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PILOT ACTIONS AND INVESTMENTS

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4.1 APPLICATION OF INTEGRATED ENVIRONMENTAL LAND MANAGEMENT IN FUAS

As the next step - based on the developed common strategy for integrated environmental management in FUAs and subsequent Action Plans for the project FUAs - the pilot actions were developed and implemented, located in **7 project countries**.

The involvement of stakeholders and citizens played an important role in this phase. These pilot actions are showing the practical ways of Action Plans implementation and, of course, physically visible results: they aimed to reach the project objectives on protection of land resources and reduction of urban sprawl in FUAs.

The content of the pilot actions refers to the specific problems in the 7 countries concerning integrated environmental land management identified in the individual FUAs.

In the foreground these pilot actions have a strong demonstration character, showing possibilities and solutions which are transferable and replicable also in other areas. Another important reason concerns the experiences made thereby relating to all aspects of the common approach, the acceptance of the actions within the regions and the sustainability of the results.

Physically visible results of the project are pilot actions in form of **two investments financed by LUMAT project**, they are located in Slovakia and Poland:

- The investment in Slovakia involves restoration of neglected natural park for sport and recreation zone in location Štrky in Trnava, aiming at securing overall rehabilitation of currently abandoned area of Štrky. This overall rehabilitation opens up this area for broad public of Trnava City and Trnava FUA offering possibilities for sport, leisure and relax activities in natural environment.
- The investment in Poland consists in rehabilitation of the brownfield site located in the middle of the Ruda Śląska city. The investment creates an available open space of a natural, “half-wild” character; this place will become the walking and biking route connection of two districts as key element of the peri-urban infrastructure.

In the other 5 areas pilot actions demonstrate the implementation of integrated environmental land management based on different actions such as site revitalization plans, business plans for restructuring areas with environmental requirements, mine water use for heating greenhouses.

All these pilot actions are addressed mainly to the general public-the inhabitants of these regions who will have better living conditions and standard due to improving aesthetics, quality and safety of places where they live, work and rest. During the development phase the target groups were involved giving the possibility to express comments and ideas on the project partly on municipalities website, partly by information events organized in the regions.

Also the local and regional public authorities have the possibilities to see the actions which are examples of improving environmental land management and show the implementation of the developed Action Plans.

All the project partners were involved in pilot actions implementation using the common transnational concept developed in the framework of Action Plans, due to specificity of each of the 7 pilot areas.

4.2 PILOT INVESTMENT IN RUDA ŚLĄSKA

— Design targets

According to elaboration of revitalization design of zinc spoil heap, in Ruda Śląska vital targets were indicated such as:

- remediation and **phytostabilization of heavy metals contaminations** in

the area

- biodiversity protection
- social participation.

— Actions preceding the construction design

The following actions and studies were provided:

- social participation lead by ARCA Studio
- meeting with inhabitants of local community which gave range of expectations and propositions; prime conception plan for area developing was a result of meeting
- mineralogical and chemical characteristics of the area done by prof. Iwona Jonczy from Silesian University of Technology, Gliwice
- study of utility features of zinc spoil heap deposit done by CB Project and

GIG Institute

- plant cover studies lead by specialists from Department of Biology and Environmental Protection, Silesian University, Katowice
- various actions undertaken by municipality
- greenery inventory of trees on the area dedicated for ground level changes
- indication of metallophyte plants spots on the area concerned
- analysis of application possibility of inhabitants expectations.

— State of the heap before the redevelopment

Most of the surface of spoil heap area was covered by meadow of mixed herb plants and sparse woodlots. Majority of herb plants represent **metallophyte species**. All above the ground parts of mentioned herbs were contaminated, that could bring health problems to people while having frequent skin contact with them.

In northern part of the area there were sharp crags of height about 2-3m, above them steep slopes bringing danger of falling down to space users.

Some patches uncovered by plants had revealed rough spoil contaminated deposit. Partially there could be found boulders of parched slag with sharp

edges. They were present on northern slopes and in woodlots. There was a need to cut down dangerous crags, make

even slopes and hide exposed parts of spoil heap material.

— Construction design range

Design followed results of above actions and contained the elements listed below:

- remediation and phytostabilization of top layer of the spoil heap
- northern slope and spoil heap top formation

- road path system
- lighting design

- surveillance infrastructure design
- recreation infrastructure: view points, grill area, outdoor gym equipment, industrial playground, education path.

