

THE RUHR, VIRTUOUS MODEL OF UPGRADING?

Chiara CORDOPATRI¹

1 Graduate student, Regione San Giovanni 1, Chiusa di Pesio, CAP 12013, Cuneo, Italy,
cordopatrichiara@gmail.com

Keywords: requalification, strategic urban planning, regional scale, territorial system, social needs, grey areas, park of services, shared image

Abstract

The evolution city into Post-Carbon City has resulted in the disuse of large industrial areas. Some of these are now, places of human activities incompatible with the needs of society and environmental emergencies. The urban planning and the mobility system of these highly central areas, are necessary for having a quality of life and economic activities linked to: sustainable development, preservation of the identity of local communities and relationship with the rural area. An urban regeneration case eligible as an excellent example is: the Ruhr.

This German region, was object of an exemplary structural upgrading at regional scale of the territorial system. Which has averted a looming environmental damage caused by over a century of industrial production. The design was procedural and did not use a general masterplan, but a strategy composed by seven individual plans certainly achievable.

The managing bodies of the intervention on a regional scale, were created from the specificity of the process of transformation and crisis of this territory. Obtained the most appropriate means of evaluation by following a careful analysis of deficit and potential aspect for each project. Creating, in this way, a solid foundation for a lasting economic, environmental and social renew.

These strategies will be actualized in: the EmscherPark. The element of the park has inside: tertiary, commercial and technological innovation. Becoming also the main source of employment and income for the new image of the region. This regeneration method, regards the creation of unreleased management tools of the territory.

1 Introduction

The saturation of the soils does not allow to build new infrastructure, therefore became an essential prerogative learning how to interpret the urban voids. Since they are often a link between the old town centre and the new expansions. Their centrality makes them attractive places for new urban transformation. Those that we consider *voids are very extensive but also full of potential, so their disposal allows to propose new configurations precisely in parts of the city to now devoid of "margins of flexibility."* The disposal is also considerable as a crisis of function, but does not affect the central role, now acquired, by the places in which it occurs, it tends to accentuate, giving to it a new meaning.¹

The former main coal mining centre of the European continent has now changed its nature; the Ruhr area is well known for about fifteen years for a regional reorganization to 360 degrees (implemented from 1990 until the beginning of 2000), which begged the looming environmental damage caused by over a century of industrial evolution. This redevelopment was then extend to social, political and economic ambit.

The aim that proposes this research paper is to analyse the main effects and results that has pursued the environmental and economic conversion of the Ruhrgebiet. The purpose, is to understand if the intentions that moved the entire operation of the structural change of the Ruhr could be translated into a real successful and used as a model across the world. Often cited as a role model and apply in areas of degradation of physical space and social phenomena as a result of industrial disposal.

Has this intervention program really achieved sustained success over time?

Can it be considered the starting point for the certification of the Post-Carbon City?

2 Background

The Ruhr, the most extended basin mineral of Europe, is located inside one of the most populated federal states of Germany, the North Rhine-Westphalia. Crossed by the rivers Ruhr and the Emscher. Thanks to the mineral wealth of the subsoil, since 1850 the Ruhrgebiet began a long period of industrialization made up of light and shadow.

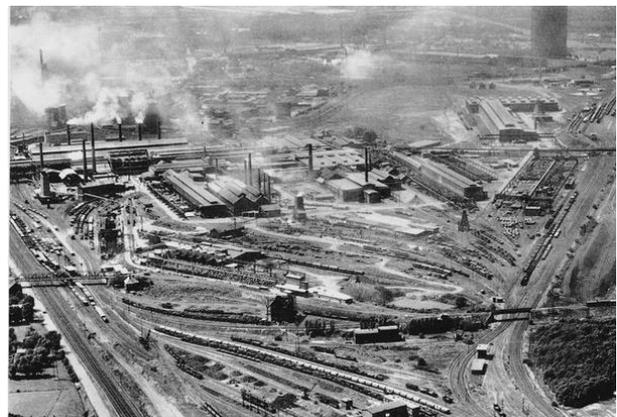
First, the industrialization cause a deep changing of the landscape. In Fact, before the nineteenth century there were no permanent surface structures for the coal mining, because the extraction did not happened during the whole year. Successively, *with the advent of the steam engine they started to build permanent structures, the mining activity grew and the structures on the surface became composed of extraction towers, engine rooms and laboratory for washing and preparing the coal.*² The arrangement was structured in order to limit the movement of coal and workers in relation to the main roads.

