

Peter Wirth, Barbara Černič Mali,  
Wolfgang Fischer (Editors)

# Post-Mining Regions in Central Europe

Problems, Potentials, Possibilities







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## Preface

Structural change in mining districts is a complex process, challenging cities, regions and governments all over the world. It comprises economic, social, ecological, and cultural changes. This volume deals with such regions in Central Europe.

In Western Europe, the subject has been a concern of political discussion and scientific reflection for some 50 years. The debate has mainly focused on major coal and steel regions like North-East England and Wales (Great Britain), Wallonia and Limburg (Belgium), Nord-Pas-de-Calais and Lorraine (France), Ruhr and Saar (Germany), and Asturias (Spain). In the affected areas the end of mining has provoked the overall decline of industry. The impacts have been far reaching, bringing economic, social, and ecological crisis to vast regions. Overcoming the shock has proved a protracted and painful process. Given the economic and political importance of the regions mentioned, regeneration has been a task of "national" importance, challenging governments, trade unions and big enterprises. Smaller mining regions have rarely attracted such attention, though the effects of decline have been no less drastic there.

In the former communist countries of Central and Eastern Europe, regime change in 1989/90 brought a radical turning point. Many old industries had survived till then in the autarkic economies of these states. When the system collapsed, many industries faced ruin and cities and regions were plunged into crisis. In Eastern European countries, too, certain former flagship regions of the coal and steel industry attracted most attention: Upper Silesia (Poland), Ostrava-Karvina Region (Czech Republic), Valea Jiului (Romania), Donezkyj Bassejn (Ukraine). Furthermore, the lignite industry in the Leipzig-Halle and Lusatian Districts (Eastern Germany) as well in the Bohemian Basin (Czech Republic) suffered rapid decline. The impacts resembled those in Western countries. But there was an important difference: the old industrial regions in the East had to master change in a society in transition with a weak overall economy and less continuity. Today we can look back on 20 years of experience in these countries.

How relevant is this well-known topic for the early 21<sup>st</sup> century? Does it make sense to address it at a time when the discussion about the new economy is at its peak? Why do we not use the concepts from the 1980s and 90s to solve recent problems? Or is there reason to call attention to unsolved problems in an atmosphere of political indifference?

This volume seeks answers to these questions. It focuses on the so-called "potentials" of mining regions. These potentials can be defined as legacies of mining which can be exploited and valorised even after mineral extraction has ceased. There are two categories of potential, natural and cultural. Natural potentials are post-mining landscapes, renewable energies and thermal water. Cultural potentials are artificial relicts such as technical structures, buildings and infrastructures, as well as the traditions of miners. It makes sense to distinguish between them because the two categories are valorised differently.

What we describe as potentials differs from "heritage". The latter is seen mainly in the context of "preservation". Of course, the development of post-mining potentials includes heritage aspects such as the use of old mining building as museums. But our view is wider. "Potential" has a progressive connotation. It can be associated with concepts like "innovation" and "modernization". The concept of potential gives a strategic touch to economic restructuring. Moreover, the "potential approach" can easily combine with urban and regional regeneration issues. It fits in with development trends like resource economy, climate adaptation, energy transition, and sustainable development. The concept can also extend to regional identity and tradition. In this sense it can play a progressive role in the communication of political stakeholders.

In contrast to most scientific ventures to date, this volume addresses the problems of mining regions with small and medium-sized towns, mostly situated at the outer and inner peripheries of countries. This spatial category is often limited in general functions. Such areas are sparsely endowed with infrastructure. Particularly lacking are high-quality education facilities like universities and research centres. Small and medium-sized towns are becoming less important as sites for business and industry in many countries. And local authorities generally have little scope for action. Small and medium sized towns have little administrative capacity for strategy building, planning and control. Altogether, politics pays little heed to this type of mining region. There is all the more need to draw greater political attention to them.

With this in mind, the book has three main aims: *first* to describe the situation of post-mining regions with small and medium-sized towns in Central Europe at the beginning of the 21<sup>st</sup> century; *second* to introduce the "potentials" concept into the scientific discussion on urban and regional regeneration; and third to underline the need for political action by the European Union and national governments to promote change in former mining regions.

The results presented here were obtained in the framework of the project ReSource – Utilisation of post-mining potentials for sustainable re-development in Central European mining cities and regions. It was co-funded by the European Regional Development Fund (ERDF) in accordance with the EU Objective 3 "Territorial cooperation", programme Central Europe. From 2009 to 2012 ten partners worked together to promote urban and regional development in 6 mining regions: the Steirische Eisenstraße (Styrian Iron Route) in Austria, the Czech lignite region Sokolov-východ, the Mansfeld-Südharz copper region and the Zwickau-Oelsnitz coal region in Germany, the brown coal region of Salgótarján in Hungary, and the Zasavje coal

region in Slovenia. Half of these regions are in the post-mining phase. In Styria, Zasavje and Sokolov is mining continuing with longer-term prospects. Nevertheless, in these regions, too, the importance of mining is declining and the economy is in transition. All are affected by change, all are in search of perspectives for development in the post-mining period, and all have a number of potentials they can exploit.

