



The Adaro Energy Indonesia Reserves and Resources

Sumber Daya dan Cadangan Adaro Energy Indonesia

Adaro (Equity Adjusted) Consolidated Coal Resources

Konsolidasi Sumber Daya Batubara Adaro (Disesuaikan per Ekuitas)

Group and Operating Company Grup dan perusahaan	Resources estimated as at Dec. 31, 2021 ¹ Perkiraan Sumber Daya per 31 Des 2021			
	Total Resources Total Sumber Daya (Mt)	Measured Terukur (Mt)	Indicated Tertunjuk (Mt)	Inferred Tereka (Mt)
Adaro total sub-bituminous Coal Resources: PT Adaro Indonesia, PT Semesta Centramas, PT Paramitha Cipta Sarana, PT Laskar Semesta Alam, PT Mustika Indah Permai	3.332	2.566	550	216
Adaro total metallurgical Coal Resources: Adaro Minerals Indonesia, Kestrel Coal Mine, Australia	971	181	424	366
Adaro total low-rank Coal Resources: PT Bhakti Energi Persada	334	201	125	7

Adaro (Equity Adjusted) Consolidated Coal Reserves

Konsolidasi Cadangan Batubara Adaro (Disesuaikan per Ekuitas)

Group and Operating Company Grup dan perusahaan	Reserves estimated as at Dec. 31, 2021 ¹ Perkiraan Cadangan per 31 Des 2021		
	Total Reserves Total Cadangan (Mt)	Proved Terbukti (Mt)	Probable Terkira (Mt)
Adaro total sub-bituminous Coal Reserves: PT Adaro Indonesia, PT Semesta Centramas, PT Paramitha Cipta Sarana, PT Laskar Semesta Alam, PT Mustika Indah Permai	898	857	41
Adaro total metallurgical Coal Reserves: Adaro Minerals Indonesia, Kestrel Coal Resources, Australia	209	84	125

1) Tonnage have been rounded, hence small differences may occur in the totals.

Resources estimated as at Dec. 31, 2020 Perkiraan Sumber Daya per 31 Des 2020				
	Total Resources Total Sumber Daya (Mt)	Measured Terukur (Mt)	Indicated Tertunjuk (Mt)	Inferred Tereka (Mt)
	3.357	2.593	546	217
	1.007	144	440	423
	334	201	125	7

Reserves estimated as at Dec. 31, 2020¹ Perkiraan Cadangan per 31 Des 2020			
	Total Reserves Total Cadangan (Mt)	Proved Terbukti (Mt)	Probable Terkira (Mt)
	935	893	42
	140	88	52