Furthermore, at the beginning of the twentieth century, the steam engine was replaced by the electric motor, this allowed a greater freedom to organize the volumes of the area. The greatest influence on the architecture of the region, came by the industrialists class. Which, with the bourgeois revolution of 1848, began to express their status through the factories. That's the reason why, the Ruhr boasts buildings worthy of being preserved and reused.

Another fundamental transformation happened in the society. Miners and farmers turned into workers and technicians. During the 1850 the inhabitants of the Ruhr were still mainly with an agricultural vocation, but already in 1900, they could be consider the workers of the largest industrial centre of the continent. In little more than a century, the territory underwent a profound transformation: in an area of 4,432 square kilometres, the inhabitants went from about 300,000 in 1820 to 5.7 million in 1965; the existing mines arrived, in until the 1956, to extract about 124 million tons of coal per year. The Ruhrgebiet, become fundamental for the sustenance of the future Europe, that through its concession, one time, Germany extinguished economical debts.



1. Foundry in Oberhausen



2. Duisburg Bruckhausen

*The problem of the deterioration of the ecological assets in Europe, rose to national political issue in the early 60s. The reuse of industrial areas began with the first signs of de-industrialization, adopting three types of intervention: renewal, revitalization, recovery. In 1970, with the crisis of the coal mining activity, each spot, was gradually abandoned and the other sectors related to it have been greatly reduced. In the Ruhr, it has recorded the highest percentage of industrial land and disused mining in East Germany. In the land of the industrial primary (the chimney higher, the deepest mine, the mill more specialized) was spreading alcoholism, drugs, depression.*³

In the eighties, with the recognition of part of the industrial heritage as Heritage of Humanity of Unesco, it has been developed a program of revitalization of the Ruhr coal basin; integrated with important interventions of Environmental and Economic Planning.

2.1 The prerequisites _ previous plans on the region

As early as in the '20s, with the SVR (Municipal Association of rebuilding of the Ruhr coal basin) was required the reconstruction of the landscape through the inclusion of green stripes (North-South Grunzuges) and the construction of five metropolitan parks by 1968. The association changed during the 1979 in the KVR (Municipal Consortium of the Ruhr), in order to take control of the regional territory. With very broad powers, the KVR could plan interventions sufficiently timely and efficiently, but left the task of drawing up the plans of more general programming to the three provinces of the region, in order to take account of the different socio-economic and territorial.

3 The strategy

Defined as a structural upgrading on a regional scale in a territorial system, the transformation has gone through several levels: economic, social and environmental. *Heal the damage was most impelling prerequisite to regenerate the area, due to the fact that the landscape is characterized by: vast industrial plants decommissioned and reclaimed, toxic dumps, railway yards and abandoned slag heaps coal, as well as workers villages emerged chaotically up to fill every space and then abandoned.*⁴

The great process of productive reconversion and environmental enhancement was implemented through a policy of regional planning conducted by appropriate institutional bodies (such as the KVR and IBA).

The role of the IBA as a "moderator regional" has produced important results, showing that *the public power is capable of governing the transformation of the territory. A specific reference institution conducive to dialogue between: industry, trade unions, social groups and local authorities; by supporting organization and quick decision-making. This experience enhances the role of the Public in any operation to revitalize the method of working and produce.*⁵

The task was realized through:

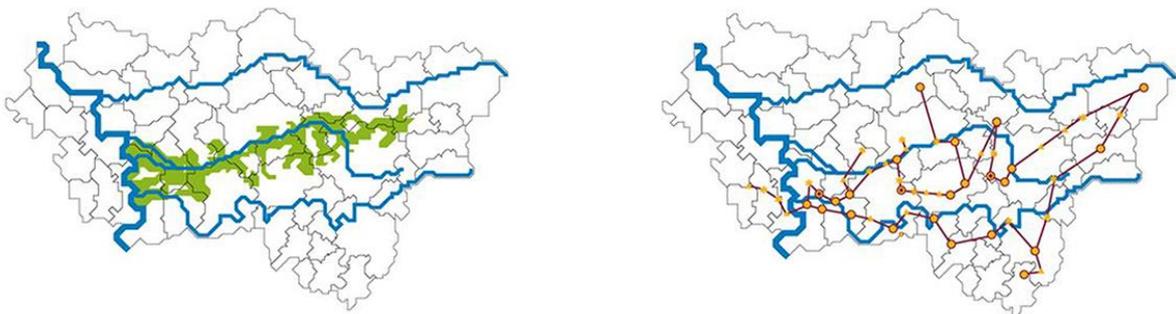
- Policies of strict protection of the free spaces remaining
- By releasing and recapturing the new nature areas
- Keeping the most significant fabrics
- Thanks to a mixité of residential and productive zones with green areas
- A system of walking and cycling routes by recovering several water channels and rail routes.