The regions have been accompanied in their efforts by academic partners, both universities and scientific institutes: The Leibniz Institute of Ecological Urban and Regional Development (IOER) Dresden, the Urban Planning Institute of the Republic of Slovenia (UPIRS) Ljubljana, the Institute of Geography and Regional Science of the Karl Franzens University (KFU) Graz, the Institute of Applied and Landscape Ecology of the Mendel University (MENDELU) Brno, the Institute of Geography and Earth Sciences of the Eötvös Loránd University (ELTE) Budapest. An additional partner is the Institute of Geography and Regional Development of the University of Wrocław. Though no Polish region was involved in the ReSource project, Wrocław University has contributed a study of the former Wałbrzych coal region. ReSource symposia in Großräschen/Germany (2009), Leipzig/Germany (2010), Leoben/Austria (2011), and Sokolov/Czech Republic (2011) provided additional expertise on post-mining development from other European and world regions. Discussions among scholars from different theoretical backgrounds with far-reaching experience in structural change proved extremely fruitful. On the one hand, they had an intensive methodological component. In order to compare situations, problems and strategies in the regions under investigation, appropriate algorithms had to be created for common use by all partners and in all regions. Such products of discussion and analysis as the "Road Map", the "Regional Profiles", and the "Strengths-Weaknesses-Opportunities-Threats (SWOT) Reports" have been an important basis for this publication<sup>1</sup>. On the other hand, there was a discussion on the theoretical conceptualisation of potentials in the post-mining development, for instance transition, innovation and actor theories. All participants in these discussions can be found as authors in this volume.

A great deal of practical knowledge was generated in discussions with practitioners from the field in ReSource. They included the German county Zwickau as lead partner, the International Building Exhibition Fürst-Pückler-Land (Germany), the Educational Institution of the Saxony-Anhalt Employers' Association (Germany), the »Styrian Iron Route« Regional Association (Austria), the Association of Communes Sokolov-východ (Czech Republic), the Local Self-Government of the Town of Salgótarján (Hungary), and the Regional Development Centre Zasavje (Slovenia). All discussion in project workshops, meetings, and face to face with representatives proved useful.

*Part one* provides an overview of the state of the art in post-mining development in Europe. It covers and seeks to systematize knowledge in the field since the 1970s. It also aims to place

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1 Project reports are available here: <http://www.resource-ce.eu/en/project-results/scientific-support/>

the post-mining discussion in the context of the "potentials approach", examining the notion of post-mining potentials on the basis of the knowledge available on change in mining regions. The first part concludes with a series of questions on the role of post-mining potentials in developing former mining regions. These questions provide orientation for the following parts.

*Part two* introduces the regions under study. A brief overview of the geographical location and current development trends in all regions is followed by an examination of each in turn. The demographic, economic and employment situations in each region are analysed. The history and mining legacy of each is also described. The main focus is on the factual and institutional aspects of change. Governance constellations, development strategies and actors in the process are characterized. The analysis of each region ends with a presentation of post-mining potentials and their embedding in recent development strategies.

The *third part* discusses the state of the art in the use of Central European post-mining potentials in the form of a "good practice analysis". 50 projects and 23 centres of knowledge were analyzed on the basis of pre-designed and completed forms. Evaluation methods were tailor-made. The analysis establishes a distinction between the efficient, long-running projects for the use of cultural potentials (e.g. mining museums, tourist paths, mining-related events) and very recent, financially demanding, (mostly pilot) projects for using natural potentials, such as biomass production on degraded land or geothermal energy for district heating. Where locations accommodate multiple uses and projects can be considered comprehensive, an integrative approach is introduced in addition to cultural and natural potentials. An overview of centres of knowledge shows that universities and research centres have successfully adapted to the needs of post-mining regions, offering them knowledge and experience for the whole range of purposes, e.g. geotechnical solutions, land reclamation and recultivation projects, social transformation, etc.

*Part four* provides a scientific debate on post-mining potentials. The authors of the six contributions address the topic in specific ways, considering concrete empirical knowledge from different theoretical perspectives. Antonín Vaishar, Zdeňka Lipovská and Milada Šťastná (Brno) see small towns as functional centres in mining regions undergoing a radical change. Jörn Harfst, Peter Wirth and Gerd Lintz (Dresden) discuss the use of old mining potentials as a problem of regional capacity building. Sylwia Dołzbłasz (Wrocław) focuses on local actors in the restructuring of post-mining municipalities. The role of youth participation in the development of former mining regions is highlighted in the contribution by Naja Marot and Barbara Černič Mali (Ljubljana). The strategic destination management in an Alpine mining region is the focus adopted by Judith Pizzera and David Osebik (Graz), who explain extreme and endurance sport as an opportunity for image transformation. And the role of natural protection and ecotourism in the development of a former mining region is analysed by Gergely Horváth and Gábor Csüllög (Budapest).

