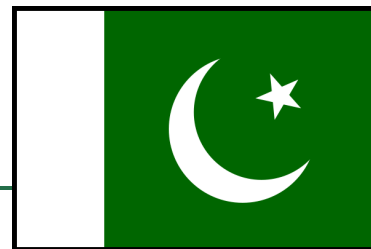


25 Pakistan



25.1 Summary of Coal Industry

25.1.1 ROLE OF COAL IN PAKISTAN

Coal had historically been the primary fossil fuel for Pakistan with the major consumers being railways, cement, fertilizer, and power plants. This held true until large deposits of oil and natural gas were discovered in the 1960s (PakistanEcon, 2001). As of 2011, coal provided for only 6 percent of Pakistan's total primary energy consumption, compared to natural gas at 47 percent and petroleum at 35 percent (EIA, 2014). Pakistan is facing an unprecedented energy crisis due to a surging demand and supply gap. Its current energy needs are heavily dependent on oil and gas and the demand far exceeds its indigenous resources such as coal, hydro, and renewable sources (PakMinPlan, 2014). The current demand and supply gap of 5,000-8,000 MW and demand growing at 8 percent per year ensures guaranteed uptake of power produced by independent power producer projects at market competitive prices (BOI, 2014).

Pakistan has one of the world's largest lignite reserves in the Tharparkar district of Sindh, found in the early 1990s and estimated at more than 185 billion tonnes (PakTribune, 2010). Table 25-1 indicates Pakistan's recoverable coal reserves to be 2,070 million tonnes (Mmt). Total estimated resources are far more extensive and may offer greater recovery ultimately. The total in-ground resource is estimated to be 185,000 Mmt, of which about 2,000 Mmt are presently mineable and 3,400 Mmt are measured (PakGeoSurvey, 2014).

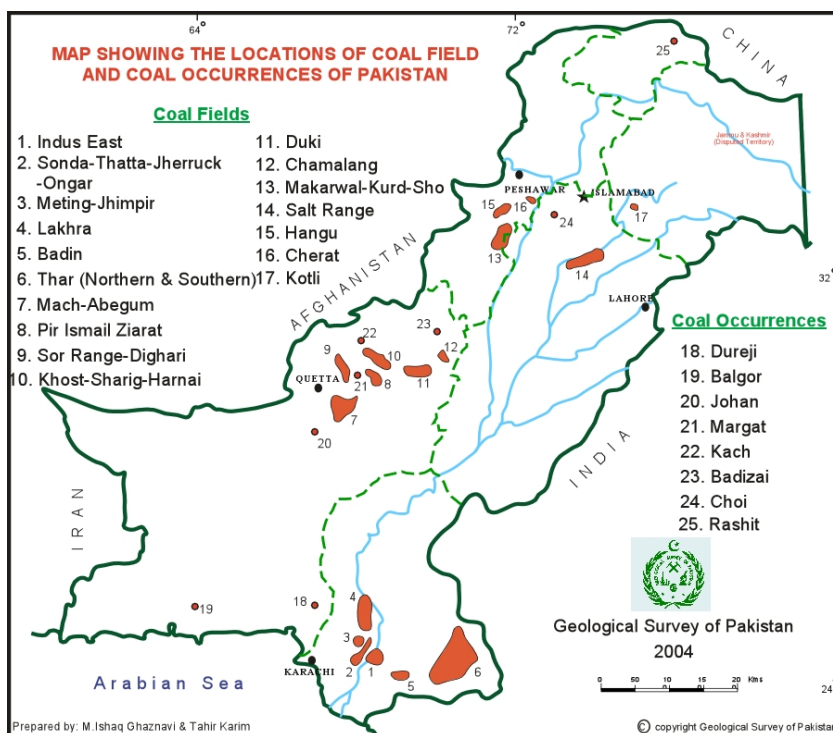
Table 25-1. Pakistan's Coal Reserves and Production

Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)
Estimated Proved Coal Reserves (2011)	0	2,070	2,070	21 (0.2%)
Annual Coal Production (2012)	1.9	1.2	3.1	38 (0.04%)

Source: EIA (2014)

Pakistan is divided up into four provinces and four federal territories. Coal is found in all four provinces, but the bulk (around 98 percent) is in Sindh province, where the Thar coalfield is located (Figure 25-1).

