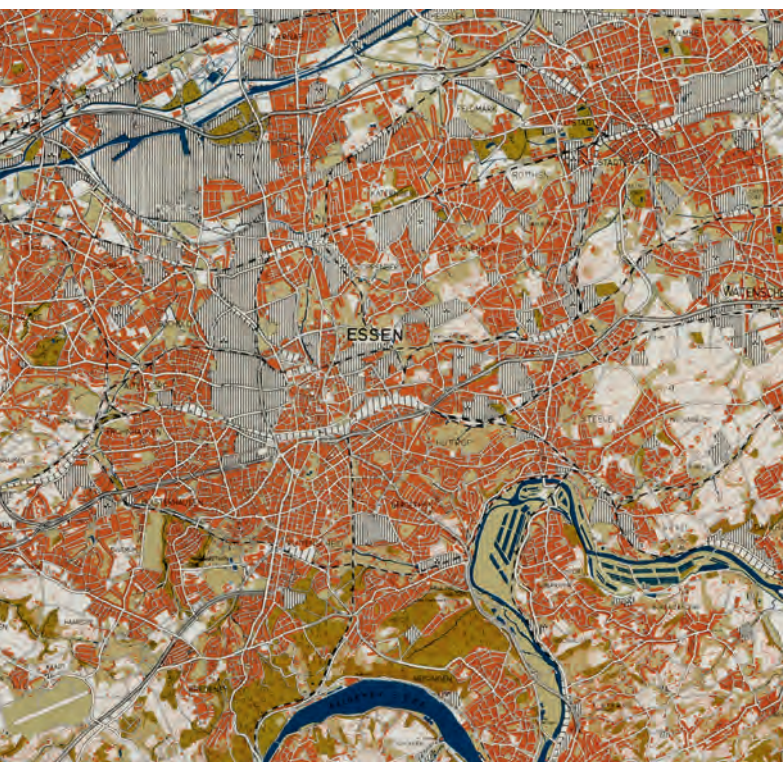


Metropolis Ruhr

A Regional Study of the
New Ruhr

 metropoleruhr



Regionalverband Ruhr

Andreas Keil and Burkhard Wetterau

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New Ruhr

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INTRODUCTION

Considering the processes that have taken place since the beginning of the millennium the Ruhr can be - and increasingly is – addressed as “Metropolis Ruhr” – a term that is regarded as the up-to-date and adequate expression of the regional development perspectives. In all fields relevant to a regional study the Ruhr is currently changing towards a modern 21st century metropolitan region.

It is therefore the aim of this study to present the recent development trends of this region. On more than 100 pages a survey shall be given that is profound, pointed but nevertheless easy to comprehend. It is dedicated to readers from both inside and outside the Ruhr that are interested in the development and change of this region; special regards are given to research and teaching activities. This is the first translation of the original German text in a series of versions in foreign languages to come.

This study seizes the concept developed for “Das Ruhrgebiet. Landeskundliche Betrachtung des Strukturwandels einer europäischen Region” (authors: Bronny/Jansen/Wetterau) edited by the former Kommunalverband Ruhrgebiet in 2002. The processes and relations of the past exhibited in that study are still relevant to the present and have therefore been taken up as the starting points of the actual processes in the Metropolis Ruhr as this study is explicitly centered on regional developments and structural changes that are currently relevant to the Metropolis Ruhr.

The first chapter presents the starting points, i.e. the natural zoning and the historical development of the region, followed by the historical outlines of the coal mining (up to the 1960s) and the iron and steel industries (up to the 1970s) developments. The industrial evolvement of the region has been constituent to the old Ruhr area but it is also the foundation from which the new Metropolis Ruhr has started.

The second chapter deals with the socio-/cultural-spatial developments of administration, urban structure and social patterns and gives way to actual processes in the Metropolis Ruhr considering the urban renewal and the regional consciousness.

The third chapter is focused on the new economic structures of the Metropolis Ruhr and addresses the tertiarization, the small and medium businesses as well as the increasing economic importance of tourism, sports and culture.

The fourth chapter describes the actual changes of patterns, networks and functions in this metropolitan region, including the impacts of the European Capital of Culture 2010 events.

The fifth chapter tries to outline the perspectives of the Metropolis Ruhr as a region in the network of globalization.

1. THE RUHR – STARTING POINTS

1.1 The natural landscapes

As is indicated by the 429 m range between the topographical heights of the lowest and the highest points, the region of the Ruhr comprises different natural landscapes that aggregate to three major ones. The lowest point (13 m) can be localized in Xanten (District of Wesel) in the west of the region, in Lower Rhine Bight. The highest one (442 m) is located on Wengeberg in Breckerfeld (Ennepe Ruhr district) in the southern Rhenisches Schiefergebirge (Rhenish Slate Mountains). In the north of the region there is the third large natural landscape, the Westphalian Bight.

The three large natural landscapes can be divided in smaller units the impact of which has been as important for the development of the regional patterns as have been the courses of the major rivers – the westward orientated rivers Ruhr, Emscher and Lippe and the northward bound river Rhine.

Between the heights of the Rhenisches Schiefergebirge in the south and the Westphalian Bight in the north there is the lowland of the river Ruhr after which the region has been named. The river is deeply eroded into the Schiefergebirge. The inner banks and the terraces of the Ruhr valley are covered with fertile loam and loess soils that favoured settlements and agriculture. The valley cut of the river Ruhr had also disclosed the carboniferous strata of the Schiefergebirge that gave birth to the regional coal mining starting in small open diggings (glory-holes) and in galleries.

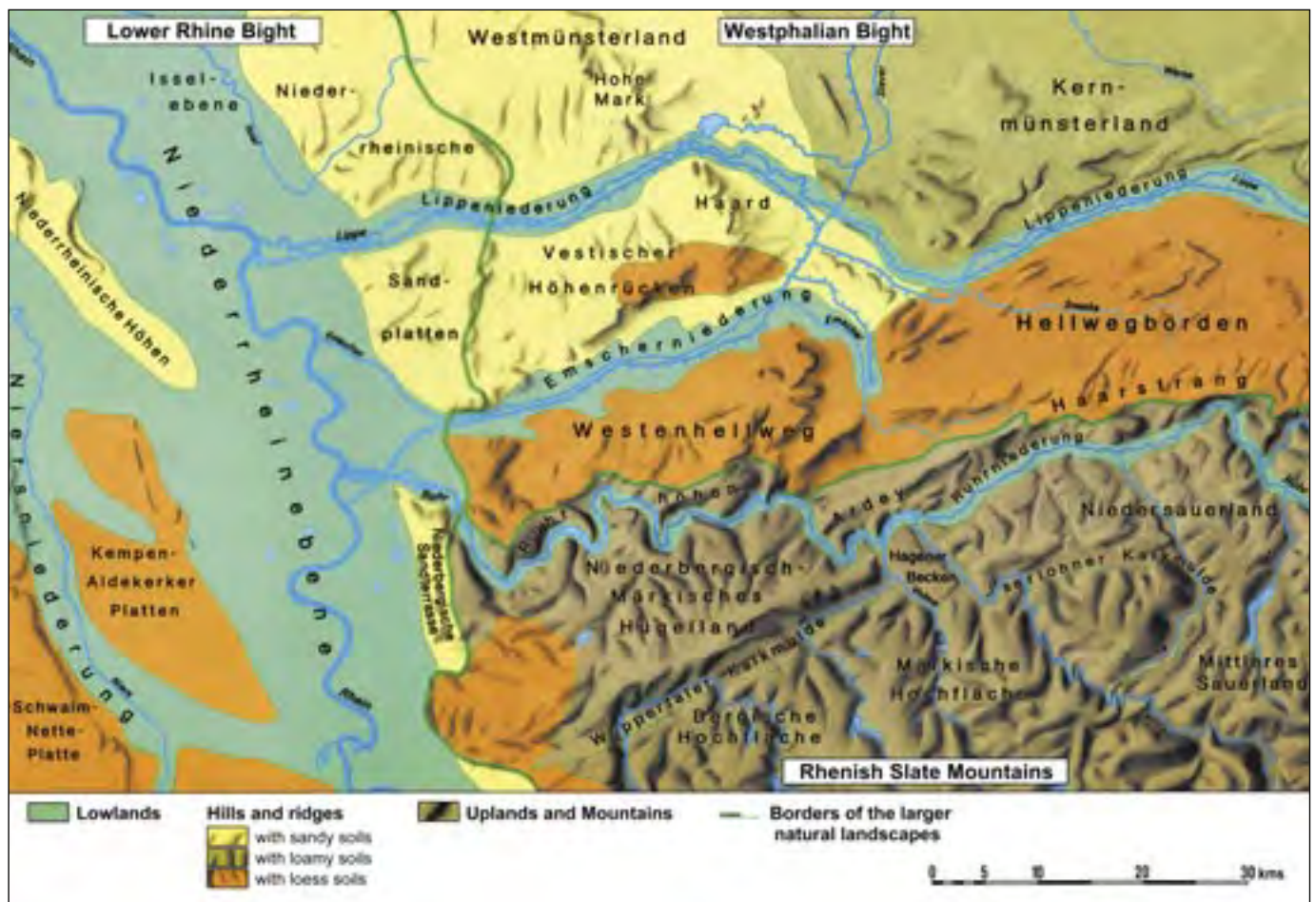
North of the Ruhr valley there is the Hellweg zone which is part of the Westphalian Bight. The relatively plain Hellweg zone slightly inclines to the north and is characterized by a fertile loess cover that exhibited agricultural land use since the younger Iron Age.

To the north the Hellweg zone gives way to the river Emscher lowland. Up to the industrial times the impounding strata of

Emscher marl had made these areas along the river a zone of wet moorlands which had only sparsely been populated. In contrast to these lowlands the mountainous area of the Recklinghäuser or Vestische Höhenrücken in the north of the region had been preferred by settlements and agriculture due to its post-glacial loess cover.

On both sides of the river Lippe there is the Lippe zone in which the soil wetness of the floodplain prevented a dense agrarian settlement as it did in the Emscher zone. The Lippe zone is embedded into the hills of the Southwestern Münsterland.

The natural landscapes mentioned so far exhibit an east-west orientation and thus follow the courses of the rivers Ruhr, Emscher and Lippe. But this east-west orientation can also be deduced from the two levels of the underlying geological structure. The upper “floor” comprises Upper Cretaceous deposits. In mining these strata are named the over-



1.1.1 The natural landscape structure of the Ruhr



1.1.2 Ruhr zone: Free-range cattle on the banks of the “old” Ruhr near Mülheim Raffelberg



1.1.3 A Hellweg zone green belt: The Mechtenberg bridge in Gelsenkirchen



1.1.4 The Lippe zone near Waltrip

burden as they cover the carboniferous strata that form the “lower floor”. The carboniferous strata crop out in the southern Ruhr valley zone from which they dive down beneath the Westphalian Bight by an inclination of 2–3 degrees. Consequently, the thickness of the overburden increases to the north and thus does the depth of the coal. With the quality of the coals increasing to the north, coal mining spread from the Ruhr valley into the areas of the Westphalian Bight.



1.1.5 Emscher zone: Landscape of bridges in the Gelsenkirchen Nordstern Park with the Emscher island and the open-air theatre



1.1.6 Physical geography and administrative boundaries (Regionalverband Ruhr/Regional Association Ruhr area)



1.1.7 Rhine zone: Angler on the banks of a Rhine bayou, Bislicher Insel (Bislich Island) near Xanten

In the northwest the Niederrheinische Sandplatten (Lower Rhine sandy hills) separate the Westphalian Bight in the north from the Bight of the Lower Rhine in the west; these Sandplatten are heathlands on the main terrace to the right of the Rhine.

Adjacent to the west, the plain of the lower Rhine is a landscape of wetlands and terraces molded by the river. The wetlands are green lands and used by cattle breeding and dairy whereas the terraces are covered by agriculture. Unlike the areas on the right bank of the river Rhine, the overburden of the carboniferous strata underneath the Lower Rhine plain has been built up by tertiary strata and by Buntsandstein and Zechstein deposits. But as the quality of the coals increases to the north as well, there is a paramount northward movement of coal mining in the Ruhr.

1.2 Adaptation to the physical conditions

Over centuries the areas between the rivers Ruhr, Emscher, Lippe and Rhine have developed in compliance with the physical conditions described above. Mostly fertile soils provided good conditions for various agricultural activities and an old, even if sparsely populated agrarian landscape came into being. The industrial use of the coal resources, however, caused a fundamental change and the region adapted completely to the exploitation of this resource.

Geologically, the Ruhr is part of the north-west European coal belt which also comprises the mining districts in the south of Poland, in southern Belgium, in northern France, in South Wales and in the Midlands of England. It was in the Carboniferous, 300 million years ago, that coal came into being, the strata containing coal are addressed as seams. As already mentioned above, these seams crop out in the Ruhr valley, i.e. at the northern fringe of the Rheinisches Schiefergebirge, and dive down to the north under the overburden. If the seams are followed further to the north a depth of more than 5,000 m would be reached under the North Sea.

With the depths of the coal seams increasing, both the pressure and the temperatures are changing and thus does the quality of the coal.

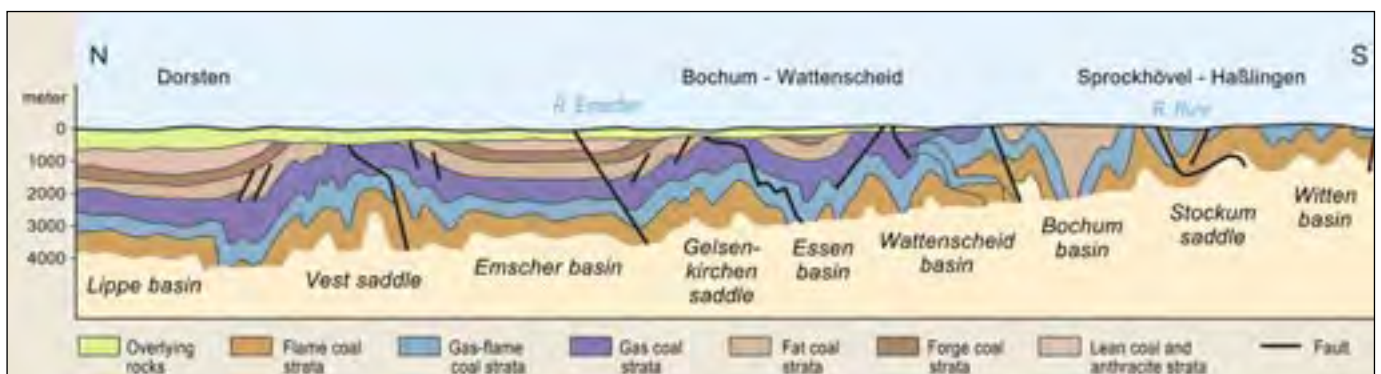
• It was already in the 14th century Ruhr zone that coal could be excavated by simple means from seams immediately under the surface. Due to its high contents of carbon the calorific value of this coal is high and it is has mainly been used for domestic purposes. Because of its low contents of volatile components as water and ashes (10-14 per cent) this coal is called lean coal.

• Further north, in the Hellweg and Em-scher zones, the 19th century shaft mining tapped the forge coal and coking coal seams. The coking coal with its remarkably higher contents of volatile components (19-28 per cent) allowed the production of coke. Since 1850 this coke has been used in the smelting works of the Ruhr to produce pig iron.

• Long-flame coal which is being excavated in depths of up to 1,300 m in the still active coal mines of the northern Emscher and Lippe zones exhibits particularly high contents of volatile components (35-40 per cent). Thus this coal has become the foundation of the coal chemistry industry in the Lippe zone and is also used in coal-fired power stations.

Next to coal iron ores have been mined in the Ruhr. Already in mid-18th century the first iron smelting works were founded in the Emscher zone where bog iron could be gained by means of open cast mining. The small iron smelting works were consolidated to Gutehoffnungshütte in 1803 which developed to one of the great industrial companies, by now operating under the name of MAN Turbo AG. Iron ores could also be mined in the Ruhr zone as in the course of carbonization iron carbonate precipitated. Very soon, however, these Ruhr zone smelting works lost their economic importance as all over the region importing iron ores from the Siegerland and particularly from abroad, e.g. from Scandinavia and from Brazil, became less expensive, and it still is.

Next to coal and iron ore salt is another resource of the Ruhr. Layered upon the coal seams the rock salt deposits extend from left of the river Rhine near Duisburg to the north. Since 1925 they are excavated in depths between 740 and 840 meters on the Borth salt mine in the Wesel rural district (1.8 million tons in 2010). The salt



1.2.1 Geological section

is used by the chemical industry and for winter road gritting.

Building materials as sandstones and sands are to be found in the valleys of the rivers Ruhr and Rhine. Devonian compact limestone is quarried near Hagen as well as dolomite which has been and still is used for the production fire-resistant materials required by the steel and concrete industries. The Ruhr sandstones excavated near Witten and Herdecke are used for the production of paving stones, facing tiles, window sills and other construction materials. The clay, gravel and sand businesses find their basic materials particularly in the northwest of the Ruhr; the marl clays are used by local brickworks, and, due to their high contents of quartz, the sands near Haltern are a raw material much sought after by the glass industry.

Another important natural potential that influenced and favoured the development of the Ruhr is the water of the rivers Ruhr, Emscher, Lippe and Rhine. Connecting various functions, the rivers are used as lines of transport, they provide the population with water of high quality and the industries with cooling waters and,



1.2.2 The closed mine Nachtigall near Witten/Ruhr

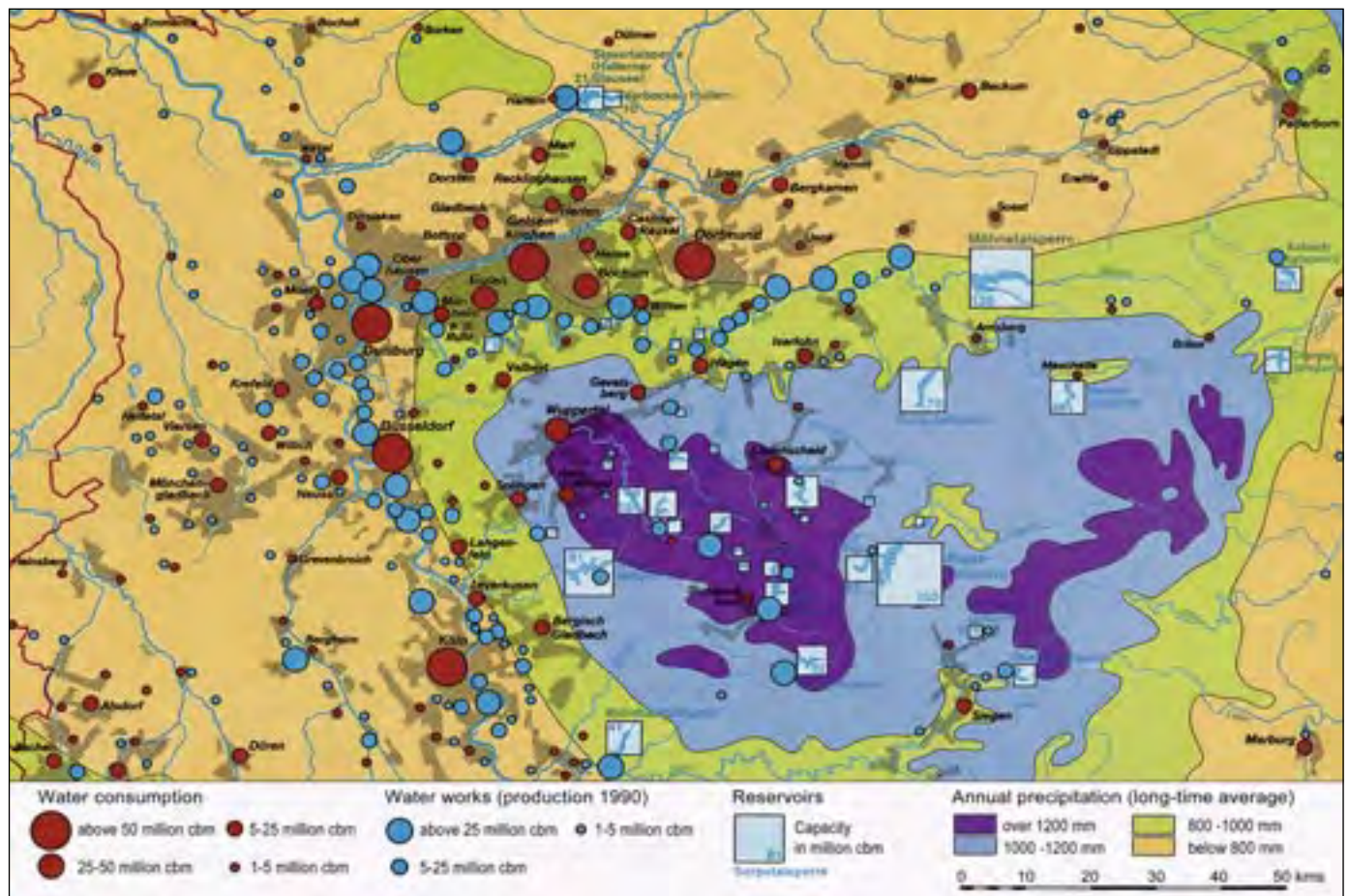


1.2.3 Groundwater replenishing basin in the Ruhr valley near Fröndenber

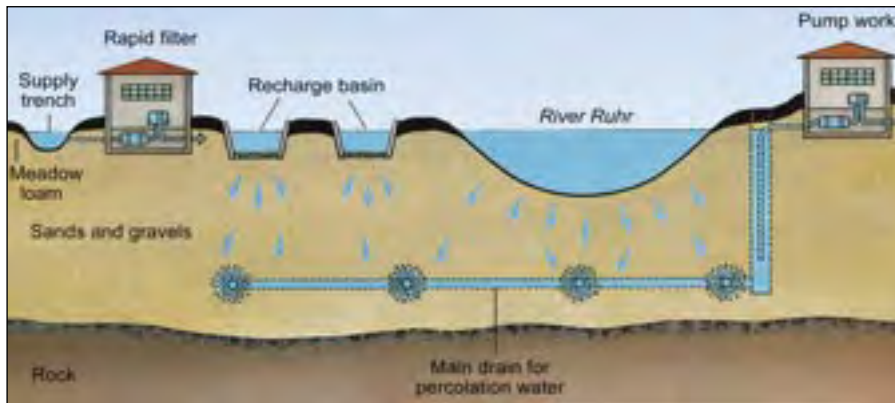
finally, the rivers are used to dispose of used water.

The river Ruhr has once been so important a transport line that the whole region as a whole has been named Ruhrgebiet (The Ruhr) even if only 124 kilometers of its total length of 220 kilometers are situated in the region. Until the advent of the railway the transportation of mass goods over long distances was only possible on rivers. But before the Ruhr could achieve its importance in

transport sluices had to be built. Since 1780 the river was navigable between Fröndenber-Langschede and the mouth near Duisburg-Ruhrort and was used to transport building materials, timber and cereals. Most of all, however, new market areas along the rivers Ruhr and Rhine could be reached by these measures which caused a remarkable increase of the coal production of the Ruhr zone mines. Although great parts of mass goods transportation has been transferred to the railway systems since



1.2.4 Water supply in the Rhenish-Westphalian industrial area



1.2.5 Water works Essen: Sectional view of the water catchment plant

mid-19th century the ports at the Ruhr mouth extended to the world's biggest inland port and its biggest inland container transshipment port.

A constant water supply for both industries and population became an important precondition for the Ruhr to become the largest industrial conurbation of the world. Despite of the massive de-industrialization in the recent decades the Ruhr still exhibits a high consumption of water. In 2010, the Ruhr industries still took 49 per cent of the total water consumed; another 30 per cent were needed by shipping to compensate sluicing losses and condensation; the remaining 21 per were consumed by private household and other users.

Disregarding its size the river Ruhr is of great importance for the water economy of the region. This is demonstrated by the water reservoirs in the Sauerland catchment area, by the midstream storage lakes and water catchment plants and by the port facilities at the mouth in the Lower Rhine area. There are diverse relations between the river and the cities, the industrial plants and the population of the Ruhr, Hellweg and Emscher zones. To supply the region with water, 293 million cubic meters have been taken from the river Ruhr in 2010.

But it is only because of adjusted interventions that the river Ruhr provides regular water levels and a high water quality in order to cope with the massive water demands of the region. The Sauerland is not only known for high amounts of annual precipitation but also for the variations of these precipitations. It was already in the 19th century that years of precipitation amounts below average caused water shortages in the downstream areas of the Ruhr. That is why the Ruhralsperrenverband has been founded in 1899 in order quantitatively to guarantee the water supply of an increasing industrial area. At first some minor reservoirs have been built. But when these reservoirs were not sufficient the big Möhne Talsperre (Möhne Reservoir) has been built which was the largest one in Europe when put in operation in 1913. The last big dam that has been completed was the Bigge Talsperre in 1965. In total, eight dammed reservoirs summing up to a capacity of 463 million cubic meters today allow the small river Ruhr to cope with the big water demands of the Metropolis Ruhr.

But to guarantee not only the amount of the water needed but also its quality the Ruhrverband has been founded in 1913. To maintain the water quality of the river Ruhr sewage plants have been

built at the mouths of its tributaries. Moreover, some dams have been built in the middle course of the river Ruhr that have the effects of natural purification plants as they decelerate the flow velocity of the river and allow the floating particles to settle. From 1929 to 1979 the five dammed lakes Lake Hengstey, Lake Harkort, Lake Baldeney, the lake near Kettwig and finally Lake Kemnade have been completed. In the meantime, both the reservoirs and the dammed lakes have also achieved an important recreational potential for the population in the southern parts of the Ruhr. In 1990, the Ruhralsperrenverband has been incorporated into the Ruhrverband which now forms the basis of a reliable water supply for the Metropolis Ruhr by operating a system of reservoirs and lakes as well as 70 sewage plants in the catchment area of the river.