In the *final part* we return to overall reflection on the prospects and possibilities of post-mining regions in Europe. The discussion draws both on empirical research in the regions and general considerations about post-mining development, offering recommendations for policy at the European, national, regional and local levels. The message is that the integration of the natural and cultural potentials of mining in the urban and regional development strategies of former mining regions can improve the outcomes of regeneration – even during outphasing. As we see, the potentials in European mining regions differ strongly depending on the type, duration, and spatial impact of mineral extraction. There is accordingly no one-fits-all solution. But certain development axes can be considered essential.

Last but not least, the editors would like to express their appreciation to Katrin Schießl, Clemens Herrmann and everyone involved at the oekom Verlag for their support in the decisive phase of this publication. We also thank Rhodes Barrett (Berlin) for proofreading all contributions with such care, keeping in mind that none of the authors is a native speaker of English.

It is the hope of the editors that this publication will encourage scientific investigation in post-mining regions, help improve the management of mining and post-mining regions in Europe, and draw political attention to the needs of areas affected by mining.

*Peter Wirth, Barbara Černič Mali and Wolfgang Fischer*

# **Part I: Overview**

## **Problems and Potentials of Post-Mining Regions**

### **Introduction**

Mining industries have played a crucial part in the European history, being an important factor of economic and social development over the centuries. Without the extraction of raw materials such as copper, iron, silver, salt and coal, the development path of the continent would look distinctly different. Central Europe has in many ways been at the heart of these developments. Starting in the 19<sup>th</sup> century, the extraction of coal and lignite provided the basis for the industrialisation of many European regions. To strengthen heavy industry after World War II, mining in eastern European countries was intensively developed by opening new mines, while uranium mining became increasingly important from the 1950s with the development of nuclear energy production and nuclear arms.

Mining is a dynamic industry, with some resources being mined for centuries until reserves are exhausted or technical and market conditions change, as in the European mining industry since the 1960s and in the former communist countries of Central and Eastern Europe after 1990. In nearly all known cases, the end of mineral exploitation caused a number of serious problems, the “unavoidable socio-economic drama of pit closure” (Baeten et al. 1999, 250). The problems are very similar in all mining regions (Wirth & Lintz 2007) and research in the ReSource project underlines this diagnosis. Firstly, mining has almost everywhere caused considerable environmental degradation. This encompasses abandoned surface mines, underground galleries, lowered ground water levels, and contaminated sites in mining and related industries such as energy, iron and steel, and chemicals. Affected cities are usually burdened by disused mining facilities, miners’ settlements, and often overdimensioned and dilapidated infrastructures. Secondly, mining had in many cases been the dominant industrial sector. The decline of mining plunges the entire economic foundations of a region into crisis. It often proves difficult to attract new industry and business, and alternatives such as tourism are usually unable to produce as much prosperity as mining. This leads to a third set of problems: high unemployment with all the associated social impacts. Mining skills are mostly incompatible with the requirements of modern industry. Bad economic conditions often lead to outmigra-

tion. The final result is usually a loss of human resources, spending power, and taxable capacity in the region (Müller et al. 2005). These conditions put pressure not only on local authorities but also on national governments and the European Union to develop rehabilitation and development strategies. In sum, we can say that the problem is a complex one that often debilitates the actors involved.

Despite the unpromising situation, it is not acceptable in densely populated countries and regions to leave the affected areas to fend for themselves. Furthermore, extensive experience shows that transforming mining regions is not a utopian project. One of the best-known comprehensive regional approaches is the International Building Exhibition (IBA) Emscher Park in Germany, which took place in the Ruhr District from 1989 to 1999. The ecological and cultural restructuring of an old industrial region was seen in this IBA as a necessary basis for comprehensive renewal. A total of 89 projects were realised with extensive state support; for instance, slag heaps were integrated into green landscape concepts and old mining facilities adapted to accommodate education and innovative services (e.g. Kilper & Wood 1995, Eckart et al. 2003).

On the basis of such experience, this volume describes the natural and cultural potentials for the post-mining development of regions and cities, investigating the integration of these potentials in holistic urban and regional development concepts. We are concerned with the artefacts (buildings, infrastructure, landscape sceneries etc.) and traditions left behind by the mining past which can be valorised to promote post-mining development. It is of crucial importance for the development of former mining cities and regions:

— to identify these potentials and

— to embed them in overall development strategies (e.g. masterplans, regeneration plans).

The focus is on regions with small and medium sized towns, where local authorities have little steering capacity and which mostly escape the attention of state government.

Part one of the volume addresses issues of fundamental importance for the entire study. The following section gives an overview of the spatial dimension of mining regions in Europe. It is argued that there is still urgent need to include mining regions in the debate on regional regeneration and development, also at the beginning of the 21<sup>st</sup> century. Section three provides a literature analysis, dealing with the discussion on structural change in mining regions over recent decades, describing five main fields of research. In section four the potentials of mining are explained in detail. A distinction is drawn between natural potentials (renewable energies, mining landscapes, etc.) and cultural potentials (buildings, infrastructures, traditions, etc.), because the two categories require different valorisation approaches. The concluding section considers the perspectives for research on the potentials of mining regions, also providing orientation for the present publication.