Figure 25-1. Pakistan’s Coal Fields



Source: PakGeoSurvey (2004)

25.1.2 STAKEHOLDERS

State-owned companies control the production and marketing of coal. The Mineral Department of the Ministry of Petroleum and Natural Resources is responsible for the exploration, planning, development, and operation of mining ventures that are controlled by the state-owned companies (USGS, 2014). The Government of Sindh and the Thar Coal Development Authority are other governmental bodies that claim ownership and/or control over the resources.

Key stakeholders involved in Pakistan’s coal and the coal mine methane (CMM) development industries are outlined in Table 25-2.

Table 25-2. Key Stakeholders in Pakistan’s CMM Industry

Stakeholder Category	Stakeholder	Role
Developer	▪ Cathay Oil & Gas Ltd.	Holds rights to CBM and groundwater in Sindh
	▪ M/s Rheinbraun Engineering	Mining feasibility studies
	▪ Lakhra Coal Development Authority (LCDC)	Project development
	▪ Pakistan Mineral Development Corporation (PMDC)	Project development
	▪ Deep Rock Drilling (pvt) Ltd.	Mining feasibility studies
Mining Companies	▪ Kathwai Coal Mines Pvt Ltd	Project hosts
	▪ Habibullah Mines Ltd.	
	▪ United Musakhel Mining Company (Pvt) Limited	

Table 25-2. Key Stakeholders in Pakistan’s CMM Industry

Stakeholder Category	Stakeholder	Role
Universities and Research Centers	▪ Pakistan Institute of Engineering and Applied Sciences, Islamabad	Technical assistance
	▪ National University of Sciences & Technology Rawalpindi	
	▪ Ghulam Ishaq Khan Institute of Engineering, Swabi	
	▪ University of Eng. & Technology (UET), Lahore	
Energy Companies	▪ Habibullah Energy Limited (HEL)	Investment, energy production
	▪ Pak Energy (Pvt) Ltd	
	▪ Pakistan Electric Power Company (PEPCO)	
Investment Groups	▪ Al Abbas Group	Investment
Government Groups	▪ Ministry of Petroleum and Natural Resources	Licensing, exploration, production
	▪ Thar Coal Development Authority, Government of Sindh,	Licensing, exploration, production
	▪ Geological Survey of Pakistan	Technical assistance
	▪ Hydrocarbon Development Institute of Pakistan (HDIP)	Technical assistance

25.1.3 STATUS OF COAL AND THE COAL MINING INDUSTRY

The contest between the national and provincial governments over the energy resources of Pakistan has stalled some development efforts. As part of a larger government plan to boost private sector ownership and involvement in industry and energy sectors, some government-created entities like the Lakhra Coal Development Authority (LCDC) have been transitioned to public-private entities. The goal is to encourage development and take advantage of market efficiencies, but these efforts have not been entirely successful. In 2007, the LCDC had 44 mines fully developed and capable of each producing 40 to 50 tonnes of coal per day, with another 39 mines under development (PakMinPet, 2007). After 17 years of operation, LCDC had developed less than 30 percent of the potential 149 mines in the Lakhra field and is able to meet only 60 percent of the coal requirements of the associated Lakhra power plant, which is often forced to operate below capacity (Siddiqui, 2008).

Additionally, American, Chinese, and German companies, among others, have been brought in to provide mining feasibility studies to encourage international investment, but questions over coal quality, infrastructure, and government support have caused many potential international investors to pull out of major projects (Haider, 2007; PakTribune, 2010).

Pakistan is still in the process of drafting a national coal policy. There have been repeated attempts to draft a policy since at least 2001, but they have not been successful as yet (Bhutta, 2010; Siddiqui, 2008). This lack of policy has hurt the development of the Thar deposits found in the 1990s and has impeded Pakistan’s progress in developing mining technologies and attracting CMM investments (Chaudhry, 2007).

Table 25-3 lists some of the major coal mines in operation in Pakistan.

