

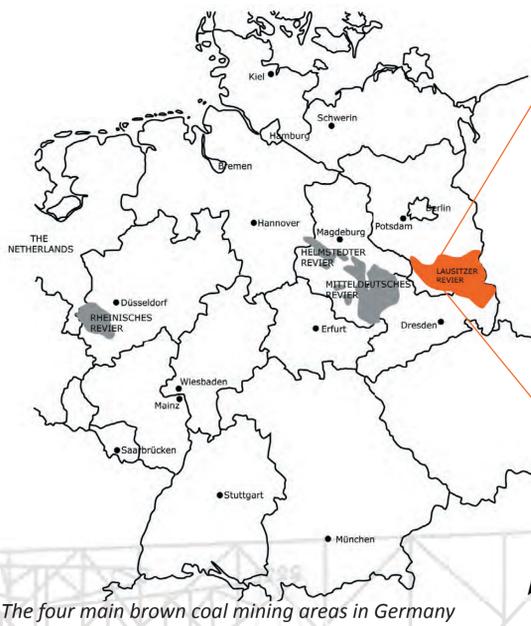
# Brown coal mining and rehabilitation

## Location

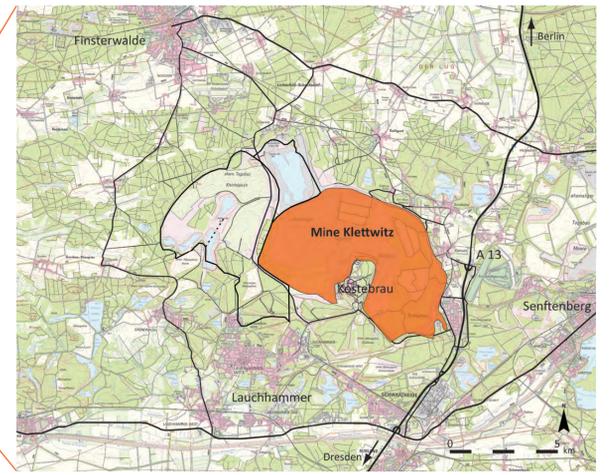
There are four main brown coal mining areas in Germany. The study area, Lusatia (Lausitz) is one of them. The specific site of the research is the former mine Klettwitz, which is part of the mining area Lauchhammer. The area is connected to the A13 highway between Berlin and Dresden. The mine Klettwitz is mined from 1951 to 1991.

## Mining

The brown coal mines in Lusatia area open cast mines. This is a surface mine where specific machines excavate overburden material and brown coal, and where other machines spread the material in the same mine. A machine that is unique for brown coal open cast mining in Lusatia, is the overburden conveyer bridge that excavates, transports and dumps material from one to the other side of the mine in one movement. Mining creates different forms in the landscape. There is a big dump area where the material is spread. There is a gully at the edges of the mine, because the conveyer bridge can not spread there. A final void comes to exist, mostly at the end, because of the brown coal that is excavated. And every mine has a certain context.

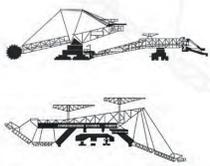


The four main brown coal mining areas in Germany



The specific site under research: the former mine Klettwitz

### EXCAVATING



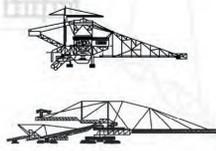
machines that excavate overburden material and brown coal

### CONVEYING

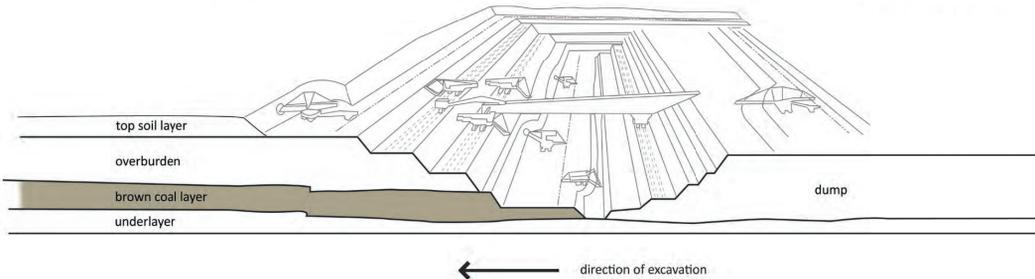


overburden conveyer bridge, machine that excavates and spreads overburden material

