



## Toolkit

# Environmental rehabilitation and repurposing

Guidance on the governance of  
environmental rehabilitation and  
repurposing in coal regions in transition

## SUPPORT MATERIALS

### Providing support materials to coal regions in transition

The Platform for coal regions in transition developed the following support materials to assist practitioners in coal regions across Europe.

#### Transition strategies toolkit

Guidance on how to:

- develop a transition strategy in coal regions;
- identify actions and projects to support the strategy;
- monitor, evaluate and continuously adapt the strategy.

[↗ Link](#)

#### Governance of transitions toolkit

Guidance on how to:

- design the right governance model to support a transition process in coal regions;
- facilitate stakeholder engagement;
- enhance the role of social dialogue and of civil society in the transition process.

[↗ Link](#)

#### Sustainable employment and welfare support toolkit

Addresses the issues of:

- skill needs and reskilling for coal regions in transition;
- cooperation among stakeholders;
- support options for workers who are at risk of losing their jobs;
- economic diversification of coal regions as a means for long-term job creation.

[↗ Link](#)

#### Environmental rehabilitation and repurposing toolkit

This toolkit gives advice on:

- securing finance;
- knowledge and tools;
- governance and institutions to support mine closure, environmental rehabilitation of mines and repurposing of coal related infrastructure.

[↗ Link](#)

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## How to use this toolkit

### Slides / Pages 4-11

This section features key ideas and concepts behind environmental rehabilitation and repurposing.

It can also be used as a stand-alone presentation. For each slide, more detailed information can be found in the accompanying notes.

### Accompanying notes / Pages 12-28

The accompanying notes follow the same structure as the slides and offer an in-depth look at each section, including further resources, links, examples, and case studies.

## AIMS AND SCOPE

The aim of this toolkit is to **provide guidance on environmental rehabilitation and repurposing** with an emphasis on governance processes.

## WHO IS THIS TOOLKIT FOR?

- National and regional authorities, and local governments.
- Stakeholders (such as civil society organisations).
- People engaged in political debate and local development processes.



Zollverein World Heritage.

(Photo © Jochen Tack / Zollverein Foundation)

## KEY TERMS

### Mine closure

Mine closure is the process undertaken when the operational stage of a mine is ending or has ended, and the final decommissioning and mine rehabilitation is underway.

### Mine completion

A completed mine has reached a state where the next land user can accept responsibility for the site.

### Mine rehabilitation

Mine rehabilitation is the restoration of the land on which mining has taken place to the intended post-closure land uses.

### Perpetual obligations

Perpetual obligations refers to the ongoing actions needed with a long-term perspective.

### Repurposing

Repurposing refers to the beneficial reuse of a closed mining or other industrial operation, whether through value-added changes or reuse of the land.

## KEY MESSAGES

- Environmental rehabilitation and repurposing of former mining assets is an **important challenge** for coal regions in transition.
- Environmental rehabilitation and repurposing aims to **protect citizens and the environment** by creating a safe and healthy environment.
- Environmental rehabilitation and repurposing itself **attracts new businesses and creates new jobs**.
- Financial risks of closure could make **public sector intervention inevitable**.
- Mine closure can provide the **opportunity to better integrate redevelopment and repurposing plans** so that they are aligned with public, long-term spatial and economic development interests.
- The application of tools and good practice guides can help to **bolster knowledge and capacity**.
- **Enhanced coordination to speed up implementation**, as well as acceptance among the local population, are preconditions for successful transitions.





# Background

## Challenges

- The **potential for repurposing depends on a number of regional and local factors**, such as the site location, sectoral demands, economic opportunities, etc.
- **Timing is an important factor**, as well as harmonisation with existing planning frameworks.
- **Challenges and risks vary** depending on the type of region, the type of mining and the predominant assets for which repurposing is sought.
- Challenges arise particularly **when time horizons change** (e.g. in case of premature/sudden closure), or conditions change (e.g. in case of changed ownership).

### REGULATORY CONDITIONS

In Europe mine closure processes are highly regulated, mainly on the national level (e.g. in a Mining Act or Minerals Act) or through various government issued permits. Consequently details differ from country to country, sometimes even site to site.

Regional governments need to carefully check obligations - especially when mines are sold or closed early - to ensure that rehabilitation is carried out properly and costs for rehabilitation are not being borne by taxpayers or the local municipalities.

[➔ Read more](#)



# Background

## Opportunities

- Rehabilitation and repurposing can be an important **economic opportunity** that helps to mitigate negative economic and social impacts during transition.
- Rehabilitation must not be viewed as a liability for coal regions, but rather as the **key element for forging a new future**.
- Timely and efficient repurposing of land and infrastructure is often seen as a decisive factor in **attracting new businesses and permanent new jobs in the region**.
- Many regions at later stages of transition, even sometimes decades after mines have closed, come to **revalue the old heritage** of industrial infrastructure and buildings.
- **Cultural heritage and dignity** are extremely important success factors for transition.



### MATRA POWER PLANT: COST-EFFECTIVE REHABILITATION WITH A SUSTAINABLE BUSINESS MODEL

The Matra Power Plant in Hungary is one of many examples of mine site redevelopment for solar and wind energy generation. Other options include conversion to geothermal heating systems utilising water from closed coal mines, or hydro power plants and pumped hydroelectric storage.





## Secure financing for mine closure

### Secure financing is necessary to:

- cover full costs of environmental rehabilitation measures;
- lower financial risks for all (companies, regions);
- provide the necessary financial means;
- define where public sector intervention is inevitable (e.g. in cases of premature/sudden closure where no other solution is applicable).

#### LIST OF MINE CLOSURE COSTS

(ICMM 2019, NON EXHAUSTIVE LIST)

Typical closure costs included in closure cost estimates:

- closure planning and decommissioning investigations on closure design, environmental impact assessment etc.;
- costs for abandonment, shaft backfilling and closure;
- treatment of surface and groundwater;
- security construction costs including seals, liners and dams;
- post-closure monitoring and maintenance, including long-term costs on safety and health.

🔗 [Read more](#)





## Secure financing for mine closure

### Approaches to manage financial risk

#### Pooling funds for environmental rehabilitation measures

Objective: guarantee availability of financial means to implement environmental rehabilitation measures.

Description: the general idea behind pooling funds for mining rehabilitation is to provide a guarantee that environmental rehabilitation measures can be implemented.

[➔ Read more](#)

#### Covering long-term costs in a run-off company

Objective: guarantee availability of financial means to implement perpetual obligations.

Description: a run-off company can be established when a company is closed and the liabilities 'run off' over time. This is an insurance approach to guarantee that firms continue to honour (in full or in part) existing contracts and claims, including those that emerge many years or decades after closure.

[➔ Read more](#)



#### THE RAG FOUNDATION APPROACH TO PERPETUAL REHABILITATION COSTS

- In 2018, after 150 years of hard coal mining, the last mine closed in the Ruhr Area, Germany.
- Many corporate duties remain and will remain in the long-term, including: securing the old shafts and tunnels, permanent management of pit water and groundwater purification etc.
- To finance those perpetual post-mining tasks, a large share of the assets of the mining companies (including real estate) were brought into a foundation (the RAG Stiftung).

[➔ Read more](#)



# Knowledge and tools

## Knowledge and tools can be helpful for:

- standardising closure planning processes;
- providing information on the specific conditions of rehabilitated areas or sites;
- matching available sites (rehabilitated and non-rehabilitated) with potential investors.

## Approaches

### ICMM good practice guide

Objective: enhance capacity in standardised closure planning.

Description: the International Council on Mining and Metals (ICMM) good practice guide aims at improving the closure-related performance of companies and regulators. It contains examples of good practices and a range of tools that can be used to make well-considered decisions when planning for the closure of a mine.

[↪ Read more](#)

### Management Tool for Continuous Mine Closure - CLOSUREMATIC

Objective: support the process of closure management with digital tools.

Description: CLOSUREMATIC is designed as an easy way to use a digital planning and management tool for continuous mine closure. With it, closure planning can become automated, simpler and faster, with continuity in long-term closure data management.