Of great importance for providing drinking water are the waterworks. The geological situation in the Ruhr valley offers good conditions for the production of drinking water as there is a gravel layer of 15 meters on the rocky foundation. On the one hand, this layer of Ruhr gravel works as groundwater storage, on the other, water is discharged from the river into this layer to let it percolate. An alluvial clay layer of 2 meters in thickness covers the Ruhr gravel and protects it from any contamination.

Water provision from the river Ruhr is enlarged by the supplies from the rivers Rhine and Lippe. Waterworks use the river Rhine to extract bank filtrates. Due to its salinity the water of the river Lippe can be used as drinking water with limitations only; as the water of the canals, it is provided as industrial water. In the north of the Ruhr the waterworks in Haltern provides the drinking water as it can rely on the Haltern sands that contain a large water storage; additionally, the Stever, a little river in the Münsterland, contributes to the water supply.

In total, the water economy has established a complex network to provide the supply of the Ruhr. As far as the sewage water disposal is concerned, the river Emscher is of enormous importance.

By the end of the 19th century the Emscher was still a natural river meandering due to low gradients. The river rises in Holzwickede southeast of Dort-



1.2.6 Canoeists on the river Ruhr in front of the ruined Hardenstein castle

mund and flows into the river Rhine near Duisburg-Walsum. Since the beginning of the industrialization sewage water from numerous industrial units and private households has been dumped into the river Emscher without any control. The low gradient and the meandering course as well as the mining induced subsidence regularly caused wide-spread flooding. This situation has been seen as harmful to public health as the river was carrying heavy loads of excrements and toxic materials. To overcome this grievance the Emschergenossenschaft has been founded in 1899 in order to regulate and to control the sewage water disposal and the discharge of the river.

As the regulation of the sewage water disposal was crucial to the economic development of the areas along the river Emscher the Emschergenossenschaft implemented a pragmatic but nevertheless radical solution by transforming the river Emscher into an open sewer lined by dykes and regulated from Dortmund to its confluence with the river Rhine. Tributary creeks were also used as sewers and were equipped with concrete sheathings accelerate the drainage. Had the sewage system been developed under ground as it is the standard in other conurbations it would have constantly been affected by damages caused by the on-going subsidence. An above ground sewage system, however, allowed easy control and maintenance.

Nevertheless, mining induced subsidence that in some places score 20 meters had to be taken into consideration as well. On the one hand, more than 100 pumping stations are draining the area, on the other, the lower section of the river Emscher has twice been transferred to the north; in 1910 the conjunction of the Emscher and Rhine rivers has been transferred from Duisburg-Alsum to Duisburg-Walsum and, in 1949, from there further north into the Dinslaken. The henceforth mainly disused lower sections were maintained as “Alte Emscher” (old Emscher) and “Kleine Emscher” (small Emscher) and serve as sewers for the northern parts of the cities of Duisburg and Oberhausen. Dykes alongside Emscher, Alte Emscher and Kleine Emscher protect the adjacent areas from flooding.

To treat the sewage water running above ground, next to a central wastewater treatment plant mechanical sewage



1.2.7 Former water mouths Alte Emscher and Kleine Emscher and the present course of the river Emscher

works have been established in the larger Emscher cities. In the 1980s and 1990s high investments allowed four central Emscher sewage works to be built in Dortmund, Bottrop, Duisburg and Dinslaken in which the sewage waters are purified both mechanically and biologically.

As active coal mining is now limited to areas north of the river Lippe and west of the river Rhine and subsidence has ceased in the Emscher zone an open sewage system is no longer indispensable.

Since the beginning of the 1990s measures have therefore been taken to restore



1.2.8 Conjunction of the Emscher and Rhine rivers near Dinslaken



1.2.9 Emscher sewage treatment plant with biogas towers in Bottrop



1.2.10 Emscher mouth sewage treatment plant on the borders of the cities of Dinslaken, Duisburg and Oberhausen

the river Emscher and its tributaries to a natural state as well as to discharge the sewage waters into subsurface canals. In 2010, running parallel to the river Emscher a subsurface sewage canal has been put in operation between Holzwickede and Dortmund-Deusen. Section by section the separation of natural water which flows free above ground from the sewage waters that are canalized below ground is driven forward to the mouth in the west. To convert the river Emscher water system completely in this way investments of 4.45 billion Euros have been calculated.

Simultaneously, areas for new land uses are regained along the river Emscher by the Regionalverband Ruhr (RVR) in the course of the project Emscher Landschaftspark (Emscher Landscape Park, ELP).

This section has shown that in the first development phase of the Ruhr it was man who had to adjust himself to the natural potential of the region. When, however, industrialization and technical development opened new possibilities the man – environment relation began to change. Since then, as in all highly



1.2.11 The renaturated Alte Emscher in the Landscape Park Duisburg North

industrialized regions in the world, the natural conditions have been adjusted to the needs of the population living and working in the region. The rivers Ruhr and Emscher that have been transformed various times are demonstrative examples of this adjustment.

1.3 The historical development of settlements

The fertile soils of the Ruhr and Hellweg zones have favoured agricultural activities since pre-historical times. Archeological findings have proved continuous populating of the region for more than 5,000 years, i.e. since the younger Stone Age.

Around the time of Christ's birth, Germanic tribes settled in the areas along the rivers Rhine, Ruhr and Lippe. The Romans had founded large cities like Xanten and advanced into the areas right of the Rhine by laying out military camps as e.g. near Haltern and Bergkamen. But no ancient Roman cities had been founded in the Ruhr before the Germanic tribes repulsed the Roman back to the left side of the Rhine.

In the following centuries the region was more and more occupied by the Franks and the Saxons, with the Ruhr separating the Franks in the south from the Saxons in the north. In the 8th century, however, military actions began between the Christian king Charlemagne and the pagan Saxons. For the provisions of the army Franconian royal courts and castles were founded along the Hellweg. The earliest written documents on the cities of the Ruhr can be traced back to this period; so a royal court of Duisburg has been mentioned in 738. The royal courts served the troops but were also places of administration thus giving important impulses for the development of settlements. Places like Duisburg, Dortmund, Recklinghausen and Werden abbey became important both locally and regionally; here countrymen and craftsmen sold their products, travelling tradesmen came here for business.

The Hellweg was not only an important military road but even more a prime trading route which extended from the mouth of the river Ruhr via the cities of Mülheim, Essen, Bochum, Castrop, Dortmund and Unna to the river Weser and finally to the river Elbe and allowed an active West-East exchange of goods. The hamlets along this trading route evolved into trading places,

free imperial cities and in some cases into Hanseatic Cities.

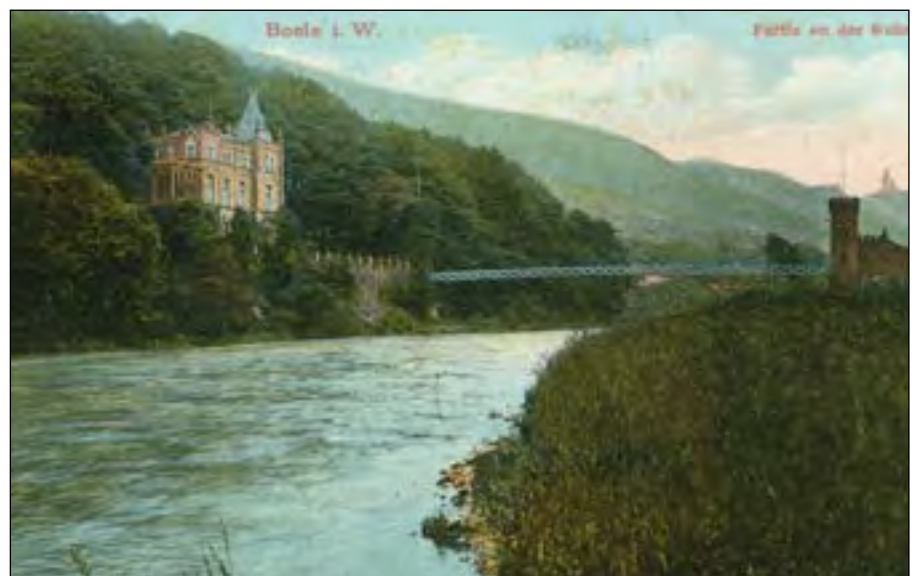
In the 12th century the Hanseatic League had at first been established as a cooperation of tradesmen in the riparian areas of the North Sea and the Baltic Sea, but, by the end of the 14th century, had turned into a union of cities that also comprised cities like London, Bruges and Cologne. The prosperity of the Hanseatic League period also influenced the development of settlements in the Ruhr; from the 14th to the 16th century 18 hamlets and towns achieved the status of Hanseatic cities: Bochum, Breckerfeld, Dortmund, Dorsten, Duisburg, Essen, Haltern, Hamm, Hattingen, Kamen, Lünen, Recklinghausen, Schwerte, Unna, Wattenscheid, Werne, Wesel and Wetter.

As for all European regions, the following centuries were a period of decline in the Ruhr as well. The collapse of the Hanseatic League, the Thirty Years' War (1618-1648), the wars initiated by Louis XIV of France, the Seven Years' War initiated by Prussia (1756-1763) and the Napoleonic Wars (1792-1813) changed the once important economic cities to small agriculturally based towns. Moreover, all Hellweg cities were severely impaired when the coastal trade grew in importance. And finally, the administrative disruption of the 17th and 18th centuries German Reich is reflected by the administrative fragmentation of the areas along the rivers Rhine, Ruhr, Emscher and Lippe. Even if these towns had charters they did not exhibit urban structures; the population mainly relied on agriculture and the crafts were but slightly specialized. Some economic impulses were sent out by the new transport routes that were laid out from the Ruhr valley to the lower Rhine area and into the Netherlands in the second half of the 18th century; regional crafts as e.g. rope making, tanning, weaving, paper making and others benefited.

The period of depression had been passed through in 1815 when the region became part of the Kingdom of Prussia and thus got access to the German Confederation. Now the way was open for a common political and economic development; starting points of industrial activities gradually came into being. Moreover, by promoting the use of hard coal instead of charcoal the Prussian government strengthened the basis of the future regional prosperity – the coal.



1.3.1 The route of the Hellweg



1.3.2 The Funckenburg (Funckenburg castle) in the border area of the cities of Herdecke, Dortmund and Hagen, c. 1900; the pedestrian bridge over the Ruhr connects the castle with the so-called mouse tower the area around which became an island when the Lake Hengstey has been dammed up in 1929.



1.3.3 Modern times reflection of history: Dortmund old city-hall

1.4 The development of coal mining (up to the 1960s)

As mentioned above, the regional coal resources were the essential locational factor to change the Ruhr into Europe's most important industrial conurbation, even if this development started later than in other European industrial areas. Coal mining in the Ruhr is impeded by the fact that the most productive coal seams are located in great depths and that they are affected by unfavourable tectonics. While the coal seams in Britain can be reached in depths of 300 meters and Poland exhibits coal seams of 5 to 15 meters in thickness and in depths of 400 meters, the thickness of the Ruhr coal seams is but only 1 m and they are to be found in depths between 600 to 1,300 meters. In addition, there are tectonic dislocations and unfavourable bedding situations.

According to this, lean coal right below the surface could easily be grubbed in the 14th century Ruhr zone. Since the 16th century coal has been excavated by means of gallery mining. Closely above the bottom of the Ruhr valley a slightly rising galleries were driven into the rocks to catch the seams in steep beddings. However, to produce pig iron in the smelting works charcoal was used up to the

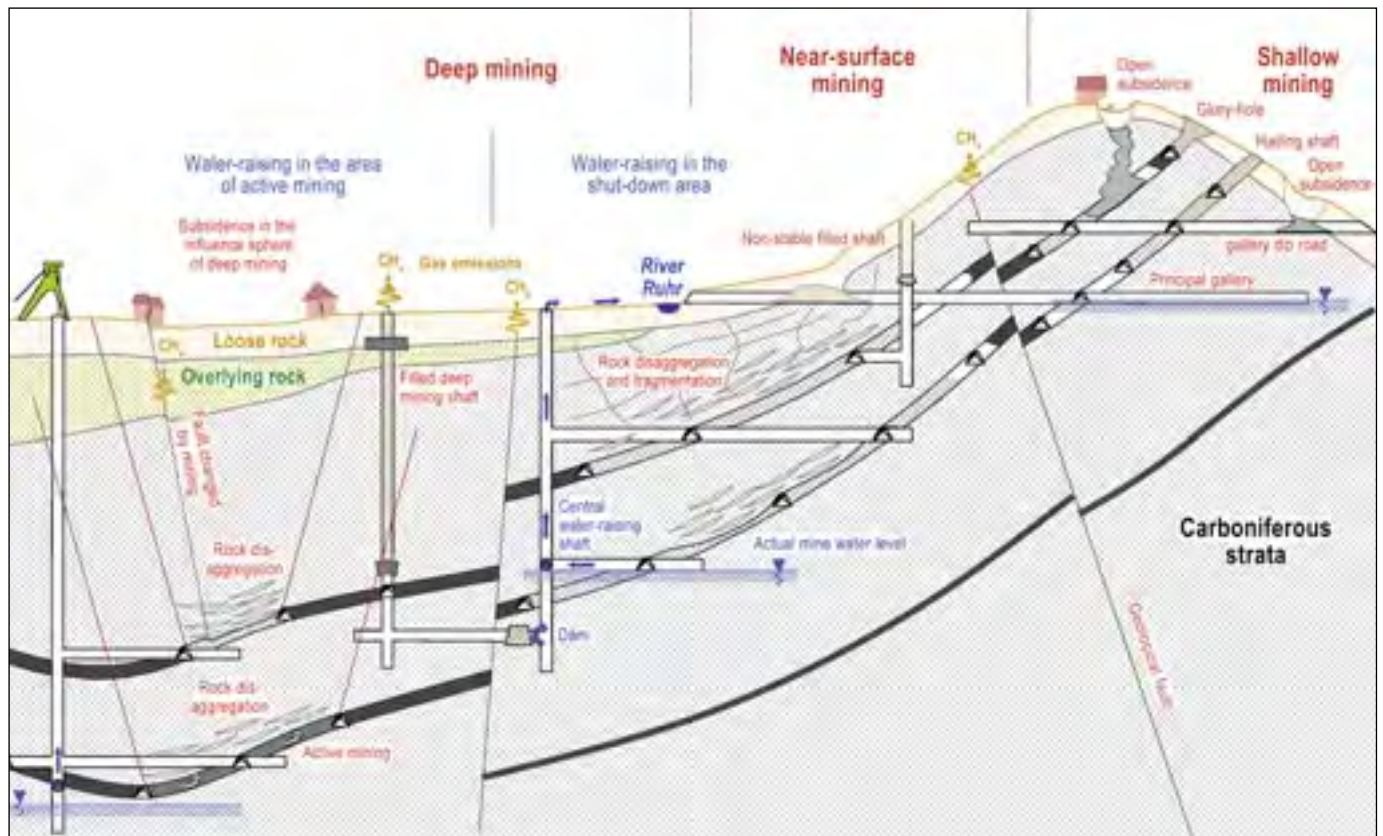


1.4.1 Mouth of a mining gallery

beginning of the 18th century, with devastating effects on the forest stands (clear cuttings). In 1834 the Franz mine in Essen became the first deep mining colliery, as the industrial pioneer Franz Haniel succeeded in using the steam engine to pump the ground water, in cutting off the marl layers that cover the coal seams and finally in catching the deep lying coking coal seams. This incident can be regarded as the breakthrough in the Ruhr becoming a coal and steel

region because the coking coal that became accessible could be processed in coking plants to gain high quality coke. This coke was used by the emerging iron works to produce pig iron in their blast furnaces. Thus the new technology of deep shaft mining caused an interrelated momentum between the production of coal and the smelting of iron ore.

On the one hand, the technology of deep shaft mining rapidly spread towards the



1.4.2 The development of coal mining: shallow mining, near-surface mining and deep mining

north, at first since 1840 by new mines around the Hellweg zone cities (Duisburg, Essen, Bochum, and Dortmund). But because the demand for coking coal kept on increasing rapidly, coal mining reached the Emscher zone (Oberhausen, Bottrop, Herne, Castrop) already in the 1860s. Consequently, the number of mines and miners as well as the production of coal increased. On the other hand, since the first coke-fired blast furnace of the Ruhr had been blown in the Friedrich Wilhelm smelting plant in Mülheim smelting plants became one of the major customers of the Ruhr coal (see 1.5).

Whereas the river Ruhr had yet been the main transport route in the early industrial phase from 1780 and 1870 (see 1.2) new modes of transport for the coal and other mass goods came into being in the Hellweg and Emscher zones since mid-19th century. The Cologne-Minden railway line (since 1847, connecting Duisburg, Oberhausen, Dortmund and Hamm) and the Bergisch-Märkische railway line (since 1862, connecting Duisburg, Mülheim an der Ruhr, Essen, Bochum and Dortmund) evolved into the major railway lines of the region. They opened up new transport technologies and markets, and were another main customer of coal.

Tab. 1: Coal production in the Ruhr, 1800-1960

Year	Number of mines	Number of miners	Production ('000 tons)
1800	158	1,546	201
1810	177	3,117	369
1820	161	3,556	425
1830	172	4,457	571
1840	221	8,945	890
1850	196	12,741	1,961
1860	277	28,487	4,276
1870	215	50,499	11,571
1880	193	78,240	22,364
1890	175	127,534	35,517
1900	170	228,693	60,119
1910	164	342,249	89,089
1920	196	469,781	88,097
1930	155	314,973	107,179
1940	151	293,830	129,189
1950	143	358,077	103,329
1960	125	313,462	115,441

Source: information provided by Gesamtverband Steinkohle

The development of a canal system for the transport of mass goods (coal, but mostly iron ore) followed by the end of the 19th century. By the Dortmund-Ems Canal (1899) the eastern part of the Ruhr area got access to the North Sea; the regional canal system was enlarged and refined by the Rhine-Herne Canal (1914), the Datteln-Hamm Canal (1914) and the Wesel-Datteln Canal (1931), the last two often being summed up and addressed as Lippe side Canal.

Economically, the decades from 1850 to 1900 were influenced by a constant change of prosperity and depression; in the boom period from 1895 to World War I the industrialization of the Ruhr reached its peak. According to the spatial development of coal mining specific structural zones had been developed so far. As the Ruhr zone had been developed in early industrial times it had already reached its peak when the technological take-off began. Both the Hellweg and the



1.4.3. The historical routes of the Cologne-Minden and Bergisch-Märkische railway lines within the present-day railway network



1.4.4. Herbede mine (city of Witten) in the 1920s/1930s

the chemical industry, and of transport and it was yet of utmost importance for domestic purposes. Following the national economic interests, the pre-war industrial structures were consolidated. Retrospectively, both the interwar and the post-war years can be regarded as the late industrial phase of the Ruhr in which tried and tested old industrial structures were held on thus preventing future orientated basic innovations from being established.

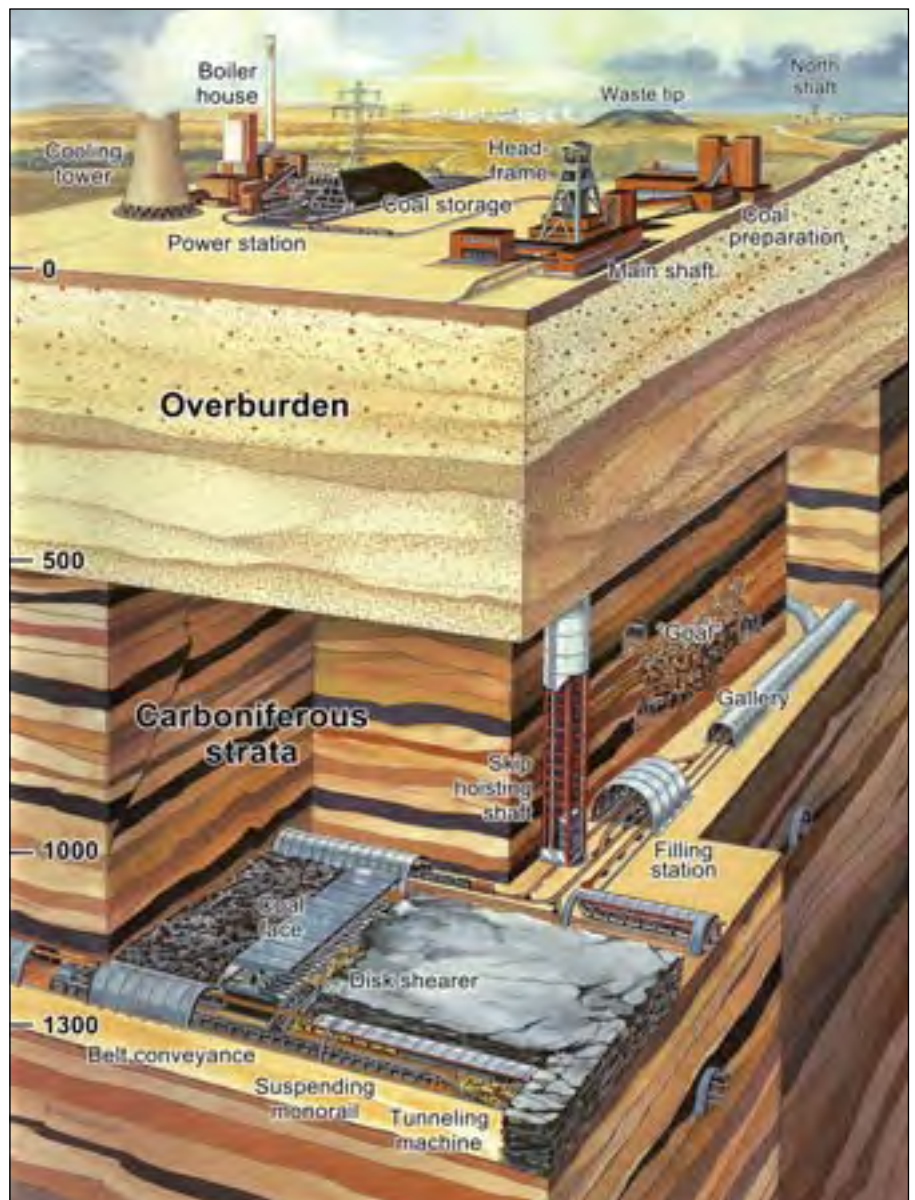
When the coal crisis started in winter 1957/58 it happened out of a sudden for most of the people. At first this crisis was regarded as a temporary growth crisis of the coal mining industry; the various structural changes on the energy market that had also taken place quite suddenly were widely disregarded.



1.4.5 Unser Fritz mine (city of Herne), 1978

Emscher zones saw massive industrial impacts in the high industrial period from 1850 to 1900. At this time the Lippe zone in the north as well as the Lower Rhine area were development areas in which a massive invasion of coal mining was yet to come; coal chemistry and power generation became the new branches of industry that made use of the gas-flame coal that is available here (see 1.2).

During the two World Wars the industrial capacities of the Ruhr have predominantly been used by the armaments industries and the war economy. After World War II the production of coal has quickly been resumed as coal became the basis of Germany's economic reconstruction. Coal still was the energy basis of iron smelting, of electricity generation, of



1.4.6 Cross-section of a coal mine

When the crisis began coal was still the most important and nearly exclusively used energy source in Germany, and still in 1957 new shafts were planned. But when Germany had been integrated into the western alliance international markets had been opened from which coal could be imported. The contrast between the unfavourable mining conditions in the Ruhr and low costs of imported coal increased the competition. Moreover, Germany had to comply with long term contracts and had to import cheap US coal. That is why many customers changed to the cheap imported coal or to other energy sources as natural gas and oil the price of which had sunk rapidly when the Gulf States had entered the international oil market. In addition, traditional customers as the shipping, the railway company, the iron and steel industries and the chemical industry were able to slash their consumptions of domestic coal in these years. Enormous amounts of coal had to be tipped and could not be sold. The crisis continued into the 1960s. Because the coal seams were exhausted in many areas south of the river Emscher the coal mining industry started its retreat from these parts of the Ruhr by closing down many mines; the coal production was concentrated on the mines north of the river Emscher. The 1968 coal act reorganized the regional coal mining industry; all mining companies merged to the newly founded Ruhrkohle AG that since then produced fixed amounts of coal which have been subsidized henceforth.

1.5 The development of the iron and steel industries (up to the 1970s)

As mentioned above, there have also been iron ore resources in the Ruhr. One of them was the shallow bog iron deposit which could be excavated in the Emscher zone. In 1758 the St Anthony Hütte was founded in Osterfeld (later part of the city of Oberhausen) to produce pig iron using bog iron and charcoal. Local iron resources allowed also the foundations of the Hörder Bergwerks- und Hüttenverein in Hörde near Dortmund in 1852 and of the Henrichshütte in Hattingen in 1854. Whereas in England coke had been used in the iron smelting process already in 1735, it was as late as 1848 that it was applied in the Friedrich-Wilhelms-Hütte in Mülheim an der Ruhr.

Next to the coke-fired blast furnace there were various basic technologies that had already successfully been applied in Eng-



1.5.1 Blast furnaces in Duisburg-Bruckhausen

land and that got importance in the Ruhr in the course of the 19th century. The method of puddling made it possible to eliminate from the pig iron the carbon and the impurities with which, as it runs from the blast-furnace, it is charged. Other methods that optimized the production of steel were the cast steel production (in the Ruhr since 1845), the Bessemer converter which allowed an inexpensive mass production of steel from molten pig iron (since 1862), the Siemens-Martin open-hearth furnace (since 1864) in which the processes are slower and can much easier be controlled than in the Bessemer converter, and finally, the Thomas converter (since 1879). The Thomas steel process was of particular importance because it made it possible to produce steel from the phosphor-rich minette ore. This new technique gave a special push to the regional coal and iron industry of Ruhr as these minette ores could be transported on the Rhine from Alsace-Lorraine which was part of the German Reich from 1871 to 1919. Electricity was another new technology that increasingly pushed the development. Thus the annual amount of pig iron increased from 11,500 tons in 1850 to 8.2 million tons in 1913.

In the 1850s the first coke-fired blast furnace of the Ruhr still needed two tons of coke for the smelting of one ton of iron ore. That is why the Hellweg zone with its rich supply of coking coal (see 1.4) became the ideal area for the ironworks because, due to this coal-iron ore relationship, the transport of the iron ores to the coking plants of the Hellweg zone was cheaper than vice versa, particularly because the coke burnt up completely in the smelting process.



