

## SELECTED CHANGES IN EXPLOITATION AND MINING OF MINERAL RESOURCES IN THE CZECH REPUBLIC IN THE PERIOD 1993–2005

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### Abstract

**In the last few years, structure changes in the Czech economy, especially in industry, have influenced both the role and the importance of branches of extracting and processing minerals and materials of mineral origin. Index of mineral production share of the GDP reflects the changes, as it has decreased from 3.7% in 1993 to 1.3% in 2005. Mining industry has to a large extent negative impact on the environment. That is why production restrictions in many deposits have a positive effect on landscape and nature and on other factors with environmental impacts. Very important is decrease of mineral production in protected landscape areas. Mining in these areas has reached the half level in 2005 compared to 1993. However, there still exist protected landscape areas where restrictions have not been materialized and even when an extent of mining has increased.**

**KEY WORDS:** mining spaces, mineral resources, building minerals, limestones

### 1. INTRODUCTION

In the last few years, structure changes in the Czech economy, especially in industry, have influenced both the role and the importance of branches of extracting and processing minerals and materials of mineral origin. Market economy caused a restriction or even termination of mining of non-economic deposits, where mining continued with the help of state subventions in the past. All mining was stopped in the deposits of ores, the mining of coal has been limited significantly in many regions. The mining of uranium ores was strictly limited.

### 2. MINING SPACES IN THE CZECH REPUBLIC

At present, (as of 31<sup>st</sup> December 2005), in the Czech Republic, there are 1004 mining spaces (claim) with a total area of 1 480 km<sup>2</sup> (2% of the state territory). The delimitation of the mining space is only the beginning of a procedure which will end with permission

granted for mining entailing the beginning of the anthropogenic transformation of the relief. The mineral sources in the Czech Republic are owned by the state. They consist of deposits of selected minerals ("exclusive deposits"). Additionally, the protected deposit area is established for exclusive deposits of mineral resources (in accordance with the Mining Law – see below), where construction activities unrelated to the extraction of the exclusive deposit are limited. When considering the fact that nearly 90 % of the mineral resources in the Czech Republic are extracted from opencast mines, the extent of anthropogenic influence on the landscape is obvious. The extraction itself is controlled by the applicable Bureau of Mines.

At present, the importance of extraction of mineral resources has been shifted from the area of public interest to the focus of interest of private mining companies which are attempting to gain economic profit from the mineral resources of the territory. This also results in a range of conflicts of interest between municipalities along with citizen-action associations and the mining companies. Nevertheless, the "mining lobby" plays an important role in regional development. In areas with underdeveloped economies in particular the presence of mining companies is approached mostly positively. They represent an important source of income for the municipal budget and often contribute to off-budgetary incomes despite the landscape risks and environmental impacts resulting from the extraction activities. The municipalities where the extractions are carried out benefit from the income in the form of remunerations set by the mining law as settlement for the allotments and compensations from the extracted minerals in accordance with the § 32a of the Law no. 44/1988 Coll., within the meaning of the Law of ČNR no. 541/1991 Coll. The accounts on which the remuneration's are paid are kept by the applicable Bureau of Mines which then distribute this money to the authorised beneficiaries, i.e. to the municipalities and the state budget. The annual payment of an mining space larger than 2 hectares is CZK 10,000 and it is multiplied with each extra km<sup>2</sup>. The annual payment for mining spaces smaller than 2 hectares is CZK 2,000.

According to the Mining Law, the annual compensation for the extracted minerals is calculated as a percentile share of the total receipts for the extracted mineral at the actual market price (the maximum share is 10 %). 25 % of the amount paid to the Bureau of Mines is transferred to the state budget of the Czech Republic. This money is used for reparation of damages to the environment caused by the extraction of exclusive and non-exclusive deposits. The remaining 75 % is transferred to the budget of the municipality. Remuneration is paid in accordance with the kind of extracted mineral. The actual rate depends on the kind of mineral resource and is set by Decree no. 617/1992 Coll of the Ministry of Economics, with, for example, 5% for oil and natural gas, 0.5% for underground mined coal, 1.5 % for opencast mined coal, 8 % for kaolin (China clay), 10 % for high-percentage limestones, 3 % for other types of limestone and other cement mineral resources, etc.

Table 1: Mining spaces in the Czech Republic (1993 and 2005 compared)

mineral	Number of mining spaces			Total area of mining spaces		
	1993	2005	Index 2005/1993 (%)	1993	2005	Index 2005/1993 (%)
Hard coal	38	27	71,1	524,4	374,5	71,4
Brown coal and lignite	54	36	66,7	458,4	305,8	66,7
Crude oil and natural gas	27	93	344,4	253,9	432,7	170,4
Ores	18	5	27,8	29,6	5,6	18,9
Radioactive raw materials	16	11	68,7	99,7	65,6	65,8
Kaolin	25	27	108	9,6	11,1	115,6
Building stone	351	385	109,7	60,5	66,2	109,4
Gravel sand, sands	165	173	104,8	109,2	114,8	105,1
Limestones and dolomites	63	50	79,4	28,6	26,2	91,6
Brick raw materials	175	109	62,3	36,7	25,1	68,4
Other minerals	184	88	47,8	77,1	52,1	67,6
Total	1091	1004	92	1678,1	1479,7	88,2