Operating Company/ Project Perusahaan/ Proyek	Block/Company/Locality Blok/Perusahaan/Lokasi	Mining method Metode penambangan	Adaro ownership equity Kepemilikan Saham Grup Adaro (%)	Coal Resources as estimated at Dec. 31, 2021 Estimasi Sumber Daya Batubara per 31 Des 2021 ¹					
				Total Resources Total Sumber Daya (Mt)	Measured Terukur (Mt)	Indicated Tertunjuk (Mt)	Inferred Tereka (Mt)	Moisture Kelembaban % adb	
PT Adaro Indonesia ²	North Tutupan	OC	88,5%	991,5	784,0	152,0	55,5	20,6	
	South Tutupan	OC		687,5	534,2	116,5	36,8	20,0	
	North Paringin	OC		208,3	166,9	30,4	11,1	19,8	
	South Paringin	OC		45,0	14,3	24,5	6,1	20,0	
	Wara I	OC		1.034,4	707,8	204,8	121,8	24,0	
	Wara II	OC		315,0	264,2	44,7	6,1	19,3	
Total Adaro Indonesia				3.282	2.471	573	238	21,4	
IUPs at Balangan ³	PT Semesta Centramas	OC	75%	68,0	60,0	7,0	1,0	26,1	
	PT Paramitha Cipta Sarana	OC		58,2	42,0	13,3	2,9	24,1	
	PT Laskar Semesta Alam	OC		138,7	108,3	27,0	3,4	25,8	
Total Balangan Coal				75%	265	210	47	7	25,5
PT Bhakti Energi Persada ⁴	PT Bumi Kalimantan Sejahtera	OC	10,2%	555,0	243,0	288,0	24,0	14,4	
	PT Bumi Murau Coal	OC		1.110,0	665,0	431,0	13,0	14,3	
	PT Birawa Pandu Selaras	OC		23,0	16,0	6,0	1,0	13,9	
	PT Khazana Bumi Kalimantan	OC		177,0	128,0	44,0	6,0	13,4	
	PT Persada Multi Bara	OC		949,0	546,0	380,0	23,0	14,5	
	PT Telen Eco Coal	OC		454,0	373,0	78,0	3,0	14,9	
	PT Tri Panuntun Persada	OC		4,3	3,3	0,7	0,2	13,9	
Total Bhakti Energi Persada				10,2%	3.272	1.974	1.228	70	14,4
PT Ratah Coal	East & Central Kalimantan	OC	100%	No resources estimated in 2021 Belum ada estimasi sumber daya di 2021					
PT Pari Coal	East & Central Kalimantan	OC	100%	No resources estimated in 2021 Belum ada estimasi sumber daya di 2021					
PT Adaro Minerals Indonesia ⁵	PT Juloi Coal - Bumbun (metallurgical)	OC	83,84%	174,5	60,4	57,8	56,4	1,2	
	PT Juloi Coal - Juloi Northwest ⁶ (metallurgical)	OC		629,9	-	269,6	360,3	1,0	
	PT Kalteng Coal - Luon (metallurgical)	OC		50,9	24,7	19,3	6,9	1,3	
	PT Lahai Coal - Haju ⁷ (green coal)	OC		4,3	3,8	0,4	0,1	2,8	
	PT Maruwai Coal - Lampunut ⁸ (green coal)	OC		7,7	7,2	0,5	-	1,9	
	PT Maruwai Coal - Lampunut ^{8,9} (metallurgical)	OC		97,7	91,2	6,4	0,1	1,3	
Total Adaro Minerals Indonesia				980	194	361	426	1,1	
PT Mustika Indah Permai ¹⁰	South Sumatera	OC	75%	304,7	295,0	9,7	0,0	20,6	
PT Bukit Enim Energi	South Sumatera	OC	61%	No resources estimated in 2021 Belum ada estimasi sumber daya di 2021					
Kestrel Coal Resources ¹¹	Queensland, Australia	UG	34,6%	430,5	54,7	350,8	25,0	2,9	

- Adaro's coal resources refer to resources generally suited to host open-pit mineable coal reserves unless noted otherwise. Resources are reported according to JORC 2012 Edition, with reference to the Australian Coal Guidelines 2014. Coal qualities are reported on Raw Quality on air dried in situ basis. Tonnage have been rounded, hence small differences may occur in the totals.
- PT Adaro Indonesia's (AI) coal resources were estimated as at Dec. 31, 2021 by AI Strategic Planning Department. Competent Person Indonesia (CPI) is Yansen Palobo, a full time employee of Adaro Indonesia. The overall decrease over previous resources in North Tutupan, South Tutupan, Wara 1, and North Paringin due to depletion based on topography end of year 2021. The Competent Person (CP) as peer reviewer is Hani Adi Graha MAusIMM, of PT Adaro Jasabara Indonesia.
- The coal resources at PCS, SCM and LSA were estimated as at Dec. 31, 2021. The CP was Dwiyoiko Trah Urip Taruno MAusIMM, of PT Adaro Jasabara Indonesia. Decrease in SCM and LSA coal resources are due to depletion base on 2021 production. Overall increase of PCS coal resources is due to additional drill holes data and re-estimation as per October 31, 2020. Mining has not been commenced in PCS.
- The CP was Hani Adi Graha MAusIMM, of PT Adaro Jasabara Indonesia, and the coal resources were estimated as at Dec. 31, 2019. No updated coal resources estimation during 2020 - 2021.
- The Adaro Minerals Indonesia Resources were reported as at Aug 31, 2021 in accordance with the guidelines of the 2012 Edition of the JORC Code. Prepared by Competent Person Sigit Hardjanto, who is a Member of the Australian Institute of Mining and Metallurgy. Mr. Hardjanto has sufficient experience which is relevant to the style of Coal and type of deposit under consideration to qualify as a Competent Person as defined in the JORC Code
- The increase of the coal resources in Juloi Coal - Juloi Northwest (metallurgical) is due to update geological model