— Design assumptions

Main problem and target of actions designed for area of zinc spoil heap in Ruda Śląska was the soil contamination and the process of the situation improving with remediation, **to reach safe recreation open space there**. Additional targets were: to mitigate

dangerous sharp and high crags on the northern heap edge; to build possibly low cost in maintaining leisure infrastructure with possibly broad offer, vandalism resistible, and with deep connections with local identity and history.

— Remediation

Remediation of topsoil in the area concerned was provided by **phytostabilization** on the top of spoil heap and covering northern slopes with clay and new soil layers. That should prevent inhabitants from the contact with dangerous substances. That was important especially on the top of spoil heap where the most of sport and leisure activities would occur. To protect people against heavy metals present in metallophyte plants there was planned destroying of green cover on the spoil heap top with chemicals and replacing

them with proper safe species. Southern slope remained nearly untouched with minor activities provided. Nearly all designed activities are connected with northern and top area. For southern slope **gradual exchange of plant species was planned**, and was realized by cutting grass before seed maturity and sowing target species of grasses, similar as for phytostabilization. Phytostabilization design involves the reduction of the mobility of heavy metals in soil. That can be accomplished by decreasing wind-blown dust and

minimizing of soil erosion according to creation of tight plant cover. Reducing contaminant solubility or bioavailability to the plants depends on pH level and presence of stabilizing substrate.

The addition of soil amendments, such as brown coal, and alkalizing agents in form of lime fertilizers, can decrease solubility of metals in soil and minimize leaching to groundwater. Most of active chemical compounds of heavy metals are blocked this way and neutralized.

The **mobility of contaminants is reduced** by the accumulation of contaminants by plant roots, absorption onto roots, or precipitation within the root zone. To provide proper habitat for planned grasses there was designed addition of fertile soil to the top layer of the ground. There were chosen grass species especially suitable to limit contaminations in roots and restrain

— Social participation

Since 2014 consultations were conducted with local community within the EU program participation within FUA of Chorzów, Ruda Śląska, Świętochłowice. The social needs and comments were indicated, concerning:

- **values:** accessible green open space, attractive landforms, connections with wider open space system, neighbourhood of shopping centre
- **disadvantages:** lack of monitoring, menace of violent hooligan

their migration to aboveground stems.

Three species of grasses with diverse form varieties were used. They are:

- Lolium perenne - rye grass
- Festuca rubra - creeping red fescue
- Miscanthus x giganteus - giant miscanthus.

According to some scientific research these grasses can grow on zinc spoil heap habitat and have very limited traces of heavy metals in leaves:

- Phytostabilizing area - 12266 m²
- Covering of northern slopes with clay and new soil area - 12366 m²
- Southern slope for gradual species exchange - 17778 m².

behaviour, garbage in area, nearby industry, high voltage line

- **needs:** bicycle and ski infrastructure, sport facilities, view point, playground of industrial connotations.

According to the first consultations, a first conception plan was designed. After thorough assessment of local conditions, treats and relations were prepared final conception plan in February 2017. Its assumptions were presented to the local community on the

meeting in 23.02.2017. Main direction of paths were kept as well as localization of playground, open space sports facility and playing field. Places for grill were

— Development elements

According to landform change, northern slope was transformed. Limited part was left untouched as the “essence of the place” - high crag with moss and grass plant cover, with matured birch tree and some outcrop of spoil heap material with slag sinters. Some information points of **educational path** connected with slag features and metallophyte plants are placed nearby. The slope has been planted with birches, oaks and ash trees in geometrical groups to support expression of man-made landscape, but with use of native trees. On the area of the northern edge there was designed **Land Art** made of hornbeam trees. On the middle of the heap top there was designed a view point in form of hill about 4 m high.