Source: Makarius, R. ed. (1993, 1995, 2005); Kavina P. ed.(2004); database Bureau of Mines

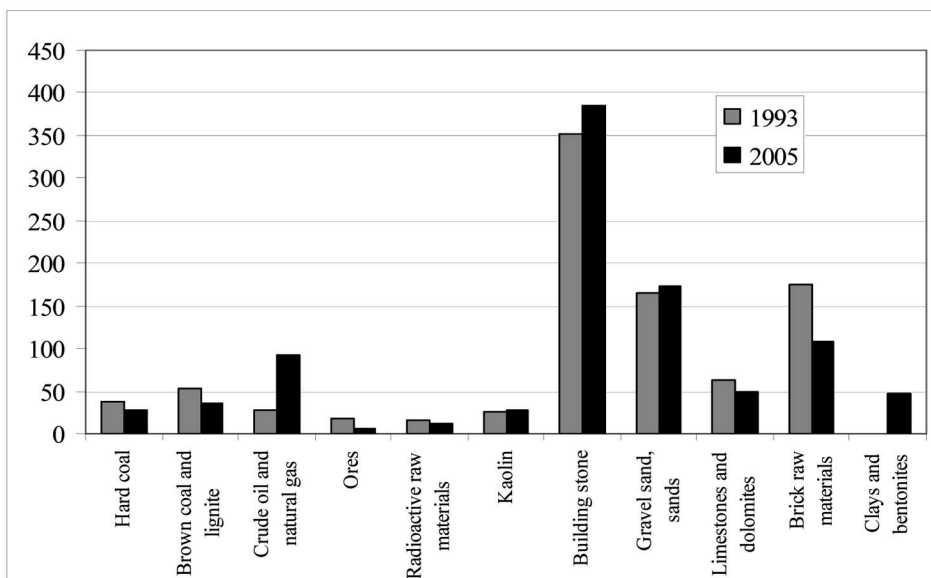


Figure 1: Number of mining spaces in the Czech Republic in the year 1993 and 2005 (comparison)

Source: Makarius, R. ed. (1993, 1995, 2005); database Bureau of Mines

### 3. EXTRACTION OF MINERAL RESOURCES IN THE CZECH REPUBLIC

Although in modern history the Czech Republic and the previous state formations within its present area did not rank among leading mining countries, the utilisation of domestic raw deposits was high in the past. Over the course of each individual historical period, priorities in terms of extraction of minerals changed, and this was reflected in the varied intensity of extraction with a number of consequences including noticeable changes in the relief. Ore extraction has, for example, a particularly old tradition with the oldest archeological evidence of gold panning dating back to the 9<sup>th</sup> century B.C. In the Middle Ages, Bohemia was the centre for European mining of gold and silver. The last boom in mining was after 1948, during the period of socialist industrialisation when ore deposits were extensively extracted, even at the cost of substantial financial losses. Particularly common was that after long-term historical deep mining which damaged the environment to a relatively limited extent, i.e. without substantial anthropogenic transformations of the relief with a maximum attempt at effectiveness, the mining in the 1950s and 1960s broadly affected vast areas with a number of accompanying adverse effects. Vast opencast mining resulted in the destruction and liquidation of numerous underground mines, but especially the emergence of new anthropogenic shapes on the surface. The extraction was often accompanied by vast regulations of waterways and the emergence of new accumulated waste heap formations. After 1989, ore extraction was cut back considerably and later the mining of base metal deposit (+ Au) in Zlaté Hory was terminated. In 1994, ore extraction was definitively brought to an end in the Czech Republic. At present, the areas affected by extraction have been redeveloped and rehabilitated.

A somewhat different trend can be observed in the mining of deposits for energy producing raw materials. Coal has been mined from the beginning of the industrial revolution and the mining of uranium ore began after World War II. The extraction of energy producing raw materials reached its height in the second half of the 1980s. After 1989, a state reduction programme was launched, and the previous extensive mining was reduced considerably. Additionally, volume and territorial limits were set for coal mining. The extraction of uranium ore has also been substantially reduced and is limited to the Rožná deposit, where the uranium ore is mined by the traditional deep-mining method. In North Bohemia, however, uranium is attained through the leaching of in situ within the arms of the liquidation program at the deposit in Stráž pod Ralskem.

In contrast, the extraction of oil has been dynamically developing of late in South Moravia in the area around Hodonín and Břeclav. There is also new interest in the extraction of oil and natural gas in the Beskydy Mountains in the Trojanovice region where vast deposits of black coal have been found. The Trojanovice allotment was designed for the purposes of extensive stone-coal extraction back in 1989, and with its area of 63 km<sup>2</sup> is the largest allotment in the Czech Republic. At present, coal mining is concentrated in two areas: Podkrušnohoří (brown coal) and the Ostrava basin (black coal).

