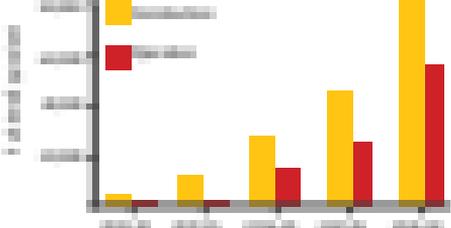
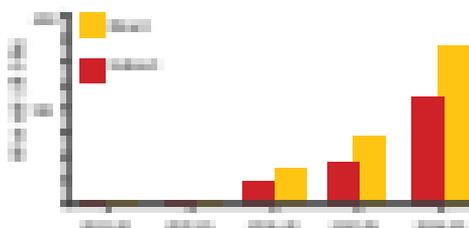
Developing CO₂ projects creates Indonesian jobs and multiplier effect



CO₂ facilities construction jobs



CO₂ facilities service jobs



1 trillion USD investment in CO₂ storage...
 Indonesia is rich in CO₂ storage potential...
 This is the high value capturing...
 Indonesia is rich in CO₂ storage potential...
 Indonesia is rich in CO₂ storage potential...



Investment in CO₂ storage projects

Investment



100% CO₂ storage

Investment



100% CO₂ storage

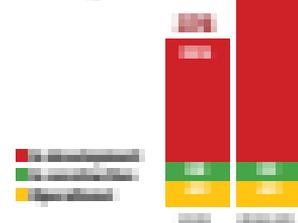
Investment



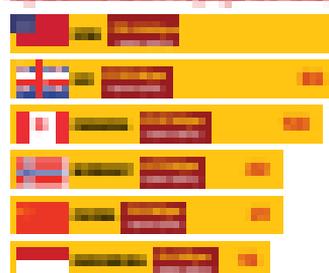
100% CO₂ storage

Global CCS deployment expanding rapidly

2022-2023
Global CCS capacity increasing rapidly



Top countries with CCS projects (2023)

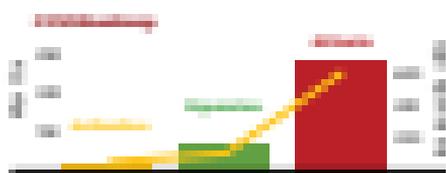


Expected global CCS capacity (2028)



USA

Clear economic benefits from CCS forecast



Source: Global CCS Institute

	2020-2023	2023-2028
Additional gross regional product (GRP) (billions USD)	1	15.5
Additional jobs (billions USD)	100	1,000
Additional tax revenue (billions USD)	100	1,000

Source: Global CCS Institute

*Percentage of jobs of manufacturing sector including gas processing and petrochemicals



China

Massive opportunity through CCS predicted



2025
7.4 billion USD
in investment in
CCS capacity



2027
7.2 billion USD
in investment
in CCS capacity



2025-2027
Additional investment
contributing to
3.7 Gtpa by 2028
(Global CCS Institute)



United Kingdom

East Coast Cluster (ECC) creates long-term benefits



2025
28,000+
jobs (2023-2028)