1.5.2 Charging a converter in a Duisburg steel works



1.5.3 Coilbox in the Bochum hot strip mill: The Coilbox is located between the roughing mill and the finishing stands. The transfer bars from the roughing mill are rapidly coiled and then subsequently uncoiled and fed at a lower speed to the finishing stands. Forming a transfer bar into a coil dramatically reduces radiant heat loss and produces a virtually uniform temperature in the uncoiled transfer bar as it enters the finishing stands.

Tab. 2: Production of pig iron and crude steel in the Ruhr, 1920-1975

Year	Pig iron ('000 tons)	Crude steel ('000 tons)
1920	4,463	6,162
1925	8,000	9,896
1930	7,859	9,324
1935	9,086	11,318
...		
1950	-	9,706
1955	13,291	16,639
1960	17,807	23,200
1965	18,330	24,600
1970	21,300	28,500
1975	19,300	24,300

Sources: Paul Wiel, *Wirtschaftsgeschichte des Ruhrgebietes. Essen 1970, S. 227f, S. 238f* and RVR datafile after *Statistisches Jahrbuch der Nordrhein-Westfälischen IHK*

Due to these favourable locational factors the iron and steel industries had spread extensively over the Hellweg zone up to World War I. The production of pig iron was carried out in a wide range of blast furnaces and its refinement took place in various steel works. Rolling mills carried out the further processing and produced rails, profiles, wires, steel straps and blank sheets.

Extensive industrial plants and a wide range of connections and interrelations between the production units became the characteristic spatial pattern of the Hellweg zone which was focused on the banks of the Rhine near Duisburg. Due to its remarkable investments in production sites and infrastructure that were necessary to cope with the demands the iron and steel industries did not follow the northward movement of the coal mining industry but remained in the Hellweg zone. By the end of the 19th century many steel companies had secured themselves their own

coal and coke basis by acquiring coal mines and coking plants; in some cases this entrepreneurial consolidation is reflected by new integrated iron and steel works.

In both World War I and World War II the iron and steel industries of the Ruhr was the center of the armaments and war industry.

In the interwar years the inflation and the ensuing economic crisis caused a concentration process of the iron and steel companies and saw the formation of large-scale enterprises. After World War II the steel production was controlled by the allies (Ruhr Statute) whose interest it was to deconcentrate the large steel companies and to dismantle their production sites. In the course of these measures the Ruhr lost six blast furnaces, 47 Siemens-Martin converters and 60 electric steel furnaces as well as rolling mills and other manufacturing plants.

However, this dismantling of production lines which were in parts outdated also allowed modern production structures to be established after 1950 in order to meet the increased demands on the national and on the world market. These new technologies and structures allowed higher production capacities and improved product qualities. Due to this new strength of the regional steel companies the production of crude steel increased from 14 million tons in 1950 to 54 million tons in 1974.

After this record year the steel crisis began. But at first, as with the coal crisis (see 1.4), the steel crisis was regarded as a fluctuation in business activity. There still was a high demand for steel on the world market; but the structure of the inter-

national steel market had changed as the steel companies were now in a worldwide competition. Japan in particular had built up a substantial steel industry. Next to the new competitive conditions on the world market two other trends were to reduce the demand for steel from the Ruhr. On the one hand, steel was partly replaced by new materials (particularly products made from plastics and ceramics), on the other, lightweight constructions that saved material and energy were prevailing.

Unlike the competing companies in Britain, France, Italy and elsewhere, the iron and steel companies of the Ruhr had to do without public aid in the 1970s and 1980s. Even on the national level companies like Thyssen and Krupp became disadvantaged in comparison to other companies as e.g. PREUSSAG that was disencumbered by the government.

These fundamental changes on the global steel market caused a restructuring of the coal and steel industry of the Ruhr (for structural change see chap. 3).

It could be shown in this chapter that, based on favourable natural conditions, a rapid process transformed the Ruhr into Europe's most important industrial conurbation; yet widely rural in 1840, the areas along the rivers Ruhr, Emscher and Lippe had reached the phase of high industrialization already by 1900. This process was based on the coal resources, particularly the coking coal deposits that were the precondition of the development of the iron and steel industries that became the second column of the regional industrial structure.

Within only some decades an intensely intertwined industrial complex based on coal, iron and steel spread over the whole region, the rivers were the natural starting lines of its infrastructure. But they became not only the guiding lines of development within the various structural zones (Ruhr zone, Emscher zone, Lippe zone), but with industrialization progressing they were also adapted and to the needs of the population living and working in the region; so the natural system of the river Emscher was transformed into an open sewage canal.

In the following chapter the focus is laid on the urban/suburban landscape as it developed since the beginning of the industrialization.



1.5.4 Duisburg-Bruckhausen, 1992

2. THE RUHR/METROPOLIS RUHR – SOCIO-SPATIAL AND URBAN DEVELOPMENTS

2.1 Development of the administrative boundaries

In chapter 1.3 the historical development of the region has been outlined until 1815. Since then the region has been affected not only by the industrial impact but also by a variety of political and administrative changes; eventually, the Ruhr has been defined by the urban and rural districts comprised by the Regionalverband Ruhr area (RVR, Regional Association Ruhr).

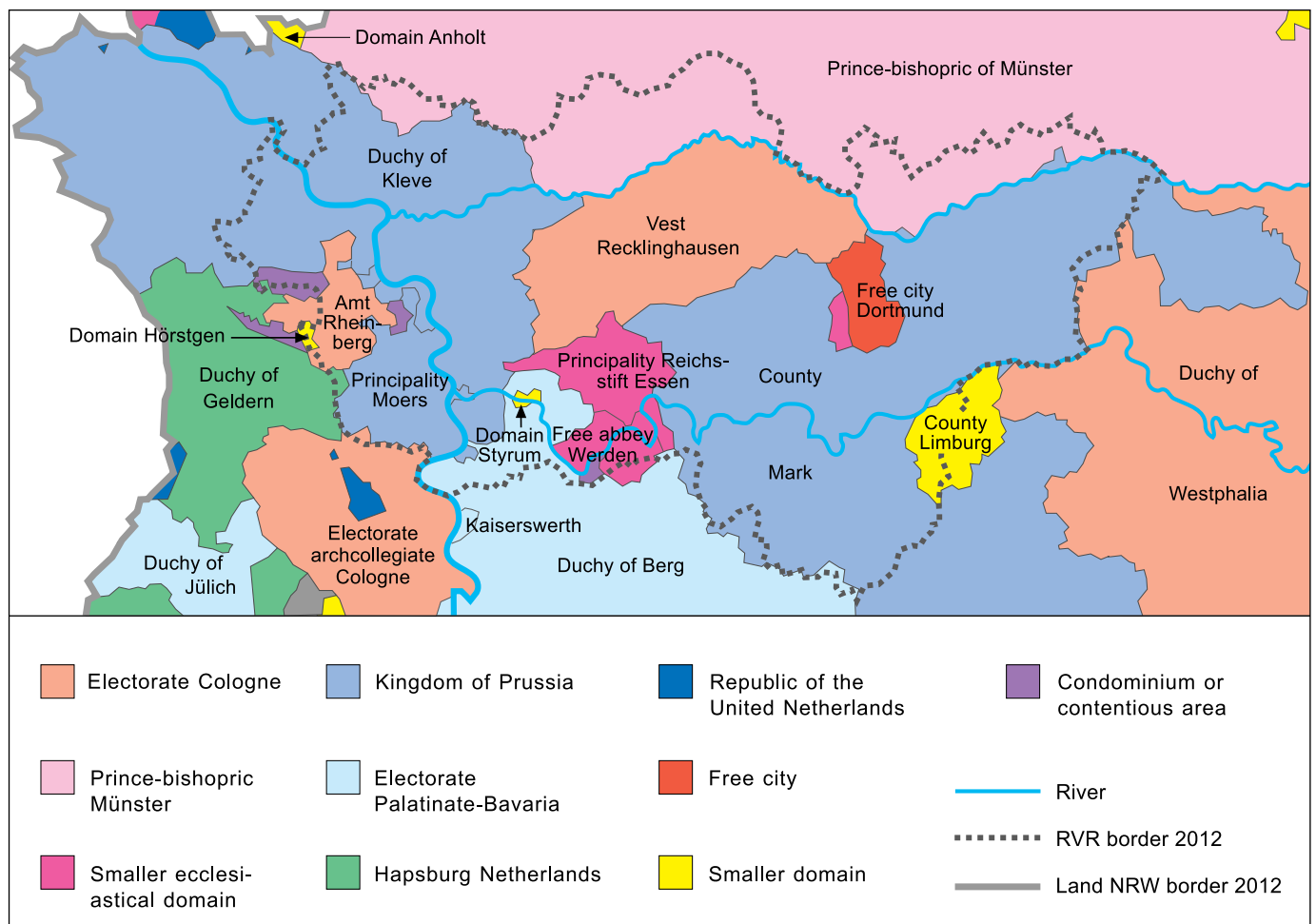
On the 1815 Congress of Vienna new borderlines were fixed in Europe which also changed the territorial integration of the region along the rivers Ruhr, Emscher and Rhine. The up to then existing scattered regionalism disappeared, ecclesiastical territories, e.g. the free abbeys of Essen and Werden, or territorial claims were abandoned and what later was referred to as the Ruhr became part of the kingdom of Prussia which as a whole was divided in ten provinces (first tier) and

25 Regierungsbezirke (administrative regions, second tier). The western part of the present-day Ruhr was integrated in the Rhine province (Rheinpreußen, Rheinland) and the Regierungsbezirk Düsseldorf respectively, whereas the larger part in the east was incorporated into the Regierungsbezirke Münster and Arnsberg in the province of Westphalia. Hence the present-day division of the Ruhr in the three administrative regions Düsseldorf, Münster and Arnsberg dates back to the 1815/16 Prussian administrative reorganization. The Regierungsbezirke were divided in new (rural) districts (Landkreis) that often remarkably differed from the existing ones. In the Rhine province the districts of Duisburg, Essen, Moers and Rees and in Westphalia the districts of Bochum, Dortmund, Hagen, Hamm and Recklinghausen were established.

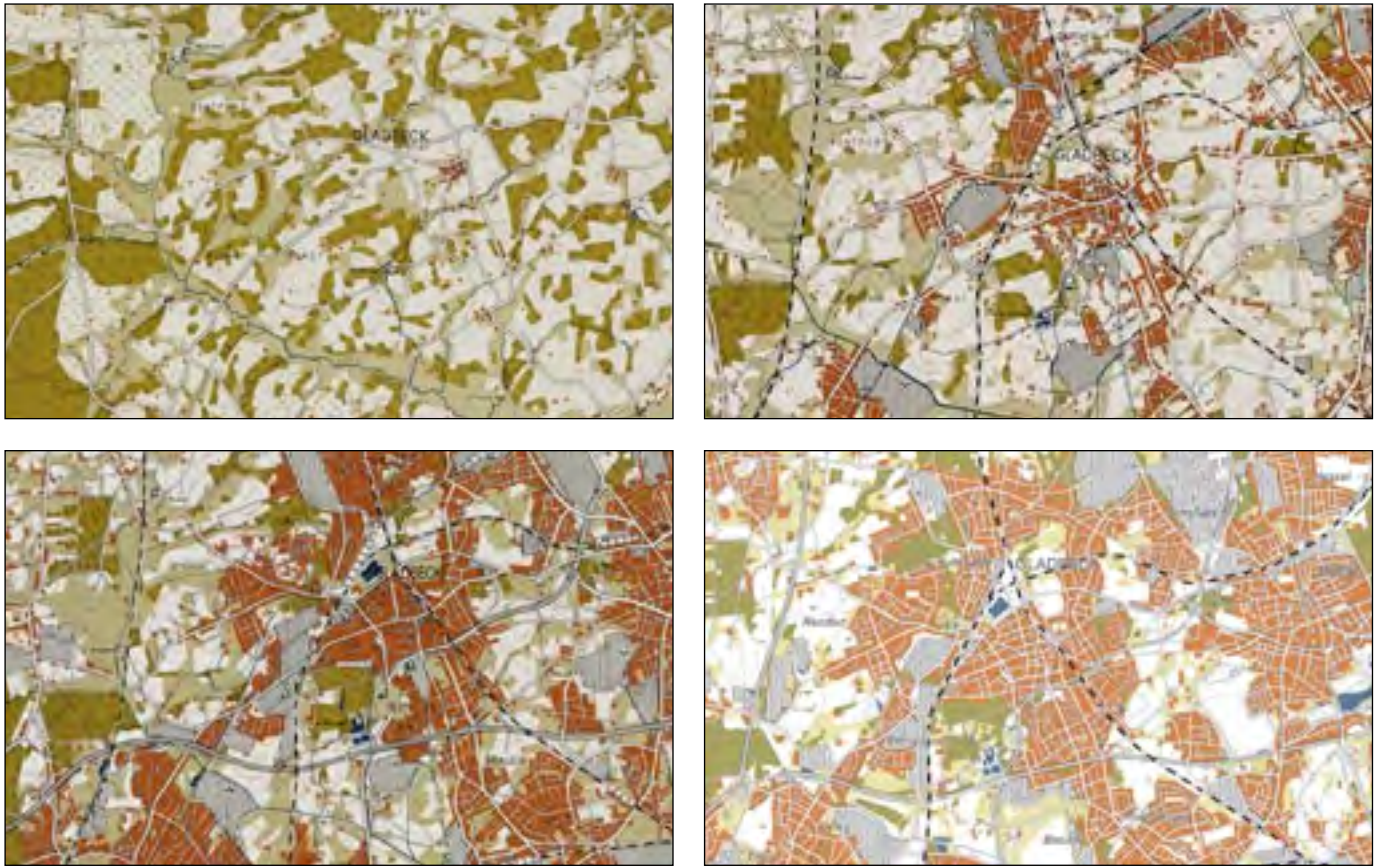
In both provinces the political authorities intended to declare the larger cities independent urban districts (kreisfreie Stadt);

thus, due to industrialization and the ensuing increase of population in the second half of the 19th century, the Rhenish cities of Essen (1873) and Duisburg (1874) and the Westphalian cities of Dortmund (1875), Bochum (1875) and Hagen (1887) became independent urban districts. When the rural district of Bochum reached a population of 249,000 inhabitants in 1885 it was regarded as too large, and, consequently, parts of it were detached and established as the new rural districts of Gelsenkirchen and Hattingen. In the following years numerous incorporations, a constant flow of immigrants and the ensuing urban sprawl let the cities of the Ruhr grow rapidly. The cities of Buer, Hörde, Osterfeld and Hamm were excluded from their former rural districts and were established as new urban districts.

Between 1926 and 1929 the “reorganization of the administrative units in the Rheinisch-Westfälisches Industriegebiet



2.1.1 Territories in the Regionalverband Ruhr area (RVR), 1789



2.1.2 The urban development of Gladbeck (Map sections 1840, 1930, 1970, and 2010)



2.1.3 The growth of the larger cities in the Ruhr, 1875 to 1975: Dortmund as an example

(Rhenish-Westphalian industrial area)” act was put into practice which caused numerous incorporations and boundary changes; urban districts as Hörde and Steele lost independence and were incorporated into the cities of Dortmund and Essen respectively. Since this comprehensive reorganization the administrative units of the Rhineland and Westphalia provinces remained unchanged until 1946.

After World War II the former Prussian provinces were dissolved. Since August 23, 1946 the northern part of the Rhineland province (Regierungsbezirke Aachen, Cologne and Düsseldorf), the province of Westphalia (Regierungsbezirke Münster and Arnsberg) as well as Lippe-Detmold (since 1947) formed the Land Northrhine-Westphalia (NRW) the capital of which is the city of Düsseldorf.

The 1970s were a period of new administrative revisions, with the 1975 restructuring initiative being the most significant one. As in other European countries, larger administrative units were created as this was supposed to increase the efficiency of administration and public life. In the Ruhr some cities lost independence; Wattenscheid became part of the city of Bochum, Wanne-Eickel part of the city of Herne and Rheinhausen part of the city of Duisburg, the up to then independent cities of Dinslaken and Castrop-Rauxel were incorporated into the rearranged rural districts of Wesel



2.1.4 Old Amtshaus/City Hall in Herten (1892 to 1957)

and Recklinghausen. Some of the administrative changes were enacted against the will of the population involved.

In the course of this administrative reorganisation the Siedlungsverband Ruhrgebiet, founded in 1920, lost its planning sovereignty which was transferred to the planning councils of the Regierungsbezirke in Arnsberg, Düsseldorf and Münster.

In the late 1990s the occasional proposal has been made to reduce the number of NRW-Regierungsbezirke from five to three

in the course of which a new Regierungsbezirk Ruhrgebiet was to be founded comprising the area of the existing Regionalverband Ruhr; the remaining parts of the Land NRW were to be divided between the new Regierungsbezirke Rheinland and Westphalia. The Christian and Free Democrats 2005 government announced this administrative revision to be accomplished by 2022 as this would increase the efficiency of the administrative bodies. However, the Social Democrats and the Green Party 2010 government did not mention this topic anymore in its coalition treaty.

SVR, KVR, RVR

In 1920, the **Siedlungsverband Ruhrkohlenbezirk (SVR)**, a special purpose regional association, has been founded in order to regulate and organize the rapid development of Germany's most important industrial conurbation by means of a regional planning body that was superordinate to the rural and urban districts planning authorities. The SVR regional settlement planning coordinated the local land-use and zone planning, retained open and green spaces for recreational purposes and conducted the regional traffic planning. The leading figure to conceptualize and enact this first regional planning of the Ruhr was Robert Schmidt, the first SVR director (1920-1932).

In the post-war phases of re-construction and *wirtschaftswunder* (German Economic Miracle) the rapid development of the Ruhr was coordinated by the SVR that enacted a mandatory regional planning by means of a comprehensive regional development plan.

This regional planning competence has been taken from the SVR in the course of the 1975 administrative reorganization. Regional planning has henceforth been carried out by the planning councils of the three Regierungsbezirke Arnsberg, Düsseldorf and Münster.

In 1979, this loss in regional planning competence has been enshrined in the course of the reorganization of the SVR towards the **Kommunalverband Ruhrgebiet (KVR)**, Communal Association of the Ruhr). The tasks remaining with the KVR were the politically less relevant ones: public relation, open space protection, leisure and tourism planning, survey and mapping, regional studies and services for the various affiliated districts.

The scope of tasks changed again in 2004 when the NRW government reformed the Regional Planning Act in the course of which the newly named **Regionalverband Ruhr (RVR)**, Regional Association Ruhr) regained planning functions as it has become its task to establish regional master plans. It is also in its responsibility to promote the development of the Emscher Landscape Park and of other open spaces. Moreover, it has adopted the regional economic development planning and the regional location marketing.

In 2007, the importance of the RVR increased as the regional planning of the Metropolis Ruhr has been assigned.



2.2.1 Essen from Southeast, c. 1867

2.2 Development of the settlements

The development of the Ruhr to Europe's most important polycentric conurbation started late but rapidly. As mentioned in 1.3, a series of locally and regionally important Hellweg and Hanseatic cities had developed, but up to the 19th century the region was widely used by agriculture and consequently sparsely populated. In 1840 only some 240,000 people lived in the area. Promoted by the upswing of coal mining and the iron and steel industries the built-up areas began to sprawl when the pre-industrial cities expanded and new industrial housing quarters came into being. Today, it is primarily the core area along the Hellweg and the river Emscher that is extensively if not continuously built up.

In the early industrial but still rural phase c. 1840 the settlement patterns based on different natural conditions allow a zonal differentiation.

In the southern Ruhr zone the gallery mining of anthracite, lean and forge coals had an early industrial impact. In the vicinity of the mines so called cottar settlements housed the increasing population. By apportioning the marches (commons) small holdings were established (cots), they were run by the women, whereas the men worked as miners. Due to these small holdings of the miners the Ruhr zone was particularly densely settled and intensively used by agriculture. Till today these miners' holdings cause the characteristic dispersed settlement patterns of the Ruhr zone.

The Hellweg zone adjacent to the north was a fertile boerde landscape and, in terms of agriculture, the most important part of the region. Next to a variety of nucleated villages there were the

medieval Hellweg towns Duisburg, Mülheim, Essen, Bochum and Dortmund. After the seams of coking coal had been tapped by means of shaft mining the Hellweg zone was affected by the early industrialization that let the population increase rapidly.

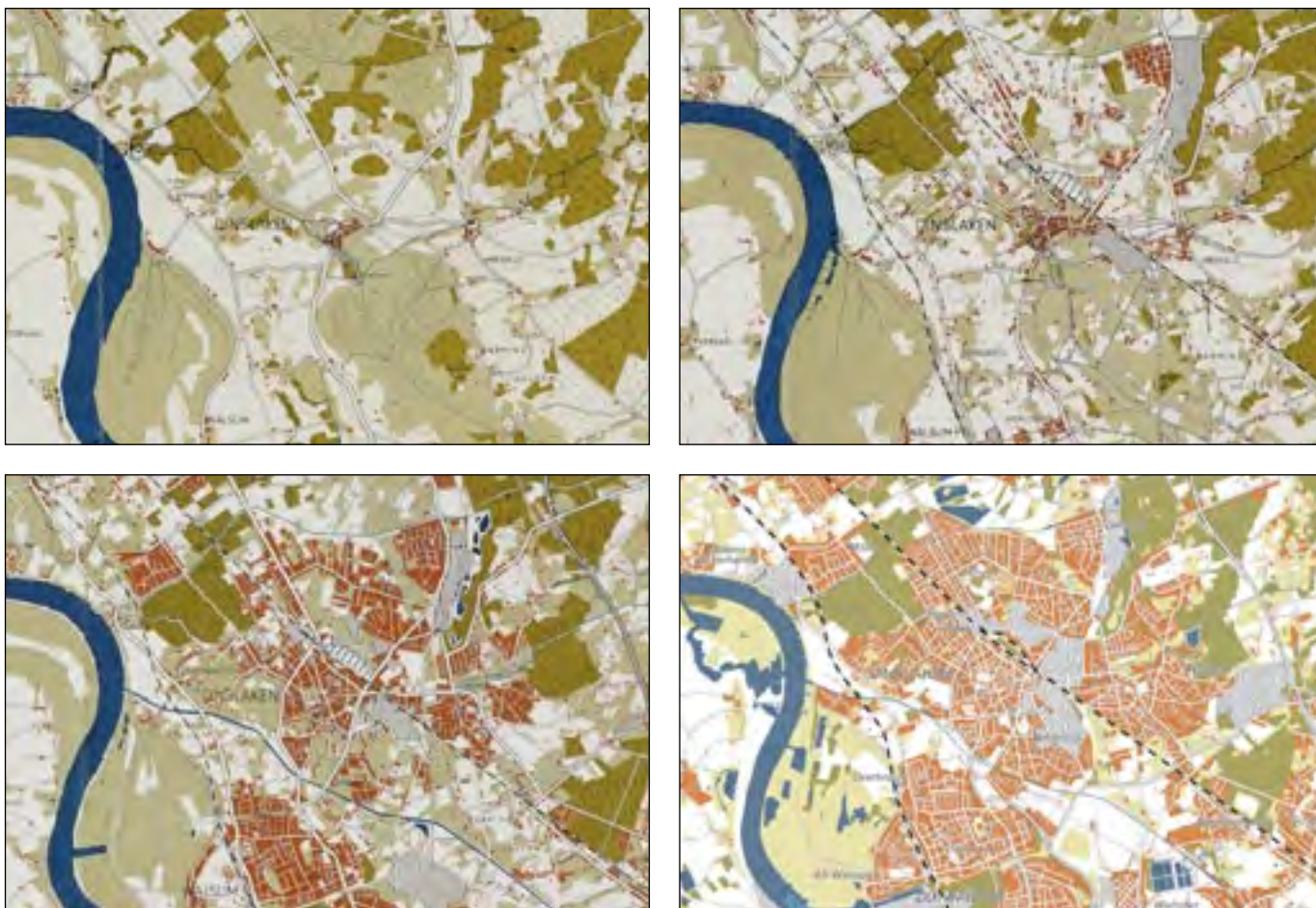
To the north, the fertile boerdes of the Hellweg zone descend to the Emscher lowlands where the low stream gradient of the river and the ponding layers of Emscher marl prevented nearly any settlement. More favourable conditions for economy and settlement were to be found further north, particularly in the area of the loess covered Recklinghäuser Höhenrücken that turned into the preferred zone of agriculture and settlement in the northern Ruhr area. The Haard north of it, the sandy plates of the Lower Rhine in the west as well as then Hohe Mark north of the river Lippe are characterized by poor sandy soils. But as

the conditions were even better than in the Emscher lowlands the population densities of population and settlements was higher than there.

The high industrial phase from 1850 to 1900 changed the Ruhr from a rural area into Europe's largest industrial conurbation. The pre-industrial landscape of 1840 was transformed into a confusing industrial region that comprised mining and industrial sites, railway tracks, streets and housing quarters. This transformation was promoted by coal mining that, depending on the natural conditions and the technological options, spread in phases from the south to the north ("Northward movement"). That is why the c. 1900 settlement structure at the end of the high industrial phase can also be described by using a model of more or less homogenous zones of economic and urban development. The differences between the zones derive from the



2.2.2 Typical cottar's house built of Ruhr sandstone



2.2.3 The development of built-up areas in the Ruhr 1840, 1930, 1970 and 2010, the case of Dinslaken

differences of the industrial impacts they have been faced with.

The Ruhr zone is that part of the Ruhr area where industrialization began but which was affected only during the first phase; early coal mining caused the dispersed settlements mentioned above. Thus the Ruhr zone is that part of the region that has least been changed by industrialization. The collieries and smelting plants established here were small in size and in number of workers and, besides of the small towns of Witten and Hattingen, gave no impulses to the development of settlements.

In contrast, the Hellweg zone has massively been transformed by industrial activities in the high industrial phase. Mines and smelting works were the nuclei of comprehensive companies by ensuing coking plants, steel works, rolling mills, foundries and engineering works. The demand for labour force caused thereby could only be satisfied by in-migration. The comprehensive growth converted the medieval towns along the Hellweg as Duisburg, Mülheim, Essen, Bochum and

Dortmund into major and compact industrial cities.

