

9 Czech Republic



9.1 Summary of Coal Industry

9.1.1 ROLE OF COAL IN THE CZECH REPUBLIC

The Czech Republic domestically provided for 1.06 Quadrillion Btu of its total energy consumption of 1.572 Quadrillion Btu in 2012 (EIA, 2014). Coal comprises 40.8 percent of the country's indigenous energy supplies (IEA, 2013). The Czech Republic ranks 27th globally in coal production, producing 54.97 million tonnes (Mmt) of coal in 2012. Its total recoverable coal reserves are estimated at approximately 1.05 billion tonnes (see Table 9-1).

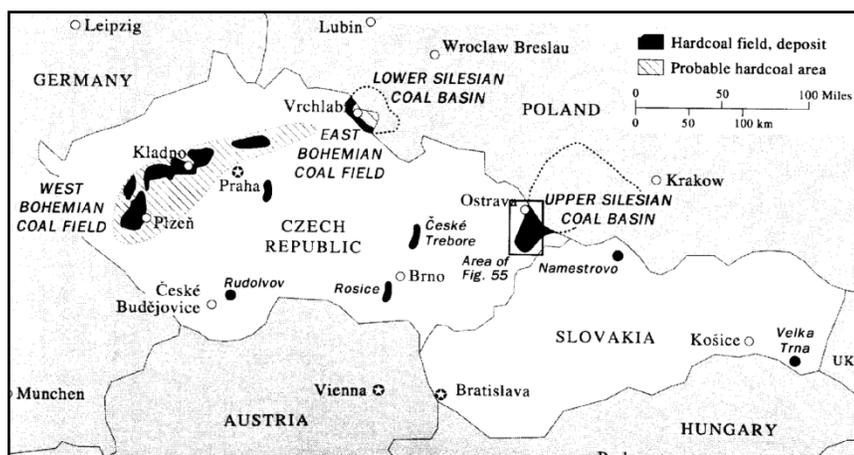
Table 9-1. The Czech Republic's Coal Reserves and Production

Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)
Estimated Proved Coal Reserves (2011)	181	871	1,052	27 (0.118%)
Annual Coal Production (2012)	11.44	43.53	54.97	16 (0.70%)

Source: EIA (2014)

Hard coal occurs mainly in the eastern Silesian region, with the Ostrava-Karviná coalfields (known as "OKR") in the Upper Silesian Coal Basin being the most important black coal field in the country. Brown coal (lignite) is found mostly in the Northern Bohemian Brown Coal Basin (Euracoal, 2014). Other coal basins include the Lower Silesian coal basin (Zacler coal field) and the East Bohemian Coal Field (Kladno district) (Schwochow, 1997). The Republic is an exporter of coking coal to Slovakia, Austria, Hungary, and Poland mainly for steel production (IEA, 2010). See Figure 9-1 for locations of coal deposits.

Figure 9-1. Coal Basins of the Czech Republic



Source: (Schwochow, 1997)

9.1.2 STAKEHOLDERS

Table 9-2 lists potential coal mine methane (CMM) development stakeholders in the Czech Republic.

Table 9-2. Key Stakeholders in the Czech Republic’s CMM Industry

Stakeholder Category	Stakeholder	Role
Mining companies	▪ Ostravsko-Karvinské Doly (OKD)	Project hosts
	▪ Severočeské Doly a.s.(SD)	
	▪ Severní Energetická (formerly Litvínovská uhelná a.s.[LUAS])	
	▪ Vršanská uhelná, a.s. (VUAS)	
	▪ Sokolovská Uhelná a.s. (SU)	
Energy Companies	▪ Green Gas DPB	CMM project identification and investment
	▪ Energie - stavební a báňská a.s.	
	▪ Unigeo a.s.	
	▪ CEZ Group	
	▪ Czech Power Company	
Engineering, Consultancy, and Related Services	▪ RWE Energo	Technical assistance
	▪ See also http://www.epa.gov/coalbed/networkcontacts.html	
Developers	▪ Essar Global	Project opportunity identification and planning
	▪ See also http://www.epa.gov/coalbed/networkcontacts.html	
Natural Gas Transmission & Distribution Companies	▪ RWE GasNet (distribution)	Gas storage and trade Gas transmission Gas production and storage
	▪ RWE TransGas (transmission)	
	▪ Moravske Naftove Doly	
Regulatory Agencies and Government Groups	▪ Ministry of the Environment	Regulation, licensing, permitting
	▪ Ministry for Regional Development	
	▪ Ministry of Industry and Trade	
	▪ Energy Regulatory Office	

Sources: IEA (2010); Euracoal (2014)

9.1.3 STATUS OF COAL AND THE COAL MINING INDUSTRY

The coal industry is important to the Czech Republic's economy and coal will likely remain a key critical energy source through 2030 (Green Gas DPB, 2012). Table 9-3 characterizes the Czech Republic's coal mining industry as of 2008, stating production tonnage for each mine type.