## Mining Regions in Europe at the Beginning of the 21<sup>st</sup> Century

In the context of spatial development in Europe, mining regions have been a well-aided and critical subject. In Western Europe, where the decline of coal and steel regions started 50 years ago, structural change is far from over. And in the former communist states of Central and Eastern Europe no mining region has yet fully overcome the social, economic and ecological impacts of mineral extraction.

A look at the mining of solid energy feedstock (hard coal, brown coal/lignite and uranium) in Europe, which gives a good idea of the spatial dimensions of mining in Europe today, shows the size of the problem. In 2005 there were 226 mining regions, of which 54% were still in operation (Lintz & Wirth 2009). In 46% mining activities had ceased entirely, generally after 1990 (Tab. 1).

Tab. 1: Mining areas in Europe 2005 (Lintz & Wirth 2009)

| Raw<br>Material<br>Number<br>of areas | Hard coal | Brown<br>coal/lignite | Uranium   | <b>Total</b> |
|---------------------------------------|-----------|-----------------------|-----------|--------------|
| in operation                          | 30        | 84                    | 7         | <b>121</b>   |
| closed                                | 26        | 23                    | 56        | <b>105</b>   |
| <b>Total</b>                          | <b>56</b> | <b>107</b>            | <b>63</b> | <b>226</b>   |

The 226 mining regions include some 1,000 mines. In Western Europe mining is retreating: in France, for instance, no solid energy feedstock is now mined at all. In Central as well in South Eastern Europe, by contrast, the density of active mining districts is still high. This means that many European mining regions are undergoing a difficult process of restructuring, mining activities continuing in some and having ceased in others. It is therefore important not to lose sight of the problems facing such regions, to support them politically, and to focus research on their problems, potentials and perspectives.

## Discussion of Change in Mining Regions

The literature broadly discusses structural change in former mining regions. Many empirical studies examine the problems and the solutions adopted when mining activities ceased. Often the academic debate on change in mining regions is part of a broader discussion on old industrial regions (e.g. Eckart et al. 2003). In former communist countries, structural change is also associated with societal transition processes since regime change in 1989/90 (Steiner 2003). A closer look at the "structural change literature" shows that some sections of this literature relate more closely to the discussion in this book.

*One main focus* is on transformation processes in former mining regions. Descriptive and explanatory studies of post-mining areas play an important role in economics, political science, and human geography. They deal with political, cultural, social, and economic change in spatial entities such as regions and cities. The literature offers both a Western and an Eastern European perspective. In Western Europe, restructuring in mining regions, mainly of the coal and steel industry, occurred earlier and was embedded in "old" market economies. Change was shaped by substantial political trade-offs and long-term phasing-out scenarios. A great deal of experience has been gathered in many countries with an emphasis on the coal and steel industry. The British literature concentrates on the English Midlands (Cloke et al. 1996), the English Northeast (Hudson 2005) and Wales (Jones & Munday 2001). The debate in the UK is mainly on the role of central government in regeneration, the relationship between the government and local actors, and appraisal of development strategies. The German discussion focuses strongly on the Ruhr District, originally the largest old industrial area in Europe (Hassink 1993; Häußermann & Siebel 1994; Ache 2000; Wissen 2001). It mainly addresses innovation policy and how to overcome paternalistic industrial structures.

Though mining areas in Austria are much smaller than in Britain and Germany, the problems of change are very similar. Kaufmann & Tödtling (2000) highlight the importance of regional innovation systems, while Zimmermann et al. (2007) combine innovation with co-operation and identity concepts. The Belgian experience sees change in the Limburg region in the context of multi-level governance processes (e.g. Baeten et al. 1999), and Jansen-Verbeke (1999) describes the same region from the perspective of policy change. In Asturias (Spain) the huge problems faced in compensating the decline of the coal industry are discussed against the background of economic alternatives (Voth 2004). Dale (2002) explains change in four Norwegian mining sites from an institutionalist perspective. All in all, the academic discussion stresses that old industrial regions in Western Europe have to deal with "low adaptability, inflexible patterns of behaviour and insufficient ways of mastering change" (Steiner 2003). Nevertheless, there are some examples of progressive frame change (Shaw 2002).

The former Eastern Bloc countries experienced a period of radical transformation after the political upheaval of 1989 and 1990. The tempo of change was extremely high and existing economic structures were unable to cope with a free market economy in a globalised world. Most Central European mining regions therefore faced the double dilemma of having to deal with both an overall, rapid transition to a free market economy and the redevelopment of old industrial and mining regions to make their products competitive under world market conditions. Although these countries have in the course of 20 years established the essential institutions of a market economy with the corresponding legal systems, there are still differences between West and East in standards of living, productivity, and competitiveness (Steiner 2003). Investigation of structural change in Central and Eastern European mining regions plays a major role in the debate on economic transition (Gorzela 1998; Gorzela 2002; Müller et al.