[↪ Read more](#)

### Information platform for post-industrial and degraded areas in Silesia (OPI-TPP)

Objective: match available sites with investor or planner demand.

Description: this online database features post-industrial sites and covers elements such as the presence of residential buildings, agricultural activity, and environmental conditions.

[↪ Read more](#)



# Institutions and governance

## New institutions and governance structures can be helpful for:

- implementing environmental liabilities and organising repurposing processes;
- establishing general contacts for stakeholders regarding all aspects of environmental rehabilitation and repurposing;
- providing the necessary financial means.

## Approaches

- **incentivise repurposing** in countries where the regulatory framework may disincentivise land repurposing and investments;
- **establish public institutions with the potential to enforce rehabilitation and repurposing processes**, while, at the same time, integrating interests of mining companies and regional authorities;
- **use strategic partnerships to overcome a lack of funding and capacity needed** for infrastructure transformation. Close cooperation between companies, regulators, investors, land-use planners and local communities is essential to identify the most sustainable uses of former sites, and to maximise social-economic development.

# Accompanying notes

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# Introduction

## Purpose of this toolkit

The aim of this toolkit is to provide guidance on environmental rehabilitation and repurposing with an emphasis on governance processes. This toolkit is mainly targeted towards national and regional authorities, as well as local governments. In addition, it may provide a useful reference for other stakeholders, such as civil society organisations, as well as those engaged in political debate and local development processes in coal regions. For each of the themes, this guidance document comprises two areas: a general description of the challenges and options for how to deal with them. Each option includes a short description, their advantages and disadvantages, and a good practice example. This toolkit concludes with main messages as takeaways.

## KEY MESSAGES

Environmental rehabilitation and repurposing of former mining assets is an important challenge for coal regions in transition. When mines close, regions are left with the environmental legacy of mining.

Environmental rehabilitation and repurposing aims to protect citizens and the environment by creating a safe and healthy environment, made up of biodiverse ecosystems, which improve the physical environment while rehabilitating and repurposing land and assets for future use.

Environmental rehabilitation and repurposing itself attracts new businesses and creates new jobs. From a governance perspective, key challenges for coal regions in transition are:

- to secure financing for mine closure that reduces financial risks;
- to build up knowledge and apply tools to address regional knowledge and capacity gaps;
- to establish institutional and governance structures to coordinate approaches, speed-up implementation and increase acceptance among local and regional populations;
- to reduce risks and uncertainties regarding the regulatory situation.

Financial risks of closure could make public sector intervention inevitable. This may occur either because mining companies do not fulfil their obligations, or because outcomes of their actions are not aligned with regional development and diversification aims. Approaches to secure financing for environmental rehabilitation and repurposing include:

- pooling funds to guarantee implementation of rehabilitation;
- covering long-term costs in run-off companies to guarantee funding of perpetual costs;
- outsourcing closure planning and implementation at an early stage of mine operation to create financial liabilities and ensure implementation;
- strengthening regulatory obligations to reduce risks and uncertainties with changing regulatory situations.

Securing finance is both a challenge and an opportunity. Mine closure can provide the opportunity to better integrate redevelopment and repurposing plans so that they are aligned with public, long-term spatial and economic development interests.

The application of tools and good practice guides can help to bolster knowledge and capacity on environmental rehabilitation and repurposing related to closure processes.

Enhanced coordination to speed up implementation, as well as acceptance among the local population, are preconditions for successful transitions. Institutional and governance approaches can help foster these transitions. These approaches include establishing new public institutions, building strategic partnerships, and enforcing long-term regional planning processes.

## Key terms

**Mine closure** is the process undertaken when the operational stage of a mine is ending or has ended, and the final decommissioning and mine rehabilitation is underway. Mine closure is highly regulated in Europe, but regulation differs from country to country. Generally, mine closure is the responsibility of the mine owner. An integrated approach to closure takes into account environmental, economic and social considerations from an early stage, and continually throughout a mine site's life.

**Mine completion** is the goal of mine closure. A completed mine has reached a state where the next land user can accept responsibility for the site.

**Mine rehabilitation** is the restoration of the land on which mining has taken place to the intended post-closure land uses. Rehabilitation refers to the measures undertaken to this end, and can include measures to restore the landscape to its pre-mining land uses (environmental rehabilitation). This covers physical mine closure, environmental reclamation and rehabilitation (including the removal of mine equipment), securing the stability of remaining dumps and impoundments, water management and surface stability at closed underground mines, and monitoring and managing any post closure environmental and human health impacts.

**Perpetual obligations** refers to ongoing actions needed. Depending on the type of coal mine and specific regulatory requirements, there are some activities

that may need to be carried out indefinitely. For example, the underground mines in the Ruhr area (Germany) were not flooded after closure, but instead ground water has continuously been pumped out of closed mines to minimise negative environmental impacts.

**Repurposing** refers to the beneficial reuse of a closed mining or other industrial operation, whether through value-added reuse of the land (e.g. energy generation or residential use), reuse of infrastructure at another site, or derivative business opportunities that create positive economic activity.

## Background

Mining regions have always undergone a cycle of prospection, operation and eventual closure, whether because resources are depleted, or because further mining becomes uneconomic. When mines close, they can leave behind a legacy of environmental degradation alongside many other challenges. Locations formerly used for mining and related industrial activities require environmental rehabilitation, and the repurposing of land and infrastructure may be necessary to make them available for future use.

Environmental rehabilitation and repurposing of former mining assets is an important challenge for coal regions in transition. Although plenty of experience of mine closure management exists, this knowledge can be fragmented and often resides in regions that have already undergone a transition away from mining. The aim of this toolkit is to

## ENGINEERING AND TECHNICAL ASPECTS OF ENVIRONMENTAL REHABILITATION

This toolkit does not attempt to address the technical aspects of environmental rehabilitation (e.g. technical solutions to address negative impacts of mining activities on soil, water, and air resources), and for maintaining or improving landscape and functional quality. These are complex tasks to mitigate risks for regions and their communities comprising, for example, measures that address geomechanical stability (dealing with hydraulic failure, slope slide prevention, erosion protection, restoring soil fertility) and soil preparation.

The environmental rehabilitation of areas transformed by coal mining and the settlement of permanent damage, such as the increase in groundwater, will define the conditions and prospects for re-use. That is why these processes should be embedded early in planning procedures and involve regional authorities and stakeholders.

### Further reading

- 🔗 [World Bank \(2018\). Managing Coal Mine Closure: Achieving a Just Transition for All.](#)
- 🔗 [H2020 TRACER \(2019\). Best practice report on environmental protection and post-mining land reclamation.](#)
- 🔗 [H2020 TRACER \(2020\). Report on the environmental impacts and sustainable reclamation solutions in nine coal region.](#)

share knowledge and experiences that may be valuable to those regions that are now taking on transition.

Although environmental rehabilitation and repurposing of assets is concerned primarily with mine closure processes, the preparation of these processes is of relevance throughout the lifecycle of a mine. Preparation for the ending of mining operations and for a sustainable legacy thereafter is, or should be, a long-term strategic task for a mining company. This requires thorough planning and interaction with stakeholders across different governance levels and policy areas. In a broader context, the concepts and frameworks of environmental rehabilitation and repurposing are applicable to other coal-related industries with comparable characteristics and similar challenges (e.g. power plants, steel production, etc.). Moreover, this process is applicable to vertically integrated companies, where the same entity owns and operates both mines and power plants.