The advance of coal mining into the Emscher lowland was supported and accelerated by the lay-out of the Cologne-Minden railway. This first railway line of the Ruhr area, opened in 1847, connected Duisburg and Oberhausen and then, with but a small incline, run through the sparsely populated southern Emscher zone towards Dortmund and Hamm. The railway became a new mode of transport and an important customer of the products of the basic industries (coke, iron, steel) as well.

Inclined by this new locational advantage in the up to then only slightly developed and settled Emscher zone a great multitude of large mines and smelting works were established. The demand for labour force was so high that both the coal mining industry and the iron and steel industries had to recruit workers from the provinces in East Prussia. These workers were housed in so called colonies that were erected in the immediate vicinity of the works (see side note on workers' hous-

ing estates). Due to the rapid growth of the population the bewildering fabric of mining sites, workers' housing estates, villages and railway stations along the Cologne-Minden railway line ended up in unplanned mining towns as e.g. the city of Herne. Of even greater importance were sites where coal mines and iron and steel works developed in close proximity as in Gelsenkirchen that had been jumped from a village with 500 inhabitants in 1818 to a city of 220,000 inhabitants in 1905. The relationship between a combined/integrated development of coal mining and the iron and steel industry and its effects on population could have been shown in places like Oberhausen and Hamborn (today incorporated in the city of Duisburg) as well as it demonstrates the enormous impact that industrialization had all over the Emscher zone.

By 1900 the Hellweg and the Emscher zones had developed to the core area of the Ruhr. The Ruhr zone had already been left by coal mining and the Lippe zone in the north and the Lower Rhine area in the west were regarded as zones of for expansions that were yet to come.



2.2.4 Workers' housing estate Eisenheim, city of Oberhausen



2.2.5 Dahlhauser Heide estate, Bochum-Hordel



2.2.6 Plan of the Dahlhauser Heide estate, Bochum-Hordel

Workers' housing estates

The housing estates that have been erected in the Ruhr since the 1850s are the unique form of housing the regional miners and the iron and steel workers. Due to its spatial compactness and its homogeneity in built forms and social structure this typical feature of the urban/suburban fabric of the Ruhr is often referred to as "colony". One of the oldest of these colonies – and the oldest still existing – is Eisenheim in the city of Oberhausen, laid out for the workers of the Gutehoffnungshütte (GHH) between 1844 and 1901; since 1973 this estate is protected by strict conservation regulation.

The basic industries used these housing estates as an effective additional incentive to recruit workers and make them to commit themselves to the company, for to create, develop and retain a permanent and qualified workforce was regarded as a major objective by all great companies. So working contracts were directly coupled with the lease contracts. If the job was lost or a worker changed to another company the flat/house had to be left as well. Despite of this dependency to the com-

panies these housing estates were very popular places to live as they offered a better and more affordable housing than the urban mass dwellings.

Retrospectively, three main types of colonies can be distinguished:

1. The earliest colonies were laid out by following contemporary English patterns: small and simple houses, 1.5 storeys high, were set in long rows of 100 and 200 meters; they were commonly referred to as "D-Zug" (compartment train).
2. Since about 1860 semi-detached houses, 1 to 1.5 storeys high were erected alongside a street. Attached to each house was an individual garden as working a garden and keeping small animals were welcomed by the workers that had migrated in from rural regions. Moreover, having gardens been worked by the workers' wives was a bare necessity to guarantee the food supply of the population.

3. The garden colonies, the third type of colonies, tried to overcome the uniformity and sheer usefulness of their predecessors and were orientated to the English Garden Town movement. Their characteristics are green areas, winded streets and spacious places, the houses exhibit diversified designs, partly with loggias, elaborate roof forms and half-timbered walls.

Since the 1958 coal crisis and in the course of the process structural change the demand for the flats in workers' housing estates decreased. They were no longer able to fulfill the increased demands for the quality of housing. In some estates the houses were privatized, other estates were dismantled completely.

Some estates of particular value and attraction have been renovated and preserved as a whole, some are under the protection the conservation law as e.g. the Dahlhauser Heide estate.

Whereas the 1900 suburban/urban structure of the unplanned industrial district was centered on the area between the rivers Ruhr and Emscher the urban fabric of the present day conurbation extends from the river Ruhr in the south to the river Lippe in the north. This is to indicate that the suburban/urban sprawl of the Ruhr continued in the 20th century, even if it was accompanied by a comprehensive structural change in the course of which coal mining has been confined to two sites in the north and one on the western side of the Rhine and the iron and steel industries have reduced the number of their sites remarkably.

The dominant aspects of the economic change will be dealt with in chapter 3, the various phases of the urban growth are explicated in the following.

In the first half of the 20th century this growth can be divided into various phases that are separated from each other by phases of stagnation and regression due to global political and economic influences (World War I and II, Global economic crisis).

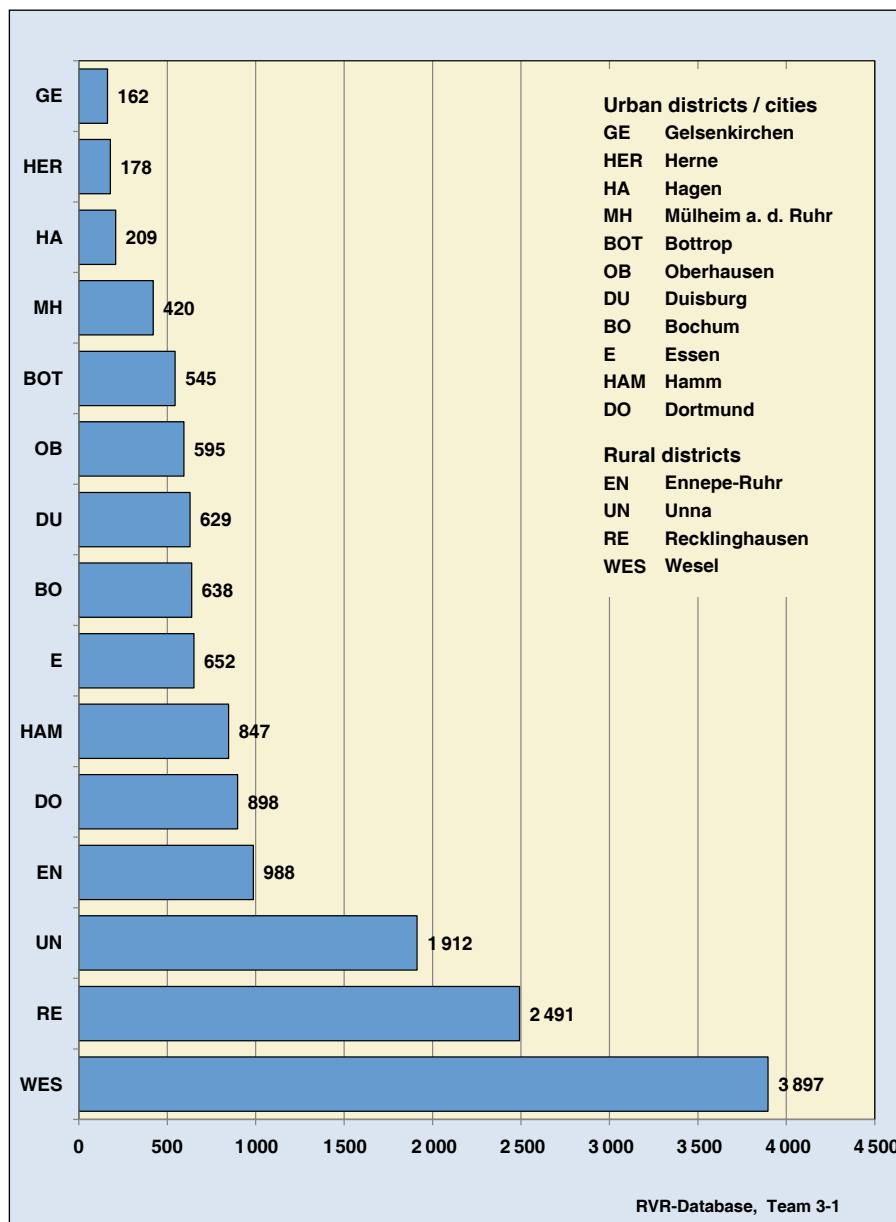
As in the late 1920s and early 1930s the basic industries achieved a culmination in terms of technology and efficiency, their thirst for land ceased; correspondingly, both the SVR and the urban planning departments were able to widen their influence on the land market; they initiated early stages of urban and regional planning and promoted an urban non-industrial development of the cities. The general development plans of some Hellweg cities established a functional land-use zoning and divided the city areas into southern perimeters that were less affected by industry and could therefore be used for middle-class housing and recreation purposes and into northern perimeters that were subject to massive industrial impacts; the present-day north-south divide of the Ruhr can be traced back to these 1920s planning concepts. The central urban structures were highlighted by some prominent buildings, as e.g. the Deutschlandhaus in Essen, the city hall and the adjacent quarter in Oberhausen and the "Glückaufhaus" and other expressionistic buildings in Gelsenkirchen.

World War II aerial bombardments caused sweeping destructions, particularly in the Hellweg cities and on the iron and steel sites. From the early 1950s onwards the national reconstruction required an

Tab. 3: Development of population and built-up areas in the Ruhr

Year	Population		Built-up area	
	millions	index	hectares	index
1950	4.6	100	84,000	100
1961	5.7	124	104,000	124
1970	5.6	122	123,000	146
1981	5.4	117	142,000	169
1993	5.4	117	157,000	187
1998	5.4	117	162,000	193
2000	5.4	117	164,000	195
2005	5.3	115	168,000	200
2010	5.2	113	171,000	204

Source: RVR data file



2.2.7 Decrease of open space, 1990 to 2010 (hectares)



2.2.8 Emscher Landscape Park

efficient industrial region, politics and economy were eager to restore the pre-war situation as soon as possible. That is why not only the industrial structures but also the spatial structures developing until 1960 are a reproduction of the 1930s structures. Gradually and fuelled by an increasing in-migration the larger cities of the Hellweg zone were extended and amalgamated with the smaller towns south of the river Emscher. Due to the northward movement of coal mining another focus of suburban/urban growth lay in the northern Emscher zone. Settlement activities were also intensified in the Lippe zone, particularly in the area around the city of Marl, as well as west of the river Rhine.

In the second half of the 20th century urban development continued despite the decline of the traditional heavy industries. In this phase the development was characterized by factors and processes that could also be recognized in other urban conurbations in the developed countries, i.e. an increase of traffic spaces, open and semi-open settlement forms, larger flats for smaller households, extensive sites for trade and industries.

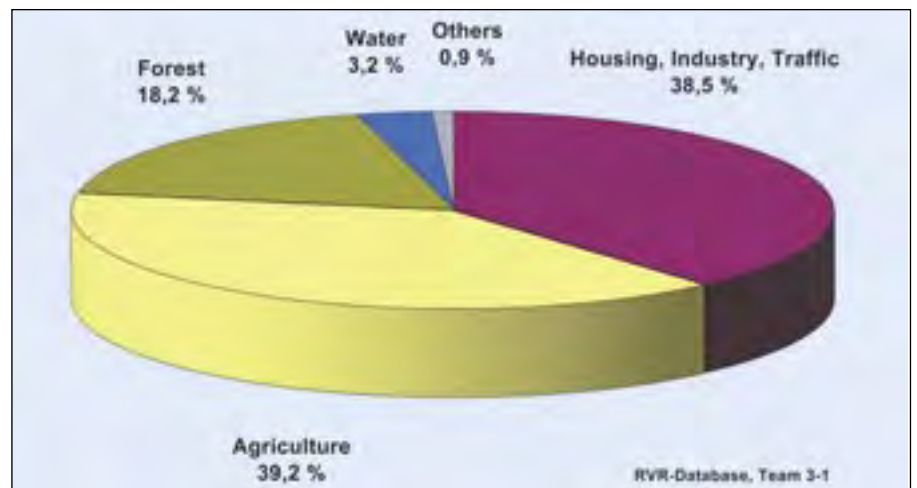
Moreover, several initiatives have been launched since the 1970s to alleviate the effects of the economic decrease of the

heavy industries. To modernize the urban patterns and the infrastructure traffic networks, (higher) education facilities, recreation sites and urban centers were established and expanded.

After an industrial and a postindustrial suburban/urban development the Ruhr has become Europe's largest polycentric metropolitan region and has now entered the international locational competition. In comparison to competing metropolitan region it is the special urban fabric of the Ruhr, particularly the relation between built-up areas and open spaces that is regarded as an important soft locational

factor considering the quality of the living conditions.

Already in the 1920s it has been regarded as beneficial to protect the open spaces. To cope with the unabated suburban/urban growth in the high industrial phase and in the years after World War I the Siedlungsverband Ruhrkohlenbezirk (SVR) has been founded (see above). The SVR determined the protection of seven regional green belts that were to become recreational areas of ecological compensation for the regional population as well as structuring elements of the urban development. In the Hellweg and Emscher



2.2.9 Land use in the Ruhr area 2010

zones these belts were to prevent a further uncontrolled expansion of the cities. In the west of Ruhr, however, this aim could not be achieved; the present-day built-up areas of the cities of Duisburg, Oberhausen and Mülheim are connected in many ways. Nevertheless, the concept of protecting the open spaces is maintained and has been embedded in the “Regionales Freiraumsystem Ruhrgebiet” (Regional Open Space System Ruhr). With former industrial estates becoming brownfields the green belts can be expanded; in addition, extensive landscapes outside the core area – Regional Park Lippe valley - Hohe Mark, Landscape Park Lower Rhine, and Regional Park Ruhr valley – have been protected and developed. The core element of the Regional Open Space System, i.e. the Emscher Landscape Park, will be discussed in details in 4.3.

2.3 Population development

The population development of the Ruhr reflects the economic and industrial development. Due to the massive increase of the industries and their demand for labour force the 220,000 inhabitants of the 1816 rural region increased to nearly 5.7 million in 1961 when the region reached its industrial peak. This population growth was mainly fuelled by five major immigration waves:

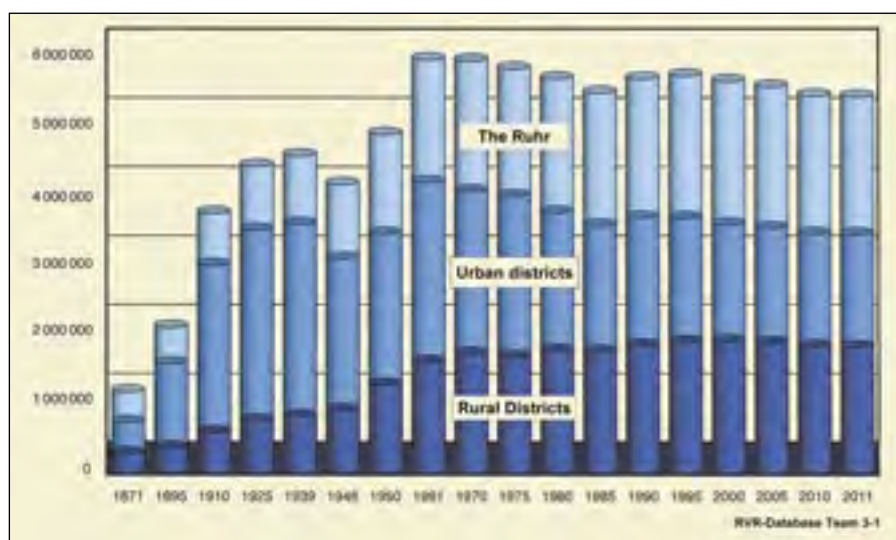
1. immigration of a mainly rural population from the West Prussian provinces Westphalia, Rhineland and Hesse since 1840,
2. immigration of miners from the mining districts in Upper Silesia and Moravia since 1865,
3. immigration from East and West Prussia, Galicia and Slovenia since 1880,
4. immigration of expellees and refugees since 1945,
5. immigration of guest-workers from the Mediterranean since 1959

By these processes the cities of the high industrial Hellweg and Emscher zones achieved the highest density values of above 2000 inhabitants per square kilometer; the city of Herne achieves the highest density value of 3,247 inhabitants per square kilometer (2010).

Since the 1960s, however, the population has been decreasing to 5.15 million in-



2.3.1 Population densities in the districts of the Ruhr, 2011



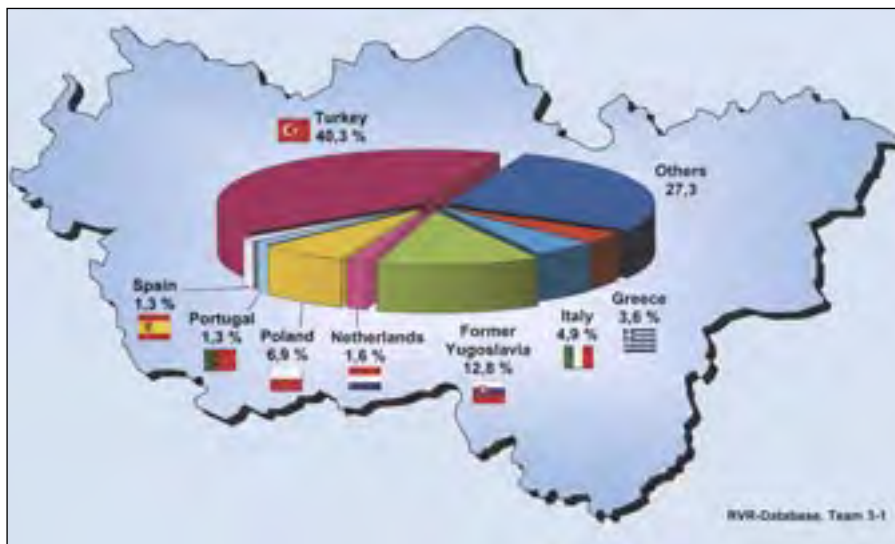
2.3.2 Population development in the Ruhr, 1871 to 2011

habitants (31.12.2010). There are many causes and trends to explain this decrease. Since the 1960s there has been an out-migration of workforce into the developing industrial areas in southern Germany. Due to the crises of the heavy industries and the massive job losses caused thereby a continuous negative migration balance, with the number of people leaving the region surpassing the number of immigrants, influenced the population development. Because the losses of German workforce exceeded the rationalization effects in the period from 1960 to 1973, the coal mining and iron and steel industries welcomed the immigration of foreign workers, at first from the member states of the newly founded European Economic Community (EEC), later particularly from Turkey. Due to the 1973 ban of recruitment and the 1983 repatriation grant program the general immigration of foreign workers ceased temporarily. Immigration

from Turkey increased again in the following decades but was mainly restricted to immigrants that were embraced by the family reunification programs. In total, it was the last of the immigration waves mentioned above that has sustainably imprinted the structure of the regional population and its development potential.

The more the Ruhr changed from a regional industrial complex into a post-industrial conurbation the more it has been affected by demographic trends that generally affect highly developed societies. Due to a general social change individualization increases and the wish for children decreases. Since the 1980 the negative migration balance is accompanied by a natural population decrease with the number of deaths surpassing the number of births.

The natural population decrease and the out-migration, particularly of younger



2.3.3 Foreigners in the Ruhr by nationality, 2010

persons in their working ages, produced an unfavourable age structure. The share of pensioners is above, that of younger persons below the average of the Land NRW. As a variety of negative demographic trends coincide the Ruhr happens to see a particularly strong demographic change. Prognoses predict ongoing processes of demographic shrinking and aging. This shall be answered by a selective in-migration of younger persons of the working age and their successful integration.

In 2010, there were 585,000 foreigners living in the Ruhr, i.e. 10.8 percent of the total population; the about 225,000 Turks form the largest group (40 %). In the city of Duisburg there live 39,000 Turks, i.e. the highest proportion in the Ruhr. The opening of Germany's largest mosque in Duisburg-Marxloh (incl. an interreligious

and intercultural community center) in 2008 is regarded as evidence of a successful integration. On the other hand it should not be ignored that it is the group of the foreigners and particularly that of (former) Turkish nationality that is particularly affected by the negative consequences of the industrial decline; this group shows high unemployment rates and a low participation in education. Moreover, these problems are concentrated in heavily deprived quarters of the Hellweg and Emscher zones cities (see 2.4). According to the general demographic prognoses, it will last another 25 years that the rest of the Land North-rhine-Westphalia and Germany as a whole will be confronted with demographic processes similar to that the Ruhr is facing at present. Insofar, the Ruhr can be regarded as a demographic laboratory

that allows corresponding experiences and insights to be gathered in order to handle a shrinking population.

Next to the general demographic trends, the actual regional population structure exhibits some specific trends the most prominent of which is the core-periphery divide. From 1961 to 2010 the cities of the Hellweg and Emscher zones had to accept a population loss of 750,000 whereas the peripheral rural districts gained 225,000 new inhabitants; the city of Gelsenkirchen lost 125,000 (-33 per cent) of its population in this period whereas in the rural district of Wesel the population increased by 140,000 (42 per cent). The regional decrease of population is thus differentiated by distinct intra-regional demographic processes and contrasts. Remarkable population losses in the core areas go along with a population increase in the less densely populated areas on the fringe of the Ruhr.

However, the process of core-periphery migration is very complex and has to be regarded in a differentiated way. Some core cities as well some cities in the rural districts are differently affected. In 2003 a RVR study could show that the larger cities of Duisburg, Essen and Bochum had to take high losses. They lost population to smaller core cities like Mülheim an der Ruhr, Bottrop, Oberhausen and Herne, to the districts with intermediate population densities in the direct umland, e.g. the rural districts of Wesel, Recklinghausen and Unna and, finally, to rural areas farer away like Olfen, Möhnesee or Kalkar.



2.3.4 Main mosque in Duisburg-Marxloh

Personal motives, e.g. the change of the household composition, the wish to buy/build a house, individual life-styles and life plans, are generally the most important ones; singles and couples mainly show a tendency towards the core cities, whereas families prefer the urban and rural umland districts. Next to these personal motives and to the quality of the actual dwelling/flat, the main factor that influences this kind of mobility is the quality of the living environment with particular reference to the degree of noise, the lack of open space, the social structure and others. The long lasting efforts to improve the quality of the housing quarters in the cities of the Ruhr that have – highlighted by key words like “urban development”, “urban renewal” and “urban reconstruction” – brought forward a complex development.

2.4 Urban development/Urban renewal/ Urban reconstruction

In their development since 1945 the cities of the Ruhr very clearly document their orientation to the concepts and guiding principles prevailing in West Germany. In the immediate postwar years it was the main aim to rebuild the severely damaged cities as soon as possible. With the city centers and the adjacent densely settled housing quarters being widely destroyed and an increasing number of expellees and refugees it was of utmost priority to erect housing quarters. In the 1950s urban development was guided by the concept of the structured und deconcentrated city. In accordance to that the historical city-center of Dortmund has remarkably been rearranged by increasing the plot sizes and generously extending the traffic areas, including the widening of ring roads and the lay-out of new parking places. The planning activities of those years were inspired by an atmosphere of optimism and by the ideas of renewal and growth.

As in all larger cities in West Germany the urban planning of the 1960s followed three guiding principles. The demands of traffic and of the private motorization were prioritized and urban development followed the idea of a city adapted to cars. Numerous national roads, ring roads and motorways have been laid out and widened; the "Ruhrschnellweg" (Federal street B1/motorway A40, the "Emscherschnellweg" (motorway A42) and the city motorway in Duisburg (A59) became the spinal cords of the new network of regional streets.

In that period of a nearly unlimited economic prosperity the idea of "urbanity by density" was another guiding principle of urban development. In all cities of the Ruhr new large housing quarters, some with several thousand units, were erected and emphasized the new idea of urbanity



2.4.3 The Metacity with flexible inner walls in the New Town Wulfen near Dorsten



2.4.1 The Dortmund city-center before ...

2.4.2 ... and after the re-organization of the plots

by their mere dense compactness. Because these large housing quarters have mostly been erected outside the existing urban patterns they initiated an outward growing of the cities by suburbanization. In the vicinity of the village Wulfen-Barkenber (near Dorsten) where a new coal mine was to be deepened even a new town for 50,000 inhabitants was planned and housing quarters for some 15,000 inhabitants were built there in the 1960s and 1970s. Influenced by the architectural design of the British New Towns, the "Neue Stadt Wulfen" became an architectural laboratory in which many concepts of condensed housing were tested (e.g. Finnstadt, Metastadt, Habiflex); only few of them have been successful, most of them could not keep the promises and ended in dismantling or redevelopment projects.

These processes were based on the new individual mobility, on new techniques in architecture and on the need for a new housing because the concept of "urbanity by density" was closely connected to the 1960s concept of "urban renewal by large-scale redevelopment". The general idea of growth had its effects on the city centers because the old housing quarters erected around them c. 1900 were dismantled in the course of "clean sweep" redevelopments. Small businesses have

been expelled and inhabitants have been settled in the large suburban housing quarters in order to allow retailing, administration, banks, insurances and other city center floor uses to expand into the areas adjacent to the city-center.

In the 1970s, particularly in the Ruhr the belief in growth was abruptly ended by the energy and steel crises. Moreover and unexpectedly, the large housing estates did not meet the expectations of the population. The ambition to renew and to modernize the cities was increasingly be answered by the alternative draft of conserving the traditional architectural qualities. Backed by new laws and the 1975 European conservation year the "conserving urban renewal and careful rebuilding" concept became the new guiding principle of urban development. In the cities of the Ruhr demolition and modernization was replaced by the maintenance of the stock (modernization of single objects), by urban preservation and the improvement of the residential areas.