Table 9-3. The Czech Republic's Coal Mines and Coal Production (2008)

Type of Mine	Production (million tonnes)	Number of Mines
Underground (active) mines – total	13.4	6
Surface (active) mines – total	47.0	6

Source: IEA (2010)

The country extracts all bituminous coal through underground mining, using the longwall method, primarily in the Upper Silesian Basin (USGS, 1994), specifically OKR (see Figure 9-1 on previous page). Lignite comprises less than 1 percent of the total coal produced, most of which (90 percent) is extracted through surface mining.

The Czech Republic's accession to the European Union has driven several structural reforms for the country's energy industry, beginning in 1999. As of 2013, the hard coal and brown coal sectors have been completely privatized, comprising five companies (Euracoal, 2014). Ostravsko-Karvinske Doly (OKD) is the last remaining hard coal mining company, which operates 4 underground mines—Karvíná, ČSM, Darkov, and Paskov—producing 12.8 Mmt annually (IEA, 2010).

The remaining companies mine lignite (IEA, 2010 [unless noted]):

- Czech Coal Group—comprised of Severní Energetická (formerly Litvínovská uhelná, a.s. [LUAS]) and Vršanská uhelná, a.s. (VUAS)—operates 2 opencast or surface mines that produced 15 Mmt in 2008.
- Severočeské Doly (SD) operates 2 opencast or surface mines—Doly Nástup Tušimice and Doly Bilina producing 22.8 Mmt of brown coal in 2012, increasing SD's share of brown coal production to nearly 50 percent (Euracoal, 2014).
- Sokolovska Uhelna (SU) operates 2 opencast or surface mines, the Družba and Jiří mines. In 2012, its output was 6.7 Mmt (Euracoal, 2014).

Despite a healthy coal mining industry, the country reduced its coal consumption by more than a third from 1993 to 2012 (EIA, 2014).

9.2 Overview of CMM Emissions and Development Potential

The Global Methane Initiative (GMI) International CMM Projects Database identifies one CMM project in place at an active underground mine in the Upper Silesian Basin. The methane is injected into a gas pipeline for delivery, using 77 million m³ of CMM and 32 million m³ of abandoned mine methane—avoiding a total of approximately 1.56 million metric tons of carbon dioxide equivalent (MMTCO₂E) of emissions (GMI, 2014).

9.2.1 CMM EMISSIONS FROM OPERATING MINES

Methane emissions in the Czech Republic totaled 351.5 million cubic meters (m³) in 2000, are expected to decrease to 294.1 million m³ by 2015, and then anticipated to further decrease to 282.2 million m³ by 2030 (see Table 9-4).

Table 9-4. The Czech Republic's CMM Emissions (million cubic meters)

Emissions	2000	2005	2010	2015 (projected)
Total CH ₄ Emitted	351.5	325.6	306.7	294.1

Source: USEPA (2012)

Green Gas DPB has been a major player in CMM development in the Czech Republic since the 1990s. The company operates mining leases for gas extraction at all closed mine locations in the OKR mining district. The company also purchases superfluous volumes of mine gas from active mines that are incapable of utilizing for their own needs. As the holder of appropriate licenses, Green Gas DPB is also engaged in survey, extraction, distribution and the sale of mine gas (Green Gas DPB, 2014a).

Recognizing the importance and value of CMM, starting in 2004, Green Gas DPB expanded its CMM utilization projects and began installing combined heat and power (CHP) units at active and abandoned mines. The pilot project used gas from closed strata in the Vrbice coalmine and from the Paskov operational coalmine in the Chlebovice region of the Czech Republic and a total of 28 TEDOM CHP units were in operation by 2008, producing 320 terrawatt hours annually (PowerGen, 2009). For example, in 2008, Green Gas DPB installed two CHP units at the Lazy mine where gas-powered engines use mine gas drained from the gas drainage station, which helps ensure the coal miners' safety. Additional projects include ČSA mine, with the first CHP unit installed in 2009 and a second in 2011. Electricity from many of the CHP projects is delivered into local distribution networks and heat is delivered into boiler rooms for mine heating purposes (Green Gas DPB, 2014b).