That was made of spoil heap material and covered by clay, soil and sown by grass. There was installed lunette, some benches and educational path point. To the north of the view point there was designed a sledge slope. Other top area was flattened and treat with phytostabilization to neutralize heavy metals contamination. To the west of the view point there was located a **playing field**. It will be sown more densely than other places, and will be well maintained. Around the playing field, there is a low dike with tubes-tunnels

moved to the west, to be far from high voltage line. New elements of functional structure were added - mentioned in description of construction design.

for children play. Furthermore to the west there is situated the grill area under canopy of birches. Places for grill stands are in a form of gravel square pits surrounded by timber kerbs. Dark basalt gravel correspond to zinc slag but is not contaminated. **Stands for grill** are separated by the dashed lines of miscanthus. That will give sense of intimacy providing kind of a green wall maze for children play. By the centre of the area there was build a main path joining 1st Maja Street with “Trakt Rudzki” path. Near western end, on the place where the path reaches top ground platform there are concrete **hammocks**. These constructions have timber cover suitable to sit on and handles to mount own hammock. Leaving hammock for days in open space could be not reasonable because of possible vandalism and high fall of furnaces dust which makes textile dirty, especially during rainfall.

Quite near to them there are view concrete boxes with two deck **chairs** in each. **Intimate space**, with view outlined by edge of the box have boards of educational path with information about local history, industrial revolution, zinc production technology, features of spoil heap material and metallophyte plants. To the south of main path are located three iron factory vats on the slag spot.

Vats are filled with soil and planted *Lycium barbarum* - boxthorn. That shrub has falling down branches, bright silver-green leaf and can symbolize liquid metal in high temperature. Around vats are small basin with slag gravel and educational board with zinc and iron production technology. Next groups of hammocks are placed near vats. On the side path curve there is a second - "small" view point. Following that path one can find open space gym. There is either the place for boulder of zinc ore with educational board. Some additional hammocks stand there on the slope edge. On the east border is jumping track for BMX bicycles located in dean made of coal mine rock. Slopes of dean will be covered by clay and grass. Track path is covered by clay and lime gravel. The same surface is designed for BMX circus in eastern border of area. Circus has a form of round dike with ramps about 2m high, with walls suited to bike extreme rides and jumps.

On the south border there is another path going to a playground. Most of paths on the area are covered by gravel and lime stone dust. Only two paths leading

from the top of spoil heap to playground are made of mineral-and-resin surface because of steep slope. They provide extreme steep for walking path to give expression of spoil heap height. Along one of that paths there is a line of slides for children play. On the main area of the playground there is a wooden construction in the form of industrial structure with some connotations to coal mine lift tower, drift or some iron and zinc factory dwellings. Additionally there are various slides and modern play equipment which may be associated with industry but giving the same time high quality play proposition. On southern slope there are some spots of metallophyte plants left.

They create rhythms of rectangular forms or circles. Nearby there are put educational boards with information about that kind of plants. On the whole area there are boards of educational path with information about local history, industrial revolution, zinc production technology, features of spoil heap material, metallophyte plants, spontaneous flora, birds living around and area information system.

— Recapitulation

Revitalization design for zinc spoil heap in Ruda Śląska is an attempt to solve as many problems as possible. According to the sustainable development rules there were taken under consideration technology of remediation and phytostabilization and were applied to all accessible area.

On northern slope there were the most heavy works of land formation to neutralize all health hazards connected with contamination and sharp crags. The slope was flattened. Ground surface was covered with clay and clear soil layer.

Central area of the top of spoil heap was threaten with phytostabilization and southern slope was maintained in the way to rebuild flora structure with the target to get plant cover not concentrating heavy metals in above the ground shoots. On that area, recreation activities are highly limited.

All solutions are meant to provide safe environment for people to rest, spend their leisure time and enable some sport activities with no health threat. Some limited parts of the area were left untouched to preserve local flora and provide source for natural succession.

To support biodiversity nearly all designed trees are native. Most grass species except ornamental miscanthus are native too. Only groups of shrubs obscuring electricity transformer stations are introduced ornamental plants with the highest drought tolerance.

Various small architectural forms and sport facilities were applied. The form of them should support local identity. Educational path is providing information about history of the place, industry connected with the area, local flora and fauna and sustainability issues.

Spatial and architectural solutions have original form and should be legible and easy to use. Small architectural elements, within that area information elements, are resistible for vandalism and possibly not too much expensive, easy to maintain, repair or exchange.

All solutions were deigned to follow spatial, social, economical and natural demands of sustainable development and following ideas of green urbanism, the local action for biodiversity, European Landscape Convention and others.