These improvements were to protect the existing cheap housing stock, the inhabitants were involved into the renewal process and to private investments were launched. When e.g. the "clean sweep" redevelopments in the Nordstadt suburb of Dortmund were not able to give enough



2.4.4 Residential area improvement in the city of Dortmund: Westerbleichstraße in the Nordstadt suburb, 1980



2.4.5 Residential area improvement in the city of Dortmund: Westerbleichstraße in the Nordstadt suburb, 1993



2.4.6 Bahnhofstraße in Herne before pedestrianisation, c. 1960

incentives to stop the decay of the remaining c. 1900 housing stock, measures were taken to improve the environment of the housing quarters. These actions succeeded in maintaining the given social structure. Measures of urban improvement helped to enhance the quality of the street areas and new open spaces and playgrounds were laid out by means of public investments. Private investments to modernize residential buildings ensued particularly as they were promoted by public subsidies and reasonable loans.

In the city-centers measures of urban conservation were connected with projects to enhance the functional importance. In the city of Herne the Bahnhofstraße was



2.4.7 Bahnhofstraße in Herne remodelled, 2000/2001

redesigned as a shopping street, the traffic was diverted by a ring road and the former tram line was replaced by an underground. By increasing their formal and functional attractiveness medium-sized city-centers tried to compete with the non-integrated shopping-centers that were established on the periphery. In 1964 the Ruhr-Park in Bochum-Harpen was the first regional shopping-center to be opened in the Ruhr, the Rhein-Ruhr-Zentrum on the eastern fringe of the city of Mülheim was second in 1974 (the recent interrelations between urban development and retailing will be dealt with in 3.5).

The foundation of shopping-centers on non-integrated peripheral sites was part

of the overall process spatially to separate residential, industrial, retailing and leisure areas. This process is still going on and is accompanied by an increase of individual and goods traffic as well as by an expansion of the built-up areas despite the shrinking population. Since the 1980s urban planning in the Ruhr has tried to respond to these space consuming developments by means of an ecological and sustainable urban development.

In the course of the International Building Exhibition (IBA) Emscher Park from 1989 to 1999 some 30 housing quarters have been established that realize the new ideas of sustainable housing:

On the one hand, the structure of existing garden suburbs and traditional workers' settlements was taken up, retained and promoted as e.g. in the Teutoburgia estate in Herne-Börnig. It had been developed as a garden suburb between 1909 and 1923, its preserving renovation in the 1990s considered the newest ecological standards.

On the other hand, new compact housing quarters were built on industrial brown-fields as e.g. the inclusive quarter of 113 units for families and seniors on the site of the former Holland mine in Bochum-Wattenscheid. Following the ideas of ecological architecture rainwater is retained on the whole site and feeds a lake.

Furthermore, planners developed models of housing for particular groups or specific purposes. In Bergkamen the project "Women plan and build" was realized which is a housing project orientated to womens' needs in different situations of life.

Finally, the project "Built simply and by yourself" laid the basis for various self-constructed settlements the houses of which are impressive because of their compactness and the ensuing good energy balance; and have been erected by a great deal of personal contribution by the new house owners. Because of the comprehensive negative effects ensuing from the de-industrialization since the 1990s most welcome in the Ruhr are urban developments that give support to particularly deprived urban quarters. Structural change, an international competition increased by globalization as well as the reduction of welfare state subsidies caused segregation processes which brought forward urban districts in which self-supporting socio-economic problems concentrated.



2.4.8 Shopping-center Ruhr Park in Bochum



2.4.9 Housing quarter and industrial park on the Holland mine site in Bochum-Wattenscheid



2.4.10 Housing project “Women plan and build” in Bergkamen



2.4.11 “Build simply and by yourself” settlement in Duisburg-Neumühl

Particularly affected are old housing quarters in the vicinity of the city-centers (e.g. Dortmund-Nordstadt, Gelsenkirchen-Südost, Duisburg-Hochfeld) and large high-rise mono-functional housing estates on the periphery (e.g. Dortmund-Scharnhorst-Ost, Castrop-Rauxel-Deininghausen). These deprived quarters are characterized by high rates of (longtime) unemployment, a high share of households living on public benefits, a low purchasing power, high shares of migrants, deficiencies in infrastructure and urban fabric, high environmental burdens, a negative image and much more. Due to these negative factors these deprived urban quarters risk a constant downward development and degradation if this trend is not detained by joint efforts.

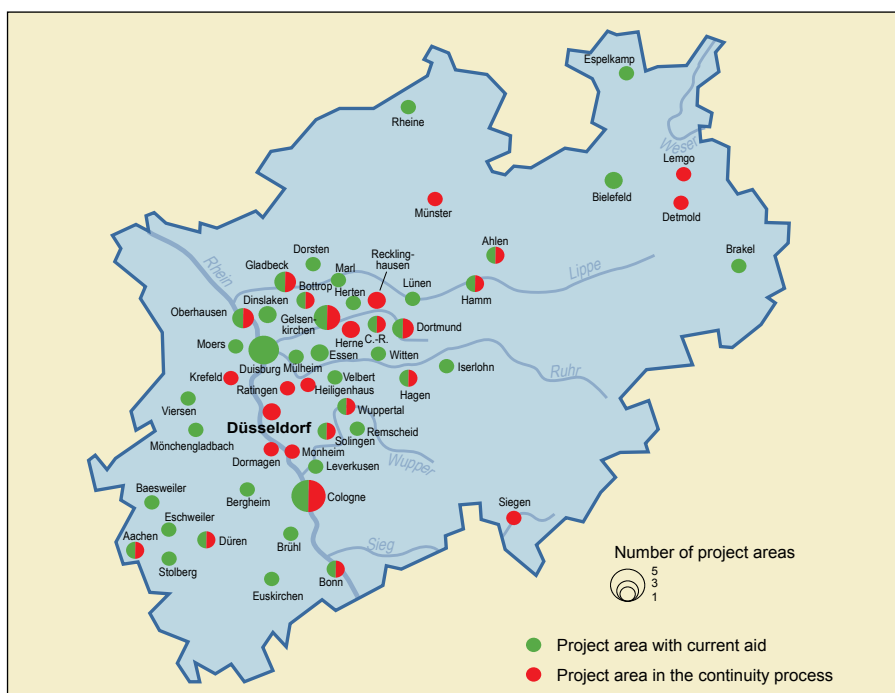
Consequently, in the northern parts of the cities of Essen, Duisburg and Hamm early concepts of urban renewal have been developed and tested. Based on the experiences gained by these projects, the

NRW government launched the integrated action program “Urban districts with special needs of renewal – Social City NRW” in 1993. By initiating this program, NRW was the first German Land that tried to overcome the downward trends of urban districts in the fields of labour market, housing, traffic, environment, education and social affairs by an integrated program. Integration means that – for a given time and for a limited area – the built, social, economic and cultural resources are bundled and coordinated in order to improve the effectivity of the total project. Since then an integrated approach has become the standard procedure in Germany and in Europe (e.g. since 1994 by the EU-initiative URBAN and since 1999 by the federal government-federal states program “Social City”).

The distribution of the areas in which this program has been or is being applied shows a clear concentration in the cities of the Ruhr in which urban districts that

have been developed by the old industries have to struggle with multiple problems. Stressed urban districts between Moers in the west and Hamm in the east and between Dorsten in the north and Hagen in the south could benefit from the integrated urban renewal in the fields of economy, built environment, ecology and social affairs. In the massively distressed large district of Dortmund-Nordstadt with its 55,000 inhabitants the integrated action program URBAN II has been executed from 2000 to 2006 and 29 million Euros of EU, Federal Government and the NRW Government subsidies have been spent. These means helped to improve the living conditions of the local population. However, it has to be stated as well that those limited und terminated program means cannot dissolve the consequences of social disparities and socio-spatial divides. The deprived areas of the Ruhr require a continuous support in order to make them worth living in social, economic and environmental perspectives; they are important sites of integration within the major cities of the Ruhr. Their important social function justifies the support of the development of the urban districts.

As has already been shown in 2.3, the cities of the Ruhr are affected by a loss of population. An adjusted renewal of the cities is an indispensable necessity as it is in the East German cities where such a renewal has already been executed for some years due to the massive demographic change taking place there. With the same intention the Federal Ministry for Traffic, Building and Urban Development has launched the program “Stadtumbau – West” (Urban Rebuilding – West) in Western Germany. In Northrhine-Westphalia the spatial focus of this program is the Ruhr area where, except of Mülheim, each city is involved. A pilot project has been started in the city of Gelsenkirchen already in 2001 in the course of which the city-center has been strengthened in its housing, retailing and service functions. Moreover, the housing conditions in the great housing estate Tossehof in Gelsenkirchen-Bulmke, built for 1,400 households in the 1970s, have been improved by architectural and socio-economic upgradings as well as by dismantling procedures and partial demolitions (reducing the number of floors). Similarly reduced was the New Town Wulfen that had been built with great enthusiasm in the 1960s and 1970s.



2.4.12 Distribution of the “Social City NRW” areas, 1993

This overview shall be concluded with some recent projects that required bigger investments. Since 2000 the city council of Dortmund is executing the strategic development planning “dortmund-project”. Some sites have been developed since then the largest of which is Lake Phoenix in Dortmund-Hörde. Up to its final shut-down in 2001 this area of 200 hectares has been used by the iron and steel plant Phoenix. Since then the area is being revitalized and developed for future purposes. Some 110 hectares in the western part (Phoenix-West: former smelting plant) are provided for a technology park and are already used by some modern IT and MST companies. Some blast furnaces and halls of the former smelting plant have been retained as a legacy of the industrial past and are used for leisure and cultural purposes.

The 96 hectares of the eastern part (Phoenix-East: former steel works) are being re-used for housing, administration, services, culture, recreation and leisure. In the center of this area there is the Lake Phoenix, with 24 hectares larger than the Binnenalster in Hamburg. This newly designed water landscape will be integrated into the regional open space system Emscher Landscape Park extending from Duisburg to Bergkamen.

The actual urban planning in the city of Essen is to strengthen the city’s regional function as a center of services and of the headquarters of internationally operating companies.

For more than hundred years the production site of the Krupp works, one kilometer wide and about three kilometers long, has separated the city-center of Essen from the adjacent quarters in the west and thus been an obstacle to urban development. In World War II the Allied forces regarded the Krupp works as the major forge of Germany’s military production, and the site became the target of massive bombardments that destroyed about 30 percent of the buildings. The destruction was completed when the post-war Allied dismantling measures destroyed another 50 percent. Parts of the giant site remained derelict; other parts have been occupied by some Krupp R&D and administrative departments as well as by various follow-up land-uses. Since the 1990s the central part of the site has been regarded as an area for potential city-center extensions. Directly adjacent to the city-center are the listed buildings of the former Mechanical Work-



2.4.13 From the dismantled steel works Phoenix-East ...



2.4.14 ... to Lake Phoenix in Dortmund-Hoerde

shop VIII (1899) and the squeezer and hammering department (1906). They have been re-used as the Colosseum musical theatre and as a multi-storey car park of a furniture department store that has been located on the site as well. To the south an area of about 10 hectares has been converted into Weststadt, a stylish quarter comprising flats, offices, shops and restaurants. Further to the west a “prestigious place” for quality-orientated car dealers has been established. But what started a wide ranging conversion and landscaping of the former production site was the ThyssenKrupp management decision to transfer the Head Quarters of the merged company from Düsseldorf to Essen. The Berthold-Beitz-Boulevard is the main axis of the area and part of a new ring road around the city-center as well. West of it, the Krupp Park, 220,000 square meter in size, enhances the recreation spaces in the inner-city area and is to provide an attractive environment for new high-quality housing estates. To join these new urban developments on the former Krupp production site and the traditional city-center

in the east the Limbecker Platz shopping center has been completed in 2009; with 70,000 square meters it is Germany’s largest integrated shopping center. To the north, the university quarter (housing estates and offices grouped along a park and a lake) connect the shopping center and the northern fringe of the city-center with the university campus.

In both Dortmund and Essen the structural change from an industrial to a knowledge-based society not only heaped up burdens but also opened the chance to re-use large old industrial sites in the center of the city for new purposes and developments. Since 2000 the local planning authority and the ThyssenKrupp company realize the re-use of the former Krupp industrial site thus continuing the westwards trends of the city-center initiated by the Weststadt. The 230 hectares of the Krupp belt will comprise the ThyssenKrupp Quarter, i.e. the new headquarter of the company, a variety of other offices and services and, as a green lung, the Krupp Park of approx. 20 hectares.

2.5 Regionalisation/Regional awareness

Globalization causes a shift of the economic and political scales. On the one hand, the supra-national European level gains importance. In a global perspective the various European nations can maintain and extend their importance and welfare only if they are organized as a union. On the other hand, this integration should be fulfilled on the small-scale regional level as well to become acceptable for the population. The concept “Europe of regions” intends to promote the regions and to support their individualities. This policy which is executed complementarily by the European Union, the Federal Government and the various states does not only promote the development potentials of the individual regions but also supports strained regions. Thus the structural change of the old industrial region Ruhr has been co-financed by the European Union, the Federal Government and the state North Rhine-Westphalia.

Considering the increasing importance of European regionalization and the particular development of the Ruhr it has to be asked: what is a region, and then, is the Ruhr a region? Both questions cannot easily be answered because with different contexts of regionalization a variety of regional types can be distinguished, as e.g. economic regions or a region as it is perceived. The Ruhr reveals multifold regional types and forms of regional awareness.

Compared to other regions the Ruhr has been formed late and slowly, as it is

neither a historical nor a natural landscape. It has been initialized only by the exploitation of the coal resources and the developments ensuing from it since the first half of the 19th century. This development disregarded the historical cultural and administrative areas (provinces, Regierungsbezirke, districts). Thus the first regional organisations, i.e. the industrial associations, syndicates or the regional water boards, have been based on economic expediencies only. It is typical of this process of creating a conurbation that this industrial area has not been referred to by a definite name up to the 1920s. Officially there were the terms “Rheinisch-Westfälisches Industriegebiet” (Rhenish-Westphalian Industrial Area), “Ruhrkohlenbezirk” (Ruhr coal district) and “Ruhrrevier” (Ruhr district). The term “Ruhrgebiet”, already existing at that time, was only used to define the catchment area of the river Ruhr.

As it became necessary after World War I to practice a housing policy and to plan the urban development in an area that grew in space and importance, no independent Ruhr province authority has been established but the “Siedlungsverband Ruhrkohlenbezirk” (Settlement Association Ruhr coal district) has been founded in Essen in 1920. It was by this regional planning board that for the first time the urban and rural districts along the rivers Rhine, Ruhr and Lippe were merged and that this area could operate as a region and was recognized as a region. But two hindrances became apparent in these interwar years of the Weimar Republic that



2.5.1 Hercules sculpture on the extended winding tower of the Nordstern mine in Gelsenkirchen

still today impede the forceful formation of a region. On the one there is the competition between the large cities of Essen, Dortmund, Duisburg and Bochum, on the other, the middle classes are more orientated to the high-rank centers of services and culture in the Rhineland (Düsseldorf, Cologne) and Westphalia (Münster, Arnsberg). Since the 1930s, however, the term “Ruhrgebiet” was used to address the economic and urban conurbation as it is today. The Third Reich period had ambivalent effects on the regionalization of the Ruhr. The Nazi ideology was critical of the



2.5.2 Motives of some image campaigns

Lyrics of the song "Oberhausen" by the comedy duo Missfits

*Die Wurst aufm Grill am Rhein Herne Kanal,
oder Pommes rot-weiß aufer Hand, ganz egal
Kannse Samstags Abend nen Bierchen trinken
zwischen durch mal nem Schiffchen winken.
Wer is schon so blöde spazieren zu gehen
wenn bei Ebbe anner Emscher die Windeln wehen.*

*Stehse auf'm Gasometer im Sturmesbrausen
und alles watte siehs is
Oberhausen*

*Die Neue Mitte der Stadt ist ein Kaufparadies
aber wat willste Dir holen mit so wenig Kies
Früher fuhrse nach Venlo um Kaffee zu kriegen
heute siehse im Centro die Holländer fliegen
Wat soll dat, dat macht nix, dat stecken wir weg,
genau wie die Zechen, die Kohle, den Dreck.*

*Lieber auf'm Gasometer im Sturmesbrausen
und alles wasse siehst ist
Oberhausen... Oberhausen*

*10.000 Plätze um Bier zu konsumieren
und jede Menge Büsche sein Herz zu verlieren
Am Sonntag im Kaisergarten sich küssen
bei den Hängebauchschweinen
Tiger vermissen
Andere Städte haben auch ihren Zoo
doch so wie bei uns is dat nirgendwo...*

*Lieber auf'm Gasometer im Sturmesbrausen
und alles watte siehst ist
Oberhausen... Oberhausen*

*Wenn die Sonne versinkt über der A3,
ist der Rest der Welt Dir total einerlei
Alle spielen se Fußball, aber keiner kommt weiter
als bis kurz vor de Liga als ewiger zweiter...*

*Und dann stehst Du anner Ecke anner Bude mit ner Fluppe,
München und Hamburg sind Dir völlig schnuppe...*

*Lieber auf'm Gasometer im Sturmesbrausen
und alles wasse siehst is
Oberhausen... Oberhausen*

*Und wennse mich fragst, wat soll ich noch hier,
dann komm doch mal gucken dann zeig ich et Dir...*

*Kommse auf'n Gasometer im Sturmesbrausen
und alles watte willst is Oberhausen... Oberhausen
Oberhausen...Oberhausen...Oberhausen...Oberhausen*

*Stehse auf'm Gasometer im Sturmesbrausen
und alles watte wills is
Oberhausen....*



2.5.3 One of the LWL-industrial museum sites (Landschaftsverband Westfalen-Lippe): Henrichshütte in Hattingen

large city and the industry, even if the Ruhr region was the national energy center and the main location of the arms industry. Moreover, the social culture that had developed in the Ruhr in the Weimar period (Social Democrats, political Catholicism, and Communism) was broken up by the Nazi ideology.

After World War II the company-related cooperative local thinking was reconstituted. On the regional level the SVR succeeded in 1966 to establish the regional

development plan in cooperation with the urban and rural districts. The regional decline that ensued from the late 1950s crises of coal mining and the iron and steel industry may even have produced a certain kind of homogeneity. But as the northern part of the Ruhr was more affected than the southern one, even the situation of crises were more influenced by the idea of competition than by the spirit of cooperation (e.g. Duisburg vs. Dortmund as locations of the iron and steel production).



2.5.4 Music rehearsal room on the Consolidati-on mine, Gelsenkirchen



2.5.5 From a 15th century horse market to one of the greatest fairs in Germany: Cranger Kirmes in Herne



2.5.6 View from the once largest coking plant in Europe on the UNESCO World Heritage site Zollverein in Essen

Based on a short but eventful history since the mid-19th century the Ruhr developed into a polycentric region the specific feature of which is its variety. Due to this variety that comprises all social fields in all sub-regions of the Ruhr the spatial awareness of the population is more locally than regionally orientated. Besides the variety and the size of the region – the Ruhr is twice as large as the Saarland – the fact that there is no undisputed regional center impedes regional thinking and regional action. Important regional media are missing as well. The newspapers of the Ruhr are not of supra-regional importance



2.5.7 Curry wurst, a typical meal of the Ruhr

as each of them covers only a sub-region. Likewise the regionalized radio and TV programs of the Westdeutscher Rundfunk (WDR, West German Broadcasting) are orientated to the sub-regions (western, central and eastern Ruhr).

There is a regional awareness of the Ruhr population, but it is a latent one. It is the sensation to belong to a particular region that has received its consistent imprint by the coal and iron industries and also by the structural change. It is this imprint that delimits the Ruhr from the adjacent regions. This regional awareness manifests itself by a consolidated perception from outside and by the political and strategic regionalizations carried out by the institutions of the Ruhr. However, typical regional stereotypes as “Grafter, miner and dove father” are no longer known to the younger generation as they are irrelevant to them.

From the external perspective, particularly from the international one “The Ruhr” is still recognized as the core region of the strong and export-orientated German industry. This evaluation is so strong that the structural crises and the structural changes are often not recognized. Moreover, from the international perspective the Ruhr is more recognized for its size and its variety than for its specifics and extra-

ordinariness. There are lots of excellent developments in the Ruhr in the fields of economy, culture, research, sports and others but internationally they are hardly recognized individually.

Within the region various initiatives and institutions as the Regional Association Ruhr (RVR) and its subsidiaries Wirtschaftsförderung metropol Ruhr (wvr, Economic Development metropol Ruhr) and Ruhrgebiet Tourismus GmbH (RTG, Ruhr Tourism Ltd), the “pro Ruhrgebiet” society, the “Initiativkreis Ruhr” as well as the city councils of the regions try to

distribute their regional interests by strategic regionalizations. To pursue this aim various image campaigns have been launched as “Das Ruhrgebiet – Ein starkes Stück Deutschland” (The Ruhr – a strong piece of Germany) or “Der Pott kocht” (The pot is boiling) as well as regional projects as “RUHR.2010 – Kulturhauptstadt Europas (RUHR.2010 – Europe’s Capital of Culture). The region is presented and marketed as Metropolis Ruhr the strength of which is the variety of potentials that is generated by its polycentricity. A new cultural landscape is staged on old industrial sites. This is an innovative and successful



2.5.8 Moon palace in Wanne-Eickel – one of Germany’s most popular comedy theaters



2.5.9 Still an institution in the Ruhr: The Bude, Kiosk, Büdchen ... a place to exchange news



2.5.10 The cabaret artist Jürgen von Manger (1923-1994) performing the character Adolf Tegtmeier

strategy as could be proved by the IBA Em-scher Park and the follow-up outstanding initiatives of industrial culture that culminate in the World Heritage Zollverein site in Essen-Katernberg. Thus, the industrial past that has left its imprints on the region is not negated but is included in the new regional developments.

This cultural approach can be regarded as a symptom of the changed attitude of the Ruhr towards its past. Still in the 1980s, to overcome and to supersede the past was the predominant action, ending up in the demolition of buildings and the greening of sites. Since then the remains of the industrial past are proudly accepted because they have the potential to attract the views from outside on and into the region.

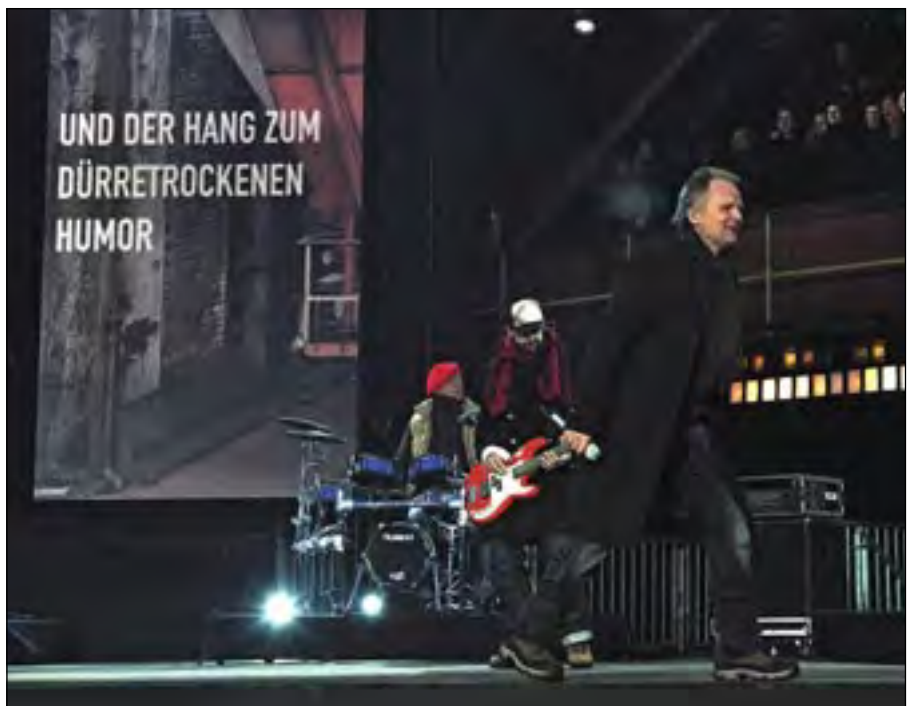
But even if it can be accepted that some highlighted and aesthetically idealized remains of the industrial past which can be made use of in the present day leisure society constitute a retrospectively based cultural regional awareness, it is incomparably more difficult to create a political regional awareness. The debate on an independent regional unit "Ruhrstadt", flaming up now and then, might have produced a discussion about the efficiency of the regional public transport system but it did not have the potential to be a topic that moves the regional society. This and other experiences in the last decades as well as recent surveys show that the population of the region deal with the region in a pragmatic way. They



2.5.11 There is not a dry eye left in the house: Herbert Knebel's Monkey Theater

assess regional and local developments positive if they are of personal benefit. The cities react in a similar way. Whereas the city of Essen pushes the regional cooperation of the Ruhr with Essen being the center-point, the city of Duisburg regards itself as a hinge between the Ruhr and the Rhine axis. The city of Dortmund is engaged in the Metropolis Ruhr (RVR, Masterplan Ruhr) but also takes its stand as a Westphalian metropolis. So the post-industrial Ruhr still exhibits a diffuse regional awareness. But common

successes as e.g. the Capital of Culture 2010 show, that by creating a regional excess value the region can gain appreciation by both the politicians and the population. And eventually and with reference to "structural change", if and when promising and supporting answers to the economic, social and urban problems that are comprised by that the term will have been found, this might be recognized as another proud impulse to strengthen the regional identity and awareness.



2.5.12 A world star from the Ruhr: Herbert Grönemeyer performing in the Capital of Culture Year 2010 opening show at the Zollverein mine in Essen

3. METROPOLIS RUHR – ECONOMY

3.1 Structural change

Due to the fact that regions are in a continuous world-wide economic competition they constantly have to adapt themselves to changed conditions. Consequently, they have to change their socio-economic structures in a flexible way in order to achieve a positive economic development as a region. Insofar, the structural change of a region is not a final incident but a continuous process.

Sometimes non-economic causes and conditions are of importance. So, unprecedented ecological changes might cause particular effects, as e.g. in tourist regions. Political decisions can cause a structural change as well. When the Federal Republic of Germany has been founded in 1949 Bonn was chosen as the capital, the function has been taken over by Berlin after the reunification. The catalyst of the regional structural change of the Ruhr was definitely an economic one.