The main intention was to reach a new centrality of an entire region, all projects have been strictly aimed to give a solid foundation for a profound economic, ecological and social development of the Ruhrgebiet. All the specific action plans redacted had as a starting point: the strengthen the weak spots in the region. Furthermore, these have been developed, with more simplified and effective tools to "govern" the increasingly complex economic and social processes on the territorial structures.

The seven main items, on the basis of which it was possible to build a new post-industrial landscape of the Ruhrgebiet were:

- *the landscape park of the Emscher,*
- *the ecological reorganization of the hydrological system of the Emscher,*
- *the recovery of the Rhein-Herne canal as recreational space,*
- *industrial understood as historical monuments, "The route of industry"*
- *new employment thanks to the park,*
- *housing construction and development of the neighbourhoods (innovative forms of housing),*
- *new proposals for social and cultural event, "The route of culture".*⁶

Each element, is strictly combined with the nature, symbol of land reclamation and revival for the region; which is integrated to the signs left by man. For example, the disused railway lines that trace the paths within the park.



5. The Emscher Park on the left and the Route of Industry and Culture on the right.

4 Main Characters and Needs

The IBA (Internationale Bauausstellung Emscher Park) is the company set up specially in 1988 by the government of the RSW LAND (Land of North Rhine-Westphalia) to accelerate the transformation of former industrial areas, then disbanded at the end of conversion operation planning. It was composed of economists, environmental experts, trade unions and political and a coordination committee referring to the minister of

urban and transport. The representatives of the region, are joined those of the main local municipalities, professional associations and dozens of individual professionals interested in the project.

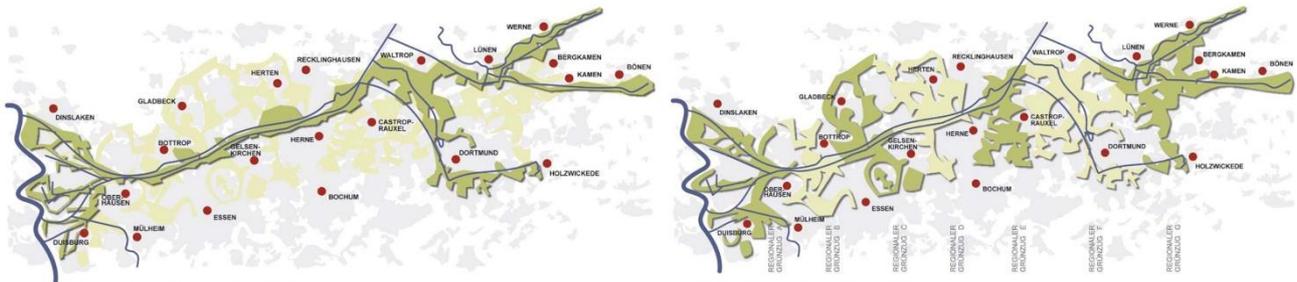
Configured as a consultancy, this company has played the role of concerted and participatory structure for addressing social groups, environmentalists, designers and entrepreneurs sincerely interested in thinking about this common goal of the regional requalification.

The IBA, operates over an area of 800 square kilometres, following the River Emscher, counting two million inhabitants and seventeen cities. Having as a starting point, a plan to free areas or releasable created by KVR.