Table.4 Design in numbers

Construction area	63,735 m ²
Northern slope for transformation	12,366m ²
Remediated area with phytostabilization	12,266 m ²
Southern slope for gradual species exchange	17,778 m ²
Bicycle facilities for BMX	2,071 m ²
Path system	4,387 m ²

4.3 PILOT INVESTMENT IN TRNAVA

The neglected natural park Štrky located in the north edge of cadastral area of Trnava City in Southwest Slovakia, originally a valuable bio-centre of local importance, had gradually changed into an abandoned and polluted greenfield in the past, mainly due to the intensive deforestation accompanied with industrial, agricultural and construction activities, plus the lack of public financial sources, allocated to other investment priorities in the city residential area.

The main aim of this LUMAT pilot action is the overall rehabilitation of this currently abandoned area, and its change for sport and recreation zone accessible for all Trnava FUA inhabitants. Through the restoration, an original natural value will be brought back to this area and will be strengthened as well as ecological stability will be increased considerably. Moreover, overall rehabilitation will open up this area for broad public of Trnava City and Trnava FUA inhabitants, offering possibilities for sport, leisure and relax activities in natural environment.

Trnava City as a regional capital city with more than 64,500 inhabitants still substantially lacks publicly accessible natural areas suitable for leisure activities such as parks and forest parks - nowadays there is only one bigger area called “Kamennýmlyn” (in English “Stone mill”), which has been intensively used for recreational, leisure and cultural activities of Trnava City inhabitants for many years.

— Background and present state

As mentioned, the Štrky area is located in the north edge of cadastral area of Trnava City and is of app. 300 m². Part of the overall area serves as a shooting range, which neighbours Štrky area from north-west side.

From southwest side there is a local communication, parking place and small cottages of local gardeners. From northeast and southeast, the Štrky area neighbours with arable land.

From north to south a small local river “Trnávka” flows, which is an over-regional bio-corridor. Its river basin was regulated in the first half of the 20. century, what together with intensive

agriculture, industry, transport activities and extensive building up producing air, water pollution and noise, have been negatively influencing this area for many years. Originally, this area belonged to so called “hard floodplain forests” composed mainly of ash, elm and oak trees, however, majority of original floodplain forests had been deforested and changed into arable land. This deforestation had considerably contributed to overall deterioration of this area and slow spread of invasive and flight wood species.

Other factor considerably contributing to alteration of this area to a “green brownfield” had been illegal dumping

of municipal and construction waste by local inhabitants for several decades -

scattered waste dumps could be about 40 years old.



Fig. 10 Picture of the Štrky area before the LUMAT pilot investment implementation

— Development elements and restoration range

In accordance with the Realisation Project Documentation for Building Permit (PD DSP) restoration of the Štrky area within the LUMAT project composes of the following main parts:

- **Water surface**

In the central part of the Štrky area an artificial water surface (lake) should be built up, creating dominant part of the whole investment. Water surface consists of water basin and two lagoons, a depth of the water

should be up to 40 cm. It mainly includes preparatory terrain works, deepening of depression for water basin, adjustment of basin strands, installation of sealing layers and drilling of water well. A small artificial hill called “sunny hill” will be made from earth left over after water basin deepening. It will represent another significant point in the revitalised area serving for relax, sun catching and leisure activities of future visitors.



Fig. 11 Visualisation of the water surface realized within the Trnava pilot investment

- **Vegetation and greenery**

Surroundings of water surface should be grassed by meadow greenery of 4,500 m². Moreover, water and marshy vegetation (835 pcs.) will be planted on water surface strands, contributing to the water cleaning, to consolidating of the basin strands

and underlining dominant character of the water surface in overall restoration. Furthermore, 120 pcs. of broadleaved trees will be planted in the area. Also, footpaths will be surrounded by natural under brush what will contribute to natural character of the whole area.



Fig. 12 Visualisation of vegetation and greenery realized within the Trnava pilot investment

- **Unpaved footpaths**

A network of unpaved footpaths of 1,065 m² totally made from milled gravel will be created, starting from three entrances to the area, leading to the water surface and joining main footpath rounding around the water surface. Moreover, educational footpath should be constructed at peripheral parts of the Štrky area where visitors could learn about the local fauna and flora.

been designed for pilot investment: wooden benches with seat back and wooden benches without seat back placed around the stone grill; also wooden table place under wooden resting shelter; dustbins with small shed; info panels with small shed; circular stone grillas well as wooden boxes for birds and bats. All these items should be certified, with simple, natural design, made of wood and stone, underlining natural character of the Štrky area.