2005; Rumpel & Waack 2004; Geißler 2005; Klusáček 2005). Some authors also compare the development of Western *and* Eastern market economies (Eckart et al. 2003; Steiner 2003). Structural change in both Western and Eastern Europe is addressed by the greater part of the "system transformation" literature. Part II of this volume provides a series of descriptions of regional transformation processes. And under "specific aspects" (part IV) Sylwia Dołzbłasz, Antonín Vaishar, Milada Štátná, and Zdeňka Lipovská present us with examples.

How post-mining potentials are used is essentially a question of political strategy building. Whilst a great deal of knowledge is available about the general transformation process and policy making in European countries, the interplay of actors, strategy building, and institutional framework conditions involved in internal rehabilitation and development processes in mining regions have so far been given less attention. This *second research focus* in the structural change debate lies in planning, regional development, and regional policy literature (e.g. Eckart et al. 2003; Rumpel & Waack 2004; Jezek 2007). The authors deal with urban and regional perspectives, possible futures, and alternative paths for former mining regions. The approach is closely associated with the strategic planning debate (Jansen-Verbeke 1999; Zimmermann et al. 2007). Last but not least, we find a bridge to sustainable development (e.g. McManus 2008). In consequence, each concept for managing change in mining regions has to consider both ecological and socio-economic aspects. Ideally, strategies for reorganising mining regions combine ecological rehabilitation *and* new economic development (Wirth & Lintz 2006; Harfst & Wirth 2011). This section can be headed "strategy making". It is mainly reflected in this volume by Judith Pizzera and David Osebek as well by Jörn Harfst, Peter Wirth and Gerd Lintz in part IV, and in the recommendations (part V).

A *third approach* deals with concepts for preserving and developing the cultural heritage of mining regions. Heritage can be seen as a resource in several respects. "... it is an economic resource ... to promote tourism, economic development and rural and urban regeneration. But heritage also helps define the meanings of culture and power and is a political resource." (Graham et al. 2000, 17). Mining and industrial heritage have become important elements of cultural heritage since the 1980s. As a rule, there are strong links between mining heritage and cultural and tourism development in the regions and cities concerned (e.g. Jansen-Verbeke 1999; Jones & Munday 2001). Heritage approaches cover not only architectural and technical artefacts (like shaft frames, processing mills, and underground workings), but also identities, traditions, and cultural events (Smith 2003). Ultimately, mining landscapes often open underground geological formations to view and present morphological forms of interest for geotourism (Dowling & Newsome 2010; Timcak et al. 2011). This is why a great deal of scientific and practical literature deals with the subject in urban and regional development, culture, architecture, geography, preservation of monuments and nature conservation. But the most important driver for heritage development is definitely tourism (Graham et al. 2000; Jones & Flynn 2011). Mining sites can help people find meaning and identity in the industrial past, and visiting old industrial sites can be in the nature of a "pilgrimage"

(Gouthro & Palmer 2011). This section can be headed "heritage and tourism". It is the main focus of Gergely Horváth and Gábor Csüllög in part IV.

But critical papers emphasise that transforming a mining site into a heritage site is a fundamental change that requires not only political decisions and funding but also participation by the local population (Jones & Munday 2001). A *fourth approach* deals with this local participation. Such studies draw on discussions about collaborative planning (Healey 1997) and public participation (Kasemir et al. 1999, Wilcox 1994), as well as on recommendations and requirements laid down by international agreements and conventions like the Aarhus Convention on Access to Information and Participation in Decision-making (UNECE 1998), the Charter of European Cities towards Sustainability (Aalborg Charter 1994), and the White Paper on European Governance (EC 2001). Observation of participation processes in the Zasavje region (Slovenia) has shown that, while participation by local residents has in general been formally included in the regional development process, young people have been involved only less formally. In keeping with the principle of equality of opportunity for all local groups to collaborate in regional planning, youth has to be given adequate opportunity to take part. Furthermore, a future perspective is built into regional development; it is therefore extremely important to motivate and involve youth. Excluding young people from regional development processes can further diminish their identification with the region and exacerbate the brain drain among the young who see no perspective for themselves in the area. Experience in many post-mining regions has confirmed such a scenario. Under the heading "participation", Naja Marot and Barbara Černič Mali in part IV explore the extent to which Zasavje youth identify with earlier and projected regional development, and explore how to improve the involvement of the young.

A *fifth category* of research into change in mining regions examines the modernisation of cities, regions and landscapes after the cessation of mining. It draws on many disciplines, including policy research, the social sciences, economics, architecture, landscape architecture, and the arts. It addresses a new philosophy of state intervention (Wissen 2001) and a new type of creative and innovative projects (Häußermann & Siebel 1994). The approach was developed primarily in Germany in the framework of so-called "Internationale Bauausstellungen" (IBA, International Building Exhibitions). The new generation of building exhibitions are long-term, large-scale initiatives to inspire change in cities and regions through creative ideas (think tanks), impressive "symbolic" projects, and competitions for the best ideas and solutions (Ganser 2001). The IBA Emscher Park in the Ruhr District from 1989 to 1999 (Shaw 2002) and the IBA Fürst Pückler Land in Lusatia (Eastern Germany) from 2000 to 2010 (Kuhn 2010) were closely associated with post-mining development. In Europe this type of complex and comprehensive project is rare. Some resemblance is to be found in the British millennium initiative, funding about 220 projects throughout Britain with lottery money, among them many regeneration projects<sup>1</sup>. The most popular has been the Eden Project in Cornwall, where a former kaolin pit provided the basis for a multiple greenhouse complex (Pearman 2009). These