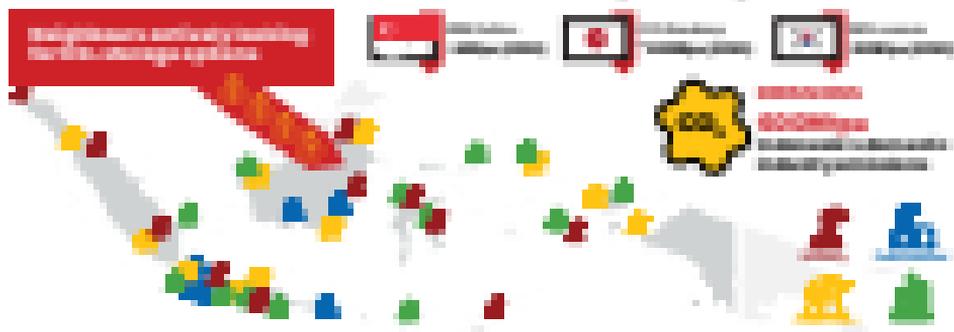


2025-2027
2.8 billion USD+
Additional investment
adding to costs

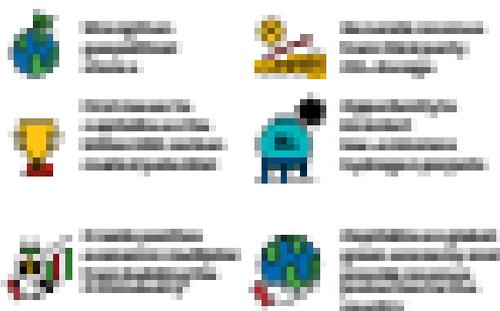


2025-2027
Additional investment
contributing to
adding to costs
by 2028

CCU hubs can boost Indonesia's economy and regional status



CCU hubs can increase Indonesia's local and regional advantage



Indonesia has what it takes

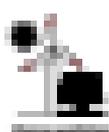


CCU will create multiple impacts for Indonesia

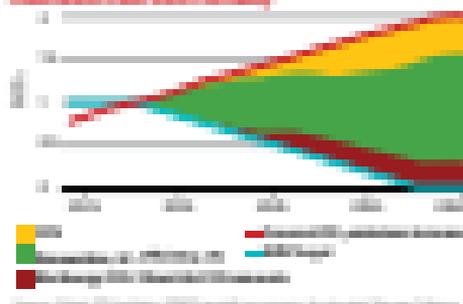


26T CO₂ needs to be removed from atmosphere for Indonesia to reach NZE by 2060*

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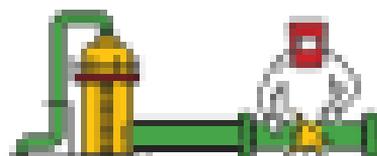


International Assessment



CCl offers cost-effective solutions to industries with limited decarbonization options

CCl offers cost-effective solutions to power and industrial plants

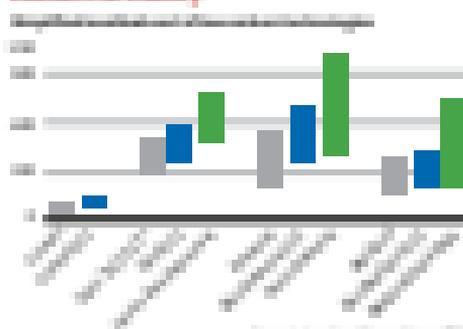


Cost-effective solution for plants (10 years old) can pay money for credits

Enables them to continue operating



CCl is cost-effective compared to other decarbonization technologies in industry

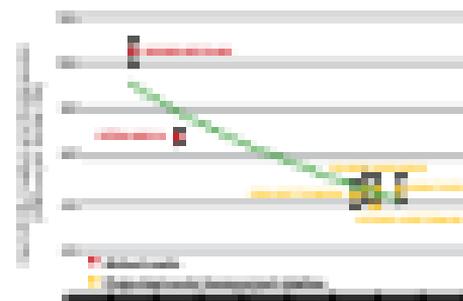


Increased uptake and advancements will further lower cost of CCl

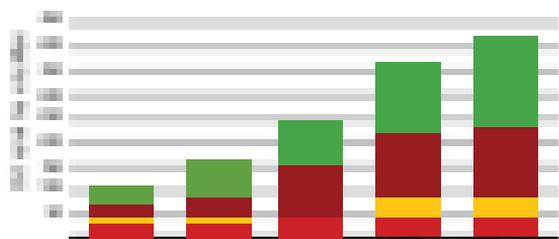
More expected to be built over time, competitive cost level versus natural gas

Investment in first early-stage projects sets pathway for future growth and industrial

Global competitive landscape



Global race to scale up CCS is intensifying



Indonesia's path to regional CCS leadership



Investment in infrastructure, especially in transportation and energy.



Attracting global investment and trade opportunities.

Take advantage of strategic location of island, central region, and status as maritime power to attract global investment and trade opportunities.



Develop attractive business environment and cost of production.

Government and industrial sector together to support areas of transportation, energy, and other infrastructure and investment.

Don't delay

Indonesia's leadership in energy development, trade and infrastructure agreements is key.

Project developer key findings

Government officials, especially in the energy and infrastructure sectors.

Investment opportunities in the energy and infrastructure sectors.