Other vested companies include a British company, Marine & Mercantile Securities, and Energie - stavební a báňská a.s., entered into a joint venture as Eurogas a.s., to explore existing wells and drill new ones in OKR coalfields between Ostrava's abandoned mines and the Polish border centered around Cesky Tesín and in the south below Frydlandt. Eurogas a.s. is currently researching alternative energy sources, including CMM and coal bed methane (CBM) with the experts from the VŠB - Technical University of Ostrava, Institute of Geonics AV CR, and others in academia (Energie - stavební a báňská a.s., 2014).

9.2.2 CMM EMISSIONS FROM ABANDONED COAL MINES

Green Gas DPB utilizes abandoned mine methane from four production areas in the OKR region with 10 abandoned shafts and 4 wells producing 25 million m³ of methane annually (Green Gas DPB, 2007).

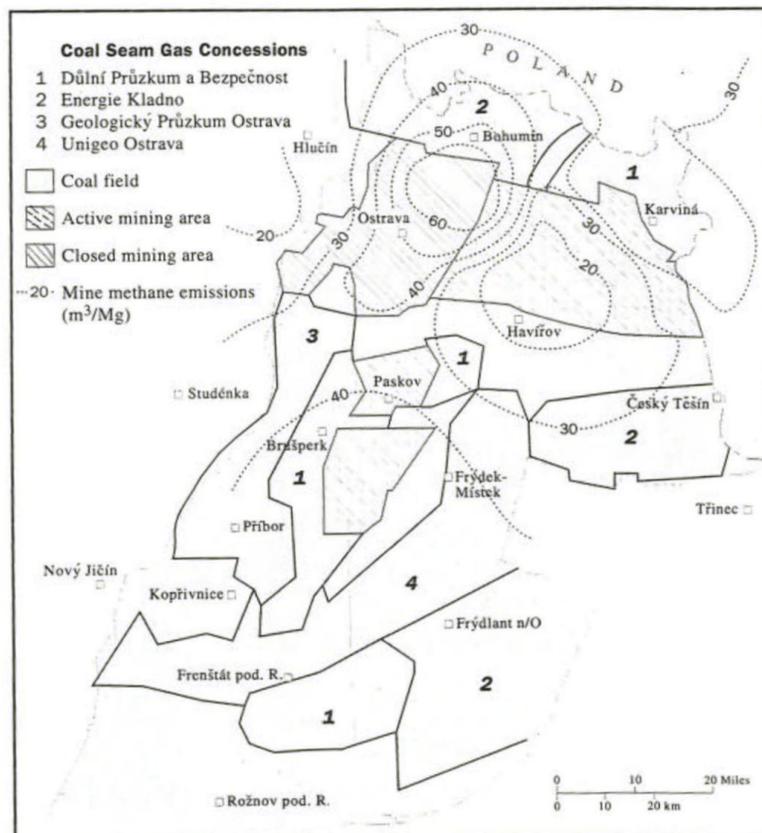
9.2.3 CBM FROM VIRGIN COAL SEAMS

The Czech lignite mines offer no potential for production of CBM from virgin seams or CMM from existing mines (BERR/DTI, 2004).

In 2004, a British study of CBM potential in the Czech Republic reported on the gas in virgin coal seams in OKR coalfields between 1991 and 1998. Twenty surface boreholes were drilled and hydrofracturing was carried out to stimulate gas flow. The survey concluded that the commercial potential for CBM was not viable and further development plans were tabled (BERR/DTI, 2004).

The Czech Ministry for Regional Development and TransGas funded coal seam gas explorations conducted by four companies—Green Gas DPB, Energie stavební a báňská a.s. (via Eurogas, a.s.), GPO, and Unigeo Ostrava—that ultimately received licenses for gas exploration in the OKR coalfields. Figure 9-2 shows the regions of these gas recovery projects (Schwochow, 1997).

Figure 9-2. Mining Areas & Coal Seam Gas Concessions in the OKR Coalfield



Source: Schwochow (1997)

9.3 Opportunities and Challenges to Greater CMM Recovery and Use

The Czech Republic, under the Kyoto Protocol, is committed to an emissions reduction of 8 percent below 1990 levels (UNFCCC, 2006). Its environmental policies are in accord with those stated in

“An Environment for Europe,” by the United Nation’s Economic Commission for Europe, which limits mining activities that are hazardous to human health and environment and promotes efficient use of non-renewable natural resources. The Czech Republic is an Annex I party to the UNFCCC (see Table 9-5). Many registered Joint Implementation projects have been submitted to the Czech Ministry of Environment, but none involve CMM and the Republic has not implemented any Clean Development Mechanism projects (UNEP, 2014).

