

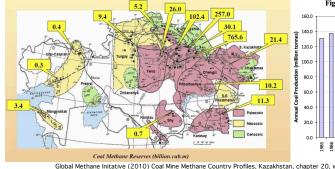
	A B	C D		E F	G	Н	I J	K		L	М	N	0	P	Q
91													BP StatRev 20	)18	
93	1985			Kazakhsta	in .		EIA data updated Ju		Coal methar	ne emiss	sions		Mt 130		
95 96	1986 1987	Lignite EIA coal stat		uminous al stats:	Bituminous EIA coal stats:	Metallurgical EIA coal stats:	Total coal EIA coal stats:	CMM emi	issions	Cruc	de CMM ra	ate	137		
97 98	1988 1989	thousand to	ns thousa	ind tons	thousand tons	thousand tons	thousand tons	million cubi	c meters		meters per		143 138		
99	1990 1991						including met. coa	ı	1,760 1,695				131 130		
101	1992 1993		304 512	8,638 7,319	107,913 91,432	15,127 12,817	139,482 118,180	]	1,648 1,627			3.0 5.2	126	6.5	
103	1994	6,1	156	6,814	85,121	11,932	110,023		1,302		1	3.0	104	4.6	
104	1995 1996	4,5	980 588	5,513 5,078	68,869 63,439	9,654 8,893	89,016 81,998		1,216 857		1	5.1 1.5	76	3.3 5.8	
106 107	1997 1998		328 262	4,791 4,718	59,846 58,939	8,389 8,262	77,354 76,181		755 649			0.8 9.4		2.6 9.8	
108	1999 2000		579 518	3,962 5,112	49,493 63,864	6,938 8,952	63,972 82,546		528 704			9.1 9.4		3.4 4.9	
110 111	2001 2002	4,7	722 379	5,227 4,847	65,297 60,550	9,153 8,488	84,399 78,264		657 inte	erpola erpola		8.6 8.6	79	9.1 3.7	
112	2003 2004	4,9	984 123	5,517 5,671	68,914 70,840	9,660 9,930	89,075 91,564		562 inte	erpola erpola		7.0 6.2	84	4.9 6.9	
114	2005	5,1	106	5,652	70,603	9,897	91,258		467 est	EPA		5.6	86	6.6	
115	2006 2007	6,0	962 933	6,599 6,679	82,438 83,430	11,556 11,695	106,555 107,837		711 inte	erpola erpola		6.1 7.3	97	5.2 7.8	
117	2008 2009		105 220	6,758 6,885	84,422 86,010	11,834 12,057	109,119 111,172		833 inte 955 est	erpola **		8.4 9.5	111		
119 120	2010 2011		341 182	7,573 7,950	94,603 99,311	13,261 13,921	122,278 128,364						110		
121 122	2012 2013		133 374	8,228 8,163	102,788 101,975	14,409 14,295	132,858 131,807						120		
123 124	2014 2015		599 091	7,515 7,424	90,795 86,022	19,738 18,761	125,647 118,298						114 107		
125 126	2016 2017		338	7,169	83,062	17,051	113,620						103 112	3.1	
127	2018												117		
129 130			https://ww	ww.eia.gov/beta/int	ernational/data/bro	wser/		Glo	bal Methane I	Intitiative ces belov					
131	subt. 1992-20 percent of 201		119 58%	159,802 6.31%	1,979,976 73.11%	296,670 15.01%	2,580,867 100%		See sour	ces belov	•				
133	% 1992-2016:		60%	6.19%	76.72%	11.49%	100%								
135							Kerimkhanov. Abdul	(2019) Coal	mining in Kaz	akhstan l	hits over 1	17 millio	n tons, Azer No	ews, 31 Ja	anuary.
136 137 138	Coal and Pe	eat in Kazakhs	stan in 2008												
139		Anth- Co racite	cing Sther Bitu-	Sub-Bitu- minous Brown Po Coal Coal	Patent Coke Gas Fuel Oven Coke	Coal Tar	Table 2	20-5. Kazakhsta	an's CMM Emi	issions (mi			1994 1995		
140			minous Coal				Underground coal mines – ver Underground coal mines – dra	ntilation emissions	983.66 189.84	914.75 200.83	915.52	957.82 6	578.12 671.37 148.31 115.8		
142	Unit Production	0	t kt 14086 92114	0 4872		kt 0 0	Post-underground emissions Surface mine emission	anica cinissions	34.8 560.1	36.4 554.1	33.9	30.6	28.7 23 452.0 411.9		