Table 2: Extraction of mineral resources in the Czech Republic (1993 and 2005 compared)

Mineral	Extraction (103)		Index number 2005/1993 (%)
	1993	2005	
metallic ores out of uranium ore)	131	0	0
uranium ore (t)	437	124	28,4
hard coal (t)	18 296	13 252	72,4
brown coal (t)	63 335	44 619	70,4
crude oil (t)	111	301	271,2
natural gas (m <sup>3</sup> )	244	221	90,6
kaolin (t)	2 326	3 884	167,0
building stone (m <sup>3</sup> )	9 677	13 684	141,4
gravel sand, sands (t)	12 305	15 921	129,4
limestones (t)	10 071	9 778	97,1
brick raw materials (m <sup>3</sup> )	1 354	1 939	143,2

Source: Makarius, R. ed. (1993, 1995, 2005); database Bureau of Mines

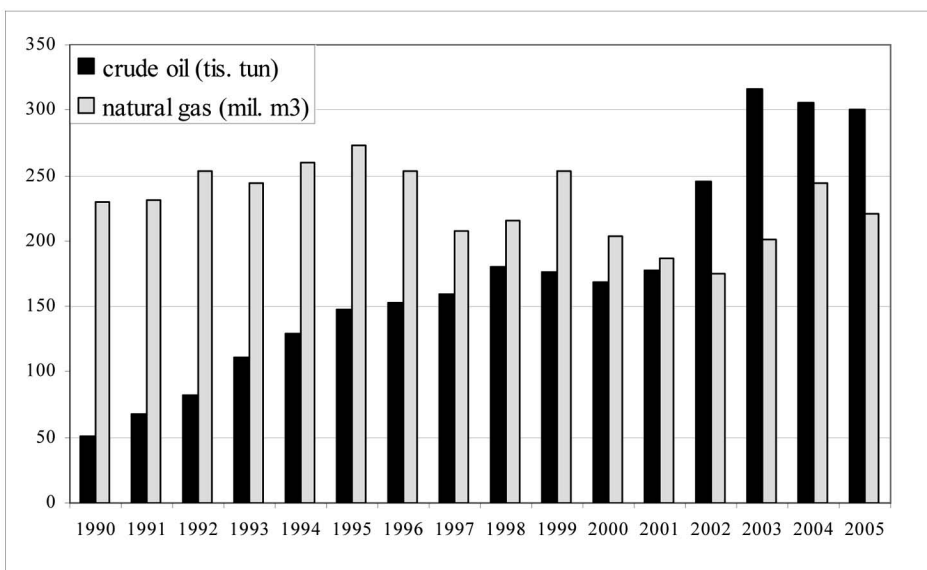


Figure 2: Extraction of crude oil and natural gas in Czech Republik in the period 1990-2005.

Coal mining in Podkrušnohoří, consisting of the largest destruction to the environment, in terms of volume, in the Czech Republic, began at the end of the 18<sup>th</sup> century in locales with outcrops of coal seams and in shallow opencast mines. Since the second half of the 19<sup>th</sup> century, the mining has become more intensive and the North Bohemia coal district has become the most important coal district in Central Europe. Deep mining methods predominated at all of the basins (Chebská, Sokolovská, Severočeská) at that time. From

the beginning of the 20<sup>th</sup> century, the amount of opencast mining has been increasing, resulting in vast devastation to the landscape. While the number of opencast mining was about 25% of the total volume of mined coal at the end of the 1930s, in the 1950s, it had reached an absolute majority. The first reduction in extraction occurred in the southwest area of Podkrušnohoří in 1833, where mineral water resources protection zones were established for spa purposes. Consequently, the highest volume of extraction was concentrated in the Severočeská hnědouhelná pánev (SHP, North Bohemia Brown-Coal Basin) where 3,5 mld. tons of coal have been extracted so far, of which 2,6 mld. tons (74,2%) in opencast mines. In the Sokolov basin, more than 1 mld. tons of coal have been mined.

### **3.1. Building minerals**

In addition to minerals fuels, industrial minerals represent the most important group of raw materials in the territory of the Czech Republic. In this group the largest reserves are of limestones, kaolin, clays, bentonite and natural (glass and foundry) sand. Other industrial minerals represent smaller nevertheless important raw material potential of the national economy. Kaolin, quartz sand, limestone, clays, feldspar and dimension stone are also important export commodities. There are very high geological reserves of construction materials – building stone, sand and gravel and brick clays – in the Czech Republic.

The landscape contains giant opencast mines, originating due to large volumes of extracted mineral resources, with noise and dust disturbing the surrounding environment and the natural system of groundwater often disturbed. Among the non-ore raw mineral resources, the extraction of limestone has a special position. The largest opencast mines include Mokrý u Brna in Moravský kras, Čertovy schody and Mořina in Český kras, Kotouč near Štramberk, Hranice in Central Moravia and Prachovice in Železné hory mountains. Opencast extraction of limestone often results in disturbances to the hydrogeological environment.

