



Direktorat Jenderal Mineral dan Batubara
Kementerian Energi dan Sumber Daya Mineral



#MINERBA
#UNTUK
KESEJAHTERAAN
RAKYAT

Energy Security in Indonesia- Supply & Demand Trends and Outlook

Presented for “Energy Security with Decarbonization Symposium 2024”

Directorate of Mineral and Coal Program Development
Directorate General of Mineral and Coal

3 September 2024



humasminerba



Direktorat Jenderal
Mineral dan Batubara



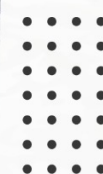
ditjenminerba



minerba.esdm.go.id



Ditjen Minerba TV



TOPIC

- 1 The Role of Coal in Energy Economy and Society**
- 2 Energy Transition and Energy Mix Achievements**

1. The Role of Coal in Energy Economy and Society



CURRENT CONDITION

significant potential of renewable energy (RE) sources, utilization remains relatively low

ENERGI	POTENSI (GW)	PEMANFAATAN (MW)
SURYA	3.294	317,0
HIDRO	95	6.696,1
BIOENERGI	57	3.104,6
BAYU	155	154,3
PANAS BUMI	23	2.373,1
LAUT	63	0
BATUBARA TERGASKAN		30
TOTAL	3.687	12.675

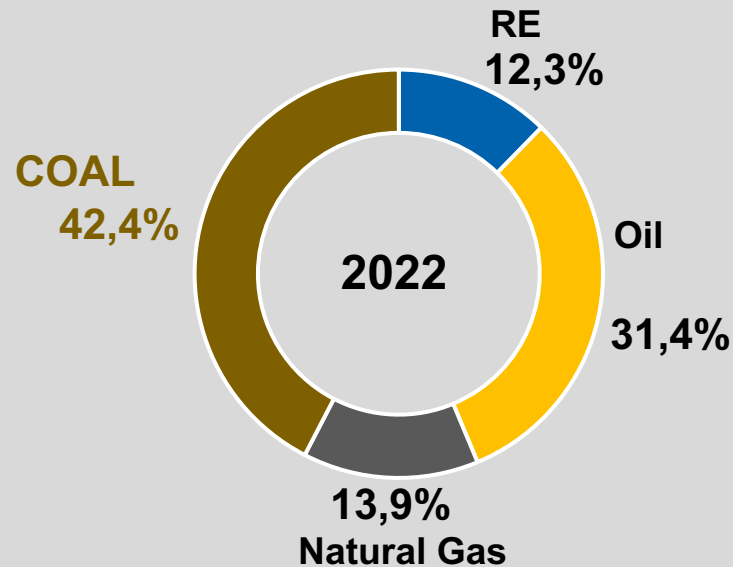
Sumber : Ditjen EBTKE, 2023

Ket: *) Realisasi Mei 2023

Potensi Nuklir: Uranium 89.483 ton - Thorium 143.234 ton

- It has utilized 0.3% of the total potential, making the opportunities for renewable energy (RE) development wide open, especially supported by environmental issues, climate change, and the increase in per capita electricity consumption..
- In addition to renewable energy, the existing potential of new energy sources is still underdeveloped.

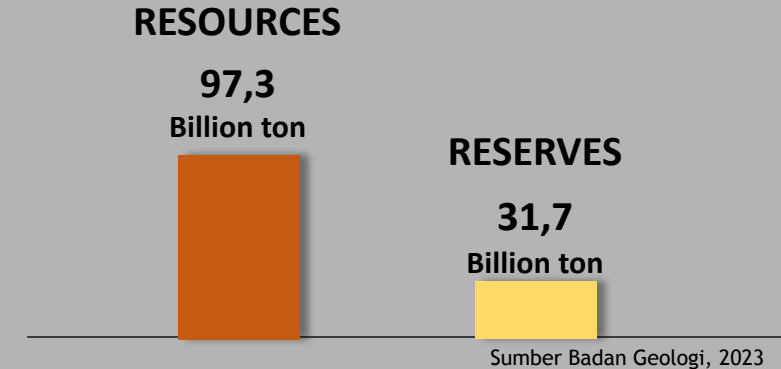
primary energy mix is still dominated by fossil fuels



Sumber : DEN, 2023

- Coal still dominates the national energy utilization sector.
- The use of RE as an environmentally friendly energy source is still low.
- The role of coal needs to be adjusted in relation to future coal usage strategies to support carbon emission reductions.