## CAUSES AND IMPACTS OF COAL MINE CLOSURE

The pressures of increasing coal mine closures result from a number of overarching issues. The main drivers of changes with regard to open casts and underground mines are mine mechanisation and competition from other fuels in downstream energy demand markets. However, increasingly, changing priorities in government policies (clean energy policies) are also key factors. At present, economies in Asia, Eastern Europe, and Africa face the same drivers of change, with large job losses already taking place in China, and other large coal producing countries in Asia likely to follow. Furthermore, in regions with mining infrastructure, dependency on the coal industry have often resulted in limited development of other economic sectors, and thus coal regions may have a lower GDP per capita than the national average. Given this context, common economic challenges for such regions are:

- difficulties establishing a local team who are skilled and in direct relationship with the affected community;
- working continually on capacity-building and on new projects, step-by-step, and putting emphasis on long-term rather than short-term development;
- using existing local clusters and networks as a basis to further expand and address new stakeholders;
- working with local businesses to help lead efforts, growing skills within the community and building collaboration, cooperation and mutually beneficial partnerships between key actors that previously operated in relative isolation;
- risk of downsizing resulting in a disproportionately high impact locally, due to a narrow local economic base resulting in lower job creation potential, even if job losses from coal mining may be small in comparison to the total labour force;
- loss of the main regional employer dramatically reducing the overall re-employment potential due to a region's geographic isolation;
- disparity of wages between coal mining and alternative professions creating a stumbling block to re-employing former coal miners;
- shedding cultural identities that include strength, determination, hard work, and risk as part of re-employment;
- indirect job losses from subsidiary businesses accentuating social and labour challenges.

Processes are ongoing and will only be accelerated by shifting government priorities towards low-carbon policies, i.e. policies to reduce fossil fuel consumption significantly and coal consumption in particular or to phase out coal. Whereas this opens up opportunities for low carbon businesses, the acceleration process will increase existing pressures and potential negative impacts in coal mining regions.

Further reading [☉ Sustainable employment and welfare support toolkit](#)

## Challenges

Why are environmental rehabilitation and repurposing so important for regions in transition?

- There will be high number of closures in the near to midterm future.
- Ambitious climate policy plans will further increase the closure rate and reduce time schedules. Thus, planning and financial provisions have to be adapted.

As a result of the above-mentioned trends, environmental rehabilitation and repurposing efforts have to be increased. This poses additional pressure on the regions in transition. The objectives for environmental rehabilitation and repurposing are:

- to protect citizens and the environment by creating a safe and healthy environment, biodiverse ecosystems, etc.;
- to improve the physical environment, e.g. by removing industrial blight, reclamation and restoration of post-mining landscapes, etc.;
- to rehabilitate and repurpose land and assets for future use.

The attractiveness of the land, and thus the potential for repurposing, depends on a number of regional and local factors, such as the site location, sectoral demands, economic opportunities, etc. In cases where site owners and operators have concepts or even permits for repurposing, the site might not be attractive enough to investors. In such cases, the challenge becomes increasing

attractiveness of match sites and repurposing concepts with investors.

Timing is an important factor, as well as harmonisation with existing planning frameworks. In practice, challenges and risks also vary depending on the type of region (rural or urban), the type of mining (open cast mines or underground) and the predominant assets for which repurposing is sought (land, buildings, other infrastructure, etc.).

This toolkit particularly addresses open casts and underground mines, coal fired power plants and coal related heavy industries. Key challenges are:

- for open cast mines: securing site safety and environmental rehabilitation of large areas (land and lakes) for future uses, including forestry, agriculture, water management, tourism, and renewable energy;
- for underground mines: securing site safety and environmental rehabilitation of heaps and rivers, ensuring ground stability above post-mine areas, and perpetual obligations (e.g. pumping of mine water);
- for power plants and other industrial infrastructure: environmental rehabilitation of contaminated sites, timely and site-specific repurposing of land (especially in urban areas) and reuse of existing infrastructure.

These challenges relate, to a large extent, to the timespan of closure activities. The time available between the present and

## REGULATORY CONDITIONS

Regulatory and other legal requirements that set standards and procedures for mine closure differ between national, regional and even local jurisdictions. Moreover, since every mining project has its own special characteristics, the application of regulations needs to be examined on a case-by-case basis, to identify the applicability of requirements for the activity in question. Requirements for mine closure are stipulated mainly at a legislative level (e.g. in a Mining Act or Minerals Act) or through various government issued permits, which must be obtained prior to commencing mining operations. Such permits may take various forms and cover different aspects of mining activities, spanning: operations permits, safety permits, environmental permits, water permits, etc.

Assessment of requests and issuance of permits by relevant authorities on an individual basis implies, in turn, that mine closure orders and requirements vary from case to case.

In the EU the [directive 2006/21/EC](#) on the “management of waste from extractive industries” is a key document which defines general principles and legal obligations for mine rehabilitation in member states.

There may be specific agreements for privatised or sold mines, between the old and new owners, with details on mine closure and rehabilitation. Sometimes, rehabilitation may not be included in contracts, and rehabilitation-related legal obligations (and opportunities) may change alongside changed ownership. Regions should therefore pay specific attention to such liabilities.

### Further reading

↻ An overview of the main principles of legislation concerning mine closure in 5 jurisdictions (Sweden, Ontario Canada, Western Australia, Norway and Finland).

↻ The H2020 TRACER Best practice report on environmental protection and post-mining land reclamation gives a brief overview on the respective regulatory framework in the EU.



the (expected) closure of mining and related activities will strongly affect choices and options available to decision makers. Three different time horizons for closures can be distinguished; these will be addressed in more detail in the subsequent sections on approaches and examples and are, in brief:

- immediate or within the next five years, as in the Spanish Asturias region;
- a mid-term time horizon of one to two decades, as in the German lignite mining areas (time horizon of politically driven coal phase-out is 2038);
- an undetermined and possibly longer lifetime of coal mines in countries that do not (yet) have coal phase-out plans.

Challenges arise particularly when time horizons change (e.g. in case of premature/ sudden closure), or conditions change (e.g. in case of changed ownership). In these cases, closure planning, plans for rehabilitation, repurposing and related financial plans may become obsolete.

From an ideal planning and financing perspective, the more time available to adapt, the smoother the transition will be, and the larger the potential is to build up necessary financial incentives and provisions. From a governance perspective, the most important tasks are:

- securing financing for mine closure to reduce the risk that environmental rehabilitation and repurposing obligations are not fulfilled due to competition and scarce financial means;

- building up knowledge and applying tools to address regional knowledge and capacity gaps;
- establishing institutional and governance structures to coordinate approaches, speed up implementation, and increase acceptance among local and regional stakeholders, comprising the general population, the business community, social partners, etc.

### Opportunities

Addressing these challenges in a timely manner is, at the same time, a risk-minimising and an enabling strategy for regions. Rehabilitation and repurposing can be an important economic opportunity that helps to mitigate negative economic and social impacts during transition.

Rehabilitation must not be viewed as a liability for coal regions, but rather as the key element for forging a new future, as a cleaner environment and good living conditions can offer new business models and are a pre-requisite to attract highly skilled workers to regions. Environmental rehabilitation measures, by themselves, have often been a first approach to compensate for job losses in mining in the short term. For example, in the Australian Bowen Basin in Queensland, with its 40 coal mines and 94,600 km<sup>3</sup> of land, it has been estimated that environmental rehabilitation measures would create 2,000 – 3,000 jobs. At one site, the Blair Athol coal mine, it is estimated that around 40 full-time jobs for the next 6-10 years

could be created. This would be more jobs in environmental rehabilitation measures than previously employed in mining at that site.

Timely and efficient repurposing of land and infrastructure is often seen as a decisive factor in attracting new businesses and

permanent new jobs in the region, and is key to opening opportunities for renewed future regional prosperity. Coal related infrastructure often has assets (like railway lines, strong electricity grids, access to rivers etc.), which could be interesting for future uses (such as

### TRANSITION MANAGEMENT QUESTIONS RELATED TO ENVIRONMENTAL REHABILITATION AND REPURPOSING

Decision makers in transition regions are faced with several important management challenges. They must begin by considering the following.