Coal Resources as estimated at Dec. 31, 2021 Estimasi Sumber Daya Batubara per 31 Des 2021 ¹				Coal Resources as estimated at Dec. 31, 2020 Estimasi Sumber Daya Batubara per 31 Des 2020 ¹					
Ash Abu % adb	Volatile Matter Zat Terbang % adb	Total Sulphur Total Sulfur % adb	Calorific Value Nilai Kalori Kcal/kg adb	Total Resources Total Sumber Daya (Mt)	Moisture Kelembaban % adb	Ash Abu % adb	Volatile Matter Zat Terbang % adb	Total Sulphur Total Sulfur % adb	Calorific Value Nilai Kalori Kcal/kg adb
2,3	39,8	0,1	5.286	1.011	20,5	2,3	39,9	0,1	5.288
2,7	39,6	0,1	5.460	700	20,0	2,7	39,6	0,1	5.462
3,4	47,4	0,2	5.414	214	19,8	3,4	38,1	0,2	5.416
3,3	37,7	0,3	5.395	45	20,0	3,3	37,7	0,3	5.399
3,7	37,9	0,3	4.956	1.041	25,1	3,0	37,8	0,2	4.950
4,0	41,1	0,3	5.094	315	19,3	4,0	41,1	0,3	5.092
3,1	39,8	0,2	5.210	3.326	21,7	2,8	39,1	0,2	5.210
2,3	36,7	0,1	4.823	70,4	32,8	2,5	36,7	0,1	4.764
3,7	37,1	0,1	4.849	31,0	24,9	6,9	35,2	0,1	4.558
2,2	37,6	0,1	4.846	141,9	30,3	2,2	37,6	0,1	4.925
2,6	37,2	0,1	4.841	243	30,3	2,9	37,0	0,1	4.832
3,4	42,5	0,1	5.444	555,0	14,4	3,4	42,5	0,1	5.444
3,9	42,3	0,1	5.486	1.110,0	14,3	3,9	42,3	0,1	5.486
3,9	42,6	0,1	5.543	23,0	13,9	3,9	42,6	0,1	5.543
4,3	42,7	0,1	5.499	177,0	13,4	4,3	42,7	0,1	5.499
3,4	42,4	0,1	5.432	949,0	14,5	3,4	42,4	0,1	5.432
3,9	42,9	0,2	5.444	454,0	14,9	3,9	42,9	0,2	5.444
6,7	42,4	0,2	5.235	4,3	13,9	6,7	42,4	0,2	5.235
3,7	42,5	0,1	5.458	3.272	14,4	3,7	42,5	0,1	5.458
No resources estimated in 2020 Belum ada estimasi sumber daya di 2020									
No resources estimated in 2020 Belum ada estimasi sumber daya di 2020									
3,5	17,7	0,8	8.317	110,0	1,5	11,3	16,9	1,0	-
4,2	27,5	0,5	8.307	625,1	1,2	11,7	25,5	0,6	-
11,2	17,4	0,9	7.686	12,9	1,6	9,7	18,0	0,7	-
8,6	37,9	1,3	7.427	4,4	2,8	8,7	37,9	1,4	-
10,7	27,4	0,5	7.509	8,7	2,0	10,5	27,2	0,5	7.509
4,0	28,4	0,5	8.227	95,8	1,5	11,3	27,0	0,5	-
12,4	16,8	1,0	7.488	7,0	1,9	10,4	17,0	0,7	-
4,6	25,2	0,6	8.246	864	1,3	11,5	24,5	0,6	
7,3	37,2	0,5	5.125	306,8	20,9	6,3	37,6	0,5	5.185
No resources estimated in 2020 Belum ada estimasi sumber daya di 2020									
16,9	38,0	0,8	-	442,6	2,9	16,9	38,0	0,8	-