Coal reserves are plentiful

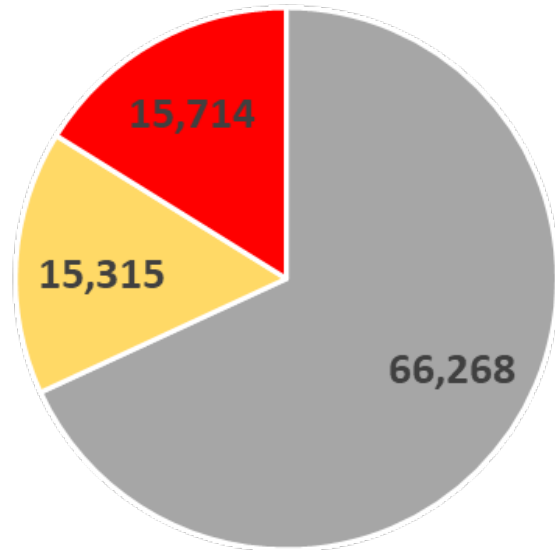


Remaining Coal Reserve Life: 60 years (production rate: 600 million tons/year))

- Coal remains the main energy source in Indonesia for the next 10 to 20 years, given that Indonesia's coal resources and reserves are still quite abundant.
- Coal is considered a relatively cheap and affordable energy source compared to other energy sources.

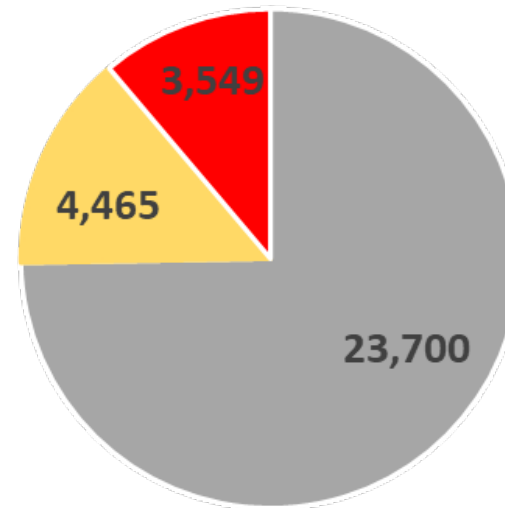
COAL RESOURCES AND RESERVES

TOTAL SUMBERDAYA



97,3 Milyar Ton

TOTAL CADANGAN



31,7 Milyar Ton

KALORI (gar)