Availability of strategic sites and resources for CCS.

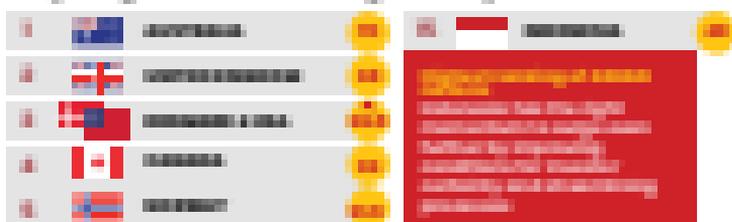
Technology transfer and investment opportunities in CCS.

Early involvement of strategic partners and investors.

Government support and investment opportunities in CCS.

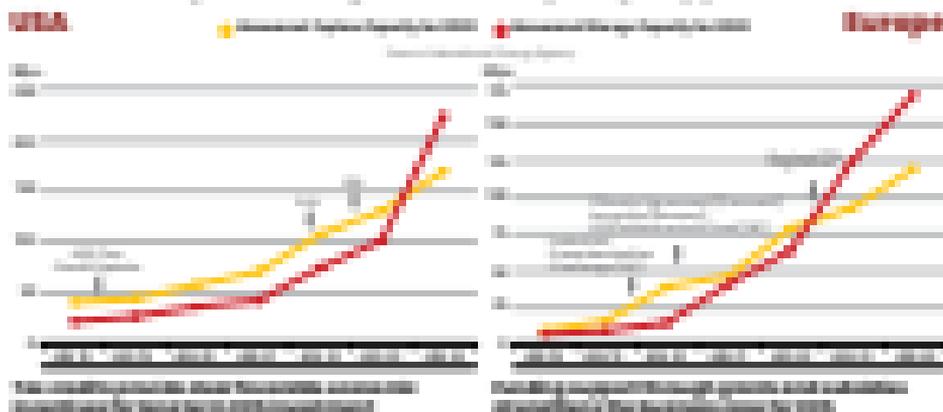
Well established CCS policy and regulations spur growth in CCS globally

The following are the top five countries with established carbon capture systems



Source: Global CCS Index

Investor certainty in USA and Europe is underpinned by proactive government policy support



Investor certainty is galvanized by these governments' best practices and regulations

<p>USA</p> <p>Proactive regulatory framework</p> <p>Carbon capture tax credit</p>	<p>UK</p> <p>Proactive regulatory framework</p> <p>Carbon capture tax credit</p>	<p>Denmark</p> <p>Proactive regulatory framework</p> <p>Carbon capture tax credit</p>	<p>Canada</p> <p>Proactive regulatory framework</p> <p>Carbon capture tax credit</p>
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Leading Asia in scaling-up CCS is one path to achieving net-zero in China

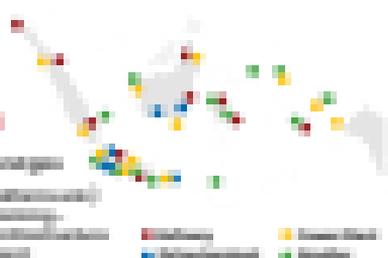
<p>INDUSTRIAL DEVELOPMENT</p> <p>China's industrial sector is the largest in the world, with a high concentration of heavy industry.</p> <p>China's industrial sector is the largest in the world, with a high concentration of heavy industry.</p>	<p>ENERGY AND THE ECONOMY'S GROWTH</p> <p>China's economy is the world's second largest, and it is a major energy consumer.</p> <p>China's economy is the world's second largest, and it is a major energy consumer.</p>	<p>ENERGY SECURITY</p> <p>China's energy security is a major concern, and it is a major energy consumer.</p> <p>China's energy security is a major concern, and it is a major energy consumer.</p>	<p>CLIMATE SAFETY</p> <p>China's climate safety is a major concern, and it is a major energy consumer.</p> <p>China's climate safety is a major concern, and it is a major energy consumer.</p>
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Strong case for CCB hubs development in Indonesia



Indonesia
Needs strategic potential

- Key advantages**
- Large population (275 million)
 - High economic potential
 - Strong government support
 - Government-led infrastructure development