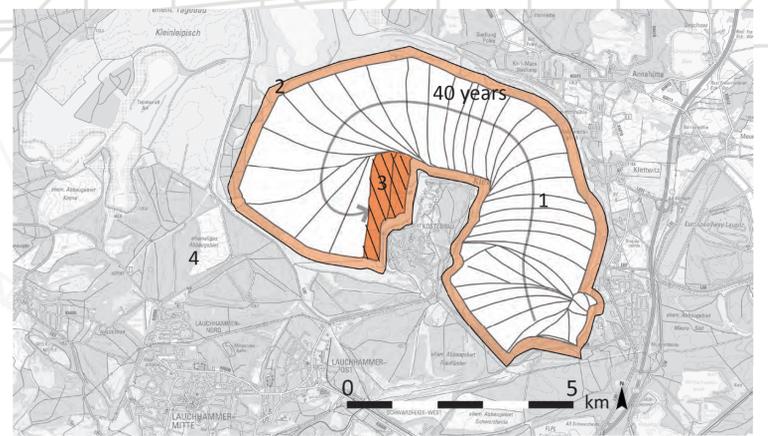
### SPREADING



machines that spread material



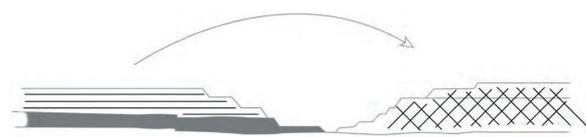
The general working of an open cast mine



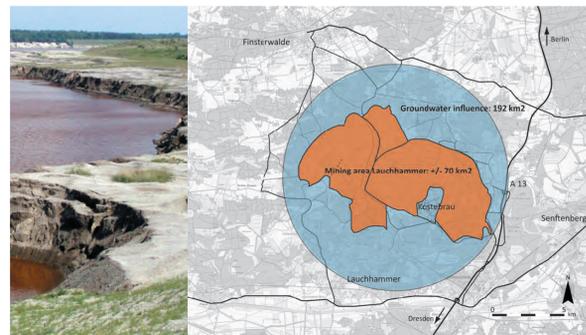
1. dump 2. 'Randschlauch' 3. open cast final 4. context void



The mine Klettwitz with the 4 typical subdivisions of the open cast brown coal mine



The dumped soils are degraded: instable, poor, acid and sensitive for erosion



Water problems: mining causes acid groundwater and water shortage over a large area



Topography is removed and areas are not accessible anymore



Placelessness: people lost their bond to their environment

## Problems

The most important problems caused by mining activities concern:

- the degraded soils and changed landscape contours;
- the water problems, both qualitative and quantitative;
- the removed topography
- and placelessness, mining removed all the aspects of space that people can relate to.

## Thesis statement

built on the problem statement and landscape architectural criticism that is formulated on the current rehabilitation practice, we suppose that:

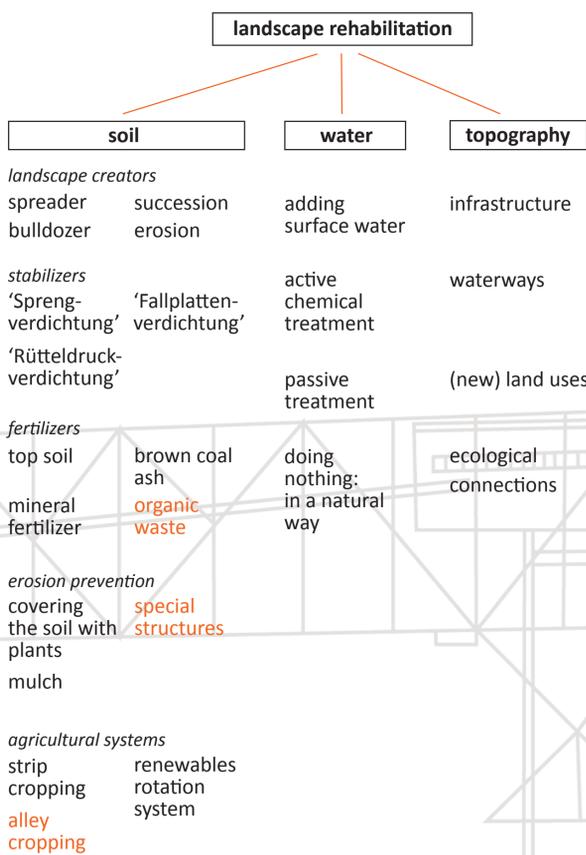
1. the environmental problems should be taken on with a more landscape based approach when this is a good alternative to the current practice;
2. the social and mental problems need a landscape narration approach to prevent the problem of placelessness in mined areas;
3. and the integration of landscape narration with a landscape based rehabilitation approach is a necessary contribution to the current rehabilitation practice.