According to use, the limestones in the Czech Republic are classified into the following grades: limestones with very high percentage of CaCO<sub>3</sub> (containing at least 96% of carbonate component), other limestones (with carbonate content at least 80%), clayey limestones (with CaCO<sub>3</sub> content over 70% and higher content of SiO<sub>2</sub> a Al<sub>2</sub>O<sub>3</sub>) and carbonates for use in agriculture.

Karst regions in the Czech Republic represent a group of isolated areas with special landscape values. They were frequently infracted by small-scale quarrying in the past and today the abandoned quarries usually represent remarkable landscape features. On the other hand, large-scale quarrying started to intensify in the 1960s and has introduced significant disturbances into the landscape. Although the overall amount of limestone extracted in the Czech Republic has decreased recently, more than one third of its production continues to be quarried from specially protected areas.

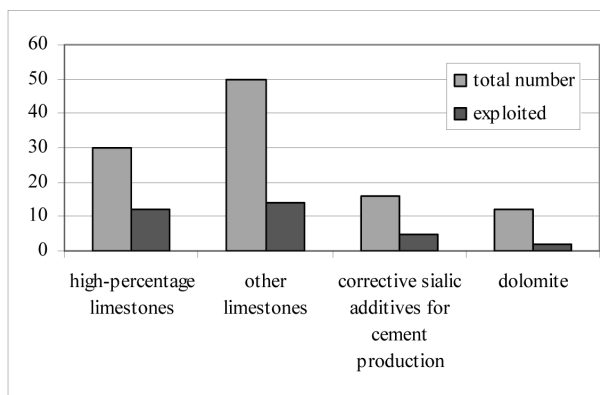


Figure 3: Registered deposits limestones and dolomite (as of 01.01.2005)

Source: Makarius, R. ed. (1993, 1995, 2005); database Bureau of Mines; Kavina P. ed.(2004)

Table 3: The largest extracted mining areas (MA) of limestone (as of 01.01.2005)

mining area	total area (ha)	year of assesment MA	mining companies	conflicts of interests <sup>3)</sup>
Skoupý	336,6	1961	Agir s.r.o.	-
Suchomasty I	310,2	1975	Velkolom Čertovy schody a.s.	PLA <sup>4)</sup> Český kras (Bohemian Karst)
Mokrá	265,9	1959	Českomoravský cement a.s. <sup>2)</sup>	close vicinity of PLA <sup>4)</sup> Moravský kras (Moravian Karst)
Chotěšov <sup>1)</sup>	220,1	2002	Lafarge Cement a.s.	accumulation area of underground waters
Úpohlavy	167,2	1967	Lafarge Cement a.s.	accumulation area of underground waters
Mořina	151,6	1961	Lomy Mořina s.r.o.	PLA <sup>4)</sup> Český kras (Bohemian Karst)
Štrambersk I	118,2	1964	Kotouč Štrambersk s.r.o.	valuable archaeological location (cave Šípka)
Prachovice	111,1	1971	Holcim (Česko) a.s.	close vicinity of PLA <sup>4)</sup> Železné hory
Koněprusy	85,7	1963	Velkolom Čertovy schody a.s.	PLA <sup>4)</sup> Český kras (Bohemian Karst)
Zadní Kopanina I	58,1	1959	Českomoravský cement a.s. <sup>2)</sup>	PLA Český kras <sup>4)</sup> (Bohemian Karst)
Dolní Lipová	56,9	1967	OMYA a.s.	balneology (spa Lipová, spa Jeseník)
Úpohlavy I	54,0	1991	Lafarge Cement a.s.	accumulation area of underground waters

Source: Makarius, R. ed. ( 2005); database Bureau of Mines

Comments:MA = mining area; 1) mining area under survey and development;

2) part of HeidelbergCement;

3) conflicts of interests - localization of mining areas in connection to the protected localities

4) PLA = protected landscape area

Table. 4: The largest mining companies of limestone and dolomite (as of 01. 01. 2006)

Mining companies	extraction (thousand t)	mining area
Lomy Mořina a.s.	1 623	Mořina, Holý vrch, Tetín
Velkolom Čertovy schody a.s. <sup>2)</sup>	1 570	Koněprusy, Suchomasty
Lafarge Cement a.s.	1 190	Chotěšov, Úpohlavy
Českomoravský cement a.s. <sup>1)</sup>	1 111	Mokrá, Hvižďalka, Špička, Loděnice
Holcim (Česko) a.s. Prachovice	961	Prachovice
Cement Hranice a.s. <sup>3)</sup>	841	Hranice, Černotín
Vápenka Vitošov	756	Vitošov
Kotouč Štramberk s.r.o.	613	Štramberk
OMYA a.s. <sup>5)</sup>	334	Dolní Lipová
Hasit Šumavské vápenice a omítkárny a.s. <sup>4)</sup>	288	Hejná - V. Hydčice

Source: Makarius, R. ed. (1993, 1995, 2005); database Bureau of Mines; annual reports

Poznámky: 1) part of HeidelbergCement; 2) part of Lhoist; 3) majority shareholder since 1997 of concern Dyckerhoff; 4) part Hasit Group; 5) part of concern OMYA A.G.