Indonesia can play a key role in helping neighboring countries

	Australia 1.2 Steps	2022-2023
	Japan 1.2 Steps	2022-2023
	South Korea 1.8 Steps	2022-2023
	Singapore 2 Steps	2022-2023

Government should build on significant progress already made to further accelerate Indonesia's CCB hubs development

Top 4 priorities

#1 Develop strategic national implementing programmes

- High government involvement
- High budget priority

#2 Policies for key agencies (inter-agency)

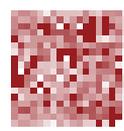
- Inter-agency coordination
- Government priority

#3 Strengthening

- Increase the capacity
- Increase the quality

#4 Internationalisation

- Increase the internationalisation
- Increase the quality



CCB hubs will benefit all Indonesians, and contribute to the global effort to combat global warming



INDONESIA JOB CREATOR

12,000 FTEs in 2025
100,000 FTEs in 2030



INDONESIA SECURITY

- Increase the security
- Increase the quality



INDONESIA INTERNATIONAL



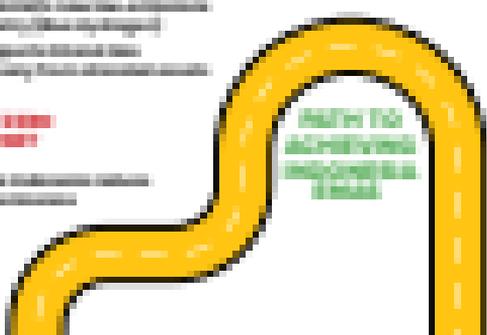
INDONESIA TO INCREASE THE GDP

1,000 BTR in 2025
10,000 BTR in 2030



INDONESIA GROWTH

- Increase the growth
- Increase the quality



PATH TO ACHIEVING INDONESIAN DREAM



coal fuels play a fundamental role in fueling nation development and driving economic growth but anticipated sea level rise and atmospheric concentrations of greenhouse gases will beyond historical levels, resulting in anthropogenic climate change. Indonesia's energy demand is forecast to increase significantly to meet the country's economic development, urbanisation and population growth. To address this growth, Indonesia must focus on increasing domestic energy supply through fueling production, reducing greenhouse gas emissions, and ensure investment that drive development of an efficient domestic supply. These competing goals are known as the energy trilemma.

Indonesia will be increasingly fuel by low-carbon renewable sources; however, the full potential of renewable energy is constrained by advancements in technology. Not as long as coal consumption increases much more slowly than gas, Indonesia will transition to fuel low-carbon domestic energy.

Despite increasing demand, production of oil and gas in Indonesia has not increased. Increasing the share of domestic supply is estimated by IEA to require a doubling of current levels of investment by 2035. In fact, changes are required to make investing in Indonesia oil and gas opportunities more attractive compared to other opportunities in other countries around the world. This can be achieved through enhanced fiscal terms, greater legal certainty, more ease of doing business and incentives that drive R&D investment beyond what a net cost world.

Gas in particular has a crucial role in many parts of Indonesia's economy. It is the backbone for all industrial fertilizer production. It takes under half per day's output industry gas also generates nearly percent of Indonesia's electricity needs. Almost a million households are heated by gas, and government schools (just including away from oil and gas assets) cover a billion dollars.

Gas as a transition fuel source of coal is crucial to reducing greenhouse gas emissions. Current projections suggest a modest increase in potential energy supply from coal than gas, but this still results in coal generating a greater proportion of total energy consumed by 2035. Natural gas produces half the carbon dioxide of coal, much less nitrogen dioxide and far less sulphur. Reducing this gas than coal is a climate and more desirable outcome.

Coal supplies a security demand and Indonesia's world-class gas potential, with the discovery of the two largest deepwater gas discoveries in the world in 2011 – the long North and Spirit gas fields.

However, unless the Indonesia R&D costs collapse, a drastic reduction, today's discovery of amounts of oil and gas production is the face of increasing domestic energy demand will suppress the country's ability to export dependency and will be Indonesia that is not export the oil and gas of natural gas when a drastic investment. It is crucial to R&D investment that produces the more long-term secure discovery. The multi-billion Indonesia's current position as a net gas importer into the future. This would ensure a transition to the energy security, sustainability and affordability needed to power the future Indonesia.