From this, the following thesis has been developed:

**'To solve the problems in Lusatia caused by the mining, the integration of landscape narration with a landscape based approach to landscape rehabilitation is needed.'**



## Landscape rehabilitation and narration principles



Schematic overview of rehabilitation principles for mines in Lusatia



organic waste



special structures



alley cropping

Examples of the principles

## landscape narration for Lusatia

### types of narrative

#### chronicle

rhetoric means:  
 accent: rhythm  
 addressing

#### memoirs

rhetoric means:  
 accent  
 anomaly  
 metaphor: synecdoche  
 addressing: aposiopesis and exclamation



accent: rhythm



anomaly: anachronism



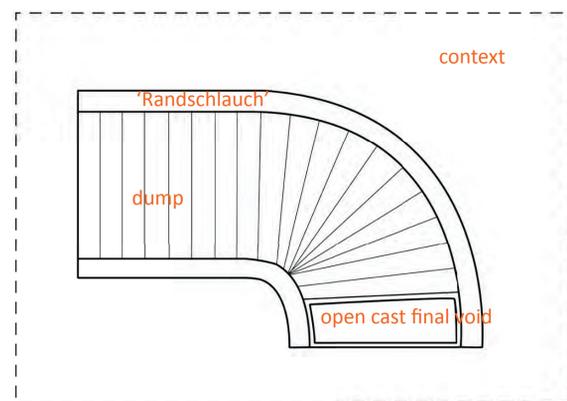
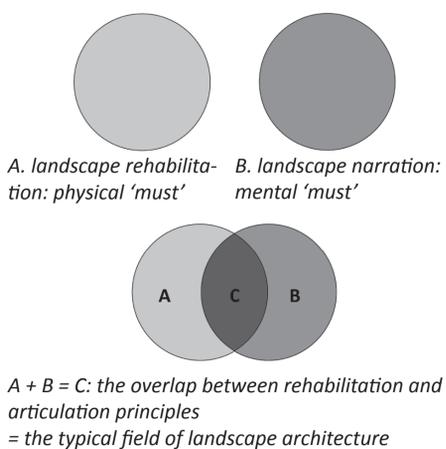
accent: contrast

Schematic overview of landscape narration principles for mines in Lusatia

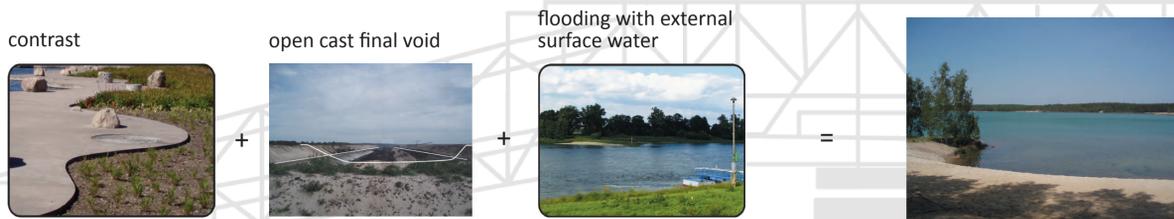
Examples of the principles

## Integration of narration with rehabilitation

The principles that are developed for landscape rehabilitation, can be seen as a physical 'must' (A), and the principles developed for landscape narration, can be considered as a mental 'must' (B). It appears that some measurements that are taken to rehabilitate the soil, can at the same time articulate a part of the narrative. Therefore, the overlap in the principles of different origin delivers the design principles. Part C is the most important part of the diagram for this thesis, because it will show that the steps that have to be taken in landscape rehabilitation can be integrated with creating the articulation of a landscape narrative. The principles need to be connected to the four subdivisions of the typical Lusatian brown coal mine, to become applicable.