7. The decrease of the coal resources in PT Lahai Coal is due to update geological model
8. PT Maruwai Coal Resources was estimated using surface as at 25 May 2021
9. The increase of the coal resources in PT Maruwai Coal (metallurgical) is due to update geological model
10. The resources were estimated as at Dec. 31, 2021. The CP was Hani Adi Graha MAUSIMM, of PT Adaro Jasabara Indonesia. The decrease in MIP's coal resources is due to depletion base on 2020-2021 production.
11. The Kestrel Coal Resources were estimated as at Sept. 1, 2021. Coal Resources are inclusive of Marketable Coal Reserves. Christopher Speedy, MAUSIMM, MAIG RGeo, of Encompass Mining is the Competent Person for Kestrel Coal Resources. Overall decrease of 12.1 Mt over previous declaration due to combination of depletion during 2020-2021, sterilisation to the North of LW409 and LW410. Coal qualities are for in-situ coal raw qualities.



Adaro Thermal Coal Reserves | Cadangan Batubara Termal Grup Adaro
Reported according to JORC Code 2012 Edition | Dilaporkan sesuai Kode JORC Edisi 2012

Operating Company/ Project Perusahaan/ Proyek	Block/ Company/ Locality Blok/ Perusahaan/ Lokasi	Mining method Metode penambangan	Adaro ownership equity Kepemilikan Saham Grup Adaro (%)	Coal Reserves as estimated at Dec. 31, 2021 Estimasi Cadangan Batubara per 31 Des 2021 ^{1,2}			
				Total Coal Reserves Total Cadangan Batubara (Mt)	Proved Terbukti (Mt)	Probable Terkira (Mt)	Moisture Kelembaban % adb
PT Adaro Indonesia	North Tutupan ^{3,4}	OC	88.5%	376.0	358.0	18.0	20.9
	South Tutupan ^{3,4}	OC		81.2	78.4	2.8	18.0
	North Paringin ^{3,4}	OC		4.7	4.3	0.4	18.1
	South Paringin	OC		No reserves estimated in 2021 Belum ada estimasi cadangan di 2021			
	Wara I ^{3,4}	OC		269.3	255.5	13.8	24.2
	Wara II	OC		No reserves estimated in 2021 Belum ada estimasi cadangan di 2021			
	Total Adaro Indonesia	OC		731	696	35	21.8
IUPs at Balangan	PT Semesta Centramas ^{5,6}	OC	75%	40.2	38.4	1.8	25.1
	PT Paramitha Cipta Sarana ^{5,6}	OC		21.8	19.8	2.0	23.6
	PT Laskar Semesta Alam ^{5,6}	OC		62.7	57.6	5.1	25.0
Total Balangan Coal		125	116	9	24.8		
PT Bhakti Energi Persada	Muara Wahau	OC	10.2%	No reserves estimated in 2021 Belum ada estimasi cadangan di 2021			
PT Pari Coal	East & Central Kalimantan	OC	100%	No reserves estimated in 2021 Belum ada estimasi cadangan di 2021			
PT Ratah Coal	East & Central Kalimantan	OC	100%	No reserves estimated in 2021 Belum ada estimasi cadangan di 2021			
PT Mustika Indah Permai ⁷	South Sumatera	OC	75%	210.2	205.7	4.5	20.5
PT Bukit Enim Energi	South Sumatera	OC	61%	No reserves estimated in 2021 Belum ada estimasi cadangan di 2021			