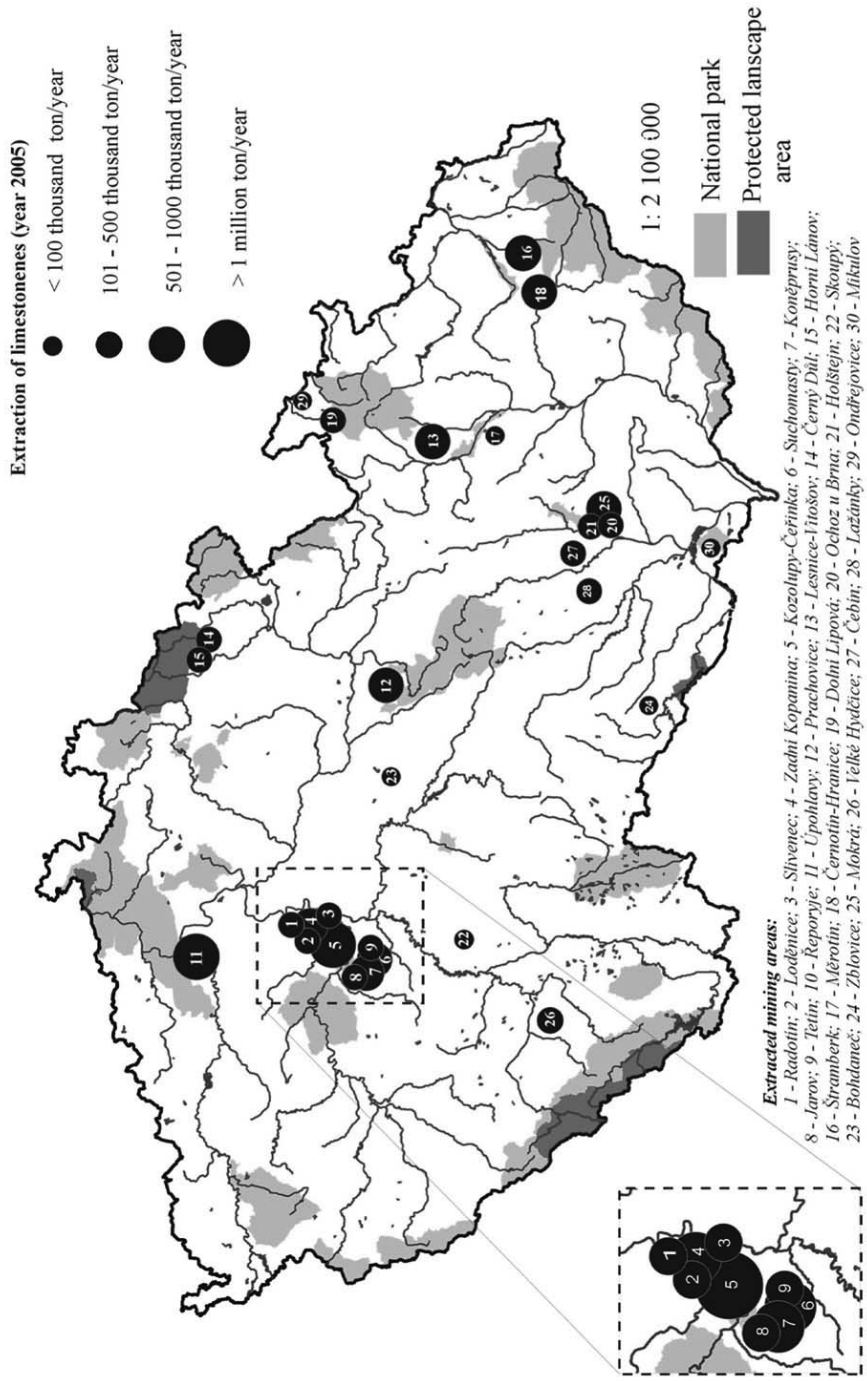


Picture 1: Extraction of limestone a: locality (mining area) Měrotín, b: locality (mining area) Vitošov; (author: I. Smolová, 2006)

#### 4. ENVIRONMENTAL CONSEQUENCES OF EXTRACTION OF SELECTED MINERAL RESOURCES IN THE CZECH REPUBLIC

Extraction of mineral resources on the territory of the Czech Republic operates on the Law on Protection and Utilization of Mineral Wealth (No. 44/1988), which, among others, newly established the status of Protected Deposit Territory (PDT). Within PDT, for the sake of protection of mineral wealth, it is forbidden to establish constructions and equipment not related to the extraction of the deposit. For the sake of protection of nature and landscape there are further limitations determined for the extraction of mineral resources, especially those resulting from the Law on Protection of Nature and





Picture 2: The largest extracted mining areas of limestone (as of 1. 1. 2006)