Tinggi
> 5.200

Sedang
4.200-5.200

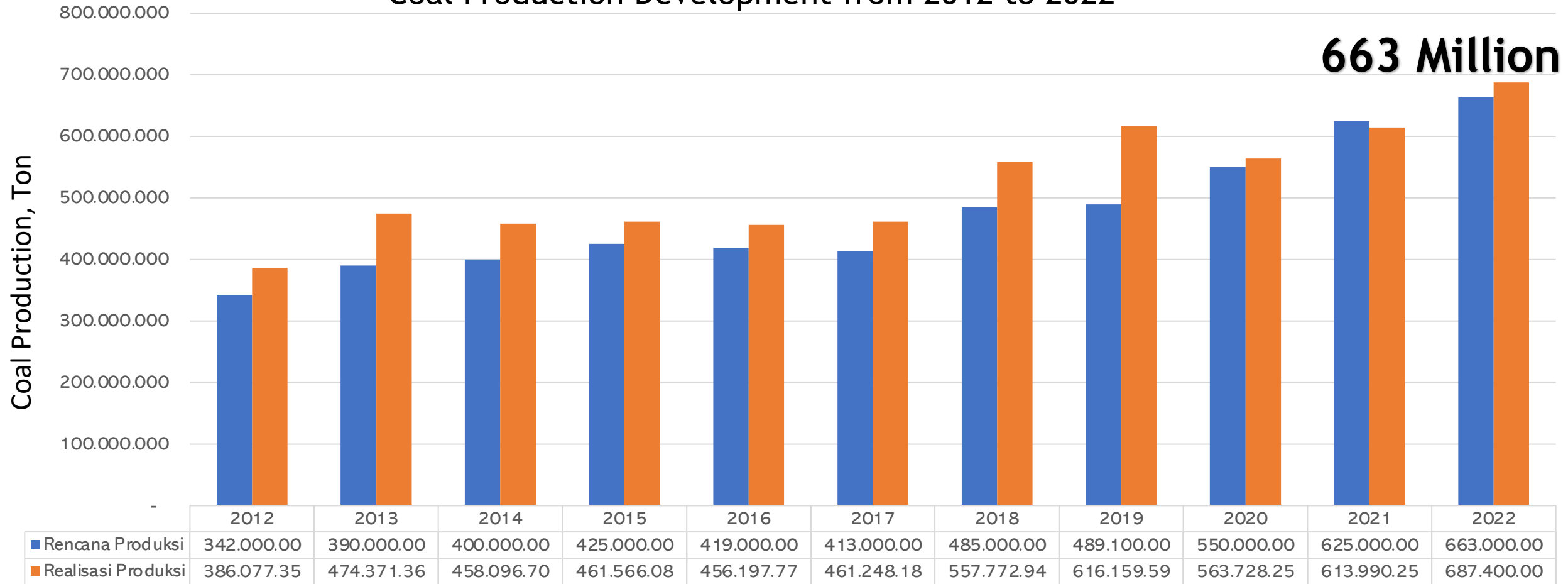
Rendah
< 4.200

Sumber Data: Badan Geologi 2023 (rilis 2024, diolah)

"Significant contribution to Indonesia's energy landscape through abundant coal resources and reserves. In 2023, Indonesia's total coal resources amounted to 97.3 billion tons, and reserves reached 31.7 billion tons with diverse caloric values."

COAL PRODUCTION

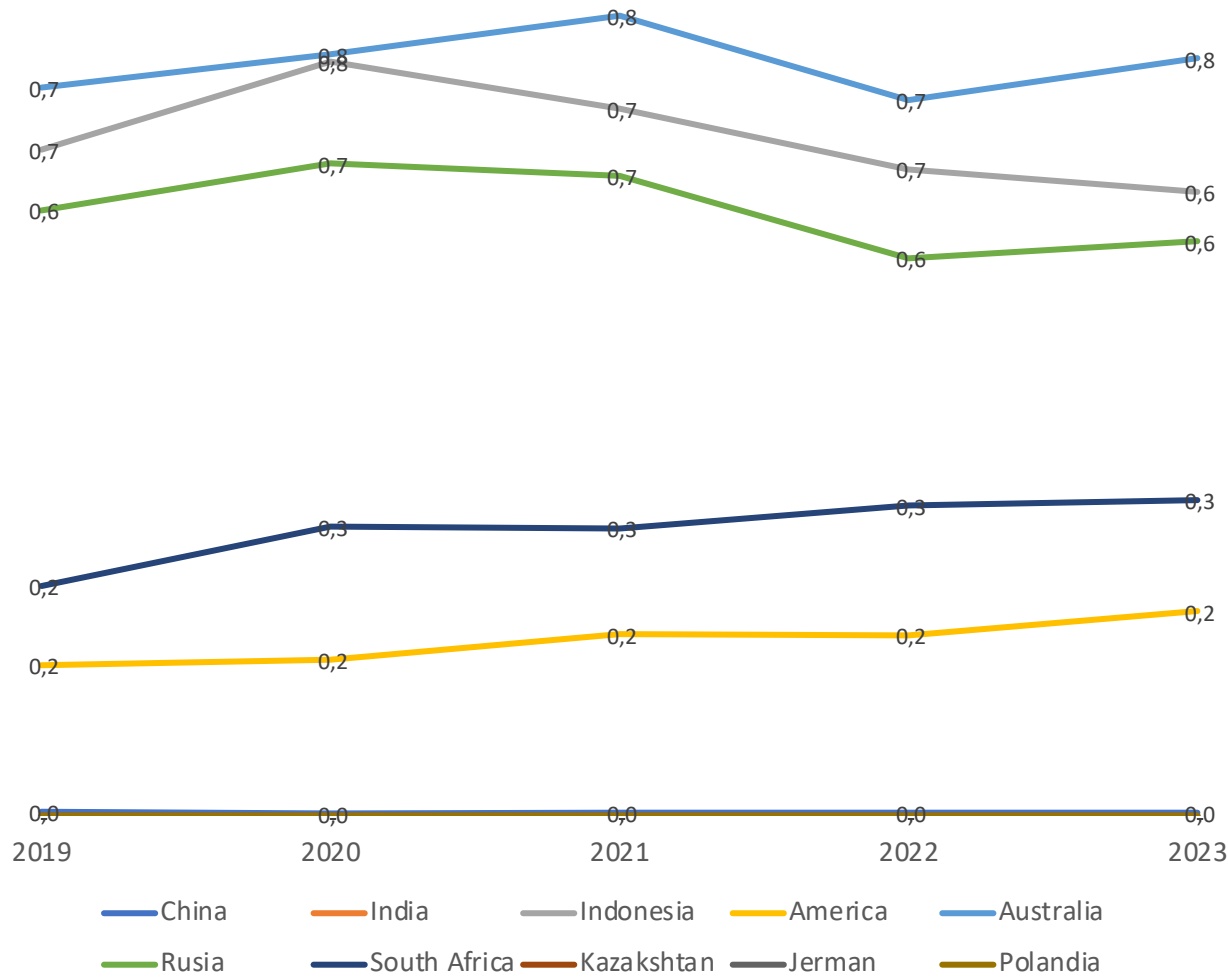
Coal Production Development from 2012 to 2022



