

## 10 Standar Lingkungan dalam AGS 10 Environment Standards in AGS



### PENGELOLAAN ENERGI [103-1] [103-2] [103-3]

Sebagai Perusahaan yang mengelola kegiatan hulu hingga hilir, ANTAM menggunakan energi untuk melakukan pengolahan dan pemurnian mineral. Perusahaan senantiasa memperhatikan aspek ini karena Energi merupakan salah satu Tujuan dalam SDGs. Energi juga merupakan salah satu dari enam indikator yang diperhatikan dalam penilaian PROPER Kementerian Lingkungan Hidup dan Kehutanan (KLHK).

Berdasarkan hal tersebut, ANTAM berkomitmen untuk menggunakan energi secara efisien. Perusahaan melakukan konservasi energi dengan melakukan inovasi pada proses produksi. Dalam komitmen efisiensi energi, ANTAM melanjutkan inisiatif substitusi bahan bakar, melakukan modifikasi pada peralatan tambang bawah tanah, dan sebagainya. Selain itu, pemantauan penggunaan energi juga dilakukan sebagai bentuk perhatian Kami pada aspek energi.

Kebijakan efisiensi energi ANTAM memberikan panduan bagi Insan ANTAM untuk mematuhi peraturan pemerintah terkait efisiensi energi, menurunkan capaian intensitas konsumsi energi spesifik dari tahun sebelumnya, meningkatkan capaian rasio efisiensi energi dari pencapaian sebelumnya, menerapkan teknologi tepat guna dan ramah lingkungan untuk menurunkan konsumsi energi; serta menerapkan sistem pemantauan dan evaluasi berkelanjutan.

Penggunaan energi yang dicantumkan dalam laporan ini mencakup kegiatan operasi ANTAM di unit bisnis dan kontraktor serta mitra usaha. Pada tahun 2020, total penggunaan energi ANTAM tercatat sebesar 11.937.877 GJ untuk seluruh unit bisnis atau meningkat jika dibandingkan dengan tahun 2019 yang tercatat sebesar 10.654.322 GJ.

### ENERGY MANAGEMENT [103-1] [103-2] [103-3]

As a company that manages upstream to downstream activities, ANTAM uses Energy to process and refine minerals. The Company recognizes this aspect because Energy is one of the Goals in the SDGs. Energy is also one of the six indicators considered in the PROPER assessment of the Ministry of Environment and Forestry (KLHK). Based on this, ANTAM is committed to using energy efficiently. The Company conserves Energy while administering an optimal production process.

ANTAM is committed to using energy efficiently. The Company conserves energy by performing various production processes and attempts to run an optimal production process. Those innovations were completed with a fuel substitution initiative, modifications in underground mining operations, etc. Also, energy usage monitoring is conducted as Our concern to the energy aspect.

ANTAM's energy efficiency policy guides ANTAM Employee to comply with government regulations related to energy efficiency, reduce the achievement of specific energy consumption intensity from the previous year, increase the achievement of energy efficiency ratios of earlier achievements, apply appropriate and environmentally friendly technology to reduce energy consumption; as well as implementing a continuous monitoring and evaluation system.

This report's energy usage covers ANTAM's operations in Business Units and contractors and business partners. In 2020, ANTAM's total energy use was recorded at 11,937,877 GJ for all business units or an increase compared to 2019, recorded at 10,654,322 GJ.



Pada 2020, total penggunaan energi ANTAM tercatat sebesar 11,93 juta GJ, lebih tinggi dibandingkan 2019 sebesar 10,65 juta GJ. Secara umum kenaikan konsumsi energi ANTAM terjadi di UBP Nikel Sulawesi Tenggara karena peningkatan penggunaan batu bara dan konsumsi solar serta listrik di UBP Bauksit Kalimantan Barat. Meskipun demikian ANTAM berupaya menurunkan pemakaian sumber energi lainnya yakni *marine fuel oil* dan bensin di beberapa Unit Bisnis.

# 11,93

juta GJ | million GJ

In 2020, ANTAM's total energy usage was recorded at 11.93 million GJ, higher than 2019's 10.65 million GJ. The increase occurred at the Southeast Sulawesi Nickel Mining Business Unit due to the higher coal and diesel consumption and electricity usage in the West Kalimantan Bauxite Mining Business Unit. However, ANTAM is attempting to reduce other energy sources, namely marine fuel oil and gasoline, in several business units.