a typical Lusatian mine with its subdivisions



These are 2 examples of the integration of the principles. Of course, there are numerous possibilities when combining 25 landscape rehabilitation principles with 15 landscape narration principles and one out of four locations in the mine. It is decided to start from the landscape narration principles, to guarantee that there will be a landscape chronicle and memoirs in the end, and then to work back. The chronicle is the overall narrative and takes the biggest area on the mine site. Suiting the process character of a chronicle, this part of the mine should be most flexible in land uses and rotation times. The landscape memoirs concerns more point and linear elements. Suiting the remembering character of the memoirs, these topologies should form a long lasting structure in the landscape. The chronicle and the memoirs complement each other. When the design principle consists of a photograph, it means that these examples are already present in Lusatia or the mine Klettwitz. Otherwise, a drawing has been made.

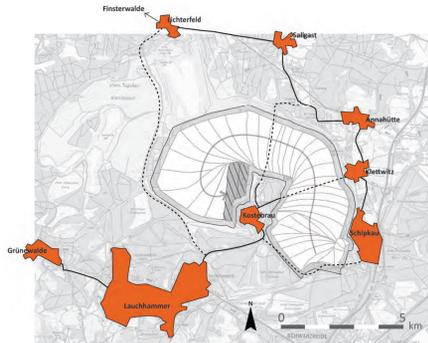


### Alternative rehabilitation plan

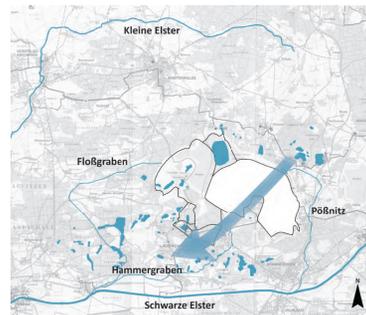
The alternative rehabilitation plan is made for an imaginary new mining start in Klettwitz in 2010, to test the design principles on a specific site. In this rehabilitation plan:

- Kostebrau is connected again with the surrounding area;
- the water is guided from north-east to south-west again;
- and important nature areas will be (re)connected.

Other important trends in land uses are: renewable energy, nature development, tourism and mixed production forests. Below, 6 phases in the development to a new rehabilitation plan are presented.



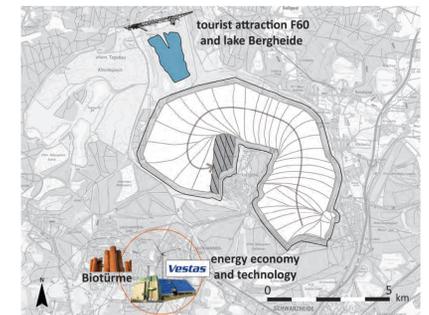
Reconnecting the villages around the mine with Kostebrau



Guiding the water system: from north-east to south-west in the area

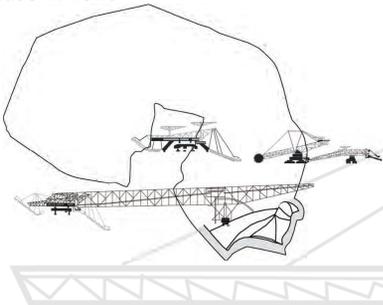


Important areas with ecological value

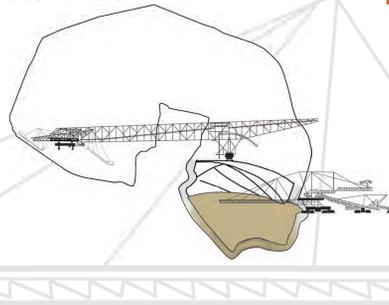


Touristic places and energy economy and technology in the surrounding area of the mine Klettwitz