Table 9-5. The Czech Republic’s Climate Change Mitigation Commitment

Agreement	Signature	Ratification
UNFCCC	June 18, 1993	October 7, 1993
Kyoto Protocol	November 23, 1998	November 15, 2001

Source: UNFCCC (2014)

The Ministry of the Environment is responsible for the implementation of UNFCCC and relevant EU legislation in the Czech Republic. The “National Programme to Abate the Climate Change Impacts in the Czech Republic” (the National Programme) presents the country’s climate protection strategy and contains GHG emission reduction goals as well as mitigation and adaptation measures. The National Programme was developed in accordance with EU requirements and was first approved by the Czech government in March 2004. Based on new scientific information and climate negotiations (within the EU and at UNFCCC/Kyoto Protocol Conferences of Parties), the National Programme was reviewed in 2007, and the Czech Government approved preparation of a new Climate Protection policy in April 2008. A similar task regarding the preparation of an Adaptation Strategy was adopted by the Czech Government in November 2009.

The Ministry of the Environment, together with other relevant ministries, is currently revising these strategic documents to include mitigation measures within the climate protection policy, and an adaptation strategy will include estimates of negative impacts, adaptation measures, legal and economic analyses.

9.3.1 MARKET AND INFRASTRUCTURE FACTORS

The Czech Republic faces a number of barriers to achieving greater CMM recovery. First, the continuing trend of declining coal production (i.e., down approximately 30 percent since 1993) in the Republic is detrimental to the growth of CMM development. Second, unusual topography in the coalfields hinders CBM recovery projects. Still, because of its large coal deposits, the Czech Republic ranks high globally in its potential for CMM development.

The Czech Republic’s electricity price structure favors generation from mine gas fired power plants. The Republic’s legislation provides for a “green bonus” for AMM and a “surcharge” for use of CMM in electricity generation (Green Gas DPB, 2007).

New technologies for CMM recovery are available and being implemented, but not broadly. No significant R&D projects were found in place to enhance the current CMM recovery technologies.

Green Gas DPB works with OKD to sell methane from active mines in the OKR district through long-term agreements, and the company is the only entity awarded a state license for exploration and extraction of methane from closed mines (Green Gas DPB, 2012). Over a 5-year timeframe, Green Gas DPB mitigated 5.7 Mmt of carbon dioxide equivalent from the mines in which it operates.

9.3.2 REGULATORY INFORMATION

The Czech coal industry is no longer subsidized. Companies that are no longer operating active coal mines receive subsidies only to pay for rehabilitation of the environment at mine sites, technical liquidation of the mines, and healthcare for former workers (IEA, 2010).

In the 1990s, the Czech government placed restrictions on the extent and impact that coal mining could have on surrounding regions. These restrictions limit the expansion of some coal mines and new coal mine development. In June of 2010, the new coalition government announced that the restrictions would remain for at least four years (Prague Post, 2010).

Starting on January 1, 2005, the Czech natural gas industry began its liberalization (EC, 2007). Vertical unbundling was also accomplished during this period. Producers, distributors, and natural gas storage companies were separated and regulations enforced to prevent possible conflicts of interests of regulated utilities and to improve service costs, transparency, and competition (Mejstrik, 2004).

Although Czech Republic relies on domestic coal for most of its energy needs, it also imports substantial amounts of gas. This makes domestic generation of CMM and CBM an attractive proposition. Holders of CBM production licenses pay a fixed annual fee per unit area and a variable royalty (about 5 percent) based on a percentage of production. However, the gas prices are set centrally by the Energy Regulatory Office, which is hindering the development of the CMM market (Pilcher, 2003).

9.4 Profiles of Individual Mines

Information on individual hard coal mines—including Karviná, ČSM, Darkov, and Paskov Mines—can be found at the OKD website (<http://www.okd.cz/en/coal-mining/how-coal-is-mined-in-okd/>), and information on both hard and brown/lignite mines can be found in Table 2 of the *USGS 2012 Minerals Yearbook – Czech Republic [Advance Release]* (<http://minerals.usgs.gov/minerals/pubs/country/2012/myb3-2012-ez.pdf>).

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