### Total Konsumsi Energi Berdasarkan Unit Bisnis dan Sumber Energi [302-1] Total Energy Consumption by Business Unit and Source [302-1]

Unit Bisnis Business Unit	Sumber Energi Energy Source	Satuan Unit	Periode   Period					
			2018		2019		2020	
			Volume	GJ	Volume	GJ	Volume	GJ
UBP Nikel Sulawesi Tenggara Southeast Sulawesi Nickel Mining Business Unit	Marine Fuel Oil (MFO)	Liter	136.777.617	5.249.525	149.872.395	5.752.103	131.303.059	5.039.411
	Industrial Diesel Oil (IDO)	Liter	5.941.778	222.282	5.163.754	193.176	5.369.023	200.855
	Batu Bara   Coal	Kg	272.317.085	5.146.806	221.880.000	4.193.550	328.457.939	6.207.855
	Solar   Diesel		554.874	20.758	612.105	22.899	473.516	17.714
	Bensin   Fuel	Liter	280.450	9.415	302.520	10.156	220.854	7.414
UBP Nikel Maluku Utara North Maluku Nickel Mining Business Unit	Bensin   Fuel	Liter	438.022	16.934	364.145	14.078	378.584	12.493
UBP Emas Gold Mining Business Unit	Solar   Diesel	Liter	3.599.477	133.037	3.788.978	140.041	3.423.176	126.658
	Listrik (PLN)   Supplied Electricity	KWh	62.399.184	225.655	56.560.419	203.618	55.540.000	199.944
	Listrik (PLTD)   Diesel Power Plant	KWh	321.400	3.017	264.140	3.054	124.400	1.498
	HSD (Transportasi Operasi)   Operational Transportation	Liter	113.289	4.238	94.093	3.520	82.175	3.074
	HSD (Operasi Alat Berat)   Heavy Machineries Operations	Liter	437.690	16.374	456.526	17.079	400.933	14.999
UBPP Logam Mulia Precious Metals Processing and Refinery Business Unit	HSD (Pabrik)   Plant	Liter	533.191	19.947	467.006	17.471	448.518	16.779
	Listrik (PLN)   Supplied Electricity	KWH	2.809.720	10.115	2.831.760	10.194	2.847.750	11.391
	Gas Alam   Natural Gas	m <sup>3</sup>	266.893	10.142*	202.708	7.703*	214.353	8.145
	Solar   Diesel	Liter	3.200	120	3.400	128	5.600	201,6
	Solar   Diesel	Liter	1.440.095	55.674	1.327.195	53.350,2	1.557.252	56.061,07
UBP Bauksit Kalimantan Barat West Kalimantan Bauxite Mining Business Unit	Bensin   Fuel	Liter	-	0	0	0	0	0
	Listrik (PLTD+BTG ICA)   Electricity	KWh	2.117.099	7.622	3.050.718	12.202	3.345.800	13.383
	<b>Total</b>			<b>11.151.661*</b>		<b>10.654.322*</b>		<b>11.937.877</b>

#### Catatan | Notes:

- Faktor konversi menggunakan standar IPCC (UNEP) 2006, GHG Protocol (WBCSD, WRI). ISO 14064
- Pengukuran konsumsi energi listrik dilaksanakan di seluruh Unit Bisnis mengacu pada ketentuan standar PROPER dari Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia.
- The conversion factor uses the 2006 IPCC (UNEP) standard, GHG Protocol (WBCSD, WRI). ISO 14064
- Measurement of electrical energy consumption is carried out in all Business Units according to the PROPER standard provisions of the Ministry of Environment and Forestry of the Republic of Indonesia.
- o Faktor konversi | Conversion factor:
  - 1 KWH = 0,004 GJ | 1 KWH = 0.004 GJ
  - 1 m<sup>3</sup> Gas Alam = 0,038 GJ\* | 1 m<sup>3</sup> Natural Gas = 0.038 GJ\*
  - 1 liter High Speed Diesel = 0,036 GJ | 1 liter of High Speed Diesel = 0.036 GJ
  - 1 liter Bensin = 0,033 GJ | 1 liter of gasoline = 0.033 GJ
  - 1 liter Marine Fuel Oil = 0,038 GJ | 1 liter of Marine Fuel Oil = 0.038 GJ
  - 1 liter Industril Diesel Oil = 0,037 GJ | 1 liter of Industry Diesel Oil = 0.037 GJ
  - 1 kg Batu Bara = 0,019 GJ | 1 kg of coal = 0.019 GJ
- \* Restatement dari laporan sebelumnya | Restatement from previous report

## Memanfaatkan *Marine Fuel Oil Sludge* untuk Substitusi Bahan Bakar Batu Bara Utilizing Marine Fuel Oil Sludge for Coal Fuel Substitution

Pada tahun 2020, ANTAM melanjutkan inisiatif substitusi sebagian bahan bakar batu bara dengan memanfaatkan *Marine Fuel Oil sludge* (MFO) di UBP Nikel Sulawesi Tenggara. ANTAM mengoperasikan Pembangkit Listrik Tenaga Diesel (PLTD) dan Pembangkit Listrik Tenaga Uap (PLTU) sebagai sumber energi pabrik feronikel. MFO *sludge* digunakan sebagai bahan bakar dan memiliki kapasitas 8x17 MW dan digunakan ANTAM untuk memasok listrik *furnace*.