- **Small architecture and mobiliari**

Several types of small landscape architecture and mobiliari have

- **Lighting and electricity distribution network**

Within the Trnava pilot investment also lighting will be installed composing of lights with light columns 5 m high. Parking lights with LED bulbs will be used. Furthermore, distributor and ground cable electricity distribution network will be constructed, serving not only for lighting but also for other electricity devices, e.g. water pumps.

- **Maintenance of vegetation and greenery during the 1st year of sustainability**

This maintenance will be realized during the first year of the investment operation and it will be covered from the city's own financial sources. Within maintenance of grass plots cutting of grass will be done, together with weeding,

additional setting of grass and leaves scrabbling, if needed. Moreover, within maintenance of water and marshy vegetation its cutting will be done together with weeding. Within maintenance of newly planted trees their irrigation will be realised. Finally, within maintenance of existing trees and greenery mainly removal/cutting of invasive and flight wood species will be realised.

The proposed design has a significant positive impact on the local environment, because it supports fauna and flora biodiversity and restoration of the whole area to its original state, improves water regime and micro-climatic conditions of this area, thus also partially contributing to adaptation of this area to climate changes.

— Pilot investment implementation

Due to repetition of public procurement for the Trnava pilot investment supplier, its commencement had to be postponed from June 2018 to November 2018 when a contract for works was signed with a winning bidder-the Slovak company Swietelsky-Slovakia, spol. s r.o., Bratislava. Actually, the first works on the site started in December 2018 with rough clean up of the area and first cutting off invasive trees. Accordingly, these works had to be interrupted because of a winter season by the beginning of March 2019 with expected end by June 2019. Such solution, of course, supposes extension of the project duration by the end of July 2019.



Fig. 13 Commencement of the works at the Štrky site

4.4 OTHER AREAS

The remaining pilot actions in the other 5 countries will constitute parts of Action Plans showing how to implement the proposed actions. During the development phase also of these pilot actions the target groups were involved and informed about the progress of the related actions. Different events and presentation were organized the pilot areas accompanied by publicity activities.

— Pilot action in region Voitsberg

The development of the pilot action in Voitsberg covers building basic elements of a sustainable cross-community “garden show Lipizzanerheimat” as a recreational and producing space for the peri-

urban metropolitan area of Graz (final goal: permanent character). Several communities of the region are involved by renaturation of “brownfields” / former mining areas by individual projects.

Step 1: potential analysis for the heating of greenhouses with mine water (winter vegetables using the waste heat) on a former mining area provides clarity for

the implementation and at the same time provides a comprehensible data basis for interested parties.

COMMUNITY ROSENAL: MINE WATER USE FOR HEATING GREENHOUSES

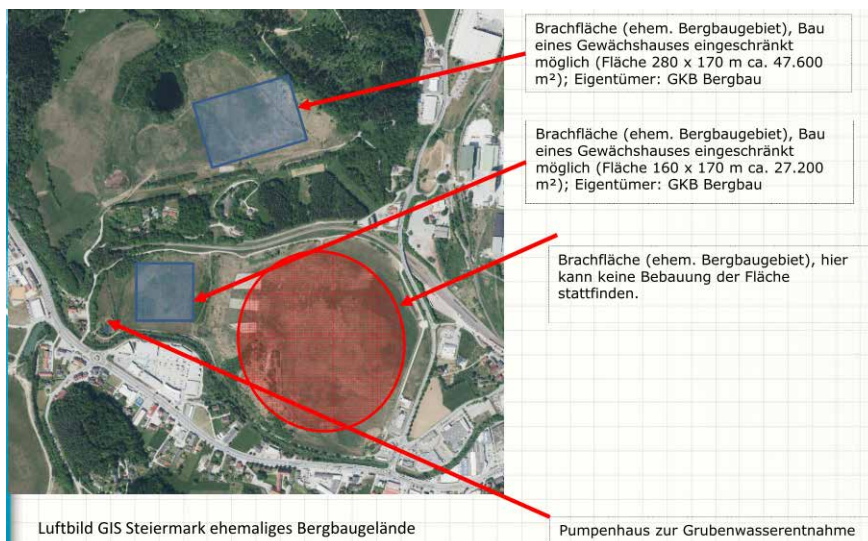


Fig. 14 Overview pilot area

Step 2: the garden house is set up and the marketing measures for interested

parties start.