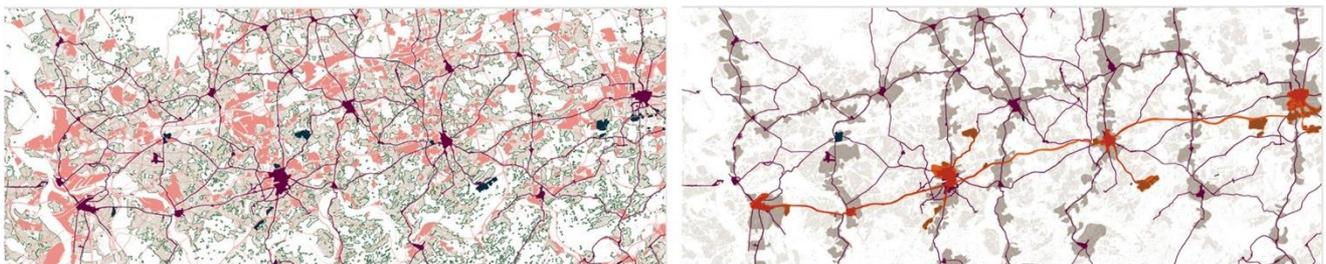
Furthermore, it has structured the entire operation based on individual projects of certain actuation and not through a general masterplan. All plans have been defined through an analysis of the deficits of the region and each structure was analysed according to very specific requirements; that would have checked the possibility of reuse.

By proposing itself as a public cooperation, the IBA has not affected the traditional planning tools. *It set itself as a catalyst and activator of the ordinary and extraordinary resources. Furthermore, it was as well able to implement any local activity by using, according to each case, ordinary urban instruments required. That kind of strategy has enabled to develop a new method to deal with complex issues, such as the structural upgrading of a large region of ancient industrialization, now in crisis.*⁷ Consequently, to this intention of simplicity and speed of implementation have been welcomed these willingness to search for new innovative methods.

Fundamental was the ability and the perseverance to direct private participation also to projects less economically profitable, but essential for the environment. In fact, one of the most surprising outcomes that this great initiative has managed to create, was the formation of a new image of the Ruhr. It becomes a region dynamic, which was able to create potential from its problems. By acting locally, it was clear how to turn their deficit in resources; from the specific process of transformation and crisis of the territory and by using the decline of the heavy industry, as the basis of a solid foundation ecological economic renewal.



2. The IBA Emscher Park, unifying the East-West direction, and the North-South Grunzue of the KVR,



3. The left image is showing in purple the principal cities of the Ruhrgebiet, in pink all the industrial areas.

The right image is showing in orange main road axis from east to west, in purple the secondary road from North to South from and in grey the worker villages (Siedlungen).

5 Urban, social requalification and rural modernization

As Petra Potz says, one of the innovations in the strategy of the IBA was represented by the participation of social forces and citizens interested in the projects. Before and during the different stages of the process, *were directly involved in decision-making the citizens, through the creation of forums for discussion and learning, moments of public discussion and communication of how activities were going on.*⁸ Indeed, by enabling

national and international competitions, was possible to create a multidisciplinary teams, responsible for: architectural, urban planning and ecological aspects. Due to search for the most competent person for each position work, the direct allocation method was override.

The seven key themes of the operation were defined through phases of consultation between the public and private actors (administrations and local professionals) involved in the requalification. *During the projects evaluations, was fundamental the quality of the social ambit, thanks to the attention to the needs of vulnerable groups and the activation of procedures of involvement and participation of the inhabitants.*⁹ The IBA, through the renovation of the residential areas, took care of the lower class, ignored by the market and bearers of particular questions.

Interviews and questionnaires were conductive during the rearrangement of the most important Siedlungen (residential complexes built during the Weimar period on the outskirts of several German cities). There was ask the opinion of the residents which voted the functions needed in each neighbourhood. The importance given to the community, is shown by how much this ecological, social and economic requalification, went mainly through the redevelopment of public spaces.

5.1 The Emscher Park

The new meaning of the park is the main innovation of the entire operation. It is propose a new typology: "the park of services." An area that includes various activities surrounded by nature, in which the building and recreation areas, are new relations of contiguity; and the progressive thinning out of the built creates a kind of filter between the compact city and open to the nature.

The plan for the Emscher Park project, aims to incorporate and supervise the steps of the gradual renewal operation of the whole region. In order to coordinate and keep under constant review the various interactions and reactions triggered by the collaboration between the numerous social partners involved. A Landscape Park, which covers an area of about 320 sq km, representing more than a third of the whole Ruhr area (800 sq km) and receives 23 million of tourists per year.

*The park is set up as a sequence of open spaces dedicated to the collective practices, in which are included walking trails, bike paths, areas for recreation and museums made in abandoned industrial buildings. A landscape no longer accrue due to the abandonment and pollution, now is able to call people by the virtue of its public function. Extended and particular spaces, in which leisure and recreational activities can be configured to suit the populations needs, generating unpublished profiles.*¹⁰

Elena Marchigiani argues, how fundamental is the central role assigned to the quality of the public space, intended as a set of places of everyday life of a community. In addition, the creation of this technological park has succeeded in attracting the interest of young creative entrepreneurs, that have played a pioneering role in this regard, and the investors from the rest of Germany and abroad.