approaches seek not only to promote structural change or to develop strategies. They include elements of all the approaches described above, introducing innovative and creative management and funding. They aim to make regions with a traditionally "black" profile attractive for new investment and to give them a new, positive image. Their goal is the complex modernisation of cities and regions. This often means non-innovative milieus have to be overcome (Häußermann & Siebel 1994). The category of "modernisation" is an element in most contributions to parts III and IV of this volume.

Research into change in mining regions concerned with *system transformation, strategy making, heritage and tourism, participation* and *modernisation* is of course never restricted to one and only one aspect. Many approaches combine the main categories. System transformation is often discussed in connection with strategy building (e.g. Dale 2002). Strategy debates are closely associated with modernisation (e.g. Zimmermann et al. 2007). There are also links between modernisation and heritage (Kirkwood 2001), etc. Many references in this chapter are accordingly cited in different contexts. On the other hand research on post-mining development is obviously interdisciplinary and intersectoral, drawing on different theories, methods, tools and approaches. It requires a wide range of actors to take joint action, exchange knowledge, and cooperate. Work in this field cannot be said to be either just beginning or reaching a conclusion. Of course a great deal of experience has been gathered with change since the 1960s. But many regions are in the throes of change, others have yet to begin, and under as yet unknown conditions. Research on post-mining phenomena is thus very much on the agenda and discussion on post-mining development is far from over. The next section considers the most important post-mining potentials in relation to urban and regional regeneration as a perspective for research.

## Natural and Cultural Potentials of Mining

Mining is a drastic intervention in landscapes and regions. As a rule it causes changes in societal structures like employment and in the environment. Large-scale mining can destroy landscapes and traditional social structures and produce new ones. After decades or even centuries of mining, the face of nature and society has changed. Perception of post-mining landscapes varies and is often negative. But they can often be positively connotated, considered to have *potential*.

Since we are dealing with post-mining potentials, the term needs to be defined. Post-mining potentials are legacies, leavings, remains or residues of mining that can be used in a broad sense after the end of mineral exploitation for a number of purposes, ultimately for mastering structural change. They can vary greatly. We distinguish between "natural" and "cultural" potentials (see Fig. 1); other authors use similar terms, for instance Jolliffe & Conlin (2011, 244) who write about "natural and human-made attractions" in heritage tourism and Jones & Munday (2001, 585) who mention "natural and built resources".

Though all residues of mining are anthropogenic in nature – they all result from human activities – there is a difference. The first category covers changes in landscapes or their components (water, soil, flora, fauna, relief etc.). It includes ecological aspects, natural resources and natural heritage, namely *natural potentials*. The other category covers artificial products of mining: buildings and infrastructures. It also includes miner's traditions, customs, and trades. It covers technical and architectural aspects, as well as cultural heritage: *cultural potentials*.

