# Czech Republic - Coal sector challenges and opportunities

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## Market Overview

The Czech Republic has a population of 10.5 million people and covers a total area of 78,866km2. It has a stable and prosperous market economy. The Czech Republic is a member of the European Union (EU) which continues to be Australia's second largest trading partner and largest source of foreign direct investment.

The Czech Republic is located in the economically significant and fast growing Central European region which has a population in excess of 120 million and is highly integrated into the 500 million European Union (EU) market population. Economic growth in the Czech Republic continues to remain strong with the forecasts for 2015 of 2.8% growth expected to be above average EU growth rates.

## Executive Summary / Resource Sector Overview

The value of the Czech Republic's mining sector is approximately A$3 billion *(Source: Business Monitor International Czech Republic Mining Report 2014, pg 7)*, employs 26,000 people with 13,000 working in underground mining *(Source: The State Mining Authority of Czech Republic, Mining Yearly 2013 (PDF) – Tables: 5.2/4 pg 159)*. The major commodities mined are hard coal, lignite and uranium. The mining sector is supported by a relatively small but traditional mining equipment, technology and services (METS) sector. The Czech Republic also has sound expertise in resources education[i], research and development with a special focus on deep underground mining and related issues.

The Czech Republic is the 4th largest coal producer in EU) and will remain one of Europe's largest coal producers as the country continues to rely on domestic coal output for heat and electricity generation *(Source: Euracoal, Coal in Europe (PDF), 2013)*. Large-scale coal reserves are domestically important as coal-fired power generation accounts for around 60% of the country's total electricity output. It is forecast that Czech coal output will reach 53.4 million tons in 2018. *(Source: Business Monitor International Czech Republic Mining Report 2014, Table: Czech Republic – Mining Industry Forecasts, pg 20)*.

The Czech coal sector is facing some significant challenges in the near term due to relatively high costs of production, particularly in the hard coal sector. Currently the cost of production is high and unsustainable at current world prices. There is a significant restructuring program underway to better align production costs to global prices.

The resource sector in the Czech Republic is facing significant challenges which will need to be addressed in the next 5 years. Through partnering with local companies Australian companies can offer products, services and solutions to assist the Czech industry address these challenges.

This paper will provide an overview of key opportunity areas for Australian firms, information on the key segments of the Czech coal sector and profiles of the major producers in the Czech Republic.

## Opportunities for Australian Companies

Opportunities for Australian resource and METS companies are predominantly in the coal mining sector. Specific opportunity areas are:

- Mine Optimisation and profitability.
- Mine safety and rescue – in 2013 there were 605 injuries and four fatalities in the Czech Republic mining sector
- Environmental, social and economic impact assessment studies and strategies.
- CO and $CO^2$ detection and monitoring (both for central and personal applications)
- Recommissioning of closed mines through application of new technologies that would allow previously uneconomic operations to be reopened.
- Personnel training using modern methods of training, including efficient and safe mining practices.
- Tailing processing and remediation
- Coal quality improvement, alternative use of coal, clean coal technologies.

Czech companies have strong connections with adjacent markets in the EU and the broader region. The Czech Republic can offer an opportunity for Australian organisations to access these larger markets in the region via the Czech Republic.

## Coal Overview

Energy production (coal and uranium) is considered important to the Czech Republic as the country's electricity output is dominated by coal-fired (59%) and nuclear power plants (33%) *Source: Eurostat, 'Energy, transport and environment indicators' (PDF) 2013, Table 2.5.2 pg 66).*

Black coal is mined in Upper Silesian Basin which adjoins the Lower Silesian coal basin in Poland. Brown coal and lignite deposits are more dispersed with large deposits in Western Bohemia near the border with Germany. The total coal reserves in the Czech Republic were estimated in 2013 at 25 billion tonnes however only 169 million tonnes of hard coal and 862 million tonnes of brown coal and lignite can be mined under current mining limits.

| *Data in million tonnes* | **Black coal** | **Brown coal** |
|---|---|---|
| Total coal deposits | 16,324 | 8,936 |
| Technically and technologically extractable deposits | 7,493 | 4,425 |
| Deposits extractable under mining limits | 169 | 862 |

*(Source: Mineral Commodity Summaries of the Czech Republic 2013, pg 150 and 154, Oct 2013)*

Coal mining development has been restricted by the Czech Government. It has established environmental mining limits which currently prevent access to over one billion tonnes of coal. There are Government restrictions in place that prevent extention of existing mineable areas and prevent the establishment of new mines. The restrictions were established to protect villages and towns from being affected by mining activities. These restrictions are under review as part of its new Resources and Energy Policy.