Development of a concept of a garden project on a club basis - **urban community garden**. This serves as a nice “entrée” for the energy park

by “beautification” of the current entrance area (former mining area). The implementation will follow within a LEADER-project.

CITY OF VOITSBERG

In the course of **optimizing the energy use** of an office property with 1,600 m² floor space, the south-facing façade will

be enriched with a special greening in terms of energy efficiency.

CITY OF BÄRNACH

Creation of a connection of all garden and park elements over the cycle way network currently under development

with regard to a recreational area for the region and Graz.

LIPIZZANE-RHEIMAT: GARDEN ROUTE

A financial model is developed for the potential industrial areas in the core area of the Lipizzanerheimat, where young companies are offered the opportunity to obtain space in a cost-effective manner without making large capital investments.

This involves the development of a venture capital-like fund that should be set up by the communities and possibly also by the property owners. This fund acquires the land and makes it available to the founders.

FINANCIAL MODEL

— Pilot action in Torino

The Metropolitan City of Turin is organized in 11 “Homogeneous Zone (HZ)”. The pilot area is the HZ n.11, named Chierese-Carmagnolese, in the Southeast territory of the CMT0 territory, within the boundaries of the Piedmont Region.

Phase 4: Integrated Programme implementation

The model proposed by CMT0 within LUMAT project is embodied in the Management Structure which is experimentally tested in the HZ Chierese-Carmagnolese, with elements of replicability to all the other homogeneous Zones of the CMT0.

Phase 1: Integrated Environmental Management structure for the HZ “Chierese-Carmagnoles

Phase 2: Development of technical skills for the Management Structure (CAPACITY BUILDING)

In particular, the Management Structure was set-up in order to:

- stimulate the collaboration, planning and implementation of inter-municipal scale actions

Phase 3: Integrated Environmental and Territorial Programme of supra-municipal projects and actions

- research, improve and aggregate data for an analysis of the context of the vast area
- exchange good practices on issues of interest
- facilitate the interception of regional, national and European resources, in particular with reference to the 2014/2020 Structural Funds
- contribute to the definition of the Strategic Plan of the Metropolitan City of Turin.

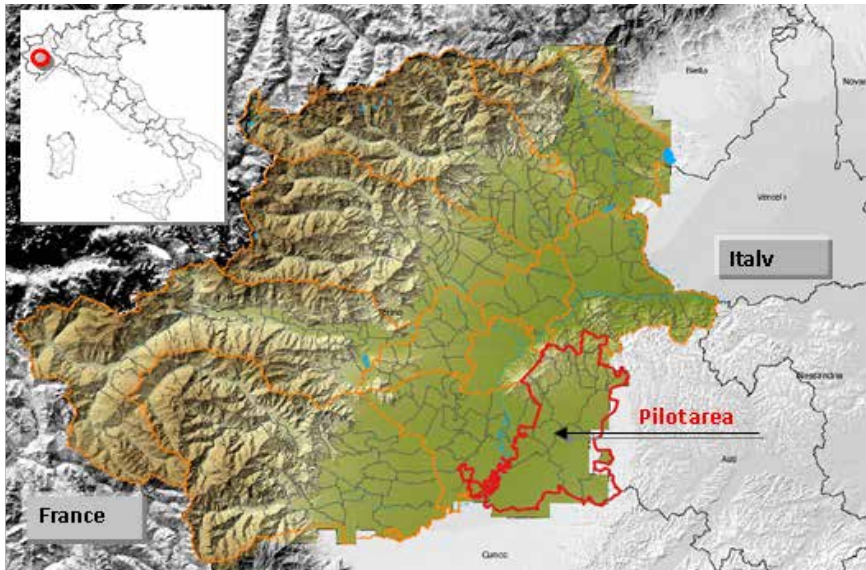


Fig.15 Metropolitan City of Turin and Pilot area “Chierese-Carmagnolese”

The Structure is therefore configured as an instrument of “territorial cooperation” capable of implementing a real action program, whose implementation responsibilities, coordinated by the individual identified, can be identified, on a case-by-case basis, by the participating bodies (Municipalities).