MFO adalah salah satu jenis *Heavy Fuel Oil* (HFO) yang merupakan hasil bawah (residu) dari distilasi minyak mentah. MFO perlu *treatment* pemisahan kandungan lumpur, kotoran padat, dan air mengingat tingkat kekentalannya yang lebih tinggi dibandingkan HSD (*High Sulfur Diesel*). *Treatment* tersebut dilakukan sebelum digunakan dalam sistem pembangkit dan dilakukan pemanasan untuk menurunkan kekentalannya. Hasil pemisahan inilah yang disebut dengan *sludge*.

*Sludge* MFO memiliki nilai kalor tinggi mencapai 34 MJ/kg sehingga ANTAM memanfaatkannya di *Rotary Kiln* sebagai substitusi bahan bakar tanpa diperlukan izin pemanfaatan LB3 sesuai Risalah Pengolahan Data KLHK No. RPD-146/PSLB3-VPLB3/2018 tanggal 16 November 2018.

Selama tahun 2020, ANTAM telah memanfaatkan 1,48 juta liter *sludge* MFO sebagai substitusi bahan bakar di *Rotary Kiln*. Volume *sludge* tersebut setara dengan sekitar 44 ribu GJ. Dari substitusi ini diperoleh penghematan penggunaan batu bara sebesar 1.490 ton dan diperoleh penghematan sebesar Rp1,2 miliar.

In 2020, ANTAM continued to coal fuel substitution initiative by utilizing Marine Fuel Oil sludge (MFO) at the Southeast Sulawesi Nickel Mining Business Unit. ANTAM operates a Diesel Power Plant (PLTD) and a Coal-Fired Power Plant (PLTU) as energy sources for the ferronickel plant. MFO sludge applied as fuel with a capacity of 8x17 MW, and is used to supply furnace electricity.

MFO is a type of Heavy Fuel Oil (HFO) that is the base product (residue) of crude oil distillation. MFO needs separation treatment for the content of sludge, solid dirt, and water considering its viscosity level is higher than HSD (High Sulfur Diesel). The treatment handled before it is used in the generator system and is heated to reduce its thickness. The result of this separation is known as sludge.

MFO sludge has a high calorific value of 34 MJ/kg which suitable for Rotary Kiln as a fuel substitute without requiring a permit to utilize LB3 according to the Ministry of Environment and Forestry Data Processing Treatise No. RPD-146/PSLB3-VPLB3/2018 dated 16 November 2018.

During 2020, ANTAM has utilized 1.48 million liters of MFO sludge as a substitute for fuel in the Rotary Kiln. The sludge volume is equivalent to around 44 thousand GJ. ANTAM was saving 1,490 tonnes of coal, equivalent of Rp1.2 billion with this initiative.



**1,48** juta liter  
million liters

*Sludge* MFO dimanfaatkan sebagai substitusi bahan bakar  
Sludge MFO are used as fuel substitution



**44.000** GJ

Volume *sludge* yang dimanfaatkan setara dengan 44.000 GJ  
The volume of the sludge utilized is equivalent to 44,000 GJ



**1.490** ton | tonnes

Penghematan batu bara atas pemanfaatan ini.  
Coal saved from this utilization.



**1,2** miliar | billion  
Rp

Penghematan penggunaan batu bara setara dengan Rp1,2 miliar.  
Savings in coal usage is equivalent to Rp1.2 billion.



Sejalan dengan konsumsi energi ANTAM yang mengalami kenaikan khususnya di UBP Nikel Sulawesi Tenggara, intensitas energi yang digunakan pada 2020 juga lebih tinggi dari tahun 2019.

In line with the higher ANTAM's energy consumption, especially in Southeast Sulawesi Nickel Mining Business Unit, the energy intensity in 2020 is also higher than in 2019.

### Realisasi Produksi dan Intensitas Energi Berdasarkan Unit Bisnis [302-3] Production Realization and Energy Intensity Based on Business Unit [302-3]