Characteristics of hard coal and lignite mined in the Czech Republic are:

| | Hard coal | Lignite |
|---|---|---|
| Calorific value (kJ/kg NCV) | 25,490 - 32,070 | 11,600 - 20,560 |
| Ash content (% a.r.) | 4.3 - 18.9 | 5.97 - 37.8 |
| Moisture content (% a.r.) | 3.5 - 9.9 | 26.46 - 38.3 |
| Sulphur content (% a.r.) | 0.42 - 0.43 | 0.78 - 1.44 |

*(Source: EURACOAL, 'Country profiles Czech Republic', Dec 2014)*

## Hard coal

Black coal (coking coal) is primarily mined by OKD (owned by New World Resources) in north-eastern part of the Czech Republic near the border with Poland. Its annual output in 2013 of approximately 11 million tonnes is primarily used in the steel industry and Czech consumption. It is extracted using continuous mining technology with only 10% being mined using plough technologies.

In 2012 the company increased the depth of its mine to 1,270 metres accessing an additional 20 million tonnes of coking coal. During this period it introduced new technologies including the introduction of an electronic personnel monitoring system *(Source: New World Resources, Open Mine No.2/2012 (PDF) pg 10, 14 and 15)*.

Recently, OKD has experienced significant losses in its operations caused by high investments in technology, a rise in costs, following higher maintenance and underground development costs. It has obtained approval from the Czech Government and investors to restructure its operations and the closure of the least profitable Paskov mine has been postponed *(Source: Mining Technology, NWR to delay Paskov coal mine closure in Czech Republic, 9 Apr 2014).*

To assist the mining region through this restructuring period the Czech Government has been evaluating measures to maintain employment. These measures include investments in environmental protection and measures to reduce the ecological damage of mining activities. This could represent new opportunities for Australian companies that can provide technologies to solve ecological damage caused by historical mining operations, mine closures and water treatment.

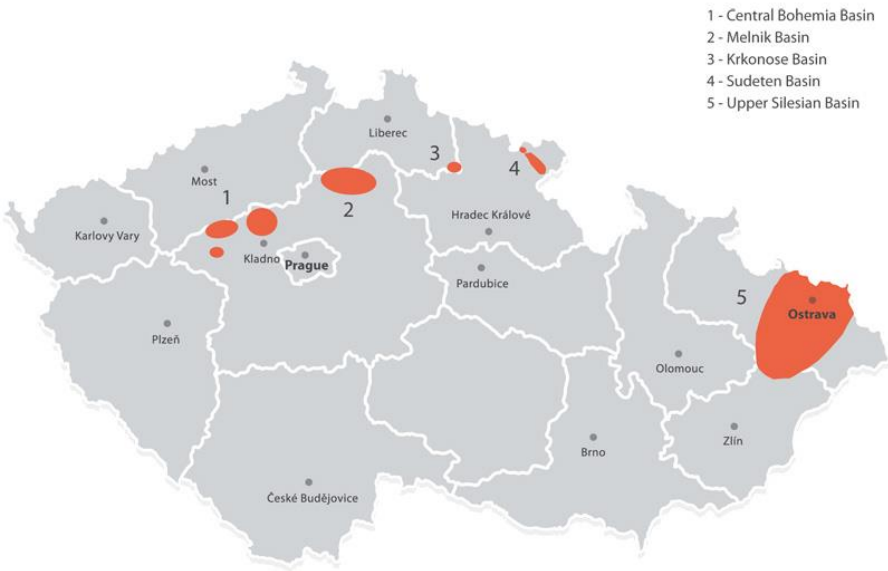


**Figure 1: Hard Coal Mining regions in the Czech Republic** *(Source: Technical University of Ostrava, 2014)*

## Brown coal and Lignite

Brown coal and lignite is mined by three companies in the Czech Republic - Severoceske doly, Czech Coal and Sokolovska uhelna.