*At the same time, the restoration of the great "cathedrals of work" was conceived as an opportunity to start training courses on building restoration, while their management offers new employment opportunities to cope with the high levels of unemployment. A consequence to be reckoned with in the rehabilitation of old steel plants and coal mining, has been the possibility to limit the consumption of soil. The reintroduction of these brownfield sites in the market has allowed at least in part to make up for the demand for new building soils.*¹²

5.2 A model to be exported

It is believed, that with the IBA Emscher Park, was born the idea of preservation of the culture industry. The IBA is mentioned when it comes to conservation and sustainable revitalization of the industrial landscape in ruins. Many of the projects of the IBA Emscher Park have opened new horizons. Were design, manufactured and widely announced, with a great use of intellectual and financial resources. In addition, it will attract the support even from the last skeptics.

All this, shows how one of the best results achieved by the IBA has been *the ability to imagine its future on a larger scale. The policies of the government of the territory until that moment, had simply acted locally by developing municipal policies related to the present, but now there is the possibility to see the act as a regional compromise.*¹³ The IBA had the willpower to direct public and private efforts to a structural change in the region, that would manifest its results only in a distant future (more than ten years).

In conclusion, as Klaus R. Kunzmann says, *the IBA Emscher Park showed (...) that a region can be renewed through outputs images from the minds and exemplary projects that together follow an invisible strategy. It showed that, even at the time of globalization, an industrial region that for decades has neglected the countryside and living spaces can be a sustainable environment for people who want to live there.*¹⁴

6 Comparison between authors

This kind of approach to the land management is, according to many authors, applicable in other post-industrial contexts. For example, according to the opinion of Petra Potz, *the experience of IBA can be "exported" to other realities with regard to its mobilizing effect. A complex catalogue of structural works, which for the network that form, can change and transform the conditions of an area in crisis. This is a different form of approach that goes beyond the parochialism and the micro - restoration of individual municipalities.*¹⁵

The mode of action, not through one big masterplan for the region (difficult to achieve), but through different specimens projects of certain actuation, is, according to Gianni Pattena, an operative example of a complex treatment on the territorial scale. *Almost as a laboratory, where tools were applied, are now ready to be used elsewhere in across Europe; for large dismissed industrial zones.*¹⁶

This opinion is shared also by Fabio Minucci, who says that *the process elaborated for the Ruhr, is a new way of facing the problems of planning policy and its implementation. Extremely innovative, of considerable interest to other realities in rapid transformation.*¹⁷ The Ruhrgebiet, as stated by Klaus R. Kunzmann, can be considered *space of inspiration. The projects of IBA are far from normal construction in urban areas, are considered particularly creative projects, models that show the way for future challenges. The IBA Emscher Park is an enormous wealth of ideas for the modernization of neglected urban spaces, and has led other cities and regions to copy their model and to deal with the help of the imported model in order to tackle the various challenges of urban development in an innovative manner.*¹⁸

The IBA's project could be brought around Europe as an example of strategy for urban construction for difficult places object of political controversy. *A brand, that carries out projects not feasible under "normal" conditions.*¹⁹ In the end, there are two voices that criticize those who claim that the experience of IBA is exportable.

The first is Klaus R. Kunzmann, who points out that certainly, the IBA is now in the international history of urban requalification, but it is not transferable. *In no other old industrial region of the world could find much public support for a project as "subversive", indicating a future that far without worrying about immediate commercial success.*²⁰ This was especially the vision and guidelines, organizational and communicative of its "inventor" and director Karl Ganser.

Just, Karl Ganser, *suggests a cautious attitude about the possibility to generalize the experience of IBA Emscher Park, saying that each region has a different economic and legal methodologies. For this reason each one must find a specific transformation strategy of its territory.*²¹ Ganser, argues that *the experience of IBA Emscher Park is only possible to draw a high degree of interest in the ecological and cultural scenery, especially when the employment situation is particularly depressed and there's the need to invest extra resources and forces, through an alternative approach to planning.*²²

7 Conclusion

Has this intervention program really achieved sustained success over time?

Can it be considered the starting point for the certification of the Post-Carbon City?