- **What is the challenge? Is environmental rehabilitation and repurposing taking place in the case of planned closure, unplanned closure or sudden closure?**
- **What is the optimal strategy to pursue for a given time horizon and regional context?**
- **How to strategically address economic and social “shocks” of closure, while taking into account the specific regulatory framework conditions in the region?**
- **What conditions and solutions would improve economic attractiveness and enable development such that areas and specific sites can be reused (more) quickly, the transformation of the regions is accelerated, and negative effects (such as job loss) are reduced?**
- **What alternative sources can replace the energy hitherto produced from coal under similar cost and supply conditions?**
- **How to facilitate the identification of balanced post-coal opportunities, including economic, environmental, recreational, energy production, and spatial reserve opportunities (e.g. for carbon forests or future environmental offsets)?**

for industry, renewables, etc.). The City of Genk provides one example whereby old, coal related infrastructure is now strategically used as an asset for modern economic development.

Many regions at later stages of transition, even sometimes decades after mines have closed, come to revalue the old heritage of industrial infrastructure and buildings. New facilities, such as recreation centres, museums, science and cultural centres can be developed on the sites.

Apart from the creation of a number of new jobs, cultural heritage and dignity is an extremely important success factor for transition. Best practice examples have been successful because they have highly valued, built-on and emphasised local coal heritage. This is the case, for example, in Zeche Zollverein in Germany, and in Loos-en-Gohelle in France. Both of these sites are now UNESCO World Heritage Sites.

**Further reading**

- ➔ [Case Study: Genk's ongoing transition.](#)
- ➔ [H2020 TRACER report on good practice cases relating to labour markets, social issues and tourism.](#)

**Example: Matra power plant: cost-effective rehabilitation with a sustainable business model**

The reconversion of former mine sites to renewable energy generation can reduce decommissioning costs, contribute to energy security and provide economic value and jobs to post-mining communities. The development of such projects benefit from the existence of infrastructure and extensive land availability. Specific plans need to be addressed on a case-by-case basis to ensure suitability to local conditions.

The repurposing of the Matra Power Plant in Hungary is one of many examples of mine site redevelopment for solar and wind energy generation. Other options include conversion to geothermal heating systems utilising water from closed coal mines, or hydro power plants and pumped hydroelectric storage.

**Description**

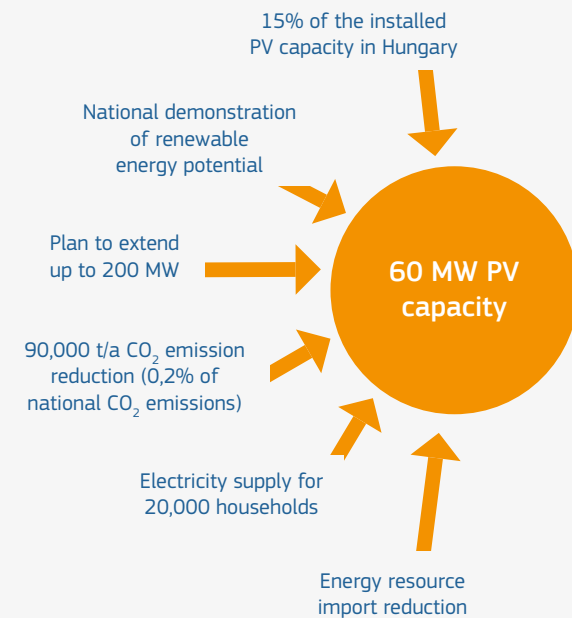
The Matra Power Plant is an example of a coal power plant transitioning into an industry cluster in which renewables play an increasingly important role. These efforts do not only retain the region's electricity generation capacity, but also keep jobs in the region. The concept includes the development of an industrial park in order to create a cluster partnership with established companies in a region that is considered rural and structurally weak. This is also an example of a cost-effective approach to the industrial conversion of exhausted coal mines using energy, forests and photovoltaics (PV).

**Achievements**

Long-term employment opportunities have been secured in the region. Specifically, according to the company, installation of the 15-30 MW PV plant could create 135-270 new jobs. Moreover, the total 60 MW PV corresponds to 16% of total installed national PV capacity, making the company one of the front-runners of renewable energy utilisation in the country. Matra will contribute to reducing the nation's dependence on imported energy resources.

**Further reading**

- ➔ [Matra Power Plant case study](#)
- Reconversion of coal mines for renewable energy generation**
- ➔ [JRC Science for Policy Report: Alves Dias, P. et al., EU coal regions: opportunities and challenges ahead,](#) Chapter 5.4, pp92. (EUR 29292 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-89884-6, doi:10.2760/064809, JRC112593)



**TRANSFORMING THE LIGNITE-FIRED MATRA POWER PLANT INTO PART OF A RENEWABLE ENERGY CLUSTER**

# Secure financing for mine closure

## Key aspects

Secure financing is necessary to:

- cover full costs of environmental rehabilitation measures;
- lower financial risks for all (companies, regions);
- provide the necessary financial means;
- define where public sector intervention is inevitable (e.g. in cases of premature/ sudden closure where no other solution is applicable).

Secure financing is relevant and required for all mine closure time horizons.

## Description

Environmental rehabilitation comes at high costs and is a long-term process. Mine closure creates substantial liabilities for public safety and health, and is, consequently, generally highly regulated in European countries. The EU Extractive Waste Directive 2006/21/EC set minimum standards including the requirement of mining companies to set aside funds for post-mining rehabilitation.

Even when regulation and legal obligations define clear responsibilities, there remains a

## LIST OF MINE CLOSURE COSTS

(ICMM 2019, NON EXHAUSTIVE LIST)

Typical closure costs included in closure cost estimates:

- shaft backfilling cost;
- shaft closure cost;
- abandonment cost;
- surface and groundwater management;
- treatment of water, including water treatment plant construction and operation;
- liner installation or removal;
- construction of seals on underground mine openings to surface;
- construction of closing dams;
- remediation of contaminated rock;
- post-closure monitoring and maintenance e.g. movement monitoring;
- access control and signage;
- disposal cost;
- costs of funding the management of future or long-term activities related to residual risks;
- closure planning and decommissioning investigations and studies to inform and assist in development of closure designs;
- environmental impact assessment of mine closure.

Indirect costs and additional company costs that may not be addressed and included in all types of closure cost estimates include:

- health and safety plans, construction monitoring, quality assurance and quality control;
- costs for management of closure activities, including supervision, power, water and sewage services, fuel and supplies;
- closure planning activities;
- interim care and maintenance costs (sometimes needed while closure designs are being finalised);
- ongoing dam safety inspections and reviews.

risk of companies being unable to fully cover the costs of mine closure. The reasons for this can vary from a lack of planning, to vested interests of operators (e.g. where the high costs for rehabilitation are not in the interest of private companies looking to maximise revenues). Premature and unplanned closures that occur before depletion of reserves, or where mining companies incur losses or become bankrupt, are at increased financial risk. Furthermore, changing energy policy priorities, such as new climate policies, increase the risk that coal-fired power plants become a stranded asset, and thus that mining companies and energy utilities are unable to cover environmental rehabilitation costs.

Ultimately, as a consequence of the realisation of financial risks, the public sector may inherit some or all of the costs of environmental rehabilitation. Public sector intervention may become necessary either because mining companies do not fulfil their obligations, or because the outcomes of their actions are not aligned with regional development and diversification aims. To avoid lasting obligations on the public sector, long-term planning is vital. One option to align mine closure obligations with regional development frameworks and plans is to form a special purpose vehicle that is jointly agreed upon and financed by the mine operator and the respective government or public agency.

The length of the time horizon between repurposing planning and mine closure influences the approaches and instruments necessary to manage risks, including financial, economic, environmental and social risks.

In the extreme case of sudden, unplanned closures, a purely company-based solution to cover financial obligations and manage environmental and social risks might be feasible for mines that have been operating for a long time, with integrated closure procedures, contingency instruments, and that have considered sudden closure in financial planning. As a rule of thumb, the shorter the time of operation and the more mine operations are involved, the more difficult it is to cover financial liabilities of mine closure or coal phase out in general, and environmental rehabilitation and repurposing in particular.