Brown coal and lignite is primarily used in power plants in the Czech Republic with only 3.5% of production exported to Slovakia, Germany and Austria. The Czech mining companies are undertaking exploration for new deposits, particularly along the Czech-Polish border where an agreement has been drawn up between the countries to allow for exploration by coal companies. This is in anticipation of the lifting of the current mining restrictions in this area. The companies are also evaluating the possibility of re-opening closed mines through application of modern efficient mining methods.

The existing mines have in recent years been modernising operations through investing in conveyor belts systems and slurry management. Two new automatic filtration slurry presses for slurry dewatering conveyor belt systems were installed with capacity of 25 and 30 tonnes of slurry in 24 hours.

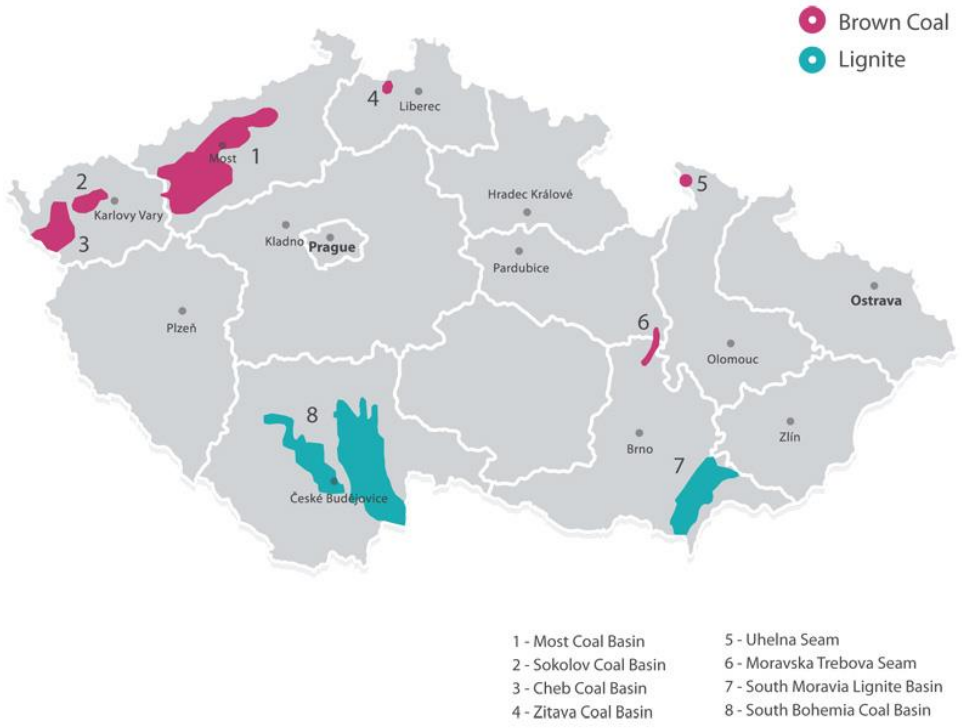


**Figure 2: Brown Coal and Lignite Basins in the Czech Republic** *(Source: Technical University of Ostrava, 2014)*

## Government regulation

For companies interested in mining opportunities in the Czech Republic it is important to be aware of the three constituent acts (mining law) that form the foundation of the country's mining and mineral-related legislation:

- The Mining Act (on protection and use of mineral resources)
- The Czech National Council Act on Mining Activity, the Explosives and State Mining Administration
- The Czech National Council Act on Geological Works.

## Major Resource companies in the Czech Republic

**OKD (New World Resources)** www.okd.cz

OKD is the only producer of hard coal in the Czech Republic. Its mines coal in the southern region of the Upper-Silesian Coal Basin located in the Ostrava-Karvina coal district. The company prospects, mines, processes, refines and sells hard coal. Such coal can be used as fuel; as well as for coke production in chemical industry and many other sectors.