Table 25-3. Operating Coal Mines in Pakistan

Coal Field	Mine	Coal Rank	Mine Type	Operator
▪ Lakhra*	▪ Lakhra Collieries	Sub-bituminous to lignite	underground	PMDC
▪ Degari- Sor-Range*	▪ Degari Collieries	Sub-bituminous-A to high volatile B-bituminous	underground	PMDC
▪ Degari- Sor-Range*	▪ Sor- Range	Sub-bituminous-A to high volatile B-bituminous	underground	PMDC
▪ Shahrig- Khost- Harnai*	▪ Shahrig	Sub-bituminous-A to high volatile B-bituminous	underground	PMDC
▪ Lakhra Coal Field	▪ Multiple	Sub-bituminous to lignite	underground	LCDC

Sources: *PMDC (2014); **MBendi (2014)

25.2 Overview of CMM Emissions and Development Potential

The Global Methane Initiative (GMI) International CMM Projects Database currently identifies no projects in Pakistan, in operation or under development (GMI, 2014). Updates on future CMM projects in Pakistan can be found at <https://www.globalmethane.org/coal-mines/cmm/index.aspx>.

25.2.1 CMM EMISSIONS FROM OPERATING MINES

Methane emissions in Pakistan totaled 66.5 million cubic meters (m³) in 2000, but are projected to increase to 86.8 million m³ by 2015, and then anticipated to further increase to 119 million m³ by 2030 (see Table 25-4).

Table 25-4. Pakistan's CMM Emissions (million cubic meters)

Emissions	2000	2005	2010	2015 (projected)
Total CH ₄ Emitted	66.5	105.0	79.1	86.8

Source: USEPA (2012)

25.2.2 CMM EMISSIONS FROM ABANDONED COAL MINES

No data about methane emissions from abandoned mines in Pakistan are available at this time.

25.2.3 CBM FROM VIRGIN COAL SEAMS

In 2007, Cathay Oil & Gas Ltd. (a Canada-based company) acquired sole rights to coal bed methane (CBM) and groundwater in Sindh, including the Thar coal field. The field has an estimated 1.0

trillion m³ of CBM resource and up to 0.6 trillion m³ of recoverable gas (USEPA, 2007). In 2013, Cathay obtained the go-ahead to explore and develop the CBM resources under the “Thar Coal Methane project” that aims to produce 0.14 trillion m³ of methane gas over a 30-year period (Business Recorder, 2013).

25.3 Opportunities and Challenges to Greater CMM Recovery and Use

As reflected in Table 25-5, Pakistan is a signatory to both the UNFCCC and the Kyoto Protocol. Pakistan is a Non-Annex I Party.

Table 25-5. Pakistan’s Climate Change Mitigation Commitment

Agreement	Signature	Ratification
UNFCCC	June 13, 1992	June 1, 1994
Kyoto Protocol	-	January 11, 2005

Source: UNFCCC (2014)

In 2013, Pakistan’s Ministry of Climate Change in Islamabad launched its first National Climate Change Policy. The policy was approved in September 2012 and provides a framework for coping with the impacts of climate change through adaptation and mitigation measures. Promotion of renewable energy sources and efficient mass transport systems are in the lineup of policy measures and financing options for projects include the Green Climate Fund and formation of a National Climate Change Fund (Express Tribune, 2013).

25.3.1 MARKET AND INFRASTRUCTURE FACTORS

Pakistan has experienced low domestic demand for coal resources, though this is beginning to change as domestic oil and natural gas suppliers reach production limits and as international energy prices increase. Despite this improving environment, conflicts between the various controlling interests within the Pakistani government have prevented a unified approach to coal resources and coal mining and thus to CMM/CBM utilization. Until there is a national coal policy and strong government interest in and focus on developing coal resources, there will not be a strong domestic market for development, nor strong international interest or confidence for investment.

Further, CMM and CBM infrastructure in Pakistan is practically non-existent currently; gas gathering, compression, and transmission infrastructure will be needed before any significant production is viable. Significant investment in coal mining infrastructure including basic resource survey and access to key supporting resources like water, roads, and electrical transmission lines will be needed before there is sufficient capability and potential for CMM/CBM development.

25.3.2 REGULATORY INFORMATION

Pakistan is transitioning many of the minerals and natural gas entities from government ownership and control to private ownership or public-private ownership. This is part of a larger effort toward deregulation, reducing government debt burden, and taking advantage of the improved efficiency of

market forces. The Privatization Commission (<http://www.privatisation.gov.pk/>) is responsible for the transition.

The Ministry of Petroleum and Natural Resources governs the activities and regulations for the coal mining industry and CMM/CBM industry. The ministry recently released a National Petroleum Policy (PakMinPet, 2009) and is drafting a National Coal Policy.

25.4 Profiles of Individual Mines

Individual mine profiles are unavailable.

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