144 145	From Other Sour Imports	ces 0 0 0	0 0 0 0 0 264 -376 -42323	0 0 0 0 0 -283	1 0 766	0 0	Total liberated (= sum of all a Recovered & Used	bove)	1768.4 8.8	1706.08 10.9	1658.69 1	640.18 13	307.13 1222.07 5.6 5.9		
146 147	Exports Stock Changes Domestic Suppl	0	0 13 13710 50068	0 0 0 4589	0 0 -22	0 0	Total emitted (= Total liberate	ed – recovered & us		1695.18			301.53 1216.17		
148 149				oal and Peat in Kaza			Emission Category	1996	1997 1998	1999	2000	2005 (estimated	2009** i) (estimated)		
150 151		Table 20	1_1 Kazakheta	n's Coal Reserves	and Production		Underground coal mines – ventilation emissions		347.45 303.45				400		
152 153			Anthracite &	Sub-bituminous		Global Rank	Underground coal mines – drained emissions Post-underground emissions	55.4 14.9	48.2 42.6 12.7 9.0	27.2 7.1	41 8.0		130		
154 155	Indic		Bituminous million tonnes)	& Lignite (million tonnes)	Total (million tonnes)	(# and %)	Surface mine emission Total liberated (= sum of all	381.7	350.2 304.3 758.55 659.35	277.3	381		450 980		
156 157	Estimated Prove Reserves (2009)		28,170	3,130	31,300	7 (3.8%)	above) Recovered & Used	3.5	4.0 10.5	11.3	12.2		25		
158 159	Annual Coal Pro	oduction (2009)			101.5	9 (1.5%)	Total emitted (= Total liberate recovered & used)		754.55 648.85	027102	704.03	467*	955		
160 161	Source: BP (		Initative (2010	)) Coal Mine Methan	e Country Profiles, k	Kazakhstan, chapter	Source: KazNIIMOSK (20 20, www.globalmethane.o								
162 163															
164 165			5.2	26.0			Figure 20-1. Kazakhsta	an Annual Co	oal Productio	on (millio	on tonnes)				
166 167		0.4	9.4	102.	30.1	160.0	_						7		
168 169	1	and a	5		765.6	21.4	10000								
170 171	300	Urai-Caspian	Turgay		E. Kazakheta	B 120.0									
172	0.3	A.X	Cal	Teniz /	Chengiz	s in 1000									
173	The season	Prearal	Zhilanshyk	Pribalhashye		10.2				Ш					
175 176	3.4	3	And the	12	Kazakhstan 1	1.3							H		
177 178	1		Nar Har	ratau Shy	Paleozoi Mezozoi	e W 20.0									
179 180	-	A	0.7	Karas	Cenozoi	0.0		m 4 2 8			4 0 0		Ц		
181 182	λ	Co	oal Methane Reserv				1986 1987 1988 1990 1991		Lear 1998 1999 2000	2001	2005	2007	i		
183 184		Global Methane	Initative (2010	) Coal Mine Methan	e Country Profiles, k	(azakhstan, chapter	20, www.globalmethane.d	org/tools-reso	ources/coal_o	verview.a	aspx				
185 186	Sources for Coal Mine Methane emissions data in column K90-K109:														
187	87 KazNIIMOSK (2002): Kazakhstani GNG Emissions Inventory from Coal Mining and Road Transportation – Final Project Report,														
188 189 190	* USEPA (2006): Global Anthropogenic Non-CO2 Greenhouse Gas Emissions: 1990–2020, U.S. Environmental Protection Agency, Office of Atmospheric Programs,														
191 192		Climate Change	Division, June 2	2006, at http://ww	w.epa.gov/climatec	hange/economics/do	ownloads/GlobalAnthroEn	nissionsReport		,	J =10	-			
193 194							raine and Kazakhstan as ( Ukraine June 3, 2010.	Case Studies.							
195															