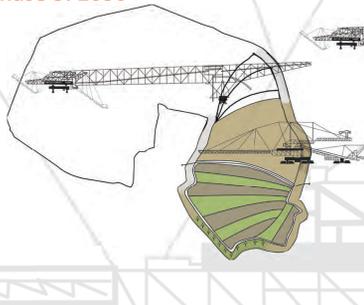
### phase 1: 2010



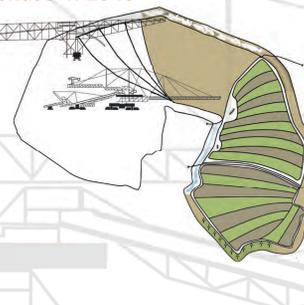
### phase 2: 2020



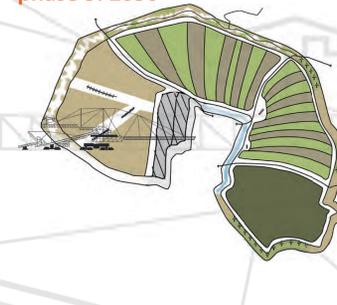
### phase 3: 2030



### phase 4: 2040



### phase 5: 2050



### legend phasing plans

- mining in progress
- spreader and bulldozer stabilization and fertilization
- closing 'Randschlauch'
- closing and raising 'Randschlauch'
- alley cropping
- windmills on raised 'Randschlauch'
- road
- 'Randschlauch' filled with water
- nature 'Randschlauch'
- conserved ridge
- mixed production forest
- open cast final void

### phase 6: 2060



### legend

- dump
- alley cropping
- production forest
- 'Randschlauch'
- nature development
- windmills on heights
- water
- open cast final void
- solar panel field
- roads
- regional road
- local road
- slow traffic route
- other
- information centre Kostebrau
- ridges in dump area
- tourist attraction F 60
- lake
- nature area
- forest
- build area
- water guided to Hammergraben
- nature areas connected through 'Randschlauch'

### Composition in 2060

In the composition in 2060, nine design principles are used. In the three impressions below is shown how rehabilitation and narration are applied together. After a process of soil improvement making use of organic waste as fertilizer and an alley cropping system, now production forests are developing on the dump area where the mining started. On the newer part of the dump there is still an alley cropping system. The open cast final void is now arranged for a large solar panel park. The 'Randschläuche' are designed as water body, connecting nature area and raised as a location for windmills. From Kostebrau the area is opened up visually and by infrastructure for traffic and recreational routes. The references to the past, that are articulated in the memoirs, support the chronicle because they tell about the past, while the chronicle visibly refers to the current situation and to the future. The memoirs form a long-term framework in the landscape while the chronicle is more flexibly adaptable to changing land uses in the future.

### Conclusions

- the integration of landscape narration principles with landscape rehabilitation causes an interesting overlap, from which design principles can be derived
  - the design principles on poster 2 show that the integrated landscape narration and rehabilitation principles are applicable on the typical Lusatian brown coal mines;
  - and the alternative rehabilitation plan for the mine Klettwitz on poster three shows that the design principles can be applied successfully on a specific mine also.
- Compared to the current reconstruction of the mine Klettwitz, the alternative rehabilitation plan is:
- as good a solution to the environmental problems, and using a landscape based approach to soil rehabilitation;
  - better equipped to solve the mental problem of placelessness, due to the narration;
  - and due to the land uses that suit current trends, also good for the economical development of Lusatia.
- Following the methodology of this design research, it can be said that the thesis is true, with the addition of a trend analysis into land uses of future importance. To be able to prove the thesis in practice, a detailed mine site design has to be made based upon this landscape based approach which integrates landscape rehabilitation and narration. Then the design should be executed, tested and evaluated.



### Impression 1

Here the design principle anomaly + 'Randschlauch'+ spreader is applied. The 'Randschlauch' is inverted from a gully into a ridge by filling it with material from the dump. Now it is an excellent location for windmills, which are a profitable new land use. The windmills mark the contour of the former mine when entering the area.



### Impression 2

In this impression the aposiopesis + 'Randschlauch' + (re)connecting ecological areas is applied. The 'Randschlauch' is now a linear connection between nature areas. It is at the same time an exciting place for hiking; the developing succession, curves in the path and height differences enable few view on what will be next.



### Impression 3

Here the design principle anachronism + dump + erosion is shown. Characteristic features of the mining dump are worth conserving as notable landscape features articulating the history of the site. Rehabilitation is consciously not undertaken, to show people the beauty of a process of erosion on a dumped ridge.