Several methods for cost estimation are used for different financial aspects of closure, including environmental rehabilitation and repurposing costs. These may be used as indicators for the scale of finances needed to secure environmental rehabilitation, and include:

- life of asset cost estimates: estimation of costs that the operator expects to incur – in the context of the current mine plan – at the end of the mine life;
- financial liability: estimated liability based on applicable accounting requirements;
- sudden closure: estimation of costs to suddenly close the operation in its current state;
- regulatory estimate (financial assurance): estimation of costs that form the basis of a guarantee provided to a regulatory body.

### Approaches

The following approaches can be applied to manage financial risk in the case of medium- to long-term closures:

- pooling funds for environmental rehabilitation measures to provide a guarantee that such measures are implemented;
- covering long-term costs in a run-off company to guarantee that perpetual obligations are met, or to avoid a transfer of financial risk to the public sector;
- outsourcing/contracting of closure planning and implementation to closure companies or authorities. One advantage of employing an external contractor is that estimated costs for closure, and particularly for environmental rehabilitation, are recorded and financial resources are “earmarked” for clean-up activities. Thus, operators become even more accountable for existing legal requirement to set aside contingencies for mine closure and mine site rehabilitation;
- regulatory authorities using their authority to strengthen regulatory obligations, ensure transparency of closure costs and provide appropriate liability regulations, including safety and control mechanisms. Total expected costs and planned financing periods should be publicly available and be designed in such a way that all rehabilitation costs can be covered with certainty; in other words, they must be insolvency-proof. This, for example,

would not include savings in a special fund. Other securities, such as cash, bank guarantees, securities on land, or insurance contracts can guarantee the coverage of follow-up costs by mining operators, even in the event of insolvency or insufficient operating profits. Each type of regulation and financial provision applied throughout mining operation should also cover rehabilitation costs during operation.

This toolkit explores the fund-pooling and run-off company approaches in more detail.

## Pooling funds for environmental rehabilitation measures

### Objective

Guarantee availability of financial means to implement environmental rehabilitation measures.

### Description

The general idea behind pooling funds for mining rehabilitation is to provide a guarantee that environmental rehabilitation measures can be implemented. The fund acts as an insurance policy. In this scheme, all mining and gas companies – classified according to specific criteria – must contribute money into a fund. Members pay an annual contribution based on the company’s estimated rehabilitation costs, reflecting

life-of-mine plans that require accounting for rehabilitation and financial risks. The Rehabilitation Fund accumulates payment contributions made by members, and the State may draw down the fund to meet rehabilitation costs where a company is unable to meet its responsibilities. This would be the case, for example, if a company faces financial distress, failure, or liquidation.

### Advantages

The mining companies' performances on taking responsibility for post closure liabilities has often been poor. This can be attributed to a number of factors. For example, in the German case of open cast mining, the calculation of costs for environmental rehabilitation is the responsibility of the operators. They are obliged to pay the consequential costs of mining and to set aside corresponding reserves in the balance sheets. As a large portion of costs are only incurred after the closure of the mine, financial reserves are invested in existing operations as assets. These financial provisions may "compete" with other more profitable investment options. There is uncertainty about the actual amount of reserves needed, the timeframe, and how insolvency-proof reserves may be (i.e. whether they can be lost if the operator becomes insolvent). In view of these economic uncertainties, the transfer of reserves to a public fund could be an option to lower risks and increase the probability of implementing adequate rehabilitation measures.

The fundamental benefit of the Pooled Fund Solution for companies is that it represents a more cost-effective means to ensure rehabilitation obligations are met. However, the amount to be placed into a fund, how that amount will be calculated, the initial provision of funds, and at what point existing securities will be released, are all design questions that have to take into account specific regional characteristics related to the individual site, estimated costs, and existing regulations or amendments to them.

### The Australian Mining Rehabilitation Fund

The Mining Rehabilitation Fund (MRF) is the Australian Department of Mines, Industry Regulation and Safety (DMIRS) pooled fund, into which Western Australian mining operators contribute. The Mining Rehabilitation Fund Act was enacted in 2012 to provide the framework for the fund. Participation in the MRF is compulsory.

All holders of mining licenses are required to report data on disturbed land and contribute annually to the fund. If estimated rehabilitation liability for a company is at or below \$50,000 AUD, disturbance data must be reported, but the company is not required to pay into the fund. Money in the fund is available to rehabilitate abandoned mines across the State in circumstances where the holder/operator has failed to meet rehabilitation obligations and efforts to recover funds from the holder/operator have been unsuccessful. The balance of the Fund and levy contribution rate are monitored on

an ongoing basis to ensure that the fund is appropriately managed to meet current and emerging rehabilitation liabilities, as well as administrative costs.

The introduction of the MRF does not absolve holders/operators of their legal obligation to carry out rehabilitation. The MRF Act allows for money owed for rehabilitation on abandoned sites to be recovered through the Courts. But, the fund enhances the State's capacity to manage and rehabilitate abandoned mines, leading to better environmental and community safety outcomes.

For the practical operation of the MRF, the following regulations are most important:

- specifying how the mining rehabilitation levy is calculated. This includes listing the categories of land disturbance on which the levy is assessed, and the unit rates per hectare on which the levy is based. A calculator is provided on the MRF website;
- dealing with administrative matters related to reporting and assessment, including the due date for reporting;
- listing what the Mining Rehabilitation Advisory Panel can advise upon and setting out requirements about the membership and procedure of the Panel;
- specifying how infringement notices will be issued for late assessment information;
- identifying how MRF data and other fund related information – such as performance reports – will be published

and shared. MRF data are published on DMIRS's website annually. Released data, which shows ground disturbance as reported by the tenement holder, can be found in the 'MRF documents' section of the MRF webpage;

- defining eligibility criteria for mine operators to obtain financing from the fund, as well as the purpose of and specific activities deemed eligible for the fund.

## Covering long-term costs in a run-off company

### Objective

Guarantee availability of financial means to implement perpetual obligations.

### Description

A run-off company can be established when a company is closed and the liabilities 'run off' over time. This is an insurance approach to guarantee that firms continue to honour (in full or in part) existing contracts and claims, including those that emerge many years or decades after closure. This approach is typically applied when a mining company is acquired, or after strategic reorientation in which only part of the business is continued. After such changes, legal requirements attributed to the original company or business remain, including possible liabilities discovered in the future (long-term impacts of the business). Hence, this approach can be used to secure perpetual costs.

### Advantages and disadvantages

The general advantage of a run-off approach is that it enables an orderly exit from the market. It is pre-emptive, in the sense that it is implemented ahead of the company getting into financial difficulties or having rehabilitation costs that remain after closure. The method for distributing assets is fair to current and future claimants. The burden of perpetual costs resulting from the environmental legacy of the mining activity or heavy industry activity remains in the run-off company and is not transferred to the public.

Where mine closure is treated as an overarching regional challenge, closure activities and perpetual tasks can be combined in a single run-off company. This can make it possible to manage transition more efficiently, for example by closing the least economically competitive mines first. At the same time, there is the potential to provide solutions for laid-off workers, as they can more easily transfer to another mine when all are managed as one company. However, this is only a ‘short-term’ solution, appropriate when closure of mines is staggered over time. It does not preclude the need for general solutions for mine closures.

Combining closure activities of multiple companies – or of a whole branch of the economy – involves substantial governance efforts to enable policymakers, companies and unions to negotiate and coordinate an orderly exit strategy.