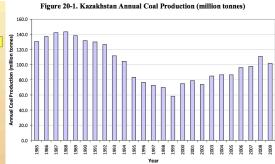
subt. 1992-2016	144,419	159,802	1,979,976	296,670	2,580,867
percent of 2016	5.58%	6.31%	73.11%	15.01%	100%
% 1992-2016:	5.60%	6.19%	76.72%	11.49%	100%

	Anth- racite	Coking Coal	Other Bitu- minous Coal	Sub-Bitu- minous Coal	Lignite/ Brown Coal	Peat	Patent Fuel		Gas Coke	Coal Tar
Unit	kt	kt	kt	kt	kt	kt	kt	kt	kt	kt
Production	0	14086	92114	0	4872	0	0	2688	0	0
From Other Sources	0	0	0	0	0	0	0	0	0	0
Imports	0	0	264	0	0	1	0	766	0	0
Exports	0	-376	-42323	0	-283	0	0	-235	0	0
Stock Changes	0	0	13	0	0	0	0	-22	0	0
Domestic Supply	0	13710	50068	0	4589	1	0	3197	0	0

Table 20-1, Kazakhstan's Coal Reserves and Production

Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)	
Estimated Proved Coal Reserves (2009)	28,170	3,130	31,300	7 (3.8%)	
Annual Coal Production (2009)			101.5	9 (1.5%)	
Source: BP (2010)					





### Sources for Coal Mine Methane emissions data in column K90-K109:

Cell: D11

### Comment: Rick Heede:

Coal production by coal mining companies and state-owned enterprises, including subsidiaries of oil and gas companies

Coal types produced are not ordinarily reported by coal operators (except for metallurgical coal). We distinguish, where possible and reasonably well known, between hard (bituminous and subbituminous) and soft (lignite or peat) coals, especially for the larger companies operating in regions such as Australia and India where soft coals are predominant. Soft coals have lower carbon content per tonne than do hard coals.

Cell: H25

## Comment: Rick Heede:

Soviet production includes Svalbard production-sharing with Norway (~0.4 million tons per year).

Cell: H52

### Comment: Rick Heede:

EIA (2011) International Energy Statistics on World Coal Production (lignite, bituminous, anthracite, and metallurgical coal), by country; data for1980-2009; total Primary Coal Production data extends to 2010. www.eia.gov/emeu/international/energy.html or www.eia.gov/countries/data.cfm.

Cell: M56

### Comment: Rick Heede:

BP Statistical Review of World Energy 2018.

Cell: E70

# Comment: Rick Heede

EIA (2006) Table 5.3 World Bituminous Coal Production, 1980-2004.

Cell: 074

### Comment: Rick Heede:

World Coal Institute 2009 report, http://www.worldcoal.org/resources/coal-statistics/,

http://www.worldcoal.org/bin/pdf/original\_pdf\_file/coal\_factsnewversion09(15\_09\_2010).pdf

Cell: K76

# Comment: Rick Heede:

World Coal Assoc website http://www.worldcoal.org/resources/coal-statistics/, 2010 production, link to 2008 production, no link to 2009 (Rhea), assume 2009 same as 2010

Cell: K79

### Comment: Rick Heede:

Cell: K83

### Comment: Rick Heede

In lieu of unvailable FIA data, CAI uses 2016 and 2017 coal production data from the BP Statistical Review 2018.