Coal Reserves as estimated at Dec. 31, 2021 Estimasi Cadangan Batubara per 31 Des 2021 ^{1,2}					Coal Reserves as estimated at Dec. 31, 2020 Estimasi Cadangan per 31 Des 2020 ^{1,2}					
Ash Abu % adb	Volatile Matter Zat Terbang % adb	Total Sulphur Total Sulfur % adb	Calorific Value Nilai Kalori Kcal/kg adb	Total Coal Reserves Total Cadangan Batubara (Mt)	Moisture Kelembaban % adb	Ash Abu % adb	Volatile Matter Zat Terbang % adb	Total Sulphur Total Sulfur % adb	Calorific Value Nilai Kalori Kcal/kg adb	
2.0	39.9	0.1	5,241	395.6	20.9	2.1	39.9	0.1	5,240	
1.9	40.9	0.1	5,651	93.4	18.0	2.0	40.9	0.1	5,649	
2.4	39.1	0.2	5,661	10.1	18.1	2.5	39.3	0.2	5,657	
No reserves estimated in 2020 Belum ada estimasi cadangan di 2020										
4.6	38.0	0.3	4,961	275.3	24.1	4.6	38.0	0.3	4,963	
No reserves estimated in 2020 Belum ada estimasi cadangan di 2020										
3.0	39.3	0.2	5,186	774	21.7	3.0	39.3	0.2	5,196	
2.2	36.6	0.1	4,641	42.5	26.0	3.6	36.6	0.1	4,722	
3.1	37.0	0.1	4,916	12.0	22.7	2.0	38.5	0.1	5,008	
2.1	37.3	0.1	4,796	65.8	24.9	3.4	37.3	0.1	4,836	
2.3	37.0	0.1	4,767	120	25.1	3.3	37.2	0.1	4,813	
No reserves estimated in 2020 Belum ada estimasi cadangan di 2020										
No reserves estimated in 2020 Belum ada estimasi cadangan di 2020										
No reserves estimated in 2020 Belum ada estimasi cadangan di 2020										
7.4	37.2	0.5	5,129	212.7	20.8	6.3	37.5	0.6	5,132	
No reserves estimated in 2020 Belum ada estimasi cadangan di 2020										



Adaro Metallurgical Coal Reserves | Cadangan Batubara Metalurgi Grup Adaro Reported according to JORC Code 2012 Edition | Dilaporkan sesuai Kode JORC Edisi 2012

Operating Company/ Project Perusahaan/ Proyek	Block/Company/ Locality Blok/Perusahaan/ Lokasi	Mining method Metode penambangan	Adaro ownership equity Kepemilikan Saham Grup Adaro (%)	Estimated Reserves 2021 Estimasi Cadangan 2021 ^{1,2}			
				Total Coal Reserves Total Cadangan Batubara (Mt)	Proved Terbukti (Mt)	Probable Terkira (Mt)	Moisture Kelembaban % adb
PT Adaro Minerals Indonesia ^{8,9}	PT Juloi Coal - Bumbun Block ¹⁰	OC	83,84%	55,5	-	55,5	1,6
	PT Kalteng Coal - Luon Block ¹⁰	OC		17,7	-	17,7	1,1
	PT Lahai Coal - Haju Block ¹¹ (Green Coal)	OC		2,3	2,26	0,03	2,8
	PT Maruwai Coal - Lampunut Block ^{12,13,14} (Green Coal)	OC		7,8	7,3	0,5	1,9
	PT Maruwai Coal - Lampunut Block ^{12,13} (Metallurgical Coal)	OC		81,8	73,9	7,9	1,3
	PT Sumber Barito Coal - Dahlia Arwana ¹⁰	OC		5,6	-	5,6	1,2
Total Adaro Minerals Indonesia				171	83	87	1,4
Kestrel Coal Resources ¹⁵	Queensland, Australia	UG	34,6%	189,9	39,4	150,5	2,9