Sumber: Handbook of Energy & Economis Statistic of Indonesia, 2021; Buku Saku ESDM, 2022



Export-to-Production Ratio of Global Coal Producing Countries



1. The highest coal export-to-production ratios are held by Australia, Indonesia, and Russia. In other words, the higher the export ratio, the more coal is exported compared to what is utilized domestically.
2. Meanwhile, the lowest ratios are in China, India, Germany, and Poland. These countries use all their production to meet domestic needs.
3. The ratio between exports and domestic use for Indonesia is 0.6 and has relatively decreased since 2020, indicating that coal mining businesses tend to prioritize the domestic market.
4. So far, coal remains a cheap energy source, and renewable energy (RE) has not been able to meet domestic energy needs. The intermittent nature of RE and its high cost are challenges. If coal production control is not implemented, energy will become scarce and very expensive in the future.

Sumber Data : Statistical of World Energy, 2024 (diolah)

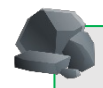


ECONOMIC AND SOCIAL IMPACT OF COAL



Supporting the national economy

- Royalties: IDR 99.47 trillion
- Non-Tax State Revenue (PNBP): IDR 99.82 trillion (Year 2023).
- Revenue from coal exports is also an important source of foreign exchange for the country (Indonesia is the world's largest coal exporter).



Coal reserves are abundant, totaling 31.7 billion tons (in 2023), which is sufficient to meet energy needs that continue to increase with economic growth.



Energy Supply Reliability:

- A source of energy that can be relied upon (abundant availability, relatively cheap, and stable) compared to other sources.

Energy Security:

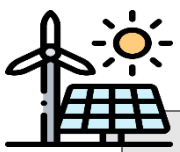
- Utilizing domestic coal resources, thereby reducing dependence on energy imports and increasing national energy security.



Increased community welfare

- With the community empowerment program (PPM) in 2023 amounting to IDR 252 trillion and creating **333 thousand jobs**.

*Gabungan data mineral dan batubara



RE (Renewable Energy) Condition

- Renewable energy sources are not yet optimal. The realization of EBT only reached 12.5% of the National Long Term Plan target of 17.9% by 2023.
- The intermittent nature of RE presents challenges for renewable energy power plants, where the frequency and voltage always fluctuate, and the system's frequency depends on the conditions of the energy source. However, the industry requires reliable electricity, especially energy availability for the industrial sector.

Negative Impact?



Environmental Damage (Land, Waste, GHG Emissions).