Achieve and sustain energy transition

Energy Indonesia balance between energy security, energy efficiency, and energy sustainability

The energy transition



Fuel Supply Resilience

Oil demand will increase to meet Indonesia's oil production. Demand for coal will increase from oil substitution. Gas production will increase to meet demand for gas in the energy sector.

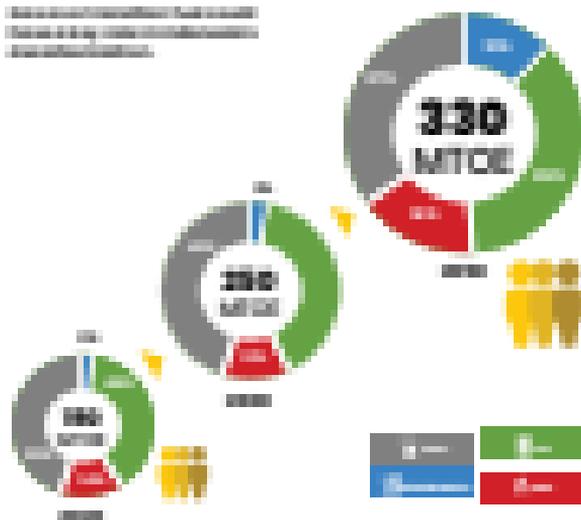


2020 2025 2030

Energy Investment

Indonesia's energy needs will grow by 70% over the next 10 years. Increasing energy supply will grow by only 30% but sustaining 50% of electricity.

Investment in Indonesia's energy sector will reach \$100 billion by 2030.



Indonesia must remain globally competitive to attract investment

To attract production-based investment, government is targeting to reduce fiscal costs per unit production to below 10% by 2030.



Source: MIGA

Improving Indonesia's E&P attractiveness

Enhanced Fiscal Terms

- Stability in investment incentives and tax regimes (Corporate Income Tax, etc.)
- Streamlined investment regulations



Regulatory

- Streamlined government policy and regulatory framework ("one-stop shop")
- Streamlined contract terms
- Streamlined regulatory and policy framework
- Streamlined regulatory and policy framework
- Streamlined regulatory and policy framework

Cost of doing business

- Streamlined regulatory and policy framework



Non-physical investments

- Streamlined regulatory and policy framework
- Streamlined regulatory and policy framework
- Streamlined regulatory and policy framework



Many years and ongoing risks loomed for Indonesia's economy

- High dependence on fossil fuels**
- High energy demand**
- High volatility of fossil fuel commodity prices**
- High volatility of global economic conditions**
- High fiscal dependence on fossil fuel exports**

Indonesia relies on one main resource that underpins its energy related activities with a serious risk to its regional growth



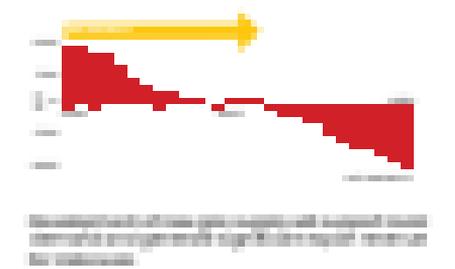
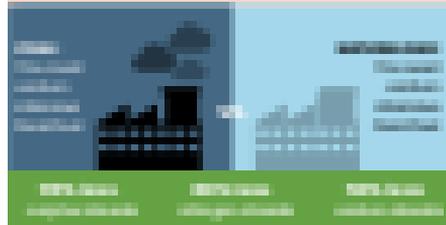
Indonesia holds significant potential for gas and investments in oil and gas exploration were the largest investor that globally ranked

Top 10 International Investors (2019)

- USA** 20.5% (Investment)
- UK** 15.0% (Investment)
- UK** 12.2% (Investment)
- USA** 10.0% (Investment)
- UK** 8.0% (Investment)
- UK** 7.0% (Investment)

Investment in the sector required to increase Indonesia's production and gas exports will rise to over \$100 billion by 2030

How to build out of renewables presents an opportunity for gas as it can be used as a transition fuel while reducing emissions to zero





The **IPA**
CONVERTER
& EQUATIONS
14.03.2023

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