Cell: H93

#### Comment: Rick Heede:

EIA (2019) International Energy Statistics on World Coal Production (lignite, bituminous, anthracite, and metallurgical coal), by country; data for 1980-2017; https://www.eia.gov/beta/international/data/browser/

Cell: K96

### Comment: Rick Heede

Source: Global Methane Initative (2010) Coal Mine Methane Country Profiles, Kazakhstan, chapter 20, www.globalmethane.org/tools-resources/coal overview.aspx

"Coal production in Kazakhstan declined by more than 50 percent in the years following independence from the Soviet Union in 1991 (BP, 2010).

The Kazakh coal mines are particularly gassy and prone to violent gas outbursts, and must be degasified and ventilated to prevent explosions and promote worker safety. The underground mines in the Karaganda basin use a variety of pre-mining and post-mining methane drainage techniques. Most of the mines are operated at a depth of more than 500 meters (m) and gas contents in these mines average between 18 and 24 m3/tonne (Baimukhametov et al, 2009) with specific emissions averaging 33 m3/tonne (KazNIIMOSK, 2002). Pre-drainage has historically been carried out using in-seam boreholes. Advance degassing from the surface has been trialed with limited success because of the low permeability of the coal seams. The Arcelor Temirtau Coal Division has had recent success in increasing degasification rates, and hence coal production rates, by drilling crossmeasure boreholes from a roadway driven 8-12 m below the coal seam. Gob gas is drained with vertical wells from the surface or via galleries driven 20-30 m above the seam (Baimukhametov et al., 2009).

Current drained methane emissions are estimated to be approximately 130 million m3 resulting from increased underground coal production rates (Alekseev, 2010), However, the level of methane utilization is very low, only about 25 million m3 annually, which is recovered and combusted in the boiler houses of five mines for mine heating. Surface mines are heavily ventilated and ventilation air with methane concentrations of about 1 percent is vented to the atmosphere (KazNIIMOSK, 2002).

Table 20-5 details Kazakhstan's measured and estimated CMM emissions. The data in this table may vary from the U.S. EPA data presented in the Executive Summary due to differences in inventory methodology and rounding.

Cell: J122

# Comment: Rick Heede

EIA International Energy Statistics for Kazakhstan, thousand short tons; data by coal rank only for 2013-2015. Previous data series from older EIA data. CAI includes metallurgical coal production.

https://www.eia.gov/beta/international/data/browser/index.cfm

Cell: J135

## Comment: Rick Heede:

The extraction of coal and coal concentrate reached 117.8 million tons at the end of 2018. It is 6 percent more than in the same period of 2017. Coal mining is concentrated in two key regions: Pavlodar (70.3 million tons) and Karaganda (39.1 million tons).

Such large enterprises as the Bogatyr Komir LLP, a subsidiary of Samruk-Energo JSC (the Bogatyr and Severny coal mines) are engaged in coal mining in the Pavlodar region; a member of Zaman Group LLP "Gamma"

(deposits "Sarykol" and "Taldykol"); Maykuben-West LLP, (Shoptykol lignite deposit), etc. In the Karaganda region, ERG Eurasian Group (Shubarkol Komir JSC, Tsentralny and Zapadny coal mines), the coal department of ArcelorMittal Temirtau JSC (Lenina, Tentekskaya, Kazakhstanskaya and others), etc. are engaged in coal mining.

Of the total coal and coal concentrate mining, only 5.5 percent (6.4 million tons) accounted for lignite, and 91.1 percent (107.3 million tons) immediately accounted for coal.

At the same time, the main share of hard coal (81 percent) was energy coal (87 million tons), and only 10 percent was coked (10.8 million tons). According to estimates of Samruk-Energy JSC, the main procurer of thermal coal is Bogatyr Komir.

Bogatyr Komir Kazakhstan company is one of the largest in the world in terms of open-pit coal mining, its balance reserves are 2.75 billion tons. The production capacity of the enterprise is 42 million tons of coal per year, including 32 million tons in the Bogatyr mine, and 10 million tons in the Severny mine.

Cell: 0194

Comment: Rick Heede:

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