2. Energy Transition and Energy Mix Achievements



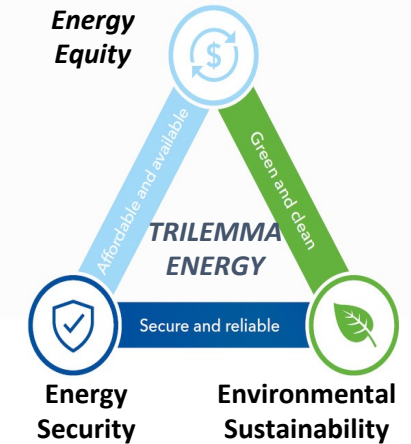
ENERGY TRANSITION AND NATIONAL ENERGY SECURITY

Global commitment to keep global temperature rise below 2°C, and strive to limit it to 1.5°C ~ as a result of COP 26 and G20 2021.



Energy transition for energy security:

•The energy transition towards EBT (renewable energy) is an effort to ensure energy availability that prioritizes environmental protection and sustainability at an affordable price in the long term.



G20 Presidency
"Recover Together,
Recover Stronger"

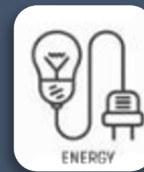
Focus of Indonesia's G20 Presidency is on 3 main issues (pillars):

1. Inclusive global health
2. Digital-based economic transformation
3. Sustainable energy transition



Indonesia continues to take concrete steps to reduce GHG emissions through the Enhanced NDC 2030 with an increase in the energy sector's target to 358 million tons of CO₂e (31.89%) with its own capabilities and 43.20% with international support.

Transisi Energi Menuju Pemulihan dan Produktivitas Berkelanjutan: Memperkuat Sistem Energi Bersih Global dan Transisi yang Adil melalui:



Ketahanan **Aksesibilitas** Energi

Mengejar kemajuan aksesibilitas ('tidak meninggalkan siapapun') menuju energi yang terjangkau, andal, berkelanjutan, dan modern untuk semua, khususnya *untuk clean cooking & elektrifikasi*.



Peningkatan **Teknologi** Energi Cerdas & Bersih

Memperluas teknologi untuk mengantisipasi tantangan transisi energi di masa depan