Landscape (No. 114/1992, as amended by the Act of Parliament No. 218/2004), which states that on the whole territory of National Parks (NP) it is forbidden to extract minerals, rock and humolites, except for building stone for buildings on the territory of NP, and that on the territory of Protected Landscape Areas (PLA) it is forbidden to “transform the preserved natural environment”. However, explicit restriction of extraction applies to the 1<sup>st</sup> PLA zones only. Moreover, there are further restrictions in the protective zones of water resources, protected areas of accumulation of underground and surface waters, in the protected area of spas, etc. As of 1992 new intentions to extract raw materials were subject to consideration of their impact on the environment by application of Law No. 244/1992 Coll. In 2002, in line with the laws of European Communities, a new Law came into force - the Law on Consideration of Environmental Impact (Law No. 100/2001 Coll., lat amendment in 2004 (Law No. 93/2004)). The consideration of environmental impact by the procedure EIA (Environmental Impact Assessment) in this law applies to determined intentions and concepts, the realization of which should have significant impact on the environment. The intentions and concepts are listed in two categories. One comprises intentions subject to consideration at all times (e.g. establishment of a new mining area or modification of an existing one, underground mining of coal exceeding 100 thousand ton/year, increase of open-cast mining exceeding 1 million ton/year, or extraction of mineral resources between 10 thousand and 1 million ton/year). The other category comprises intentions requiring declaratory proceedings. This is required for example for underground mining exceeding 100 thousand ton/year, extraction of other raw materials exceeding 10 thousand ton/year, or increase of existing extraction to 1 million ton/year.

The most extensive conflicts of interests are caused in the cases of extraction of limestone and other carbonates. With respect to exceptional nature of karst areas most karst localities are protected by law and extraction on their territory must be permitted by exception given by the Ministry of Environment. In the last few years the extraction of limestone in specially protected areas is of opposite trend than in the cases of other raw materials. Despite the fact that the total volume of materials extracted in specially protected areas has decreased within the period from 1990 until present (see Diagram 1), in case of limestone the volume of its extraction has increased in the last few years after a decrease in the early 1990's. Whereas in 1995 the extraction of limestone in protected landscape areas was 2 327 thousand ton, i.e. 21.6 % of their total extracted volume in CR, then in 2003 this figure increased to 3 381 thousand ton, which is over a third of the total extraction of limestone in CR. Therefore the rate of the growth index for the period of 1995–2003 reached 145 %. Moreover, there are several other mining areas localized in close vicinity of specially protected areas. Right behind the boundary of PLA Železné hory Mountains there is extraction in progress with the volume exceeding 1 million tons/year in MA Prachovice (Holcim (Česko) a.s. Prachovice) as well as in close vicinity of PLA Moravian Karst in MA Mokrý (HeidelbergCement).

The extraction of limestone seriously loads the PLA areas, which can be documented by the volume of extraction averaged to 1 km<sup>2</sup>. Among all PLA in CR, extreme loading is in PLA Bohemian Karst, where the load exceeds 26 thousand ton of produced raw

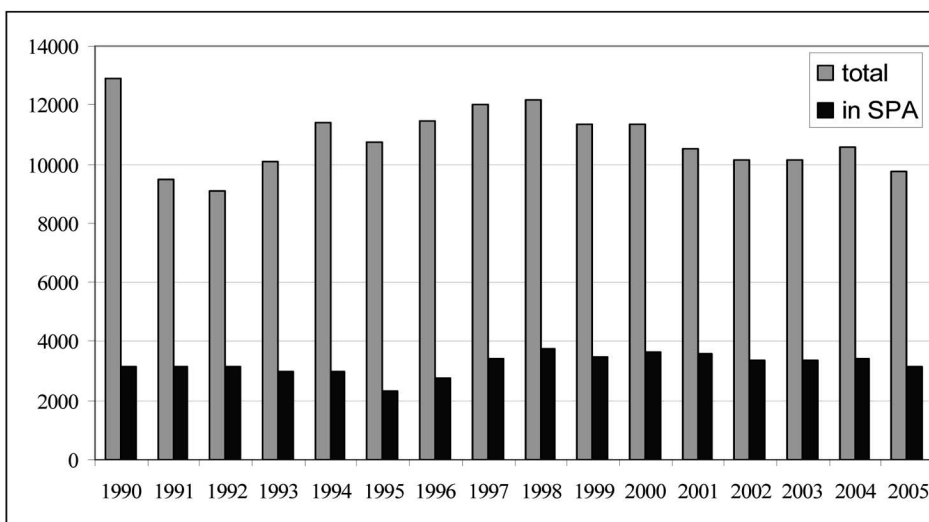


Figure 4: Extraction of limestone in the Czech Republic in the period 1990–2005 (extraction in thous. tons).