With its old industrial mono-structure the late 1950s Ruhr exhibited economic deficits if compared to other regions. In the following years an increasing substitution (other energy sources or materials such as oil, nuclear power, synthetics), overproduction and price recession, a more cost-effective production abroad (e.g. open-cast coal mining), increasingly lower transport costs, reduced inputs of coal, iron and steel due to technical innovations and increased productivity caused the crises of the regional coal mining and the iron and steel industries, then induced a general structural crisis and ended up in the regional structural change.

The superior connections of these economic causes of the structural change can be explained by the theory of sectorial change based on the classical subdivision into a primary, secondary and tertiary sector (primary sector = gaining yields in agriculture and forestry, secondary sector = mining and product processing by industries and handicrafts, tertiary sector = services; some authors detach a quaternary from the tertiary sector which comprises modern human capital intensive services). According to the theory of sectorial change there is a general trend from an agricultural society to an industrial one and eventually to a service-orientated society; the development dynamics be-

hind therefore lead from a focus on the primary sector to a focus on the secondary one and finally to a dominant tertiary sector. Indeed, this sectorial change took place in Germany and in the Ruhr as well, at present there is a prevailing service-orientated society. According to the theory, an increase of productivity is one of the main causes of this structural change. Up to the last third of the 20th century mechanization, automation and rationalization have primarily affected the primary and secondary sectors; quite recently mechanization has also remarkably changed many parts of the service sector. On the other hand, the structural change is explained by demand. The demand increased in the tertiary sector whereas an increase of the demands for primary and secondary sectors goods is limited.

Beside these theory-based superior structural changes it has to be mentioned that Germany, economically and technically highly developed as it is, is still based on a strong secondary sector, and that rationalization is still changing the tertiary sector. Moreover, services have to be differentiated into traditional more labour-intensive services that show low growth potentials (trade, distribution orientated services or consumptive services as retailing and gastronomy) and modern knowledge and human capital based services with the potential of a strong increase (education, health industry, finance, insurances, advertising, consulting, data processing, culture/entertainment etc.).

In general, the development of the Ruhr corresponds to the theory of sectorial change. Up to the second half of the 19th century a rural landscape characterized the sparsely settled region; since then industrial production dominated and changed the Ruhr into Germany's eco-

nomically most important region. Since the 1958 coal crisis a structural change of the Ruhr takes place towards a metropolis characterized by distribution, consumption and knowledge-based services.

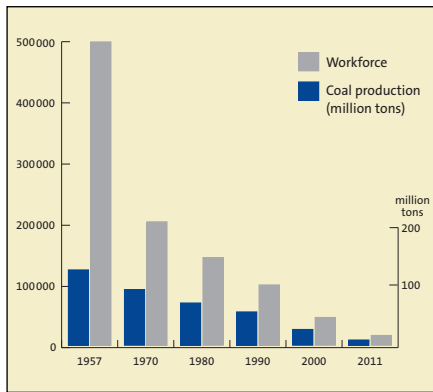
At first, the coal, iron and steel industries crisis of the 1960s was regarded as a change of economic trends, but eventually it has to be recognized as a structural crisis, when the Ruhr, for decades depending on the interrelated coal and iron complex, lost its economic basis by this crisis. The de-industrialisation and rationalization measures applied caused a massive decline of jobs. But even if these developments clearly pinpointed a tendency away from the classical productions of coal mining and the iron and steel industries, companies, politicians and the population misjudged the situation. Too big was the dominance and relevance of the traditional economic basis to accept a straightforward structural change towards promising new industries. Companies of the next technological generation, particularly those of the electrical and automotive industries and in parts of the chemical industry as well, had been settled outside the Ruhr for a variety of reasons.

The iron and steel companies and particularly the coal mining industry held extensive property scattered all over the Ruhr (production sites, extension areas, workers' settlements) that was used as a property blockade against the allocation of follow-up industries. For a long time companies inclined to migrate into the Ruhr did not find appropriate sites and instead moved to the southern Rhineland or to other German states; the only project that could be realized was the allocation of the Opel works in Bochum on the brownfields of two coal mines in 1962; in

Tab. 4: Development of the workforce in the Ruhr 1960 to 2010, by sector (percentages)

Year	Ruhr 1960	Ruhr 1970	Ruhr 1980	Ruhr 1990	Ruhr 2000	Ruhr 2010	Germany 2010
Primary sector	2.4	1.5	1.4	1.2	1.2	ca. 0.5	1.6
Secondary sector	61.0	58.4	51.6	44.4	33.3	26.9	28.2
Tertiary sector	36.6	40.0	46.9	54.4	65.4	72.6	70.1

Source: RVR data file



3.1.1 Development of coal production and number of miners in the Ruhr

1966 a third production line was opened. Still in the 1990s the three Opel works comprised a workforce of some 20,000 persons. Since then the number has been declining, and the Opel site in Bochum became the victim of the General Motors concentration process in Europe and will be closed in 2014.

In the 1960s, the old industries opposed new allocations particularly because the companies of the new branches were regarded as unwanted competitors on the qualified labour market. Moreover, former mining sites were retained as the owners were anxious that future subsidence might cause claims for compensation. Consequently, sites no longer used by mining became long-time brownfields.

Another cause of the delayed structural change was the fact that the economic basis of the region was dominated by big mining and steel companies whereas medium and small sized companies that

would have been able to influence the structural change by their flexibility and risk propensity were missing.

Moreover, up to the 1960s the Ruhr was suffering from an education blockade as there was no university in the region (from 1655 to 1818 there had been a university in Duisburg), even studies in mining and metallurgy could only be pursued outside the region, particularly in Aachen and in Clausthal. Since the 19th century the political authorities had feared that an uncontrollable cooperation between the intellectual elite, the armed forces and the workers might develop. In addition, the demands on the miners' and the iron and steel workers' education had deliberately been kept low to be able to fulfill the enormous demand of workforce also with unskilled workers in-migrating from East Germany.

In total, the structural change that became indispensable after the coal and steel crises has been impeded by the dominating coal, iron and steel complex and only little steps towards change have been admitted since 1960.

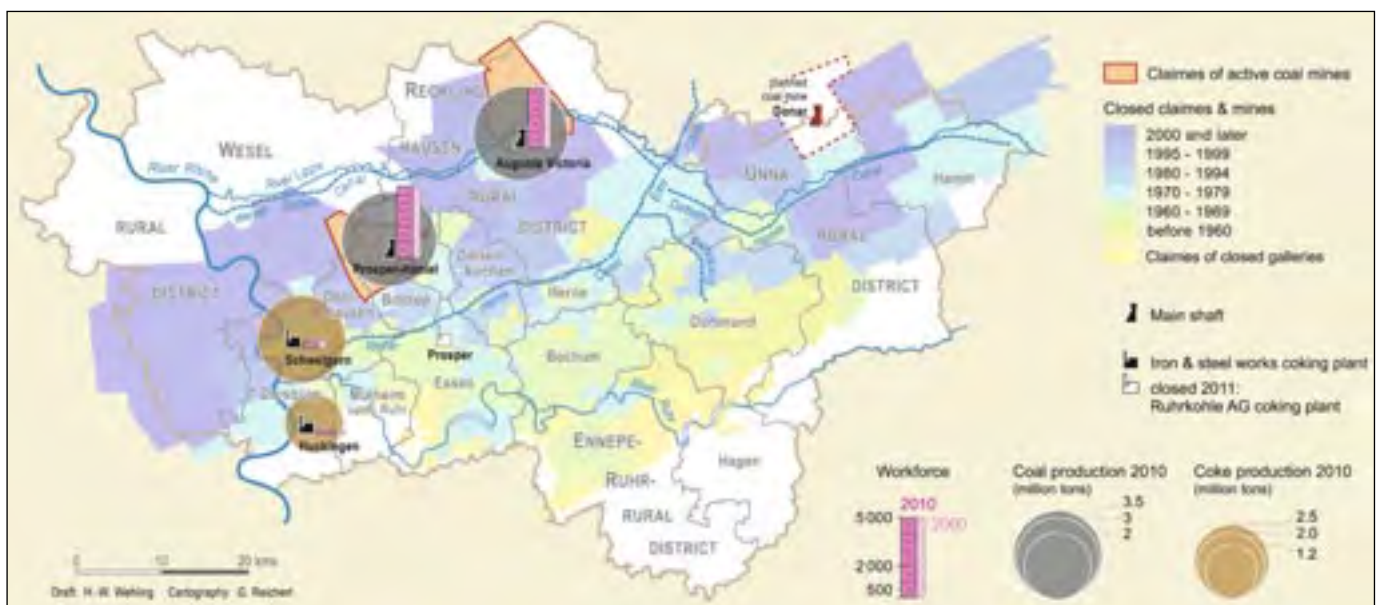
Coal mining

As mentioned above, in winter 1957/58 the coal crisis began. It was caused by the opening of the international markets and the competition of cheaper imported coal, by increasing tendencies towards oil and gas and by a drastically reduced consumption of coal by traditional customers (shipping, railways, steel and chemical industries). The 1960s reactions

on the crisis were the fusion of mining companies, modes of rationalization and, fostered by national subsidies, shut-downs. But all these measures could not end the crisis so that in 1968 the whole of Germany's coal mining industry was re-organized by the national coal act. Politics had to accept that the coal crisis could not be overcome by piecemeal reactions and that the crisis was a structural one that was going to continue.

After the foundation of the Ruhrkohle AG (1969) that merged the majority of the mining companies, the amounts of output were fixed. The difference between the world market price for coking coal and its cost-effective inland price was subsidized.

Coal mining has been the driving force of the industrialization of the Ruhr; its northward movement and the different impacts going along with it allowed the development zones to be distinguished. The decline of coal mining triggered the de-industrialisation of the Ruhr; the shut-downs, however, did not follow a constant spatial pattern. Before the foundation of the Ruhrkohle AG most of the individual mines that had been closed had been old ones, situated in the Ruhr zone and in the southern part of the Hellweg zone. After most of the remaining mines had merged to the Ruhrkohle AG a more efficient and coordinated process of closing down shafts became possible, considering the subsurface connections of the mines. Consequently, the closing down process since then did no longer meet the historical zonal model but followed other



3.1.2 Northward movement of coal mining in the Ruhr



3.1.3 Coking plant Duisburg-Schwelgern

patterns. In the 1980s mine closures mainly occurred in the Dortmund area and in the eastern parts of the Ruhr; in Essen, Zollverein was the last mine to be closed in 1986.

Since the first coal crisis this controlled retreat of mining and the reduced coal production respectively required 130 thousand million Euros of public subsidies; in 1997 alone, coal mining has been subsidized by 4.55 thousand million Euros. In 2007, the Federal Government, the governments of the state North Rhine-Westphalia and Saarland as well as the trade union for mining, chemistry and energy agreed to end the public subsidies for coal mining; according to the regulations, the amount of subsidies will be reduced with the decreasing amount of coal production until 2018.

The retreat of coal mining is nearly finished so far and is precisely planned to its absolute end. By the end of 2012, the 1957 number of 141 mining sites has been reduced to only two active coal mines (Prosper-Haniel mine in Bottrop and the Auguste Victoria mine in Marl). During this period the number of jobs in coal mining sank from 494,986 to 16,073, the annual amount of produced coal from

123.2 million tons to 8.6 million tons. In the years 2008 and 2009 the Walsum mine in Duisburg and the Lippe mine in Gelsenkirchen were shut down, the Ost mine in Hamm followed in 2010 and the West/Kamp-Lintfort mine and the total Saarland district were given up in 2012. In 2018 the Prosper-Haniel mine in Bottrop and the anthracite mining in Ibbenbüren will remain the last coal producing sites in Germany.

Eventually, depending on a variety of possible national, continental and global tendencies on the energy market this complex economic topic might still take some unprecedented changes. There are some arguments that have been brought forward in the course of the discussion whether to continue or to stop coal mining in Germany and in the Ruhr in particular.

With a basic coal mining retained beyond 2018 the national energy supply would be guaranteed. Not to be depending on suppliers is regarded as indispensable facing the incalculable development of the fossil energy prices.

An argument of equal importance is to strengthen the export-orientated German mining technology for which the resource boom in the growing economies of China, India and Russia produces a constant demand. In order to be able further to develop this technology at least a minimum regional coal mining is regarded as necessary.

Supporters of the coal mining industry also stress that a socially acceptable ending of coal mining is unrealistic. In the past only a small number of miners could have been transferred to other industries. Con-

sequently, a shortfall of taxes and increased expenses for social benefits will charge the public budgets. With the de-industrialisation proceeding, also the mining supply companies suffer from job losses as from each job in mining some others depend in other industries. Mine closures comprehensively affect the cities and the urban districts involved and consequently a restructuring of all social fields is required.

To end the policy of subsidizing the coal is mainly discussed cost-oriented. On the one hand, supporting the national coal is remarkably more expensive than importing coal, and it can only be marketed with the support of public subsidies; on the other hand, there are the follow-up costs (subsidence etc.). And finally, burning the fossil resource coal and facing a remarkable carbon dioxide burden is no longer acceptable for environmental reasons.

Iron and steel industries

As mentioned above, the crisis affected the iron and steel production of the Ruhr in 1974, i.e. later than the coal mining

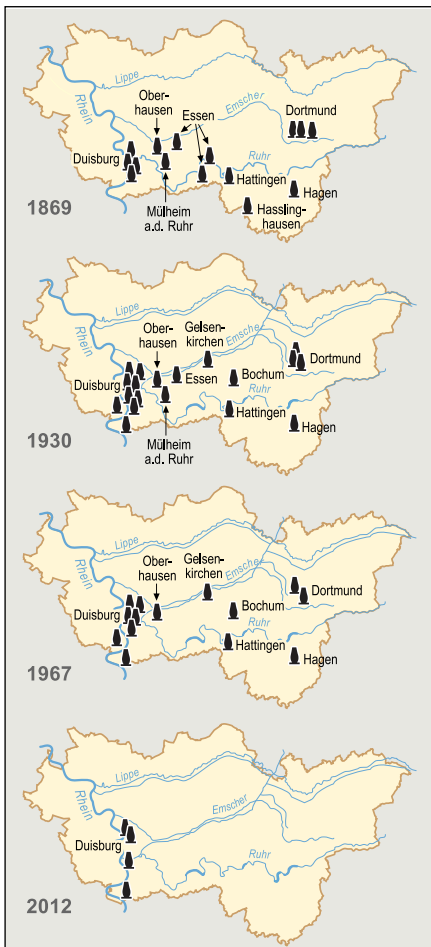
Tab. 5: Development of the work force in the iron and steel industry

Year	The Ruhr	North Rhine-Westphalia
1960	263,632	456,672
1970	226,762	427,758
1980	184,484	342,120
1990	123,181	287,851
2000	51,167	97,999
2006	44,279	87,502

Source: RVR data file



3.1.4 Sticker (Duisburg-) "Rheinhausen must live!"



3.1.5 Blast furnace sites in the Ruhr

crisis. Although the worldwide demand for steel was very strong the raised oil price became a burden of the global economy. Moreover, Japan and other plain carbon steel producing countries had grown to cost-effective competitors. From 1974 to 1988 the amount of crude steel produced in the Ruhr decreased by one third, ensuing drastic jobs losses in the iron and steel industries.

As in coal mining, attempts were made to answer the steel crisis by means of rationalization. At first, only unproductive segments of the steel works were closed, later, sites had to be closed completely to adjust the competitiveness of the companies to the changed market conditions. In addition, steel companies merged to large trusts.

The August Thyssen-Hütte AG that had installed its first large blast furnace next to the works dock in Duisburg-Schweglern in 1973 gradually transferred its total pig iron production to this site (second large blast furnace blown in 1993) and to Duisburg-Bruckhausen. After the production of pig iron had been given up in Oberhausen (1979), in Gelsenkirchen (1982) and in Duisburg-Meiderich (1986) the Thyssen Company

also closed the traditional smelting plant Henrichshütte in Hattingen in 1987; the site was turned into an industrial museum. The large smelting plant Friedrich-Alfred Hütte in Duisburg-Rheinhausen (Krupp-Stahl AG) was scheduled to be shut down in a similar way; this announcement, however, provoked massive protests and Rheinhausen became a symbolic place of the steel crisis of the Ruhr. The shut-down was postponed until 1993 when the Rheinhausen steel site has been given up completely and transformed into a logistic site. The processes of rationalization and closing-downs were accompanied by the merger of large companies. In 1991, the Krupp Company in Essen bought the Hoesch Company in Dortmund, and in 1999 the Krupp and Thyssen Companies merged to the new ThyssenKrupp Company which became a global steel and technology company.

Since April 2001, blast furnaces have been operating in Duisburg only. As mentioned, the steel works in Rheinhausen had been closed in the 1990s whereas the steel site in Dortmund remained in operation. But due to various locational advantages the Duisburg site gradually prevailed over other steel sites in the Ruhr. The prime locational advantages of the Duisburg site are its direct location at the river Rhine and its port and logistics infrastructure. Concerning the supply of the materials needed for the iron and steel production (ore, coal, oil, mainly from abroad) as well as the marketing of the products the Duisburg site exhibits remarkably better transport costs so that both the iron and the steel production is concentrated here. The iron and steel processing takes place on other sites inside and outside the Ruhr that are excellently connected to Duisburg by canals, roads and railway lines; e.g. for the automobile industry steel from Duisburg is processed and refined by means of modern technology on the Westfalenhütte site in the north of Dortmund, 60 kilometers away. However, two old blast furnaces, a steel works and a rolling mill have been dismantled in Dortmund, they have been rebuilt in China and keep on producing iron and steel.



3.1.6 Duisburg-Schweglern harbour

Tab. 6: Crude steel production 2011 (million tons)

	The Ruhr	Germany	European Union	World
Crude steel production 2011	18 Mio. t	44 Mio. t	177 Mio. t	1,527 Mio. t

Source: Federal statistical office Wiesbaden, WV Stahl

Producing iron and steel takes place on a global growth market the demand of which is influenced by the building and production demands in China and in other rapidly developing national



3.1.7 Rolling mill in Dortmund

economies. Due to the overall economic crisis the German crude steel production decreased to 32.7 million tons in 2009, but already on 2010 it recovered to some 44 million tons; the Ruhr holds a share of 44 per cent.

It has to be stated that the decades of a dominant coal, iron and steel sector have left behind a variety of burdens. First of all, there are the soils that have been contaminated because industrial pollutants and waste materials have usually been deposited and tipped. The massive industrial land-use of the Ruhr since the beginning of industrialisation has left behind soil and water contaminations. If an industrial brownfield shall be re-used an evaluation of the contamination is necessary at first.

The re-use of old coal mining or iron and steel sites is also impeded by the remaining industrial plants and buildings as e.g. blast furnaces, shaft buildings, gasometers etc. that could be contaminated as well. Both a complete dismantling and the new use are rather cost-intensive. One of the ways out of this dilemma is the concept of industrial culture which has become a unique feature of the Ruhr.

But not only real but also mental burdens played their role in the process of structural change. Since the 1960s the region is perceived by dirt, noise, contamination, job losses and other problems and the negative image was constituent

both inside and outside the region. From 1960 to 1990, the population of the Ruhr perceived the burdens of the region as so overwhelming that the chances and potentials were often overseen and had nearly no impact on the self-perception.

To complicate the situation even more, the various cities of the Ruhr, although confronted with similar problems, to a wide extent tried to solve these problems by themselves. Instead of concentrating the efforts and developing common complementary strategies a policy of communal egotisms prevailed (parochialism).

With all these aspects, the series of rise and fall, of vitalization and resurrection reflects the changing economic development of the Ruhr. Consequently, this region is always taken as a striking example for the lasting economic structural change: “Half still kept by rust and cinder, half on the jump to the day after tomorrow – there is no other region in Germany that undergoes such a radical change as the Ruhr. In the midst of the ruins of the old industries high tech firms and research labs flourish” (quoted



3.1.8 Colourful design of blast furnace 8 in Duisburg-Hamborn

from the journal *Wirtschaftswoche* in 1989).

The many efforts and developments that have caused the economic status quo of the Metropolis Ruhr shall be considered in the following sub-chapters.



3.1.9 Smelting plant Westfalenhütte in Dortmund in 2002, being dismantled to be transported to China

3.2 Structural policy and economic promotion

In the course of a long-lasting process of structural change the Ruhr had to rearrange itself anew. To support the efforts to overcome the dwindling dominance of coal mining and the iron and steel industries a series of political measures have been launched. Financially supported by the European Union, the Federal Government and the state North Rhine-Westphalia, it was the aim of the public programs of the last decades to create a coalescent diversified and socio-economically thriving Metropolis Ruhr between Sonsbeck in the west, Hamm in the east, Hamminkeln in the north and Breckerfeld in the south.

Since the mid-1960s the state North Rhine-Westphalia and the Federal Government, later the European Union as well, started to alleviate the social consequences of the structural change by measures of structural policy; new economic structures were to be established. For years these economic development schemes created the new strengths of the region, as e.g. the wide range of research activities, comprising at present some 30 sites. Retrospectively it can be said that these first programs lay the basic shaping of the Ruhr as a metropolitan region. More and more the industrial conurbation turned into a concentration of the service economy which is already able today to fulfill some metropolitan functions in the global competition.

Four phases of regional development policy and programs can be distinguished. In the first phase (1966-1974) the concept of an integrated structural policy brought forward the Entwicklungsprogramm Ruhr (EPR, Development Program Ruhr) which intended a rationalization of the spatial structures and a new industrialization, as e.g. by the allocation of the Opel car production in Bochum. It was also by this

program that new universities were established, e.g. Ruhr University Bochum in 1965 and University of Dortmund in 1968. Infrastructural deficiencies were overcome by the extensions of the motorway and the public transport systems. Following the idea of the car-adjusted city constructing new motorways and other arterial roads was preferred to the public transport network. The EPR has widely been successful in removing fundamental deficits in the infrastructure, but, at the same time, forced an urban sprawl. It has not been successful in allocating new industries and in reducing the unemployment rates.

The following Aktionsprogramm Ruhr (APR, Action Program Ruhr), launched in 1979, conceptualized the centralized structural policy of the second phase (1975-1986) and aimed at allocating innovative companies of the technology orientated industries, as e.g. information and communication technologies and bio/medical technologies. To promote these intentions various technology centers have been founded in the cities of the Ruhr. Particularly successful has been the technology center Dortmund (est. 1985) which, in 2011, comprised 280 firms with more than 8,500 persons employed. In cooperation with the Technical University Dortmund it has been developing to an important R&D site.

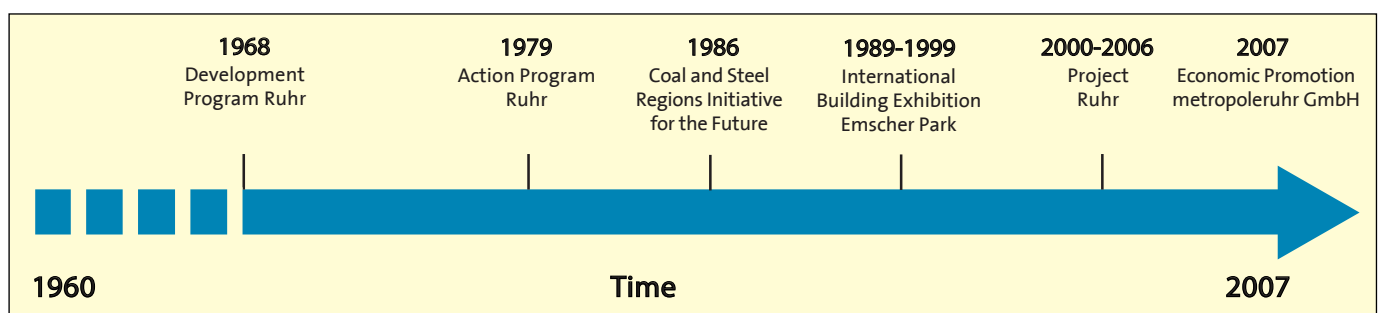
Gradually it became apparent that next to the allocation of new technology based companies the endogenous potential of the existing economic structure had to be strengthened. By launching programs to promote the coal, steel and energy technologies it was intended to transform North Rhine-Westphalia and the Ruhr into Germany's energy center; thus the modernization of the existing industrial structures initiated a re-industrialisation.

In contrast to the second phase, the approach of a regionalized structural policy has been pursued in the third phase (1987-

1999); it started with the Zukunftsinitiative Montanregionen (ZIM, Innovative Initiative Coal and Steel Regions). More technology centers as e.g. the Duisburg-Neudorf technology park (1989) were established to promote the new technologies; to use and enlarge the endogenous potentials the existing companies and other players were more integrated in the structural policy. Because, however, a regional networking or at least a regional coordination of the various planning initiatives was missing a new profile of the regional economy could not be achieved.

In 1989, the International Building Exhibition Emscher Park (IBA) was opened in the area alongside the river Emscher for a period of ten years. As the Emscher zone had experienced the severest industrial impact of all historical development zones, the IBA initiative pursued a comprehensive ecological, economic and social revitalization of the Emscher zone; and it forced the cities of the Emscher zone into a cooperation thus creating some form of regional spirit. Concentrated on six guiding themes (restoration of the landscape, ecological restructuring of the Emscher system, working in the park, new forms of housing and urban development, industrial culture and tourism, social initiatives and qualification) many development impulses could be achieved, and the perception of the Emscher zone from inside and from outside could positively be changed.

In 2000, the last phase of regional development policy that can be described by "self-organised structural policy" started when the NRW government initiated the Projekt Ruhr GmbH program. Again the existing potentials were to strengthen ("strengthening the strengths"). For its structural policy the Project Ruhr selected a cluster approach by defining 12 existing fields of competence that shall locally be strengthened. A competence field is defined as the regional concentration of loosely connected enterprises and institu-



3.2.1 Programs of regional structural policy in the Ruhr



3.2.2 At first agricultural land-use (1964) ...



3.2.3 ... then the foundation of the University of Dortmund (1980) ...



3.2.4 ... and finally, its extension by the Technology Center (center of photo) and the Technology Park (2009)



3.2.5 Spatial distribution of the competence fields in the Ruhr

tions of a specific economic field; it exhibits particular economic strengths that contribute to regional growth, innovation and employment.