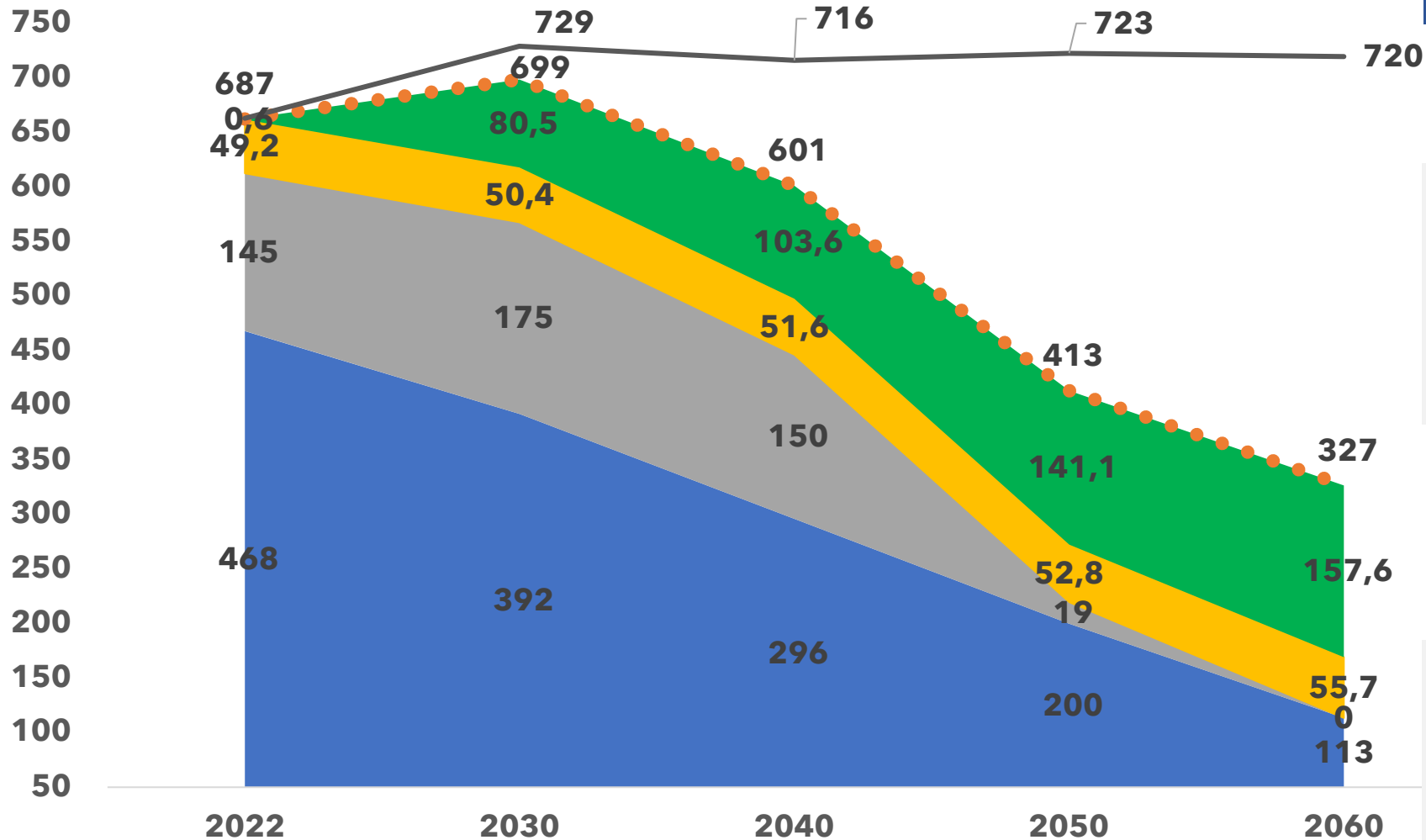


Memajukan **Pembiayaan** Energi

Memastikan ekosistem pembiayaan hijau dalam transisi energi melalui kajian best practices, mengidentifikasi tantangan, dan mengurangi disparitas pembiayaan.

COAL PRODUCTION SCENARIO NZE

Production, Export, and Domestic (NZE Scenario)



Strategies

Upstream

- Reduction of Production in line with the PLTU Coal Demand
- Use of Biofuels (B20 & B30) as a replacement for fossil fuels
- Reclamation of ex mining area

Downstream

- Cofiring Biomass
- Clean Coal Technologies (CCS/CCUS & IGCC) at PLTU and Coal Processing Industries
- Standardization

Ekspor Kelistrikan Non Kelistrikan PNT Produksi Skenario BaU

Downstream Sector Emission Reduction Programs

Optimalisasi pengembangan Industri Hilirisasi Batubara yang terintegrasi dengan Teknologi Batubara Bersih

PROGRAM PENGEMBANGAN DAN PEMANFAATAN BATUBARA

TIMELINE

Kajian Kelayakan – Penyiapan Pembangunan
Pembangunan – Penerapan Teknologi

No	Teknologi Hilirisasi	Produk Hilirisasi	2021 - 2030												2031 - 2040				2041 - 2045				
			2022	2024	2026	2028	2030	2032	2034	2036	2038	2040	2041	2042	2043	2044	2045						
PENGEMBANGAN	1	Coal Gasifikasi	Methanol & DME	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	2		SNG, Ammonia, Hidrogen, Olefin	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	3	Coal Liquefaction	Gasoline dan Solar	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	4	Coal Briquette	Briket batubara-Biomassa dan Briket Terkarbonisasi	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	5	Cokes Making	Batubara metalurgi	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	6	Coal Upgrading	Batubara untuk kelistrikan dan industri	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	7	Esktraksi Batubara	Material Maju dan LTJ	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	8		Asam Humat dan Asam Fulvat	[Timeline bars]												[Timeline bars]				[Timeline bars]			
PEMANFAATAN	9	Blending Facility; Cofiring Biomassa; dan Penerapan IGCC	Kelistrikan dan Penerapan CCT pada pembangkit	[Timeline bars]												[Timeline bars]				[Timeline bars]			
	10	Penerapan CCS/CCUS Fasilitas Pengembangan & Pemanfaatan Batubara	Penurunan Emisi CO2	Masa Kajian Kelayakan												[Timeline bars]				[Timeline bars]			