### The RAG foundation approach to perpetual rehabilitation costs

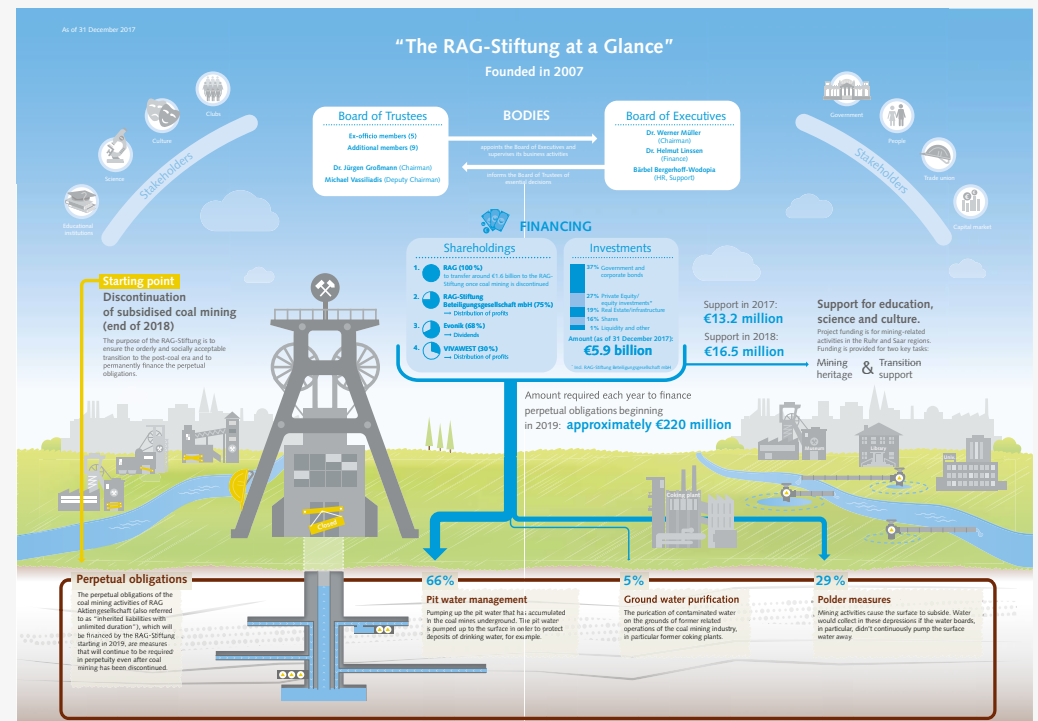
In the case of hard coal mining in Germany, the RAG Corporation (former Ruhrkohle AG) was one key institution, which helped to govern the phase-down and, eventually, phase-out of hard coal mining in Germany. In 1968, all separate coal mining companies already began merging, step-by-step, into one (private) corporation; merges were complete in 1998. This enabled more strategic decision making on hard coal mining in Germany. In 2007, the assets of the RAG corporation were brought into a foundation (the RAG Stiftung). At a similar time, the German federal government reached an agreement with the governments of the coal mining states of North Rhine-Westphalia and Saarland, the RAG Corporation, and the Mining, Chemical and Energy Union (IG BCE) to discontinue government subsidies for coal mining in Germany in a socially accepted manner by 2018.

One of the basic objectives of the RAG Foundation was to ensure the financing of perpetual mine management. After a period of planned closures (without dismissals leading to unemployment), the last hard coal mine was closed in 2018, bringing about the end of an over 150 year industrial history. But, even after the closure of the mines, many corporate duties remained, such as securing the old shafts and tunnels, eliminating mining-related damage, implementing measures including for the permanent management of pit water, polder measures and groundwater purification measures, etc. Perpetual post-mining tasks

(known as “Ewigkeitsaufgaben”) will be financed by the RAG Foundation, while the non-permanent inherited liabilities have to be financed by balance reserves built-up (and legally foreseen and approved) during the time of active mining.

The Foundation’s assets consist not only of the old mines (which are no longer assets, but rather obligations). While it was still profitable, RAG invested in other industrial sectors, namely in real estate (including housing for their workers) and the chemical industry. A large part of those assets – most

important today are the companies Vivawest GmbH, a regional estate company, and Evonik Industries AG, a global player in special chemistry – have (partly) been included in the Foundation’s capital, along with a now diversified range of investments in capital markets. This set-up reduces the risk that the long-term obligations and perpetual costs must be borne by the public sector and relieves a potential burden on the public budget. The public sector would step-in only in the very theoretical case of an emergency that left the RAG Foundation unable to finance the perpetual tasks.



### THE RAG FOUNDATION

Source: RAG (2018). Modified from source.

# Knowledge and tools

## Key aspects

Knowledge and tools can be helpful across all mine closure time horizons for:

- standardising closure planning processes;
- providing information on the specific conditions of rehabilitated areas or sites;
- matching available sites (rehabilitated and non-rehabilitated) with potential investors.

## Description

Environmental rehabilitation and repurposing is a regular task for mining companies when single parts of a mine are depleted and decommissioned. Thus, mining companies need to consider this process as part of their ongoing work. Having a high number of mining closures and sites with environmental rehabilitation needs increases the need for coordination and planning across a region. For both environmental rehabilitation of coal mines and the fast repurposing of post-industrial sites, methodologies that assist with optimally matching land with repurposing approaches may help to maximise efficiencies and minimise land conditioning costs. In-depth knowledge on the condition of the land and assets (including degradation level and type, geological features, and contamination), existing

infrastructure, and more is vital. Mining companies and regional authorities need this basic information, as well as information on current options for environmental rehabilitation, respective costs and local applicability. A variety of tools and guidelines already exist, which can be either used directly by practitioners in coal regions, or can serve as inspiration to develop similar tools specifically tailored to the needs of a region.

## Approaches

This toolkit will explore the following tools as ways to address regional gaps in knowledge and capacity:

- good practice guides, such as the ICMM, for integrated closure planning;
- databases on post-industrial and degraded areas, which allow for quick access to information relevant to repurposing, such as OPI-TPP Silesia;
- Management tools for mine closure, e.g. CLOSUREMATIC.

## ICMM good practice guide

### Objective

Enhance capacity in standardised closure planning.

### Description

Ideally, environmental rehabilitation and repurposing are to be planned for from day one of the operation of a coal mine,



## OVERVIEW ON TOOLS OF THE ICMM GUIDE

- **Tool 1: The domain model.**
- **Tool 2: Monitoring, measurement and inspections.**
- **Tool 3: Objective setting.**
- **Tool 4: Screening alternatives for repurposing.**
- **Tool 5: Key messages for social transition.**
- **Tool 6: Social transition activities checklist.**
- **Tool 7: Climate change and mine closure concerns.**
- **Tool 8: Risk/opportunity assessment and management.**
- **Tool 9: Considerations in developing closure activities for transversal issues.**
- **Tool 10: Considerations in developing closure activities for domain-specific issues.**
- **Tool 11: Social investment for closure.**
- **Tool 12: Closure plan documentation.**

as closure is inevitable eventually. The International Council on Mining and Metals (ICMM) good practice guide aims at improving the closure-related performance of companies and regulators. It contains examples of good practices and a range of tools that can be used to make well-considered decisions when planning for the closure of a mine. The guide provides guidelines, good practices, case studies and a range of tools.

Objectives of integrated mine closure, which are supported by applying the ICMM guidelines and tools, are:

- consistent and transparent engagement with stakeholders;
- community participation in planning and implementing actions that underpin successful closure;
- stakeholder support of closure decisions,
- better management of closure throughout the mining life cycle;
- more accurate closure cost estimates;
- early identification of risks and mitigation strategies;
- progressive reduction of liabilities;
- a shared vision for the post-closure period;
- a better social transition for affected stakeholders as the mine moves from operations to closure;
- opportunities for lasting benefits to be adequately recognised and planned.

The guide provides support to:

- effectively integrate closure and related environmental rehabilitation and repurposing tasks across the mining life cycle;
- enhance capacity to be proactive in identifying and addressing risks early, before they materialise with the potential to compromise eventual mine closure;
- build stakeholder confidence;
- to ensure a positive legacy for sites, by balancing environmental protection and social well-being with financial performance.

#### Applicability

- The guide is applicable to new mines, existing mines and legacy sites.
- It is intended for use across the spectrum of mining companies, from major multinationals to single asset junior mining companies.
- The guide is not exhaustive, but does establish practices and expectations for closure that are applicable to a broad variety of sites and can be used as guidance with respect to the standard of practice for sites in the absence of formal regulatory/government requirements
- The guide has been designed to be largely compatible with different regulatory regimes and corporate guidelines

#### Further information

➔ [International Council on Mining and Metals \(2019\): Integrated Mine Closure - Good Practice Guide](#)

### Management Tool for Continuous Mine Closure - CLOSUREMATIC

#### Objective

Support the process of closure management with digital tools.