- There shall exist innovative networks and co-operations between research institutions, development units and enterprises,
- New application shall jointly be tested and experiences shall be exchanged,
- Technologies and products shall be developed and marketed.

In total, structural support shall be concentrated on economic fields that in the medium term promise a self-supporting growth and that can rely on a considerable number of enterprises and expertise in the region. As the activities and projects in the selected competence fields are widely

spread over the region and no sub-region has been excluded, a broad consensus could be achieved. Figure 3.2.5 shows the regional distribution of the competence fields: Energy and energy technology, information technology, logistics, new chemistry, medical technology and health economy, micro structure technology and microelectronics, new materials incl. the steel industry, water and sewage technologies, mining technology, mechanical engineering, design as well as tourism and leisure.

In the meantime the importance of clusters and networks as part of structural development aid has decreased and is being substituted by a new system of an industrial core with flanking corporate services which still comprises 17.8 per cent of the regional employees liable to taxes (2009) and eight lead markets (health, urban construction and housing, mobility, sustain-

able consumption, efficient use of resources, leisure and events, education and research, digital communication). Following the supply and/or production chains, each of these leads market is divided in a core area of production or services and in sections that provide the materials and processes, the necessary engineering, the auxiliary industries and the auxiliary services. But whatever the approach, the following competence fields/lead markets are of particular importance.

Energy

Due to its mining history the Ruhr has always been one of Germany's most important energy extraction regions. As far as energy conversion, energy supply and energy technology are concerned the region holds the leading position in Europe. In 2010, a range of 295 companies, some 52,000 jobs and an annual turnover of



3.2.6 Pumped storage hydro power station "Koepchenwerk" on Lake Hengstey in Herdecke



3.2.7 Chemical Park Marl

47 billion Euros characterized this lead market. Leading international energy companies have their headquarters in the region. So the competence field of energy and energy technology is represented by the complete value added chain, from the production of the energy via the production of plants, the use of regenerative resources and the production of electricity, heat and fuels to the efficient energy input. Within this strong energy sector renewable energies and solar energy have become a particular focus. In 1994 the Institut für angewandte Photovoltaik (INAP, Institute for the application of photovoltaics) has been founded in Gelsenkirchen; since 2002, an overall development towards a solar city is the guiding development principle of Gelsenkirchen. A variety of public and private houses have been equipped with solar panels, in 2007 the Fraunhofer-Institut für Solar-Energie has been opened, and in 2008 Germany's largest solar energy housing estate has been built.

Despite this overall variety of potential players, however, this competence field still lacks a closer cooperation in form of a cluster management.

Logistics

The global transport of goods requires a modern and efficient organization. In the Metropolis Ruhr the logistics competence field has two locational advantages as there is an extraordinarily equipped infrastructure and the region is situated at the cross-point of the two main corridors of European development, the Blue Banana and the Yellow Banana; within a distance of 250 kilometers from the Ruhr, some 60 million people live in Europe's densest market. Consequently, Project Ruhr states that the Metropolis Ruhr has already achieved the position of a European hub of logistic expertise. In 2010, there were more than 90,000 jobs in nearly 6,000 transport and logistics enterprises and their value supply chain; in total they generated an annual turnover of 10.6 billion Euros. Quite obviously, the central site of this competence field is Europe's largest domestic port in Duisburg and its trimodal interface of ship, railway and road traffic. In the last years a cluster management could be established in the region.

Chemistry

For a long time the chemical industry has been one of Germany's most important



3.2.8 The West German Proton Radiation Center in the University Clinic Essen

industries. The state North Rhine-Westphalia with the Metropolis Ruhr is the largest chemical industry region, achieving more than one third of the turnover of Germany's chemical industry. There is a long and diversified value added chain from the development and the production of chemical substances to the application of synthetics. Chemical companies of national and international importance are located in the Ruhr as e.g. Evonik and Deutsche BP. In 2010, 225 chemical enterprises with 23,000 persons employed generated an annual turnover of more than 15 million Euros, the 230 synthetic and surface processing enterprises, providing some 8,000 jobs, achieved an annual turnover of two million Euros. It has also to be highlighted that there is a large amount of internationally renowned research and development institutions as well as numerous scientific institutions that provide research and teaching in the field of chemistry.

The ChemSite initiative, established in 1997, provides a professional competence field management. By a successful partnership between the chemical industry, the state North Rhine-Westphalia and the local authorities a lot of sites have been modernized or newly created in the last years. Because many larger companies require less space due to shrinking processes and the outsourcing of capacities so called chemistry parks could be developed using vacant plots; various enterprises are now grouped there along the material flows; one of largest integrated site in Europe is the Chemiepark Marl.

Health economy

In all regions the health economy is an important basis but not necessarily a

competence field worth mentioning in particular. In the Ruhr, however, there is a very close network of hospitals and clinics. Considering the demographical structure, the progress in medical technology and the increasing awareness health associated products and services are widely requested. To develop an intelligent urban supply structure for this growth market under the conditions of demographic change the state North Rhine-Westphalian government has chosen the Metropolis Ruhr as a model region.

Labour-intensive as it is, the health industry has given impulses to the regional structural change. In 2010, the Metropolis Ruhr provided 120 hospitals, 1,100 nursery homes, 9,000 general practitioners and medical specialists, 1,350 pharmacies, 720 medical technology companies and three medical faculties (Essen, Bochum, Witten/Herdecke). 240,000 persons worked in the health and generated an annual turnover of 10,7 billion Euros. To promote a professional cluster management some medical institutions merged to MedEconRuhr.

Cross-sectional technologies

In economic development planning, nanotechnology, microsystems technology and material technology are regarded as cross-sectional technologies and as 21st century key technologies. Their progress gives impulses to all fields which they are applied in. They fuel the development of new products and processes in the applied fields of mechanical and plant engineering, communication technology, automobile industry, logistics, chemistry and the health economy. The city of Dortmund has become a regional focus of these cross-sectional technologies.

Next to strengthening the strengths, the Project Ruhr and the cities of the Ruhr try to initiate regional co-operations within the Metropolis Ruhr.

From 2000 to 2003, the eight cities Duisburg, Oberhausen, Mülheim an der Ruhr, Essen, Gelsenkirchen, Herne, Bochum and Dortmund have been cooperating in the project „Städteregion Ruhr 2030“ (Urban Region Ruhr 2030) and elaborated fields of future cooperation. The project was concluded by a regional contract which, among others, determined to establish a common Master Plan Ruhr.

The highlight of regional cooperation so far was the year of the European Capital of Culture which took place in 2010; the urban and rural districts of the Ruhr had jointly applied for the title which had then representatively been bestowed on the city of Essen.

As far as the regional co-operation is concerned, the Regionalverband Ruhr (Regional Authority Ruhr) that comprises all urban and rural districts of the Ruhr plays a special role. Its influence on the Metropolis Ruhr has been increased by the 2007 RVR Act according to which the following compulsory duties have to be fulfilled:

- regional planning,
- establishing master plans as well as planning and development concepts,

- continuing and developing the Emscher Landscape Park, the Route of Industrial Culture and other forms of regional patronages,

- protection of areas (green spaces, water areas, forests) for recreation and to maintain a balanced natural household,

- Regional economic development, site marketing, tourism promotion and public relations,

- Analysis and evaluation of data and structural development.

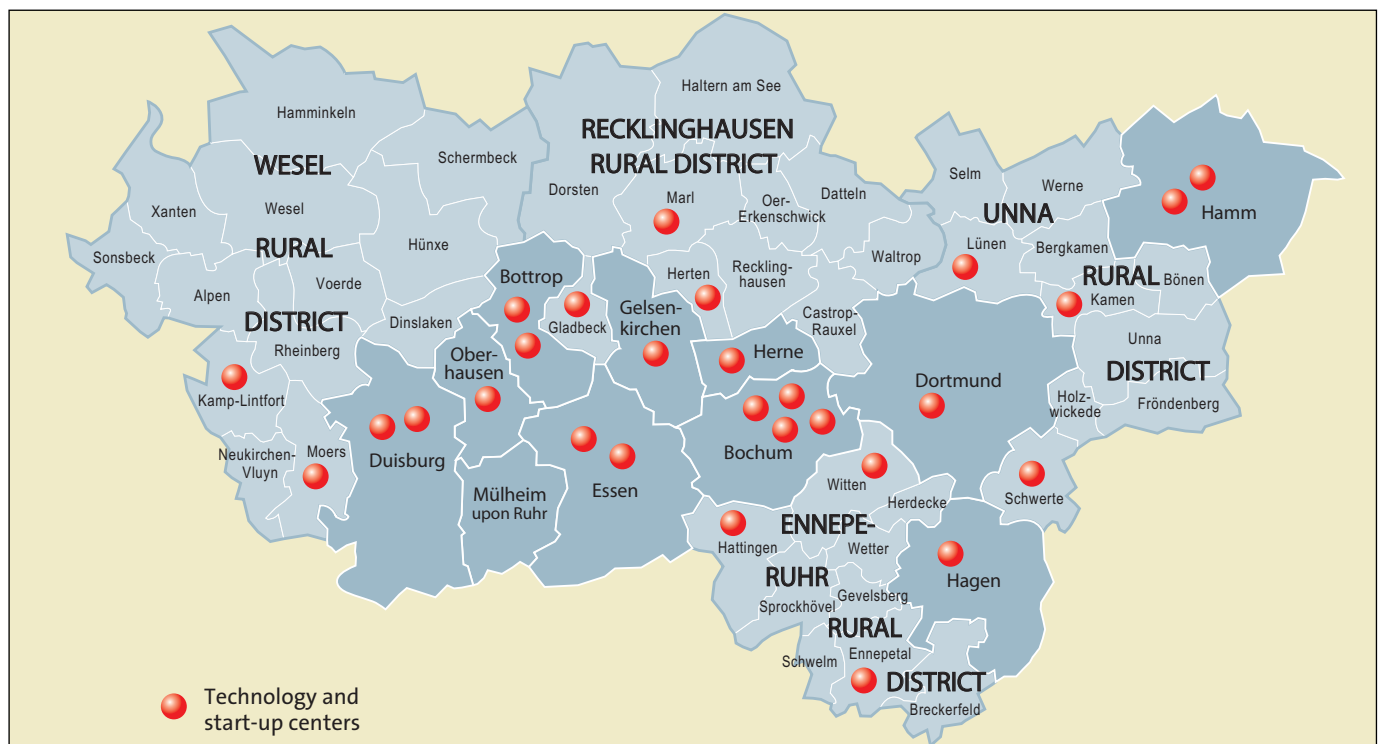
It must be stated that up to now regional co-operation within the Metropolis Ruhr is confined to soft fields as the planning of landscape and culture which is widely bare of conflicts. The effects of the commonly established master plans remain to be seen.

To fulfill the relevant economic tasks, the RVR has founded the subsidiary company wirtschaftsförderung metropol Ruhr GmbH (wmr, Economic promotion metropol Ruhr) in 2007 which deals with the economic promotion and the locational marketing by merging the local interests in a regional context. The wmr represents the Ruhr on international estate fairs as the ExpoReal in Munich and the MIPIM in Cannes. Thus the Ruhr is presented as a regional entity instead of the former competition between and single performances of

the cities and rural districts on occasions like these.

The central tasks of the wmr are to promote the Metropolis Ruhr on the national and international levels, to create and to manage regional networks and competence centers, to acquire and to consult enterprises in locational affairs, to provide relevant information about the regional economy, to create networks, to provide on the site contacts as well as coordination and professional communal support when applying for economic and regional funds. The regional economic promotion as it is executed by the wmr, is orientated to a comprehensive development of the region. That is why the wmr changed from the competence field strategy to the concept of lead markets in order to mobilize the potentials and to open up innovative regional milieus by networking.

This wmr strategy marks the actual end of a long history of economic promotion in the Ruhr that has been accompanying the process of structural change in the last decades. Whereas the traditional economic promotion of the local communities has been focused on offering new sites and on consulting enterprises without adjusting the activities to superior concepts, modern forms of economic promotion support the enterprises by providing a comprehensive site management and a range of services. Innovative companies and starters are particularly supported as



3.2.9 Technology and start-up centers in the Ruhr

well as local developments that fit into the lead markets of the region. Thus in the city of Herne the innovation and start-up center comprises various sites with innovative medium-sized enterprises. The allocation of innovative companies started in the 1980s with the foundation of the technology center in Dortmund which has become a successful cluster of information technology companies. In the meantime there have been some 30 technology centers established in the Metropolis Ruhr. Not all of them are orientated to one specific competence field, most of them are to rely on a wider range of technological services as e.g. the two technology and start-up centers in Bottrop.

In addition, since the 1990s some local “light tower projects” were to change the structure and the image of the region. However, some other major projects as “UFO” in Dortmund, “Passarea” in Essen and “Multi Casa” in Duisburg proved to be too ambitious and failed for different reasons. On other sites larger investments succeeded, as the Centro on the site of a former steelworks in Oberhausen, the Krupp green belt in the immediate vicinity of the city-center of Essen and the extensive Phoenix area in Dortmund.

What an interim balance can be drawn after decades of structural policy and economic subsidies? The region succeeded in changing from a mono-functional industrial region of coal, iron and steel to a metropolis with a new and multi-fold economic basis. By means of structural policy and economic development schemes the Metropolis Ruhr has changed into a globally orientated region and, as in all European metropolitan regions, its competitiveness is going to be developed by continuous innovations in the knowledge economy. As in other regions, this change produces sub-regions with two different development speeds; there are preferred sub-regions that positively develop according to the global needs, but there are also others in which the quality of life is deteriorating quickly as well.

By strengthening the strengths and the strong the weaknesses and the weak are left behind. To overcome this contradictory development an integrated urban renewal has been applied because the results of the international and interdisciplinary urban research show that the quality of life in deprived quarters can best be improved by integrated action programs. To reinforce the effects, the

financial resources are coordinated in an urban quarter program for a clearly defined area and for a given time. In doing so, the integrated urban renewal programs „Soziale Stadt“ (e.g. in Essen-Katernberg, Gelsenkirchen-Bismarck/Schalke-Nord, Dinslaken-Lohberg or Castrop-Rauxel-Deininghausen) and URBAN (Duisburg-Marxloh, Dortmund-Nordstadt) have been executed; financial resources have been provided by the state, the Federal Government and the European Union. By these measures severe forms of deprivation could be stopped in these quarters, the given potentials were coordinated and a positive development could be initiated.

In the last years, however, a new orientation of the national and European urban policies could be recognized, as the problem-orientated approach is substituted by a competitive one. According to the Lisbon strategy of the European Union, competitiveness on the international market is the primary qualification the regions in Western Europe have to be adjusted to, massive problems in some urban quarters are but of minor importance. The political aim to establish equal living conditions is only applied to the deprived regions of the new member states. The west European regions including the Metropolis Ruhr are set back to a policy that only guarantees minimum standards for the cities and their population (“competition orientated urban policy with a social touch”). It is therefore important to complement this general political approach by particular regional development strategies.



3.2.10 Metropolis Ruhr stand on the International Estate Fair MIPIM (Marché International des Professionnels de l'immobilier) in Cannes, France



3.2.11 The “Colani Egg” on the headframe of the former coal mine “Minister Achenbach” in the technology and start-up center Lünen (LÜNTEC)



3.2.12 Industrial and technology park Dieprahm in Kamp-Lintfort

3.3 Restructuring the major companies

Metropolitan regions send out important steering impulses, decision-making and controlling are important functions of the authorities and institutions located in them. The economic steering function is mainly concentrated in the headquarters of national and international companies.

The headquarters of a remarkable number of important global players are located in the Metropolis Ruhr, mainly in Essen (ThyssenKrupp, RWE, RAG, E.ON Ruhrgas), but also in Duisburg (Haniel, ThyssenKrupp Steel), Mülheim an der Ruhr (Tengelmann, Aldi) and Dortmund (SignalIduna). It is striking that the major companies allocated in the Metropolis Ruhr can be assigned to two fields. On the one hand, there are the energy concerns or the companies with an old industrial legacy, on the other, there are important trade and service companies. These global players have to undergo a constant change by applying strategic adjustments to the global market; the allocation of sites is fluctuating as well. After the Arcandor AG (former Karstadt-Quelle) insolvency in 2011 the headquarters of two DAX companies are left in the Metropolis Ruhr: RWE and ThyssenKrupp.

Companies with a coal and steel legacy have undergone a complete re-structuring in the last years even if they did not leave their sites in the Metropolis Ruhr.

The re-structuring of mining: RAG and Evonik Industries

As mentioned above, the federal government, the states North Rhine-Westphalia and Saarland and the trade union for mining, chemistry and energy in 2007 agreed to end coal mining in Germany and to let expire the public subsidies for the production of coal until 2018. In response to this development, Ruhrkohle AG (RAG) that had been founded in 1968 and had incorporated the chemical company Degussa in 2003 has been divided into two sections. The “black” section which continued to be RAG is still focused on coal mining; with 29,000 persons employed a turnover of 3.2 billion Euros has been generated in 2009. Next to coal mining the “black” RAG has opened some other fields of activity allocated in affiliated companies. RAG Mining Solutions avails itself of the rich technological expertise of German coal mining, mining machinery is being exported worldwide.

Tab. 7: Top ten of the Ruhr companies

No.	Turnover 2010 (million Euros)	Company	Place	National rank
1	53,320	RWE AG	Essen	10
2	46,621	ThyssenKrupp	Essen	18
3	40,026	BP Europa SE (former Deutsche BP AG)	Bochum	19
4	32,570	Aldi Süd Group	Mülheim a.d. Ruhr	23
5	27,432	Franz Haniel & Cie. GmbH	Duisburg	25
6	27,430	Aldi Nord	Essen	26
7	20,896	E.ON Ruhrgas AG	Essen	33
8	20,159	HOCHTIEF AG	Essen	35
9	14,287	Schenker AG	Essen	48
10	13,300	Evonik Industries AG (former RAG Aktiengesellschaft)	Essen	49

Source: RVR data file



3.3.1 Skyline of Essen with the Evonik and RWE towers



3.3.2 Skyline of Dortmund with RWE tower, public library and Stadtparkasse

The resource boom in Russia, China and India has opened large markets. Next to mining technology RAG Mining Solutions offers tailor-made services for deep-shaft mining (engineering, consulting and training services).

RAG Montan Immobilien is concentrated on the estate management and on the development and management of sites. In particular, new land-use concepts for former industrial areas (approx. 13,000 hectares) are developed and marketed.

The affiliated company RAG Ruhranalytik is an independent test laboratory in Herne specialized on the analysis of solid fuels and other environmental substances.

For the “white” section of the former RAG which comprises chemistry, estate management and energy Evonik Industries AG has been founded in 2007. With 39,000 persons employed Evonik has generated a turnover of 13.1 billion Euros in 2009. In the field of special chemistry Evonik holds a strong market position by developing new substances for future technologies in the fields “consumer, health and nutrition”, “resource efficiency” and “special materials”.

In the field of estate management Evonik is one the largest private housing companies in North Rhine-Westphalia managing some 60,000 own units and 70,000 units of THS GmbH which Evonik Immobilien holds a 50 per cent share in.

The energy action field is dominated by operating fossil fuels power stations. Evonik operates eight coal power stations, two refinery power stations and a variety of energy generating plants on the basis of renewable energies. Including other power stations in Columbia, in Turkey and in the Philippines Evonik produces 9,400 Megawatt.

For the superordinate control of RAG and Evonik Industries the RAG Foundation that has been founded in 2007 fulfills central tasks:

- to pilot the socially acceptable process of changing German coal mining until 2018,
- to lead Evonik Industries AG to the capital market and foster its successful development. After its stock exchange quotation analysts regard the company as a potent DAX claimant.

- to use these revenues and further earnings to accumulate a foundation fortune until 2009 that allow the “eternal burdens” of German coal mining to be paid from 2019 onwards. These burdens include the costs for permanently pumping the ground water in areas of extensive mining-induced subsidence, for the reconstruction of old shafts and for the decontamination of polluted soils. For these purposes the RAG Foundation will need several billion Euros.

The re-structuring of the iron and steel industry: ThyssenKrupp

Since the fusion in 1999 ThyssenKrupp has become a global steel and technology company the new headquarter of which has been built in the vicinity of the old Krupp house. Duisburg, home town of Thyssen, retained the last integrated smelting plant including coking plants, blast furnaces, steel works and rolling mill.

Next to the transnational steel company ArcelorMittal the ThyssenKrupp Company produces more than one third of all the steel produced in Germany. There are 1,200 jobs on the ThyssenKrupp site in Duisburg, and another 3,600 in the supplying companies. With 15 million tons of flat rolled steel produced in 2008 ThyssenKrupp Steel Europe AG was among Europe’s leading steel producers.

Focused on high quality flat steel TKS tries to remain profitable on the contested global steel market by applying modern materials, products and processes. A new blast furnace has been built at a price of 250 million Euros; some other ones have been modernized for more than 100 million Euros. Another 800 million Euros have been invested in a coking plant in 2003 that produces 2.5 million tons of coke per



3.3.3 Disk shearer produced by the mining supply company Eickhoff Maschinenfabrik in Bochum



3.3.4 Coal power station in Gelsenkirchen-Scholven



3.3.5 ThyssenKrupp production sites (October 2012)

year and thus guarantees the demands of the ThyssenKrupp blast furnaces. By all these measures TKS succeeded in increasing productivity and steel quality and was able to reduce the consumption of material and energy at the same time: the amount of steel annually produced per worker increased from 315 t (1990) to 650 t (2007). Instead of once 800 kilograms of coke needed to produce one ton of steel the new blast furnace requires only 480 kilograms of coke.

The steel boom has been initiated by the emerging Asian economies and has caused incessantly increasing prices for iron and steel; this development has been answered by ThyssenKrupp by new investments abroad. After the global economic crisis had been overcome and the demands for steel had recovered new TKS steel producing sites were established in Brazil and in the United States. In the new steel works in Santa Cruz (Federal state Rio de Janeiro) 5 million tons of high quality steel slabs are cost-efficiently produced annually. The site near to the Atlantic Ocean was chosen because of its vicinity to the iron ores and the cost-efficient modes of transport to the processing works. Three million tons of these steel slabs are to be transported to the new works in Alabama/USA where they are processed to quality flat steel; the remaining 2 million tons shall be transported from Santa Cruz to the site in Duisburg to be processed to quality flat steel as well. However, both these enterprises have not been successful and the business area Steel Americas is classified as a discontinued operation as of September 30, 2012.

ThyssenKrupp is also promoting R&D in order to enlarge the potentials of steel; in cooperation with industrial, political and academic partners the Interdisciplinary Centre of Advanced Materials Simulation (ICAMS) has been established at the Ruhr University in Bochum. Here new materials are developed that are adjusted to the properties of the final product.

Next to steel production (some 50,000 employees), industrial commodities and services (more than 140,000 employees) have become major fields of ThyssenKrupp engagements; here more than 50 per cent of the total turnover are generated which, in 2008, summed up to 53.4 billion Euros. ThyssenKrupp is a major car supplier, has sold the Transrapid to China and is an important producer of passenger transportation systems (escalators, elevators etc.). In office or residential buildings, hotels, shopping malls, at airports and in railway stations the Elevator Technology Business Area increases mobility by innovative and reliable technologies that are energy-efficient and eco-friendly. The Industrial Solutions Business Area provides end-to-end engineering services for the design and construction of chemical plants, refineries and other industrial facilities, equipment for the cement and minerals industries as well as machinery and systems for the mining, processing, handling and transportation of raw materials and minerals. Material and industrial services, as e.g. logistics, warehouse management are successful as well.

Components Technology Business Area is the world's leading manufacturer of large slewing bearings for conveying,

mining and extraction systems, for harbour, ship and construction cranes, and for earthmoving machinery; other applications are solar and wind energy plants, offshore engineering, and industrial robots. The Business Area also includes the production of crawlers and crawler components for mining, forestry and agricultural machines, excavators, bulldozers, and track-mounted tractors; finally, steering shafts, steering columns and steering gears for vehicles are produced.

Until 2009 the various business fields had been organized in the segments Steel, Stainless, Technologies, Elevator and Services. Due to the global economic crisis costs had to be reduced and the segments merged into the two divisions Materials (Steel, Stainless, Services) and Technologies (Technologies, Elevator).

But ThyssenKrupp not only changed the organization of the company, but by transferring the headquarters from Düsseldorf to Essen the company gave a clear commitment to the Metropolis Ruhr. This new headquarter is embedded into the Krupp belt which, in the vicinity of the city-center, re-uses the mainly unused brownfield of the former Krupp works that had not been reconstructed after World War II. In co-operation with the city of Essen, ThyssenKrupp is going to change this area of 230 hectares into a modern urban quarter themed "Center, Variety and Change" which will comprise the functions housing, economy and recreation.

In terms of size and architecture, the Krupp belt is focused on the ThyssenKrupp headquarters. Close to Friedrich Krupp's workshop more than 2,500 employees work in this headquarters which comprises 100,000 square meters of floor space with the corporate headquarters, the main offices of the different action fields, a management education and training center and a hotel.

Adjacent to the headquarters, in 2011 the Krupp Park has been realized on a site that had not been open to the public for decades but had been a barrier between the city-center of Essen and the local district Essen-Altendorf. Landscaped and enriched by a lake this area of 22 hectares is planned to become an attractive area for local recreation. In addition to that and adjacent to the Krupp belt, plots are being laid out that are regarded as attractive to allocate service enterprises. The revenue office with 850 persons employed, some



3.3.6 The new Krupp belt in Essen with – from left to right – Krupp Park, Berthold-Beitz-Boulevard and ThyssenKrupp headquarters

car dealers and an industrial estate have already been allocated. Both the central position and the large regional potential of customers are the advantages which this site is marketed with in order to attract new companies in a business park. The Berthold-Beitz-Boulevard is the arterial road that connects this new area to both the city-center and the adjacent districts.

This chapter shows that the structural change of the region had to go along with the re-organization of the large companies of coal mining and iron and steel. Even if it might be argued that this re-organization has come to a successful end RAG, Evonik and ThyssenKrupp will have to undergo a continuous change also in the future to be able to operate on global markets. Thus the given analysis of the status-quo situation has necessarily to be regarded as a snap-shot. The fundamental changes of RAG and Evonik in the following years have already been determined by law. Future trends on the global resource and steel markets will influence the Metropolis Ruhr and its companies, as did e.g. the fusion of the steel giants Arcelor and Mittal in 2006.