Status of Coal Downstream up to 2030

No	Perusahaan Tambang Batubara		Kegiatan PNT	Kapasitas Input Batubara	Kapasitas Produk PNT	Rencana Produksi	Lokasi	Keterangan
1	PT. Bukit Asam	IUP BUMN	Gasifikasi "Coal to DME"	6 juta ton/tahun	DME 1.4 juta ton/tahun	2026/2027 (TBA)	Sumatera Selatan	- Penyelesaian peraturan dukungan pelaksana proyek (Rperpres DME) - Menyiapkan mitra baru kerjasama proyek
2	PT. Kaltim Prima Coal	PKP2B*	Gasifikasi (kerjasama proyek) "Coal to Methanol"	6.5 juta ton/tahun	Methanol 1.8 juta ton/tahun	Q2 - 2025 (TBA)	Kalimantan Timur	- Memastikan kembali skema bisnis & mitra kerjasama proyek
	PT. Kaltim Nusantara Coal	IUP						
3	PT. Arutmin Indonesia	PKP2B*	Gasifikasi "Coal to Methanol"	6 juta ton/tahun	Methanol 2.95 juta ton/tahun	2026	Kalimantan Selatan	Penyelesaian FS, Penyusunan AMDAL
4	PT. Kendilo Coal Indonesia	PKP2B*	Gasifikasi "Coal to Methanol"	675 ribu ton/tahun	Methanol 300 ribu ton/tahun	2029	Kalimantan Timur	Penyusunan dokumen FS
5	PT. Multi Harapan Utama	PKP2B*	Semi Kokas	1 juta ton/tahun	Semi Kokas 500 ribu ton / tahun	2027	Kalimantan Timur	Penyusunan dokumen FS
6	PT. Adaro Indonesia	PKP2B*	"Coal to Methanol/DME"	6.75 juta ton/tahun	DME 1.34 juta ton/tahun	Est. 2026	Kalimantan Selatan	Sudah menyampaikan dokumen rencana hilirisasi (Pra-FS)
7	PT. Kideco Jaya Agung	PKP2B*	Gasifikasi/UCG	623 ribu ton/tahun	Ammonia 100rb ton/tahun, Urea 172.00 ton/tahun	Est. 2027	Kalimantan Timur	Penyusunan dokumen FS
8	PT. Berau Coal	PKP2B*	Rencana Gasifikasi "Coal to Methanol/DME"	n/a	n/a	Est. 2029	Kalimantan Timur	Penyiapan rencana hilirisasi batubara
9	PT Megah Energi Khatulistiwa	IUP	Semi Kokas	1 juta ton/tahun	Semi Kokas 500 ribu ton / tahun	Sudah produksi	Kalimantan Utara	Sudah berproduksi tapi belum optimal
10	PT Thriveni	IUP	Coal Upgrading-Briqueting	130 ribu ton/tahun	Briket 79 - 85 ribu ton / tahun	Sudah produksi	Sumsel	Sudah berproduksi tapi belum optimal
11	PT Bukit Asam	IUP BUMN	Coal Briqueting	30-40 ribu ton/tahun	Briket 10-20 ribu ton / tahun	Sudah produksi	Sumsel	Sudah berproduksi tapi belum optimal

- Optimization of CFPP/PLTU through the application of Clean Coal Technology; Carbon Capture, Utilization & Storage (CCUS) & IGCC.
- Optimization of coal utilization through coal downstreaming that is integrated with clean coal technology facilities (CCS and CCUS).



CLOSING

Law No. 3 of 2020 on Mineral and Coal Mining has become a milestone for improving environmentally friendly mining governance, supporting investment, and prioritizing national interests, including preparing for energy transformation.

The priority of coal is to meet domestic needs as a source of energy and raw material for national industries.

To anticipate the impact of climate change, coal can be optimized through technological innovations to replace existing power plants with Baseload EBT plants such as through Biomass Cofiring. Additionally, this is also done through the application of Clean Coal Technology innovations, including the use of IGCC and CCS/CCUS.

Energy transition can have both positive and negative impacts on social and economic aspects. It is important for the government to manage the transition's impact to ensure a just transition process in Indonesia.

Currently, the government is still focused on preparing steps to plan and manage this energy transition, including setting strategies so that this transition can provide opportunities for the economy with the principles of equity and affordability.

THANK YOU

www.esdm.go.id

Untuk update berita dan informasi sektor ESDM

Ikuti kami di akun media sosial:

 Kementerian Energi dan
Sumber Daya Mineral

 @kesdm

 @KementerianESDM

 KementerianESDM