The Structure can define the policies, strategies and projects at the FUA level, ensuring both the satisfaction of the specific needs of the specific reference context, and adherence to the strategies and general objectives of the Metropolitan City of Turin (Territorial Plan and Metropolitan Strategic Plan). The Integrated

Territorial and Environmental Plan identified by the Structure defines the priority intervention strategies for the FUA and details the operational areas of intervention. The implementation of the Integrated Program by the Management Structure involves the implementation of the projects contained therein. The time schedule depends on three elements:

- recognized supra-municipal level priority (defined by the control room)

- design level (assigned to the Project Unit, possibly assisted by external technicians)
- availability of resources.

On the basis of these elements, the Management Structure of the Homogeneous Zone 11 identified as the first project to be developed within the LUMAT project, the intervention located in the area called “Fontaneto”, in the Municipality of Chieri.

— Pilot action in Leipzig Nordraum

There based on three feasibility studies which have been carried out in the Leipzig pilot region the following

The unused buildings and sealed areas on the site are to be deconstructed. The size of the site is 21,260 m². After the deconstruction of the building and sealed spaces, a greening of the site in the frame of compensation actions is foreseen.

The former pig sty is located within an area characterized by agricultural uses and which is broken up in character by the neighbouring forest and trees along the train tracks. The ruinous building and the lack of safeguarding for the property create a visually unpleasant and planning non-compliance situation. These are to be addressed first. With consideration given to the landscape, the agriculturally used part of the property can continue to be used. The construction for the former pig sty is to be deconstructed. Through

pilot projects have been chosen and developed with the involvement of stakeholders.

- **Result:** 2,1 hectares of ecological compensation
- **Costs** (Start-Up plan) 600,000.00 €
- **Monitoring:** to take place during the upkeep of the property.

LEIPZIG

this deconstruction land will become available that can be used as a free open space as well as a site for compensation measures or as an alternative for solar panels.

- **Result:** Roughly 1 hectare of ecological compensation land
- **Costs:** (Startup plan) 140,000.00 €
- **Monitoring:** to take place during the upkeep of the property.

GROSSSTEINBERG

NAUNHOF/ FUCHSHAIN

The site is not possible to be used for a constructional use and for this reason should instead be used as a compensation site. This can enrich the surrounding agricultural landscape and strengthen the ecological function of the surrounding green axes of the Threne. A design that improves the landscape can be done as a type of compensation action according to section 15 of the federal nature protection law. After an initial evaluation of the site, the surrounding areas of land, which are not

— Pilot action in Ostrava

Priority map for areas underused, abandoned and formerly affected by use includes estimation of the potential risk of selected areas. This map shows location of 20 selected sites and includes an assessment of the potential

— Pilot action in Slovenia

The pilot action explores the non-systematic management of degraded urban areas (DUOs) and business zones in the Municipality of Kranj and adds to the purpose of the LUMAT project, which is to strengthen integral land management in FUAs with special emphasis on sustainable use land and the development of ecosystem services.

The objective of the pilot project is to stimulate industrial symbiosis (IS), based on management of industrial sites. At the same time, the pilot project implements the Action Plan of the Functional Urban Region of the Municipality of Kranj.

sealed can be left to the succession of nature and the central sealed areas can be partially de-sealed and ecologically improved.

- **Result:** Roughly 0.6 hectares of ecological compensation land
- **Costs:** Start-Up plan - to be determined
- **Monitoring:** to take place during the upkeep of the property.

risks according to the methodology of the Ministry of Environment. It is implemented according to regional integrated environmental management system.

The pilot action steps are:

- selection of the most important materials and activities in IS in Slovenia, including an overview of established networks, European projects and programs, published documents etc.
- an overview of basic concepts and definitions of IS, based on a decision by private stakeholders motivated to exchange (waste) resources for economic reasons
- an overview of production, services,

and waste from these activities in the Municipality of Kranj

- a list of major companies in the Municipality of Kranj in terms of the type and quantity of waste generated by business activities, and the manner in which it is handled
- the presentation of possible IS scenarios between companies in the Municipality of Kranj with regard to waste resources and demand for raw materials and energy
- the presentation of possible IS scenarios between selected

companies in the Municipality of Kranj, depending on the location of the companies and DUO sites. The purpose of this part of the pilot action is to check the location interaction of DUO and possible IS cases on the assumption that the key to a successful IS is based on collaboration and synergies offered by geographical proximity

- educating stakeholders about IS. This envisages informing companies about IS, where cooperation between different industrial partners is essential in order to achieve common economic and environmental benefits.