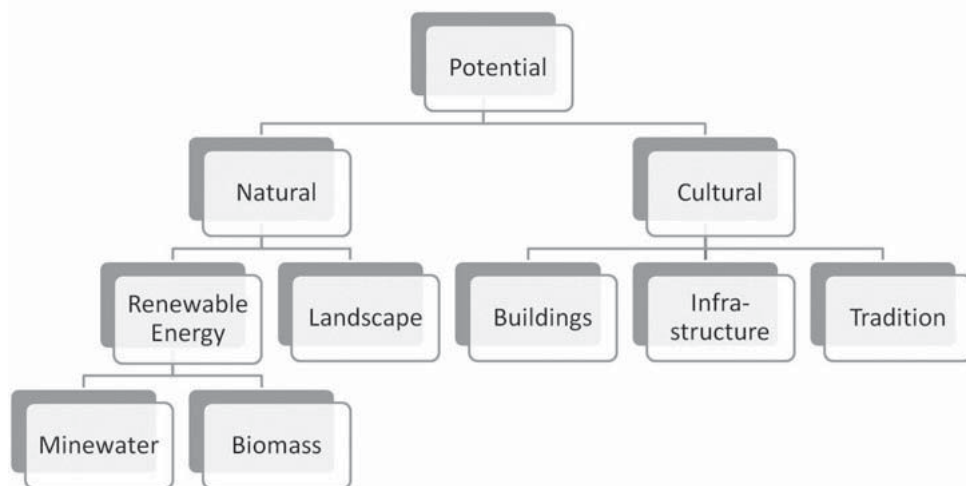


Fig. 1: System of potentials in post-mining regions

## Natural Potentials

Under the heading of natural potentials the entire landscape can be seen as offering potential. As a rule, *post-mining landscapes* differ from traditional rural landscapes characterised by agriculture and forestry. Typical are heaps forming new hills and open pits forming new hollows. The importance of these morphological forms can differ from case to case. On the one hand they can be seen as dangerous if unstable or as hindrances to urban development. On the other they can lend the landscape a unique character much more interesting than before intervention. This can lead to new forms of land use, offer inspiration for the arts (Maskit 2009). In Bottrop (Germany) the world-wide longest indoor ski run was erected on a coal slagheap<sup>ii</sup>. In the Czech Republic, Poland, and Germany lake districts are being created by flooding open cast lignite mines, providing facilities for bathing, water sports, and shipping, and for general touristic activities<sup>iii</sup> (Fig. 2). Mining landscapes often form good terrain for hiking, cycling, other sports and event tourism. One example is the annual "Erzberg Rodeo" in Eisenerz (Austria) staged at an iron ore mine, which has become one of the most famous enduro sport events in the world (see the contribution by Pizzera & Osebik in part IV). The race

course in Most (North-Bohemian Basin, Czech Republic) was constructed completely on the site of a former lignite mine<sup>iv</sup>. As mining usually opens up the earth in quarries, underground galleries etc., many mines can be counted as geo-heritage of particular scientific value. This also offers prospects for establishing open-air geological museums, as in Gánt or Tata in Hungary (see also the contribution by Horváth & Csüllög in part IV).



Fig. 2: In Lusatia (Germany) 21 former open cast pits from lignite mining will be flooded by 2017, forming the Lusatian Lake District (photo: Radke/LMBV)

Another, very specific natural potential of former mining regions is *renewable energy*. The interest in climate protection has made this an attractive option over the past decade. Mining can open the way to using different energy sources. The use of mine water to heating buildings is one innovation in post-mining development. Since relatively warm water is available in many deep mines, this could offer an alternative to fossil energy sources. A pilot project has been carried out in recent years in Heerlen, Netherlands. Warm and cold water from abandoned coal mines is used to heat and cool buildings in a large distribution network<sup>v</sup>. Similar approaches are to be found in Germany (Fig. 3).

Another challenging approach is the production of biomass on mining land. Biomass, or biological material from living organisms (mainly wood in the ReSource project), is fast becoming an important energy source in Europe. In many rural areas it is already the basis for producing electricity and heat. In mining areas the use of biomass for energy is still at an early stage. Since food and energy production compete for traditional arable land, mining land could help reduce the pressure on agriculture if used for biomass production, particularly where contaminated and less fertile mining land cannot be used for food production. An experimental concept for renewable energies on mining land is the Energy Garden Project in Welzow,

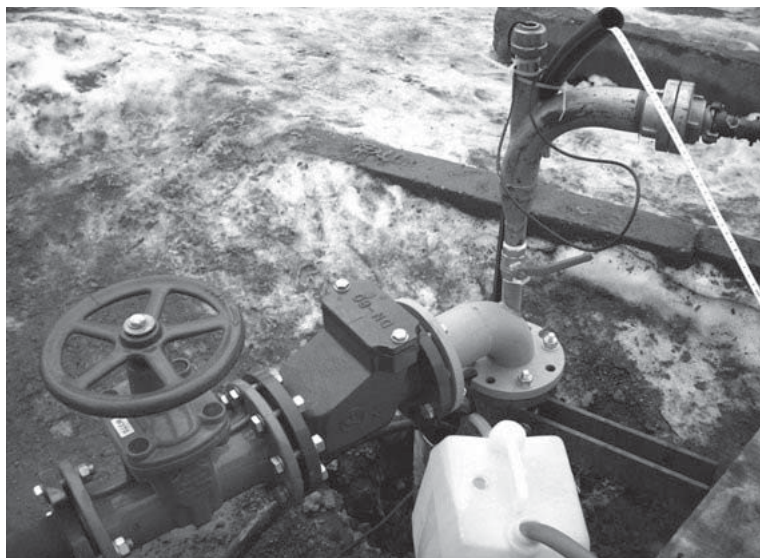


Fig. 3: Mine water drilling for school heating in Bad Schlema/Germany (photo: Wirth)

Germany, a holistic approach that combines several regenerative energy products in one place, using an intelligent, carefully designed layout. Starting in 2003, a large-scale energy landscape with wind turbines, renewable raw materials, and solar panels was planned and implemented. Various cultivation methods for biomass production like short rotation forestry are among the projects being put to the practical test in Welzow<sup>vi</sup>.

Mining activities have also produced some rare forms of natural potential. In Bad Bleiberg (Austria), for instance, thermal water from an old lead mine is used for therapeutic purposes. In 1950 an underground watercourse was cut by blasting in the mine. Water flooded the underground galleries, causing heavy losses. The blessing in disguise was that the spring had therapeutic qualities, allowing a spa to be developed after the end of mining. Today Bad Bleiberg is an outstanding spa destination. A special attraction there is the so called healing tunnel, a former mining gallery with a healthy underground climate. Tunnel therapy is indicated for people with respiratory disorders of any kind, for example bronchial asthma and chronic allergies<sup>vii</sup>.