The company mines at four mines (Karvina, Darkov, CSM and Paskov) with annual production of approximately 11 million tonnes of coal.

OKD employs approximately 11,000 employees.

**Czech Coal Group**
www.czechcoal.cz

Czech Coal Group owns two coal companies – Litvinovska uhelna a.s. and Vrsanska uhelna a.s.

Litvinovska uhelna a.s. owns a licence to mine in the area with the largest high-quality brown coal reserves in the Czech Republic (24 million tonnes) with average calorific value of 17.5 MJ/kg. The coal basin is much larger with an estimated 750 million tonnes of high quality brown coal reserves, however mining this area is currently blocked by law due to environmental concerns.

Vrsanska uhelna a.s. operates two mines where mining activities are expected to operate until 2050. This makes it a mine operation with the longest economic lifespan in the country. Most of the coal mined by Vrsanska uhelna a.s. is used to produce electricity.

Czech Coal Group employs over 4,000 employees.

**Severoceske doly, a.s.**
www.sdas.cz

Severoceske doly, a.s. is the largest producer of brown coal in the Czech Republic with average yearly production of 23 million tonnes.

The company operates two mines – Bilina mine (the deepest open cut mine in Central Europe) and Tusimice mine (producing mainly coal for power plants).

**Sokolovska uhelna, a.s.**
www.suas.cz

Sokolovska uhelna is the smallest coal producer in the Czech Republic with annual output of seven million tonnes.

The company operates Jiri, a brown coal mine. Coal is used mainly by power plants to generate electricity.

Sokolovska uhelna is also the largest independent electricity producer in the Czech Republic producing over 3,500 GWh of electricity each year.

## Major R&D institutes and universities focused on mining activities

**VSB – Technical University of Ostrava**
www.vsb.cz

The University consists of seven faculties including Faculty of Mining and Geology, Faculty of Metallurgy and Materials Engineering, Faculty of Civil Engineering and Faculty of Safety Engineering. VSB has been the main mining-oriented university in the Czech Republic since 1945. There are also several research centres specialising in nanotechnology, energy, IT (including supercomputing).

In terms of mining related research capabilities, the key capabilities lie in bulk solids, mine safety and in all aspects related to deep underground mining.

**Czech Technical University, Prague**
www.cvut.cz

The Department of Geotechnics at the Faculty of Civil Engineering is one of the leading Czech training and research institutions involved in geotechnics. The research activities of the department centre around reliability, optimisation and durability of geotechnical structures, sustainable construction, soil structure interaction, performance of challenging geotechnical structures, environmental geotechnics and construction on brownfields.

**The University of Pardubice**
www.upce.cz

The Faculty of Chemical Technology, especially the Institute of Energetic Materials, addresses mining industry challenges. The Institute specialises in chemistry and technology of explosives.

Specialised geology education and research is carried out at three Universities:

- **Charles University in Prague** – www.cuni.cz – Department of Geology at the Faculty of Science Palacky
- **University in Olomouc** – www.upol.cz – Department of Geology at the Faculty of Science
- **Masaryk University in Brno** – www.muni.cz – Institute of Geological Sciences

## Sources

**EURACOAL** - www.euracoal.org
**Ministry of Industry and Trade of the Czech Republic** - www.mpo.cz
**Business Monitor International** – Czech Republic Mining Report 2014, April 2014 – www.businessmonitor.com
**Hornicka rocenka 2013** (Czech Mining Yearbook 2013), published by Montanex a.s. - http://www.cbusbs.cz/hornicka-rocenka.aspx
**Mineral Commodity Summaries of the Czech Republic 2013**, published by the Czech Geological Survey and Ministry of the Environment of the Czech Republic in October 2013

## Contact details

The Australian Trade Commission (Austrade) is the Australian Government's trade and investment development agency. Through Austrade's network of offices in over 45 countries, we assist Australian companies to succeed in international business, attract productive foreign direct investment into Australia and promote Australia's education sector internationally. For more information on how Austrade can assist you, contact us on:

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[i] The Technical University of Ostrava has been providing Mining and Geology university level studies for 165 years