Note: SPA = Specially protected areas

Source: Makarius, R. ed. (1995, 2005); Kavina P. ed.(2004); database Bureau of Mines;

material from 1 km<sup>2</sup> and in the last few years this trend continues (Diagram 2), while it is considered that high loading is loading exceeding 10 thousand ton from 1 km<sup>2</sup>. High loading by the extraction of limestone is also in PLA Moravian Karst (2 thousand ton of produced raw material from 1 km<sup>2</sup>) or in PLA Pálava Hills, which is one of the six UNESCO biospherical reserves in CR (0.8 thousand ton of produced raw material from 1 km<sup>2</sup>). Despite the effort of, primarily, ecological associations to reduce extraction in specially protected areas, it is very hard to reduce the extraction in most localities, the only outcome is that construction of new cement works was not realized (e.g. Tmaň in Bohemian Karst). A unique project, for the time being, is “Extraction of Limestone - Example of Involvement of the Public into the EIA Process”, which was supported by the Ministry of Environment and which brought, for example, preclusion of further expansion of mine Čertovy schody in Bohemian Karst. Apart from that, also new areas for extraction are approved, which is always subject of consideration. Since 2001, the following limestone extraction areas were approved: MA Chotěšov near Litoměřice (in 2002) and MA DP Líšeň II in Brno. MA Hvozdečko near Olomouc, with expected extraction of 40 thousand ton/year, is being approved currently.

#### 4.1. Anthropogenic landscape features created by mining

Following the termination of mining activities, anthropogenic landscape features like quarries, sand pits, gravel pits, mullock tips, and spoil banks, may transform into valuable localities, favourably enhancing ecological stability in the area by advancing its landscape

diversity. Exposed quarry walls and bottoms as well as newly formed water bodies often represent suitable habitat conditions for various plant or animal species. Favourable conditions arise especially in mining areas fully left to natural succession. Botanical and zoological surveys often record even critically endangered species in localities of this type. It is possible to utilize abandoned mining areas by their integration into the natural environment in the form of landscape parks, botanical gardens or arboreta. As an example of this approach, environmental restoration of a former lime pit in the town of Štramberk (northern Moravia) is mentioned. A botanical garden and an arboretum have been developed there since 1996, covering approximately 10 hectares of the abandoned mining area and its close surroundings.

#### 4.2. Water bodies created by the extraction of raw materials

Water bodies are important landscape elements. They may also occur as a result of extraction activities. Water bodies are created as a consequence of activities in some pit quarries, sand quarries, gravel quarries or clayfields. Most commonly they are created by extraction of gravel-sands in flood plains where the mining area gets submerged during the extraction itself and the extraction then proceeds from the bottom of the water body (anthropogenic lakes). Water infilling the mined depression is of alluvial water type, which penetrates through the permeable fluvial sediments. In case of extraction of building raw materials (granite, kaolin, coal, lignite, limestone, etc.) the quarries may get submerged after completion of extraction activities by meteoric water or irruption of underground water in case of insufficient drainage or within recultivation (so-called hydrologic recultivation).

After completion of extraction activities the water bodies offer in particular recreation utilization, some of them also become important biocenters and are then protected by law. Important biocenters are in particular abandoned sand quarries in flood plains. As an example, we may take specially protected areas in the flood plains of River Morava. For example, in PLA Litovelské Pomoraví it is *NM Bázler's Sand Quarry* (0.28 ha, 1993) serving as an important refuge of amphibians in the midst of agricultural landscape, *NR Chomoutov Lake* (106.2 ha, 1993) protecting a shallow lake with several islets, important for nesting and migration of water fowl, or *NR Moravičany Lake* (92.2 ha, 1994) protecting one of the three large water bodies created by the extraction of gravel-sand in the Mohelnice Furrow. Extraction of some raw materials causes the creation of specific water environment in the immersed area (with extreme pH, increased content of minerals, etc.), to which some exceptional species of fauna and flora are united, like the *Chomoutov ("Alum") Lake* in the northwestern outskirts of Chomoutov. Also water in the *Hromnice (Red) Lake* north of Pilsen is of extraordinary composition; the lake was created by accumulation of aggressive sulphurous water in a 60-meter deep quarry for the extraction of ampelite. Even today the meteoric water outwashes sulphates from the surrounding refuse piles and the sulphates keep accumulating in the quarry. The water is so acidic (pH 2.6–2.8) that it is virtually lifeless, apart from algae.



Picture 3: Water bodies created by the extraction: a) locality Nová Ves - Litovel b) locality Žermanice - natural monument Žermanický lom (author: I. Smolová, 2005)

Besides small water bodies with high biodiversity, there are also other water bodies planned to be created in the *Krušné hory Mountains area* within the hydric recultivation, which will rank among the largest in area in our country. After termination of lignite mining, large part of open pits is to be submerged in water. An example of already submerged quarry is the former quarry Barbora near Teplice, on the shores of which a luxurious residential area is being built. The planned lake Libouš is to have an area of more than 500 ha and maximum depth of 56 meters. The water resource should be the River Ohře. The projected lake Bilina (with an area of 1,145 ha) and maximum depth up to 170 meters should also be watered from the River Ohře. If this northern Bohemian project is realized, the largest anthropogenic lakes in CR will be created.

