

CO2 emissions from Jambyl Cement Clinker production (base data)		
	Value and unit	Data source:
Calcinations process	525 kg/t clinker	The Cement CO2 Protocol, WBCSD working group Oct. 2001
Fuel firing	760 kcal/kg clinker = 3.18 GJ/t clinker	Design specifications for Jambyl Cement plant
Electricity consumption	0.105 MWh/t cement	Design specification for Jambyl Cement plant
Coal as fuel	96 t CO2/ 1000 GJ	Based on WBCSD latest version
Electricity production	1157 kg CO2 / MWh	WBCSD, CO2 Accounting and Reporting Standards for the Cement Industry, June 2005. Kazakh national data
CO2 emission from electricity production	1157 kg CO2/MWh * 0.105MWh/t cement = 121 kg CO2/ tons cement	
Clinker percentage in cement (base data)		
	Value and unit	Data source:
Cement average blend	86% clinker	Jambyl Cement operational assumption 60% of cement with 80% clinker and 40% with 95% clinker

Fuel caused CO2 emissions at Jambyl Cement (clinker based):		
Coal:	$96 * 3.18 =$	305 kg CO2 / t clinker
Combined calcinations and fuel caused CO2 emissions (clinker based):		
Coal	$305 + 525 =$	830 kg CO2 / t clinker
Final emissions per unit cement, including electricity caused emission:		
Coal based,average blend	$0.86 * 830 + 121 =$	835 kg CO2 / t cement

Total CO2 emissions based on average blended cement (92% clinker) and a total production of 1.10 M tons of cement per year:		
Coal	$1.10 * 0.835 =$	919,000 tons CO2 / year