The key elements worthy of esteem are the time and the countless resources, made available in order to strengthen the potential already present in the territory. Thanks to that, the great results of the qualification process have been able to emerge above all later from the intervention.

Alcoholism and unemployment that dominated the region, have been replaced by less than 23 million tourists per year. Essen was the Capital of Culture in 2010, becoming the first case of industrial heritage to whom was given that title. Thanks to a total of fifty-two installations (factories and Siedlungen) that compose the regional touristic "Route of Industry", with 400 km of pedestrian roads and 730 km of bicycle path. The "Road of Culture", which runs parallel to the industrial, offer panoramic stations and art installations, each year increasing thanks to the numerous competitions and festivals, organized by the region. David Chipperfield, Norman Foster, Herzog & de Meuron, Rem Koolhaas and SANAA, are some of the famous personalities intervened in order to provide new life to the sites industrial developments.

Experts do not always have found totally positive results: for example, there was not created the employment that were expected, or not always participatory processes in the management of the territorial government have been satisfying. It is nonetheless evident, however, that the positive result far outweigh the negative ones. In fact, is hardly point out in other European regions such operations that have been able to create an ecological renaissance of the land, a new shared image among its inhabitants and an ability to manage a regional transformation with new planning instruments most Democrats and wide as possible.

The highlights, that defining more precisely the objectives of the entire operation, are:

The German public opinion has always been sensitive to environmental issues: for example the German Green faction is the strongest in Europe. Consequently, the inhabitants of the Ruhr have been involved in major decisions about the ecological reorganization of the region, taking part in public discussions and sometimes

to the management of the places retrained (like the settlements). All political parties have shown their support for a territorial transformation and a renewed image of the Ruhr, which played a crucial role for the achievement of the project. Another fundamental condition, to be taken into account, is the wide availability of money that made this possible. Certainly, the public financial commitment was crucial to allow the start of the process of productive reconversion and environmental enhancement. As claimed by Elena Marchigiani, *the initial predominance of public funding has allowed to make the site once occupied by the industries, again attractive to private investors.*²³

The total cost of the redevelopment was 563 million euro, including public funds (state of North Rhine - Westphalia), private investment and funds from the European Union. This sizeable amount of funds makes it clear that the so-called "operation Ruhr" is not applicable everywhere. The Ruhrgebiet, despite the crisis that followed the disposal of mines, still had funds able to realize such an intervention, since it was in the past the Major European steel and mining centre. Today would hardly be possible to repeat a similar intervention (for example, in Italy) with the systemic crisis that has hit Europe and beyond. Another surprising aspect is the fact that this operation took place during and following the political upheavals that took place in Germany during the late eighties, which is the German Reunification. Would be interesting to investigate how it was possible to make an operation of high economic challenges in a difficult period of restructuring of state institutions. Also, it has shown how it was possible to direct a large amount of money to the Ruhr (Federal Republic of Germany) in a time when the economic recovery of the so-called East Germany was necessary.

*The urban voids appear as uninterrupted design of the city, (...) areas waiting for a morphological definition.*²⁴ Focusing exclusively on adding new functions to brownfields is a reductionist approach, according to Carlo Olmo, *because the city needs undefined spaces in order to be able to absorb the changes. Those who today are defined "grey areas" can be considered as spaces that allow to connect the times of the city with those of society (...).*²⁵ It was exactly what happened in the Ruhr, an immense area redeveloped in order to face social and environmental needs. Although the economic support was significant and not always feasible in other reality, the concept behind this project is easily understandable and deserving to be used.

When the will is to reconvert the city of our days to a Post-Carbon City, it must be made through an awareness of weaknesses to those strengths. Some of the winners aspects that can be played are: composing a heterogeneous and experienced team seeking the active participation of citizens and taking advantage of the marks left by centuries of history. From the Ruhr, the main task was the inheritance of an entire region, and it can be definitively remained to the world which we will leave to the future generations. Now we have the possibility to don't let it implode. Since today, there are three generations of industrial reconversion. The last of these, draws its intent to sustainability, quality of life and environmental protection.

This is feasible through a targeted and short-term urban planning, the need for actionable strategies from the present and not the near future; since to the manifestation of an emergency you need to be timely. There are therefore, sufficient examples and testimonies, which make us, understand that evolution, the quantum leap is possible. With the depletion of oil, cases of reclamation and upgrading to a regional level will be essential. For the benefit of the planet, the man was the dominant role must return to nature.