#### Description

CLOSUREMATIC is designed as an easy way to use digital planning and management tools for continuous mine closure. With it, closure planning can become automated, simpler and faster, with continuity in long-term closure data management. The lead partner developing the tool is the Geological Survey of Finland, with development financed by EIT Raw Materials. Compared to conventional Closure Management Plans (CMPs), the digital tool should enable for more dynamic planning and documentation, providing status quo reports and updates when needed. As continuous (planned) closure activity typically entails continuous reduction of unknowns, risks, and (financial) liabilities, the process necessitates constant accumulation of data and plans. Another objective of using CLOSUREMATIC is to enable transparency and engagement of internal stakeholders from several branches

of the mining operation, keeping them aware of the aims and progress of closure.

The software should help to plan, carry out, manage, monitor, communicate, and document mine closure according to EU technical and environmental standards. The aim is to eliminate typical problems in mine closure management, such as:

- loss of continuity upon changes in management and ownership;
- difficulties in cost estimation and tracking;
- loss of closure-related data;
- poor coordination of closure actions,
- inability to identify operations that compromise the goals of closure;
- inadequate consultation.

#### Achievements

The tool is available on a project website, and accompanying information – including on the different steps of a closure process, with specific guidance and case studies – is found [here](#). There, templates for EU-compliant documentation for mine closure including costs and risks are also available.

#### Applicability

- General applicability in mining companies.
- Automated planning and management of mine closure.



- Systematic standardised administration and sustainable environmental management of mine closure.

**Further information**

- ➔ [CLOSUREMATIC website](#)
- ➔ [CLOSUREMATIC brochure](#)
- ➔ [Mine Closure website](#)

**Information platform for post-industrial and degraded areas in Silesia (OPI-TPP)**

**Objective**

Match available sites with investor or planner demand.

**Description**

Post-industrial sites represent untapped potential for future economic development. However, for city planners and private investors, a lack of data on these sites has often proven to be a major obstacle in the economic development of the region. In particular, the lack of information on the condition and degradation level of sites has been an obstacle to attracting investors.

The Marshal's Office of Silesia Voivodeship, in partnership with the Central Mining Institute in Katowice (Głównym Instytut Górnictwa-GIG), created an online database

on post-industrial sites. The database covers elements such as the presence of residential buildings, agricultural activity, and environmental conditions, including whether the area is contaminated, if water sources are available, or if the site is a landfill for waste. The OPI-TPP tool is part of the region's Spatial Information System (RSIP), a publicly available GIS-based database that supports public administrations and municipalities. The main target groups are investors and experts who are responsible for city development and spatial planning. The tool not only allows for quick access to key information, but also the possibility to create complex, advanced reports. Although the database already covers several environmental and social aspects, it will be supplemented with further sections moving forward, such as the estimated cost of the revitalisation process and the area's value, providing a wider range of information to potential users.

**Achievements**

Key information on about 1000 degraded areas has been collected and made available to the public in an easy-to-access database. According to the implementer of the tool, it has already been used in spatial planning for urban recovery plans and by investors to get information before investing in an area. With availability of data on the environmental condition of sites, formal procedures can be sped-up, including applying for environmental approval, or for the implementation of reclamation projects. Additionally, both the data collection process and the public availability of the data has increased awareness in the region of the necessity of post-industrial site conversion

**Applicability**

- The tool has to be set-up and database information collected and managed for each region.
- Once set-up, it acts to enhance capacities of spatial planners and investors preparing investment decisions.
- The tool also enhances efficiency of repurposing processes by matching sites and locations with requests and plans for re-uses.

**Further information**

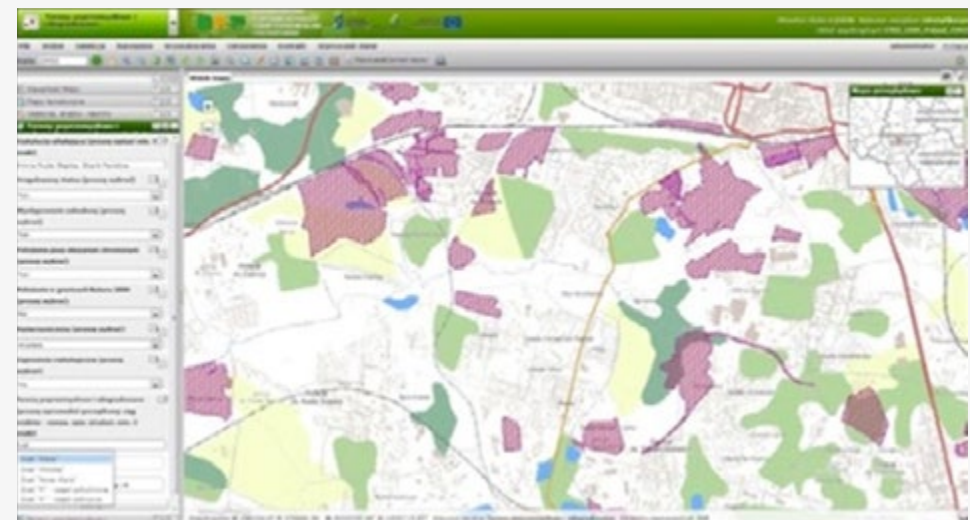
- ➔ [Case study: Information platform for post-industrial and degraded areas in Silesia \(OPI-TPP\)](#)

**Institutions and governance**

**Key aspects**

New institutions and governance structures can be helpful for longer time horizons of mine closure for:

- implementing environmental liabilities and organising repurposing processes;
- establishing general contacts for stakeholders regarding all aspects of environmental rehabilitation and repurposing;
- providing the necessary financial means.



**INFORMATION PLATFORM FOR POST-INDUSTRIAL AND DEGRADED AREAS IN SILESIA (OPI-TPP)**

Source: <https://opitpp.orsip.pl/imap/>

## Description

Repurposing and environmental rehabilitation should go hand-in-hand, as the goal of repurposing is to make the rehabilitated land or area available for other activities, in order to reduce negative impacts of closure for the region and its communities. The ability of a region to attract new industries depends on framework conditions (e.g. geographical location, interregional cooperation, administrative barriers at the national level, governance structures etc.). Due to the high costs involved and the complexity of rehabilitation and repurposing processes, there is a need for strong and efficient institutions and processes. Transition processes in the past have been slowed down and challenged by the vested interests of incumbents. There may be divergence between the interests of the mining company (e.g. minimising cost) and the interests of the region and affected communities. This may affect either the outcome (final state) of rehabilitation and repurposing processes, or the speed at which processes take place. Site-specific environmental rehabilitation and repurposing objectives also have to fit specific local or regional settings and the local identity. Workers, affected communities, civil society organisations and regulators are key stakeholders in dialogues about mine closure. Planning should therefore be transparent and involve stakeholder and community participation to create social acceptance and to be individually acceptable.

## Approaches

The following governance approaches can be applied to advance coordination, speed up implementation, and increase acceptance among the local population:

- incentivise repurposing in countries where the regulatory framework may disincentivise land repurposing and investments;
- establish public institutions with the potential to enforce rehabilitation and repurposing processes, while, at the same time, integrating interests of mining companies and regional authorities;
- use strategic partnerships with national and regional governments, foundations, and other relevant stakeholders to overcome a lack of funding and capacity needed for infrastructure transformation. Close cooperation between companies, regulators, investors, land-use planners and local communities is essential to identify the most sustainable uses of former sites, and to maximise social-economic development. An example is the “agreement for the foresighted revitalisation of significant mining areas” in the German Ruhr area, involving state government, municipalities and the RAG Foundation.

This toolkit explores the public institutions approach in more detail.

## Public institutions for land management

### Objective

Enforce or speed up repurposing processes.