Unit Bisnis   Business Unit	Satuan   Unit	2018	2019	2020	
UBP Nikel Sulawesi Tenggara Southeast Sulawesi Nickel Mining Business Unit	Total Energi   Total Energy	GJ	10.648.786	10.171.883	11.473.250
	Total Produksi Total Production	TNi	24.868	25.713	25.970
	Intensitas Energi Energy Intensity	GJ/TNi	428,21	395,59	441,79
UBP Nikel Maluku Utara North Maluku Nickel Mining Business Unit	Total Energi   Total Energy	GJ	149970	154.118	139.151
	Total Produksi Total Production	WMT	4.827.762	3.890.171	2.429.203
	Intensitas Energi Energy Intensity	GJ /WMT	0,03	0,04	0,06
UBP Emas Gold Mining Business Unit	Total Energi   Total Energy	GJ	269.232	244.741	236.294
	Total Produksi Total Production	Dore Kg	12.169	12.805	9.808
	Intensitas Energi Energy Intensity	GJ/Dore Kg	22,12	19,11	24,09
UBPP Logam Mulia Precious Metals Processing and Refinery Business Unit	Total Energi   Total Energy	GJ	20.377*	18.025*	19.737,6
	Total Produksi Total Production	Kg	237.834	257.712	217.005
	Intensitas Energi Energy Intensity	GJ/Kg	0,086*	0,070*	0,091
UBP Bauxit Kalimantan Barat West Kalimantan Bauxite Mining Business Unit	Total Energi   Total Energy	GJ	63.296	65.552	69.444,07
	Total Produksi Total Production	WMT	1.102.385	1.770.120	1.553.457
	Intensitas Energi Energy Intensity	GJ/WMT	0,06	0,04	0,04

\*Restatement dari tahun sebelumnya | Restatement from previous report



Program reklamasi di ANTAM Unit Bisnis Pertambangan Nikel Sulawesi Tenggara.  
Reclamation program at ANTAM's Southeast Sulawesi Nickel Mining Business Unit.

## Inovasi Proses *Filling* di Tambang Emas Bawah Tanah Filling Process Innovation in Underground Gold Mine

Di UBPP Emas, Perusahaan menerapkan inovasi jalur *back filling* pada proses tambang bawah tanah. Program ini berhasil berkontribusi pada upaya efisiensi energi di UBPP Emas. ANTAM melakukan *re-engineering* antara *performance curve* dari *pumping system* terhadap *head loss* yang dihasilkan dari *piping system* ke tiga area penambangan. Program ini berhasil menurunkan konsumsi energi listrik sebesar 542.160 kWh per tahun atau setara dengan 1.952 GJ per tahun. Melalui program ini perusahaan dapat menurunkan biaya pada tahun 2019-2020 sebesar Rp310.115.520,- dengan menghemat konsumsi energi listrik mencapai 976 GJ. UBPP Emas merupakan pionir dalam penerapan *maintaining slurry properties* pada fasilitas *backfill area* pabrik dan *re-engineering existing backfill plant design* sehingga konsumsi energi listrik yang sebelumnya dibutuhkan kini dapat dihilangkan.

At Gold Mining Business Unit, the Company implements backfilling innovation in the underground mining process. This program succeeded in contributing to energy efficiency. ANTAM administers re-engineering between the pumping system's performance curve and the head loss resulting from the three locations' piping system. This program reduces electrical consumption by 542,160 kWh per year or equivalent to 1,952 GJ per year. Through this program, the Company reduces costs in 2019-2020 by Rp310,115,520 by saving electricity consumption of up to 976 GJ. Gold Mining Business Unit is a pioneer in slurry management in the plant facility's backfill facility and re-engineering its design. These innovations eliminate electrical energy consumption in those processes.



### Efisiensi Pemakaian Daya Listrik Efficient Electricity Consumption

**542.160**  
kWh

Penurunan konsumsi energi  
Energy Consumption Reduction

**976**  
GJ

Penghematan Konsumsi Listrik  
Electricity Consumption  
Preservation

**Rp310**  
juta | million

Penurunan Biaya  
Cost Efficiency

## Penerapan *High-Speed Gold Electrolysis* kurangi Intensitas Energi di UBPP Logam Mulia

High-Speed Gold Electrolysis reduces the Energy Intensity  
in Precious Metals Processing & Refinery Business Unit.

Di UBPP Logam Mulia, Perusahaan melakukan modernisasi fasilitas pengolahan dan pemurnian emas dengan menerapkan teknologi *High Speed Gold Electrolysis* (HSGE) dengan sistem *auto heating* dan sirkulasi elektrolit yang dapat menurunkan pemakaian energi listrik. Dengan capaian *recovery* proses yang lebih tinggi dari sebelumnya, artinya makin sedikit *cycle* proses yang dibutuhkan untuk menghasilkan emas murni sehingga pemakaian intensitas energi listrik relatif lebih rendah dari sebelumnya sebesar 75% yaitu dari 11.7 kWh/Kg Au menjadi 2,4 kWh/Kg Au.

ANTAM modernizes gold processing and refining facilities through High-Speed Gold Electrolysis (HSGE) technology application. The process handles an auto heating system and electrolyte circulation, which can reduce energy usage. A higher recovery process than before indicates that fewer process cycles are needed to produce refined gold. The consumption of electrical energy intensity is relatively lower than the previous 75%, from 11.7 kWh/Kg Au to 2.4 kWh/Kg Au.