Even if the public opinion is not cohesive as German citizens today are cultured and educated. The institutions have the opportunity to make use of international experts, in no time. Thanks to the internet can be provide education and awareness campaigns, in addition have a direct access and the possibility of sharing instantaneously the knowledge required. In this way the specificity of the subject, can be easily understood. The technology allows a remote control, a continuous monitoring and recording of data, wherewith develop specific action plans, which can then be shown demonstrated as indispensable.

The case study mentioned above, is an awareness and a noble example of implementation and application of the tools that most of the nations have or can acquire.

8 References

- ¹ OLMO, Carlo, 2002, La città e le sue storie, in C.Mazzeri (a cura di), La città europea del XXI secolo, Lezioni di storia urbana, Skira, Milano, p.18
- ² MINUCCI Fabio, 1996, *Le regioni industrializzate tra declino e innovazione: il caso della Ruhr in un contesto europeo*, Milan, Franco Angeli; p. 118
- ³ <http://www.scienzainrete.it/contenuto/articolo/recupero-delle-aree-industriali-dismesse>
- ⁴ BEDRONE Riccardo, 1993, *Premessa*, in BEDRONE, Riccardo, MINUCCI, Fabio (a cura di), *Sulla via di una regione industriale ecologica*, Torino, Celid, pag. 9
- ⁵ MINUCCI, Fabio, 1996, *Le regioni industrializzate tra declino e innovazione: il caso della Ruhr in un contesto europeo*, Milano, Franco Angeli, pag. 45
- ⁶ http://www.ocs.polito.it/biblioteca/giardini/emscher_s.htm
- ⁷ POTZ, Petra, 1997, *Riqualificare il territorio*, in FALINI, Paola (a cura di), *I territori della riqualificazione urbana*, Roma, Officina Edizioni, pag. 110
- ⁸ *Ivi*, pag. 110
- ⁹ MARCHIGIANI Elena, 2005, *Paesaggi urbani e post urbani. Lyon e IBA Emscher Park*, Roma, Maltemi Editore, pag. 153
- ¹⁰ *ivi*, pag. 166
- ¹¹ *ivi*, pag. 228
- ¹² *ivi*, pag. 158
- ¹³ KUNZMANN, Klaus R., giugno 2011, *L'IBA Emscher Park nel territorio della Ruhr: una retrospettiva*, in *Urbanistica Dossier*, n° 126, pag. 20
- ¹⁴ *ivi*, pag. 22
- ¹⁵ POTZ, Petra, 1997, *Riqualificare il territorio*, in FALINI, Paola (a cura di), *I territori della riqualificazione urbana*, Roma, Officina Edizioni, pag. 110
- ¹⁶ PATTENA, Gianni, settembre-dicembre 2000, *Architetture, arte, paesaggio. Contaminazioni linguistiche e nuova vitalità urbana* in *Paesaggio urbano*, n° 5-6, pag. 19
- ¹⁷ MINUCCI, Fabio, 1996, *Le regioni industrializzate tra declino e innovazione: il caso della Ruhr in un contesto europeo*, Milano, Franco Angeli, pag. 44
- ¹⁸ KUNZMANN, Klaus R., giugno 2011, *L'IBA Emscher Park nel territorio della Ruhr: una retrospettiva*, in *Urbanistica Dossier*, n° 126, pag. 21
- ¹⁹ *ivi*, pag. 21
- ²⁰ *ivi*, pag. 22
- ²¹ DETTMAR Jörg, 1999, *Wilderness or park?*, in *Topos: European Landscape Magazine*, numero monografico *Emscher Landscape Park*, n° 26, pag. 11
- ²² MARCHIGIANI, Elena, 2005, *Paesaggi urbani e post urbani. Lyon e IBA Emscher Park*, Roma, Maltemi Editore, pag. 208
- ²³ OLMO, Carlo, 2002, La città e le sue storie, in C.Mazzeri (a cura di), La città europea del XXI secolo, Lezioni di storia urbana, Skira, Milano, p.18
- ²⁴ *ivi*, p.18
- ²⁵ *ivi*, p.18

Image 1: <http://www.essen-fuer-das-ruhrgebiet.ruhr2010.de>

Image 2: <http://www.essen-fuer-das-ruhrgebiet.ruhr2010.de>

Image 3: <http://www.iba.nrw.de>

Image 4: <http://www.staedtebauleitplanung.de>

Image 5: <http://www.alte-lohnhalle.de/hotel/freizeit/industriekultur>