### Description

Establishing public institutions for land management and conversion aims to overcome deadlocks in repurposing processes and speed up the processes to make sites and larger mining areas available. To follow such a strategic ‘regional’ approach to development and economic diversification of former coal mining sites, public sector intervention might be necessary to transfer ownership and responsibility for rehabilitation and repurposing from the private to the public sector. This may be necessary in classic cases of ‘market failure’, when other measures have not succeeded in aligning private and public interests.

### Establishing a property fund and a state development society to enforce repurposing

The process of industrial restructuring in the Ruhr Region in Germany started in the 1950-60s. One key obstacle to attracting new businesses to the region was the low availability of suitable land. Large areas were owned by coal mining companies, who retained land as an asset, despite not using it anymore. This was done for two key reasons: it was cheaper in the short-term

for companies to hold on to land rather than cover the costs of rehabilitation and conversion required to sell it, and they feared that new companies in the region could increase competition for cheap and/or qualified labour. This interest-driven deadlock was called “ground lock” (“Bodensperre”).

Over decades, the public sector tried to address this issue with a series of interventions, ranging from buying individual pieces of land and reselling them (e.g. in the case of a car factory), to establishing frameworks and institutions responsible for site conversion. Initially, despite massive public support programmes for economic diversification, only a few new enterprises were able to settle in the Ruhr area.

The situation changed when new public institutions were set up: a property fund (Grundstücksfonds Ruhr) and a “State development corporation” (“Landesentwicklungsgesellschaft”), which bought and restored former industrial sites. Doing so eventually led to an end of the “ground lock” and paved the way for the Ruhr Area to diversify its economy. This was only possible through high levels of engagement of local and regional governments with the private sector. In addition to political will to support new industries, regional coordination of efforts was also crucial to success.

## GOVERNANCE - PHASES FOR MANAGING COAL MINE CLOSURE. GOVERNMENT ROLES AND RESPONSIBILITIES

Government leadership is indispensable regardless of the coal industry's operating model. Beyond policy making, government roles include acting as: (i) a high-level decision-making body, (ii) institutional leaders, including as the industry's ministers, agency heads, and presidents of state-owned companies; and (iii) managers and professional staff of government ministries and agencies and state-owned companies.

Broadly speaking, commitment starts with political leadership, and then is adopted and executed by institutional leaders, managers, and professional staff.

This applies to the development of policies and programmes, and to their implementation.

Phase 1: Policy and Programs Development		Phase 2: Implementation	
<b>High-level decision making body.</b>	Provides political commitment.	<b>High-level decision making body.</b>	Reviews implementation on a regular basis based on results of monitoring and evaluation processes.
	Initiates and approves programme, including budget.		Approves any revisions to programme and budget.
	Establishes decision-making processes.		Reports to a high-level decision-making body.
<b>Institutional leadership.</b>	Enacts any new legislation.	<b>Institutional leadership.</b>	Directs specific implementation streams on physical closure and social protection and labour.
	Engages with key stakeholders in the closure process.		Engages regularly with stakeholders to assess progress..
	Approves state-owned enterprise (SOE) reforms, including decisions on repurposing ancillary assets.		Reviews any budgetary and programme revisions made by professional staff
<b>Managers/professional staff in institutions and SOEs.</b>	Develops programme.	<b>Managers/professional staff in institutions and SOEs.</b>	Implements programme.
	Establishes new implementing institutions (if needed).		Enforces laws, regulations and HSE standards.
	Determines budget allocations between ministries and agencies.		Continuous monitoring & cyclic evaluation reports on progress, achievements and deviations from original plans.
	Oversees drafting of laws.		Manages physical closure and social and labour work plans.
	Approves regulations.		Hosts regular stakeholder consultations to review progress.
<b>Managers/professional staff in institutions and SOEs.</b>	Engages with key stakeholders and local representatives to ensure that their views are considered.	<b>Managers/professional staff in institutions and SOEs.</b>	
	Proposes SOE reform programmes.		
	Enforces laws and regulations.		
<b>Managers/professional staff in institutions and SOEs.</b>	Acts as key communication channel with stakeholders for programme consultations.	<b>Managers/professional staff in institutions and SOEs.</b>	
	Prepares regulation.		

### Further reading

🔗 [World Bank \(2018\). Managing Coal Mine Closure: Achieving a Just Transition for All.](#)

## History

In 1979, more than 2,500 ha of the Ruhr that was once home to mining, commercial and transport activities lay fallow and would have been subject to rehabilitation and repurposing. The Ruhr property fund (Grundstücksfonds Ruhr, GRF) was developed within the “Action Programme Ruhr” of the then state government. The GRF was intended to set the property market in the Ruhr area in motion, eliminate bottlenecks and clear up cases of destroyed landscape. In 1984, their mandate was extended to the whole of North Rhine-Westphalia. The management of this fund was transferred to the Landesentwicklungsgesellschaft Nordrhein-Westfalen (LEG). In 2004, LEG was privatised, leading to the sale of all of GRF’s commercial properties. This was done in close cooperation with local business development agencies.

## Mission

The property fund’s activities and the condition and the conditions for the purchasing of land were regulated by the Minister of Urban Development, Housing and Transport. According to this decree, brownfield sites acquired by the property fund are to be located “primarily in central inner-community locations (...) which hamper urban development and structural development [and] pose environmental problems”. Their rehabilitation and repurposing is intended to “prevent otherwise necessary land consumption,” or “clean up cases of destroyed landscape.” Since 1987, GRF has thus developed and implemented planning

and development concepts, and carried out the complete redesign of the areas as a developer. The GRF is thus in a position to tackle the development of sites in a complex manner and to design redevelopment as an overall project.

## Financing

- Through income from the sale of land, rents and leases.
- Through subsidies from various EU, federal and state programmes.
- Through shared financing with the municipalities, e.g. of the development costs.
- Through cost reimbursements from the previous owners, e.g. for contaminated sites.

In order to achieve their stated objectives, the state government initially made approximately €250 million available and commissioned the LEG to carry out the purchases and excavation of the plots. From 1980 to 2006, the property fund invested over €1.83 billion, of which €440 million were for acquisition of land. Proceeds from the sales amounted to more than €480 million.

## Procedure

The property fund is offered to the municipalities. Purchase decisions are made based on applications of municipalities, which must state the intended use of the site, its location and the condition of the area. Furthermore, an evaluation report by the

Regierungspräsidium and a property-related supplementary examination by the LEG are required. Today, purchasing decisions are made by the Ministry of Urban Development, Housing, Culture and Sport in agreement with the Ministry of Finance. At the request of the municipalities, the fund acquires the registered plots of land from owners – after examination and release of the funds by the district government and ministries – and develops them according to the planning specifications of the municipalities, and in close cooperation with them, until the final resale.

In order to ensure success, the buyers of the then reusable and developed areas must begin by implementing the planned development and use within two years. In the event that they do not comply with this obligation, they face a priority notice of restitution being entered in the land register.

Municipalities that purchase newly created green spaces must comply with this purpose for 25 years.

## Achievements

- Of 184 projects that were acquired, representing a total portfolio of 2,672 hectares state-wide, 132 have been successfully completed.
- 2,307 hectares of the formerly industrially used land were sold by the end of 2018, of which approx. 930 hectares were sold to tradespeople.
- 1,311 hectares of redeveloped green

and development areas were transferred to municipalities or other public facilities.

- NRW.URBAN currently manages 365 hectares of the acquired land. Of these, 122 hectares are still for sale to the commercial sector.

## Further Reading

- ➔ [Herpich, Brauers, Oei \(2018\): An historical case study on previous coal transitions in Germany. Part of the project “Coal Transitions: Research and Dialogue on the Future of Coal”. IDDR and Climate Strategies.](#)
- ➔ [Metropole Ruhr \(2010\): Regionalkunde Ruhrgebiet: Phase 2 \(1975 - 1986\): Zentralisierte Strukturpolitik](#) (German only)

## Annex: key resources

- CCIRIT (2018). [Coal mine closure companies/authorities and their role in transition: insights and lessons](#).
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## Platform for coal regions in transition

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