- 1) Only drill hole with geophysically logged and quality analysed were used for reserves classification. Approximate drill hole spacings used to classify reserves are as below:
- | Deposit | Proved Coal Reserves | Probable Coal Reserves |
|-------------------------|---|--|
| Adaro Indonesia | 250m to 500m spacing, 95% coal recovery | >500m to 1,000m spacing, 95% coal recovery |
| Balangan Coal | Maximum 250m spacing, 95% coal recovery | Maximum 500m spacing, 95% coal recovery |
| PT Lahai Coal | Maximum 250m spacing, 85% coal recovery | Maximum 500m spacing, 85% coal recovery |
| PT Maruwai Coal | Maximum 500m spacing, 85% coal recovery | Maximum 1,000m spacing, 85% coal recovery |
| PT Mustika Indah Permai | Maximum 500m spacing, 95% coal recovery | Maximum 1,000m spacing, 95% coal recovery |
- 2) Adaro coal reserve quantities and qualities are Marketable Reserve basis. Coal reserve estimates are not precise calculations. The totals contained in the above table have been rounded to reflect the relative uncertainty of the estimate. Rounding may cause some computational discrepancies.
- 3) Competent Person Reserves - Rara Nastiti, MAusIMM who is a full time employee of PT Adaro Jasabara Indonesia.
- 4) Reserves statement refers to a JORC Reserves Statement report as at Dec 31, 2020. Decrease in Adaro Indonesia Coal Reserves is due to depleted by 2021 production.
- 5) Competent Person Reserves - Rara Nastiti, MAusIMM who is a full time employee of PT Adaro Jasabara Indonesia.
- 6) SCM and LSA reserve estimation as at Dec 31, 2021, based on updated geological model and life of mine plan as reported in JORC Reserves Statement at End of 2019, depleted by 2020 and 2021 production. Overall increase of PCS coal reserves is due to additional drill holes data, updated geology model and re-estimation as per December 31, 2020. PCS reserve classification as at Dec 31, 2021, based on updated geological model and life of mine plan as reported in JORC Reserves Statement at End of 2020, Mining has not been commenced in PCS. The reserves numbers based on 97% mining recovery .
- 7) Competent Person Reserves - Johannes De Brebeuf, MAusIMM / CPI who is a full time employee of PT Mustika Indah Permai. The decrease in MIP coal reserve is due to depletion based on 2021 production.
- 8) The Adaro Minerals Indonesia Reserves were reported as at Aug 31, 2021 in accordance with the guidelines of the 2012 Edition of the JORC Code. Prepared by Competent Person Jimmy Gunarso, who is a Member of the Australian Institute of Mining and Metallurgy. Mr. Gunarso has sufficient experience which is relevant to the style of Coal and type of deposit under consideration to qualify as a Competent Person as defined in the JORC Code
- 9) Technical studies in order to asses of coal reserve modifying factors is carried out at the Pre-Feasibility Level.
- 10) Assumed yield was used that developed formulated from the washability simulation data, targeting coal ash content of 4.5% adb. This assumption is referenced in the report "Indomet Coal Quality and Process Review" provided by A&B Mylec in May 2011
- 11) The decrease of the coal reserves in PT Lahai Coal is due to update geological model.
- 12) PT Maruwai Coal Reserves was estimated using surface as at 25 May 2021
- 13) The increase of the coal reserves from previous reserves in PT Maruwai Coal is due to update geological model, pit optimisation and pit design.
- 14) The larger tonnage Coal Reserve than Coal Resources might be occurred due to moisture adjustment of marketable reserve basis.
- 15) The Kestrel Coal Reserves were estimated as at Sept. 1, 2021. Prepared by Competent Person Geoffrey Watson, MSc, MAusIMM, CP(Min), RPEQ, a full time employee of Kestrel Coal Resources Pty Ltd. Overall increase of Coal Reserves is attributable to an extension of the western panels and the optimisation of panel widths.

Adaro Metallurgical Coal Reserves | Cadangan Batubara Metalurgi Grup Adaro
Reported according to JORC Code 2012 Edition | Dilaporkan sesuai Kode JORC Edisi 2012

Estimated Reserves 2021 Estimasi Cadangan 2021, 2			Estimated Reserves as at Dec. 31, 2020 Estimasi Cadangan per 31 Des 2020, 2				
Ash Abu % adb	Volatile Matter Zat Terbang % adb	Total Sulphur Total Sulfur % adb	Total Coal Reserves Total Cadangan Batubara (Mt)	Moisture Kelembaban % adb	Ash Abu % adb	Volatile Matter Zat Terbang % adb	Total Sulphur Total Sulfur % adb
4,5	16,4	0,9			No reserves estimated in 2020 Belum ada estimasi cadangan di 2020		
4,5	17,2	0,8			No reserves estimated in 2020 Belum ada estimasi cadangan di 2020		
6,8	36,9	1,0	2,5	2,8	7,2	35,6	1,1
12,2	28,8	0,5	8,0	2,0	15,6	25,7	0,4
4,5	28,2	0,5	78,6	1,3	4,0	28,4	0,5
4,5	15,9	0,9			No reserves estimated in 2020 Belum ada estimasi cadangan di 2020		
4,9	23,0	0,7	89	1,4	5,1	28,4	0,5
6,5	38,8	0,6	170,5	2,8	6,5	38,0	0,6