## 5. CONCLUSION

Although in modern history the Czech Republic and the previous state formations within its present area did not rank among leading mining countries, the utilisation of domestic raw deposits was high in the past. Over the course of each individual historical period, priorities in terms of extraction of minerals changed, and this was reflected in the varied intensity of extraction with a number of consequences including noticeable changes in the relief. At present in the Czech Republic, there are 1004 mining spaces with a total area of 1 480 km<sup>2</sup>. In 2005, 540 deposits were in operation in the Czech Republic, out of which 132 million tons of mineral resources were extracted. At present, the importance of extraction of mineral resources has been shifted from the area of public interest to the focus of interest of private mining companies which are attempting to gain economic profit from the mineral resources of the territory. In the last few years, structure changes in the Czech economy, especially in industry, have influenced both the role and the importance of branches of extracting and processing minerals and materials of mineral origin. Index of mineral production share of the GDP reflects the changes, as it has decreased from 3.7% in 1993 to 1.3% in 2005. There was a small decrease from 7% in 1993 to 2.8% in 2005.

Market economy caused a restriction or even termination of mining of non-economic deposits, where mining continued with the help of state subventions in the past. All mining was stopped in the deposits of ores, the mining of coal has been limited significantly in many regions. The mining of uranium ores was strictly limited.

The strictest rules on the extraction of mineral resources are in areas established by the Nature and Landscape Protection Law no. 114/1992 Coll. In accordance with this law, it is forbidden to extract mineral resources in National Parks (with the exception of extraction of building blocks and sand for construction within the area of the National Park), in the first zone of Protected Landscape Areas (SPA) and in Nature Reserves.

Although extraction in the second and third zones of the Protected Nature Areas is not explicitly forbidden by Law, it is quite difficult to obtain a permit for extraction. Although the overall extraction of mineral resources in the protected areas has decreased after 1989, the amount of extraction in some of them has actually increased. With some mineral resources, e.g. limestone, feldspar or precious stones, the extraction in the protected areas constitutes a substantial share of the total amount of extraction of a particular mineral. The landscape contains giant opencast mines, originating due to large volumes of extracted mineral resources, with noise and dust disturbing the surrounding environment and the natural system of groundwater often disturbed. Among the non-ore raw mineral resources, the extraction of limestone has a special position. The largest opencast mines include Mokra u Brna, ertovy schody, Mořina in esky kras, Kotou near Štramberg, Hranice in Central Moravia and Prachovice in elezne hory. Opencast extraction of limestone often results in disturbances to the hydro-geological environment.

## 6. SOUHRN

### **Vybrane zmeny v tezbe a dobyvanı nerostnych surovin v eske republice v letech 1993–2005**

Tezební innosti probıha na zemı R ve stanovenych dobyvacıh prostorech, ktere se podılı necelymi 2 % na celkove rozloze statnıho zemı. Po roce 1989 došlo k vyraznemu poklesu objemu tezby surovin, kdy v pıpade rud (vyjma uranu) byla tezba ukonena zcela, u erneho a hnedeho klesla temer na polovinu a u nerudnıch surovin se snızila o tretinu. V prubehu devadesatych let a zejmena po roce 2001 vyraznejı narusta díky objevum novych perspektivnıch lozisek tezba velmi kvalitnı ropy na jıznı Morave, ktera se vsak podılı necelymi 2 % na celkove spotřebe ropy v R. V ramci tlumovych programu jsou investovany desıtky miliard do sanacı a rekultivacı zemı v minulosti vazne narušenych tezbou surovin. Negativnım rysem je probıhajıcı a v nekterych pıpadech i rostoucı tezba v zemıch, ktera majı ze zakona stanoven ochranny reım (např. v CHKO esky kras, Trebonsko nebo Blansky les). V zajmu ochrany prırody a krajiny jsou pro tezbu nerostnych surovin stanovena omezenı, zejmena vyplyvajıcı ze zakona O ochrane prırody a krajiny, ve kterem je na celem zemı NP je zakazano tezit nerosty, horniny a humolity krome stavebnıho kamene pro stavby na zemı NP a na zemı cele CHKO zakaz „menı dochovane prırodnı prostredı“. Vyslavne je vsak tezba zakazana pouze v 1. zone CHKO.

Mimo to jsou další omezení v ochranných pásmech vodních zdrojů, chráněných oblastech akumulace podzemních a povrchových vod (CHOPAV), v ochranném pásmu lázní apod. Počínaje rokem 1992 podléhaly nové záměry těžby surovin posuzování jejich vlivu na životní prostředí uplatněním zákona č. 244/1992 Sb. V roce 2002 vstoupil v platnost v souladu s právem Evropských společenství nový zákon o posuzování vlivu na životní prostředí (zákon č. 100/2001 Sb. naposledy novelizovaný v roce 2004 (zákon č. 93/2004)). K nejčtetnějším střetům zájmů dochází v případě těžby vápenců a ostatních karbonátů. Mezi všemi CHKO v ČR je extrémně vysoce zatížena CHKO Český kras, kde zatížení dosahuje více než 26 tisíc tun vytěžené suroviny z 1 km<sup>2</sup> a v posledních letech trend zvyšování pokračuje. Vysoké zatížení těžbou vápenců je i v CHKO Moravský kras (2 tisíce tun vytěžené suroviny z 1 km<sup>2</sup>) nebo CHKO Pálava. I přes snahy zejména ekologických sdružení o omezení těžby ve zvláště chráněných územích, se těžbu na většině lokalit nedaří snížit.

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