Last but not least, abandoned mining land can be seen as a resource or natural potential for urban and regional regeneration, depending on the demand for new development sites. Old mining towns were often characterized by a mixture of industrial and residential areas. In such cases abandoned mining land offers potential for improving the quality of life, providing space for green areas for recreation, sport and other leisure activities, and for service facilities. A large-scale natural protection project was started in the Lusatian Lake District in Eastern Germany<sup>viii</sup>. In Wałbrzych (Poland) two shopping centres were built on the site of an old mine (see the contribution by Sylwia Dołzbłasz in part IV).

## Cultural Potentials

Culture is an output of a society. Grundmann (2006, 11) speaks of an expression of socialisation within the life of the community ("soziales Zusammenleben"). The mining community gives expression to its culture in specific social structures, a relatively good financial situation, a strong sense of togetherness, pride, and introverted behaviour. Miners' traditions are therefore very distinctive and alien, even mysterious to outsiders. To explore the world of mining and miners, their cultural heritage as manifested in the "artificial products of mining", whether material, like buildings and infrastructures, or immaterial, like miner's traditions, can therefore interest both miners and the general public.

One element of *cultural potentials* is *tradition*. It manifests itself, for example, in customs and observances (e.g. "Miners' Day") cultivated even long after the cessation of mining. Organisations such as folklore societies, local brass bands or traditional miners clubs play a very important role in preserving the cultural heritage (Fig. 4).



Fig. 4: Traditional miners' uniforms from the Zasavje region/Slovenia (photo: Rozina)

In active mining regions and towns membership of such clubs is a matter of course, and in post-mining regions traditions are mostly preserved by elderly former miners. Experience has shown how difficult it is to maintain interest in mining traditions among the young of the post-mining era. Success depends both on local initiative to uphold customs and on a positive response from society such as interest in the mysterious world of mining, not to mention economic support. Mining customs and celebrations play an important role in tourism strategy and development concepts for former mining regions.

A second element in cultural potential is *mining buildings* and *mining infrastructure*. Some such relics of mining activities have been revitalised as museums, for example the "Radwerk IV" in Vordernberg/Austria (Fig. 5). It goes without saying that personal enthusiasm rather than adequate funding contributed most to the success of this project, which is run by a group

dla prowadzenia polityki mającej na celu efektywne i odpowiednie wsparcie dla transformacji byłych regionów górniczych (na szczeblu lokalnym, regionalnym, krajowym, europejskim).

Przedstawione w niniejszym tomie wyniki badań naukowych są jednym z efektów projektu »ReSource – Wykorzystanie potencjałów pogórnich dla zrównoważonego rozwoju miast i regionów górniczych Europy Środkowej« realizowanego w latach 2009 – 2012 w ramach Celu 3: Europejska Współpraca Terytorialna, Program Europa Środkowa. Badania empiryczne przeprowadzone zostały w regionach: Mansfeld-Südharz (Niemcy), Salgótarján (Węgry), Sokolov-východ (Czechy), Steirische Eisenstraße (Austria), Wałbrzych (Polska), Zasavje (Słowenia) i Zwickau-Lugau-Oelsnitz (Niemcy). Międzynarodowy zespół naukowców współpracował z wymienionymi regionom przez trzy lata. Autorzy tego tomu mieli w ten sposób uniikalną możliwość wglądu w aktualną sytuację, jak i możliwości rozwoju regionów pogórnich w Europie Środkowej, a przez to przedstawienie stanu i potencjału rozwojowego badanych regionów z perspektywy naukowej.

*Sylvia Dołzbłasz*

## SLOVENIAN

### **Povzetek knjige v slovenskem jeziku**

#### **Porudarske regije srednje Evrope – problemi, potenciali, možnosti**

Osrednja tema monografije so problemi, potenciali in razvojne možnosti nekdanjih rudarskih regij srednje Evrope na začetku 21. stoletja. Posebna pozornost je namenjena regijam z majhnimi in srednjevelikimi mesti, v katerih najdemo zanje značilen institucionalni okvir in dejavnike regionalnega razvoja.

Večina prispevkov je namenjenih raziskavi tako imenovanih porudarskih potencialov in možnosti, ki jih ti ponujajo za regionalno in urbano revitalizacijo. Pogosto je dediščina rudarstva namreč obravnavana kot problem, čeprav nasprotno večkrat predstavlja priložnost, ki bi jo bilo treba izkoristiti. Potenciale delimo na naravne, med katere prištevamo na primer krajino, geotermalno vodo iz rudnikov in zapuščene deponije, in kulturne, ki vključujejo infrastrukturo, stavbe ter rudarsko tradicijo in običaje. Osnovna zamisel je, da lahko ovrednotenje in uporaba teh potencialov za ureditev rekreacijskih površin, turističnih znamenitosti ali oskrbe z energijo prispevajo k trajnostnemu razvoju po zaključku rudarjenja.

Prvi del knjige je posvečen uvodu v koncept porudarskih potencialov in pregledu dosedanjih raziskav na tem področju. Teoretičen koncept služi kot osnovna za ovrednotenje pomena