3.4 Development of the small and medium-sized businesses

According to the definition of the Institut für Mittelstandsforschung in Bonn (Institute for the research of middle-class enterprises) small businesses comprise up to 9 persons employed and generate an annual turnover of less than one million Euro, medium-sized businesses comprise 10 to 499 employees, the annual turnover is below 50 million Euros. Thus companies with less than 500 employees and an annual turnover of less than 50 million Euros are summarized as small and medium-sized businesses (SMBs) whereas businesses with more than 500 employees and more than 50 million Euros of annual turnover are large companies. EU definitions, however, regard businesses with 250 employees and an annual turnover of more than 50 million Euros already as large businesses.

These quantitative definitions reveal the strengths and weaknesses of SMBs in comparison to large ones. Due to their flexibility SMBs are often regarded as the hope and the driving forces on the labour market. In North Rhine-Westphalia

they are of great importance, as they generate 42 percent of the turnover and provide 80 percent of the jobs; in contrary, only 0.5 percent of the North Rhine-Westphalian enterprises are large ones. SMBs are also appraised for their local relations, their close proximity to market and customers and consequently for their higher locational persistence. In the Metropolis Ruhr this is particularly true because many SMBs have been the suppliers of the large coal, iron and steel companies. That is why there have been only limited possibilities to let an independent range of innovative SMBs develop. Moreover, there is only a limited readiness in the Metropolis Ruhr to found an own business. So, quite many of the existing SMBs have come to age as far as the technical equipment and the management is concerned.

Because of their economic importance and because of their specific problems the North Rhine-Westphalian Ministry of Economic Affairs and local economic departments have launched a variety of initiatives in the recent years to support the existing SMBs and to foster the foundation of new ones, often accompanied

Tab. 8: SMBs and their employees subject to social insurance contribution 2009, by size classes

City/Rural District	Total employees	Number of enterprises, by size classes			
		with 0 to 9 employees	10 to 49 employees	50 to 249 employees	250 and more employees
Bochum	13,183	11,977 (90.85 %)	946 (7.18 %)	209 (1.59 %)	51 (0.39 %)
Bottrop	4,093	3,763 (91.94 %)	280 (6.84 %)	41 (1.00 %)	9 (0.22 %)
Dortmund	21,498	19,442 (90.44 %)	1,645 (7.65 %)	335 (1.56 %)	76 (0.35 %)
Duisburg	15,113	13,706 (90.69 %)	1,087 (7.19 %)	256 (1.69 %)	64 (0.01 %)
Essen	22,932	20,778 (90.61 %)	1,607 (7.01 %)	402 (1.75 %)	145 (0.63 %)
Gelsenkirchen	7,779	7,031 (90.38 %)	580 (7.46 %)	134 (1.72 %)	34 (0.44 %)
Hagen	6,946	6,229 (89.68 %)	555 (7.99 %)	116 (1.67 %)	46 (0.66 %)
Hamm	5,623	5,004 (88.99 %)	500 (8.89 %)	102 (1.81 %)	17 (0.30 %)
Herne	4,557	4,144 (90.94 %)	317 (6.96 %)	77 (1.69 %)	19 (0.42 %)
Mülheim an der Ruhr	7,237	6,640 (91.75 %)	462 (6.38 %)	107 (1.48 %)	28 (0.39 %)
Oberhausen	7,234	6,542 (90.43 %)	538 (7.44 %)	124 (1.71 %)	30 (0.41 %)
Ennepe-Ruhr-Kreis	13,884	12,661 (91.19 %)	945 (6.81 %)	230 (1.66 %)	48 (0.35 %)
Kreis Recklinghausen	20,617	18,834 (91.35 %)	1,461 (7.09 %)	282 (1.37 %)	40 (0.19 %)
Kreis Unna	14,005	12,668 (90.45 %)	1,049 (7.49 %)	241 (1.72 %)	47 (0.34 %)
Kreis Wesel	17,735	16,243 (91.59 %)	1,207 (6.81 %)	235 (1.33 %)	50 (0.28 %)

Enterprise register of 30.04.2011 for 2009

Source: *it.nrw*

Tab. 9: Employees subject to social insurance contribution in SMBs, by size classes

City/Rural District	Total employees	Number of employees, by size classes			
		with 0 to 9 employees	10 to 49 employees	50 to 249 employees	250 and more employees
Bochum	90,316	15,428	18,552	21,993	34,343
Bottrop	19,609	4,749	5,312	4,580	4,968
Dortmund	167,965	25,616	32,061	35,244	75,044
Duisburg	134,393	17,563	21,447	25,846	69,537
Essen	271,500	25,822	31,888	41,812	171,978
Gelsenkirchen	64,135	9,659	11,749	14,111	28,616
Hagen	69,297	8,437	10,950	12,225	37,685
Hamm	38,076	7,065	9,784	9,901	11,326
Herne	54,840	5,511	6,342	7,407	35,580
Mülheim an der Ruhr	55,581	7,799	9,121	11,407	27,254
Oberhausen	48,933	8,712	10,526	12,087	17,608
Ennepe-Ruhr-Kreis	87,360	15,958	18,919	23,026	29,457
Kreis Recklinghausen	110,511	24,962	28,850	26,455	30,244
Kreis Unna	104,098	17,075	21,014	24,992	41,017
Kreis Wesel	101,636	20,720	23,965	23,067	33,884

Enterprise register of 30.04.2011 for 2009

Source: *it.nrw*



3.4.1 Eurotec Technology Park in Moers on the site of the former Rheinpreussen coal mine

with the creation of technology and start-up centers that are attractive for new enterprises and new jobs.

Particularly successful has become the Technology Center Dortmund that initiated the IT and High Tech cluster in Dortmund. Since its foundation in 1985 next to the university, the university of applied sciences, some Fraunhofer institutes and other research institutes and IT and technology SMBs have been allocated with the concerted support given by politics, economy and academics (“Dortmund consensus”). Incited by this success, the Technology Park has been added to the Technology Center. Since then, the Technical University, the Technology Center and the Technology Park are co-operating and develop new products, test them and bring them to marketability, with the university providing the academic expertise for innovative developments and the Technology Center transferring them into practice. When a product has achieved a certain degree of marketability it is transferred to the Technology Park that is engaged in its actual production. Since 1985 more than 240 high tech enterprises with more than 8,000 persons employed could have been allocated.



3.4.2 Laboratory in the Center for Nanointegration at the University Duisburg-Essen

Another initiative to transform the economy of the city of Dortmund towards small and medium-sized IT and technology businesses – instead of large coal, iron and steel enterprises – was the “dortmund-project”. This project results from the 1997 negotiations of the North Rhine-Westphalian government, the steel companies Krupp-Hoesch and Thyssen, the city councils of Dortmund and Duisburg as well as the trade unions. As mentioned above, the ThyssenKrupp fusion included the abandonment of the pig iron production in Dortmund and the transfer of this process to the company’s Duisburg site. To compensate the loss of jobs ThyssenKrupp committed to creating a strategic concept and a vision for the future economic development of Dortmund. It has been the objective of the “dortmund-project” to allocate new clusters of software, IT and e-commerce, microsystems technology (MST), biotechnology and logistics enterprises and to expand existing enterprises of these branches, thereby creating some 70,000 jobs in SMBs which are to substitute approx. 80,000 jobs that have got lost in coal mining and in the iron and steel industries. This economic development



3.4.3 Fraunhofer Institute for Microelectronic Circuits and Systems (IMS) in Duisburg



3.4.4 Technology Center Dortmund situated between the Technology Park (foreground) and the Technical University



3.4.5 Information panel at the Technology Center Dortmund

program has been backed by approx. 200 million Euros of European, national, federal and local subsidies.

In the course of “dortmund-project” and in accordance with the integrated urban development old industrial and military sites have been converted into new industrial sites. To enlarge the Technology Park more than 200 hectares of the Phoenix site have been revitalized, with 110 hectares of the former smelting plant site changing into the technology site Phoenix-West comprising innovative IT and MST businesses. On the 96 hectares of the former Phoenix steel works site (Phoenix-East) housing quarters, services as well as administrative, culture, recreation and leisure facilities will be allocated. The two parts of the Phoenix area are centered on the Lake Phoenix (24 hectares).

A former barracks site of 50 hectares situated close to the city-center and well connected to motorways, to public transport and to the airport has been converted into a technology park (Stadtkrone East) in which companies of the electronic and mobile businesses have been allocated. By 2010, a total of 800 IT enterprises, 831 logistics

Tab. 10: The Dortmund IT cluster

Specialized staff

more than 6,200 students in Dortmund IT studies
50,000 students in natural sciences and technologies within a distance of 100 kilometers

Expertise

Technical University Dortmund – Faculty of Informatics
University of Applied Studies – Faculty of Informatics
Dortmund IT Center
Fraunhofer Institute for the flow of materials and logistics
Fraunhofer Institute for Software and Systems Technology
Research institute for telecommunication

Networks

720 IT enterprises in Dortmund
Network of experts for start-up and young enterprises

Local support

Technology Center Dortmund and Technology Park Dortmund
Sectoral sites as Stadtkrone East and Phoenix West
Locate IT: support for foreign enterprises inclined to allocate
Start2grow competition and growth initiative

Source: City of Dortmund data



3.4.6 Schwing concrete pumps in Herne – the day before yesterday a family business, yesterday a hidden champion, today a worldwide player, bought by a Chinese enterprise

companies, 100 e-commerce enterprises and 45 micro technology and nano-technology businesses had been allocated in Dortmund. With only 41,000 new jobs in these new branches the employment aim of the “dortmund-project” has been missed but the share of jobs in future branches is increasing quicker than in other German cities. Dortmund has been established as a cluster of high tech enterprises and is going to grow further, even without public subsidies.

Many successful small and medium-sized businesses of the Metropolis Ruhr, inside and outside of the technology parks, can be regarded as hidden champions that successfully have unlocked the international markets and are thus of great importance to the economic perspectives of the Metropolis Ruhr.

The Essen-based company cph is a world market leader regarding a special label glue suited to PET bottles and in the production of other special adhesives; based in Essen as well is the company ista, one of the world’s leading companies in the field of measurements. For over 50 years the Ferdinand Erlmann Werkzeugbau GmbH & Co in Herten has

been a leading manufacturer of multi-spindle drills and grinders for the brake pad and clutch disk industry. Bioni CS GmbH in Oberhausen is a leading company in developing “intelligent” paints which can eliminate microbial infestations caused by mildew, germs and bacteria. ABUS, based in Wetter, has been providing security systems since 1924. With its security products ABUS is one of the best and best-known companies in its field.



3.4.7 Hidden champion CCS Challenge Card Systems GmbH developing and producing magnet and chip card systems in Bochum



3.4.8 Materna GmbH in Dortmund, one of the leading independent European service companies in information and communication technology

3.5 Tertiarisation

The structural change of the Ruhr from an industry-based society to a service-based society is often documented by high shares of jobs in services. When the old industrial Ruhr had been dominated by the secondary sector in the 1950s the service sector share in employment was as low as 32 per cent. Since then the structure of the labour force changed to a degree that the regional service sector achieves higher values than the NRW and German averages.

In Essen, the most important service city of the region, it was already in 1978 that 55 percent of all employees have been working in the service sector; as in Dortmund, today this share has increased to nearly 80 percent. Even in cities of old industrial origin a change towards the service sector has taken place, in Oberhausen the Neue Mitte Oberhausen (CentrO shopping center etc.) on the site of a former smelting plant moved the local statistics into this direction.

However, it has to be stated that the increase of the service sector has not primarily been caused by an above-average growth of the services. To a great extent it was by the job losses in the secondary sector that the relative share of the service sector has increased remarkably. To take the city of Duisburg as an example, the relative share of the service sector raised from 38 per cent in 1978 to 67 per cent in 2007, the absolute number of employees in the service sector, however, increased only from 87,359 to 101,676. The relative skyrocketing of the service sector is only due to the fact that Duisburg lost 90,285 jobs in secondary sector during this period. This tremendous job losses couldn't by far been compensated by only 14,317 new jobs in services. This shows that the relative increase of the service sector also results from the decrease of the secondary sector.

This example also shows that the explanatory power of the relative sector shares as indicators of the economic development is limited. However, the relation between the numbers of persons employed in the different sectors by the number of inhabitants is a better indicator. By means of these relations it can be shown that at no time during the 1980 to 2005 period the service sector of the Metropolis Ruhr has reached the German

Tab. 11: Shares of service sector employment (percentages)

	1970	1987	1991*	1995	2000	2005	2009
The Ruhr	43.5	59.4	61.2	66.8	72.4	76.2	77.4
NRW (excluding The Ruhr)	45.3	60.0	60.0	64.4	69.0	72.4	73.9
NRW	44.7	59.8	60.3	65.1	69.9	73.4	74.8
Germany before Re-unification	k. A.	k. A.	59.5	64.6	68.7	71.9	73.0

*since 1991 figures have been recorded by place of work, before 1991 they have been recorded by enterprises

Source: RVR data file



3.5.1 Neue Mitte Oberhausen (CentrO shopping center in the middle)



3.5.2 Shopping centers in the Ruhr



3.5.3 Before the construction of the shopping center: Limbecker Platz in Essen, 1992



3.5.4 Shopping Center Limbecker Platz in Essen, 2008

average even if it has increased from 144 to 194 by 1,000 inhabitants. The special conditions of the region cause another problem of gathering and interpreting data. All enterprises of the secondary sector also comprise higher and lower forms of services and employees working in these services, but as these enterprises are part of the secondary sector the service jobs in them are counted in the secondary sector as well.

Despite of the difficulties of recording the numbers and shares of service jobs properly it can be stated that the Metro-

polis Ruhr is a retailing region of high demands due to the high population density, the good transport infrastructure and the central location. So, next to the health industry and the business service providers retailing accounts for the largest share of service sector employment. As in other densely populated conurbations there is a wide range of forms of retailing, shopping centers, specialized retail markets and discount markets are distributed over the Metropolis Ruhr. With their high demands of space, these retail units are often to be found outside the city-centers alongside arterial

roads and, due to the polycentric structure of the Metropolis Ruhr, between the cities. In the Metropolis Ruhr there are 33 shopping centers with more than 10,000 square meters retailing floor space. This multitude is headed by the Ruhr Park in Bochum, the CentrO in Oberhausen, the Rhein-Ruhr Zentrum in Mülheim an der Ruhr and the Limbecker Platz shopping center in Essen.

Ruhr Park has been the first shopping center of the Ruhr, opened in 1964; it is based on the American mall concept with anchor stores at the ends of the axes and, as it is orientated to customers with car-ownership, with a direct motorway exit and ample parking spaces. The acceptance of the Ruhr Park was so sweeping that the store space has been doubled to 50,000 square meters already in 1969; in 2001 a multiplex cinema and leisure facilities have been added. In 2011, the total area comprised 126,000 square meters, including 7,500 parking places free of charge.

The CentrO, opened in the Neue Mitte Oberhausen in 1996, is explicitly orientated to the concept of “shopping as an event”. It can thus be regarded as an Urban Entertainment Center (UEC) or as a post-modern lifestyle orientated hyperspace that follows the customers’ demands for a connection between shopping, event, entertainment and leisure. The Neue Mitte Oberhausen not only comprises the CentrO (more than 220 shops, some 119,000 square meters retailing floor space), but also a Food Court, a restaurant promenade, a multiplex cinema, a large hall for international events, a musical theater, a leisure park, the AQUA-park, a hotel and the Sea World water park. This site, unique in Germany by its size, attracts regional, national and international attention and is regarded as a successful realization of a multi-dimensional leisure space (25 million visitors per year). Nevertheless, there are some critical side-effects. Although the nearby



3.5.5 Promenade of the CentrO in Oberhausen

gasometer has been and still is successful as part of the regional industrial heritage and as an exhibition venue it has not been integrated into the new center concept. Great projects like the CentrO may at least cause the fear that their success is at the expenses of the inner city shopping areas.

After the success of the CentrO another type of shopping mall came into being, the shopping center Limbecker Platz. It has been completed in 2010 and is one of Europe's largest city-center integrated shopping centers. Limbecker Platz comprises some 200 shops, approx. 2,000 jobs and a retailing floor space of 75,000 square meters. As the shopping center has been developed on the site of the historical Karstadt department store it is located on the immediate Northwestern fringe of the city-center of Essen. An integrated concept is being pursued to strengthen the historical function of Essen as the largest and most important shopping location of the Metropolis Ruhr. Simultaneously to the construction of the Limbecker Platz shopping center, the area around the main railway station, starting point of many city customers, has been transformed into a modern service center in 2011; the pedestrianized areas have been re-designed and extended. First observations and assessments by the shop keepers show that the retailing function of the city-center of Essen has gained attraction by the allocation of the Limbecker Platz shopping center. It is well accepted and the turnovers of the adjacent shops have decreased less than expected. As far as urban development on the fringe of the city-center is concerned, the Limbecker Platz site has to be seen in connection with the new developments in Weststadt, with the university quarter and with the Krupp belt. In general, all these projects are parts of a modern strategy that pursues the development of a compact and sustainable city by applying participative methods.

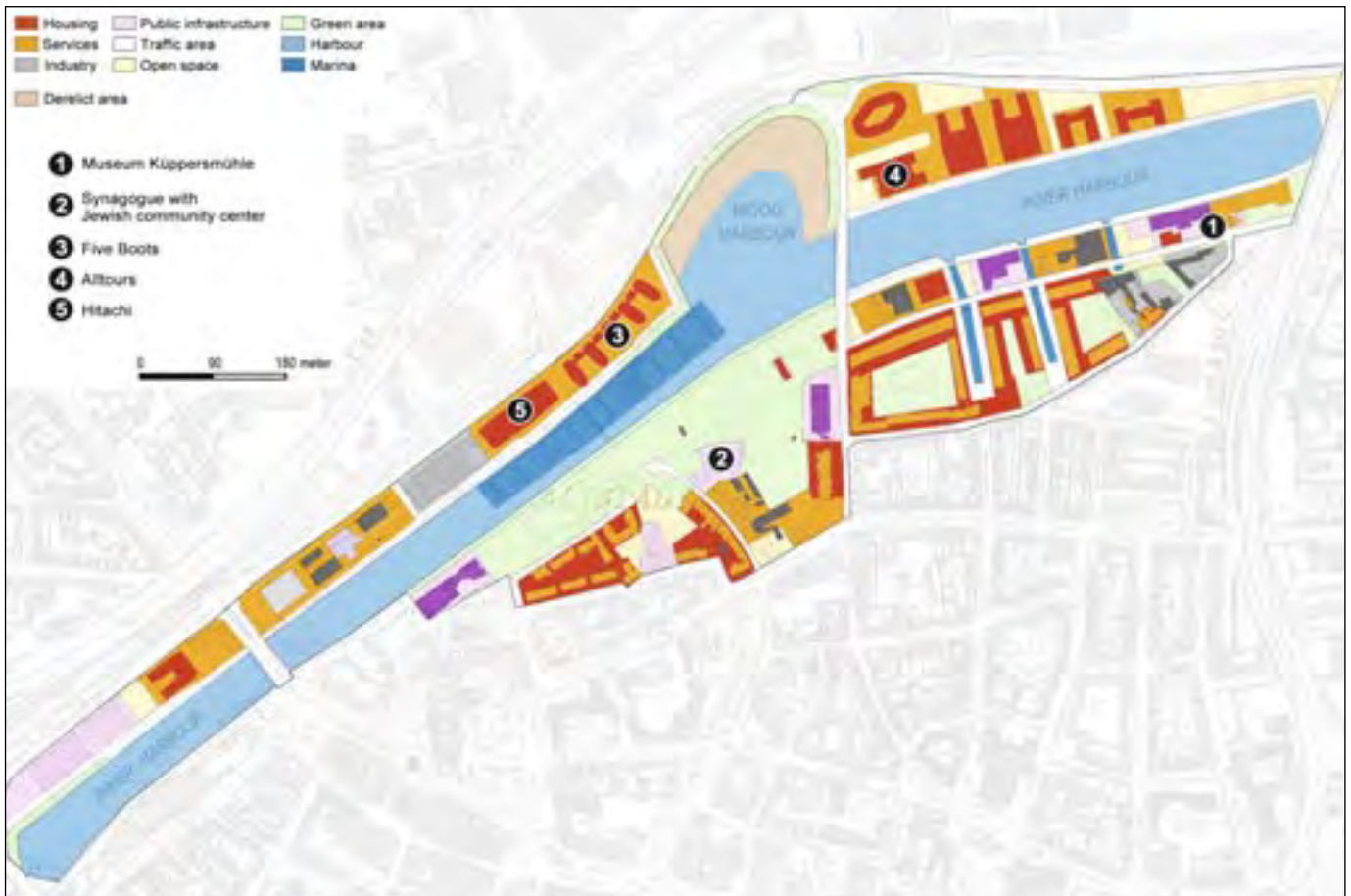
The inner harbor in Duisburg is another example to demonstrate the connection between urban development and tertiarisation. Here as well, a post-modern world of events has been constructed that combines the functions of housing, working, culture and leisure. As in Oslo, Vancouver, Stockholm, London and Hamburg, the waterfront has been integrated into the new city-center structure. Following the plan presented by the British architect Norman Foster the derelict inner harbor, once a grain harbor ("breadbasket of the Ruhr"),



3.5.6 City-center of Essen and Krupp area, 1976



3.5.7 City center of Essen and Krupp belt, 2012



3.5.8 Land-use in the Inner Harbour of Duisburg, 2011

has been re-developed for new land-uses. With the beginning of the IBA Emscher Park in the 1990s, still existing harbor buildings, as e.g. granaries and mills, were retained, if possible, were modernized, if necessary, and were combined with new buildings. Many prominent sites have been developed as e.g. the Museum Küppersmühle, the synagogue with a Jewish community center or the office building

“Five Boats”. Both a wide range of restaurants and bars and numerous offices could be created and permanently be established. Administrations offices of Alltours and Hitachi as well as numerous insurances, media companies and other enterprises have been allocated that provide more than 4,000 jobs. To enable housing along the waterfront some 500 housing units for different household types (fami-

lies, younger singles, elderly people) have been built, another 200 units are planned. As all these measures consider the idea of an ecological city, the inner harbor development succeeded in upgrading the soft locational factors of Duisburg and contributes to a new positive image that is no longer characterized by coal, iron and steel but by services.



3.5.9 Inner Harbour Duisburg

Despite of the difficulties to calculate service jobs statistically, it could be shown that the population of the Metropolis Ruhr is increasingly living in a service society. As in other regions this tertiarisation of the Metropolis Ruhr is accompanied by fundamental changes on the labour market. This market is characterized by unemployment rates that are also caused by those that are not able to change from an industrial job to a job in the services. In most cases the qualifications needed have increasingly become demanding both in services and in industries. Finally it has to be said that no new phase of deindustrialization is pursued in the region. All chambers of commerce in the region incessantly stress the importance of the secondary sector because it is the indispensable basis of a modern conurbation.

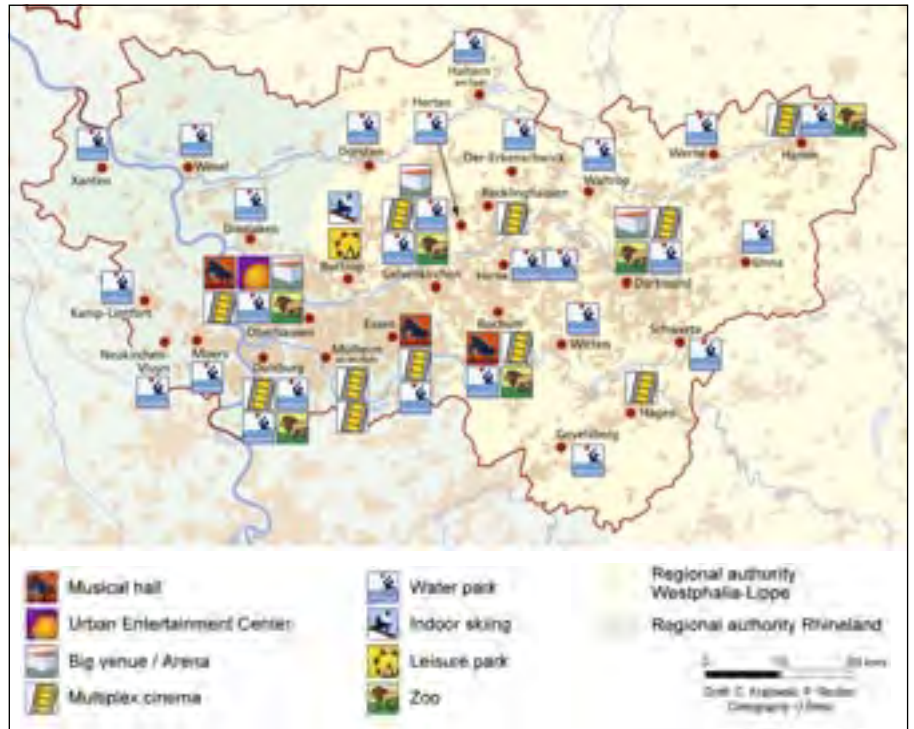
3.6 Sports, tourism and culture

The processes of structural change and of tertiarisation do not only become apparent in the technology orientated fields of competence, but sports, culture and tourism prove to be new economic fields of the region as well. When the Projekt Ruhr GmbH developed the competence field “leisure and tourism” in the 1990s many observers regarded it as the mere attempt to improve the image of the Ruhr, but there was no confidence in the economic relevance of this field. In the meantime, however, this field has revealed its growth potential in the no longer mono-structural but diversified economic region Ruhr. As in other metropolitan regions, the economic significance of sports, culture and tourism has increased remarkably.

Sports

Since the industrial development and the in-migration of masses of workers the image of the Ruhr has been connected with the tradition of football, and with horse and dove races. But it was as late as in the 1920s that football turned into the sports of the working classes because until then exercising that sport had been reserved to the middle classes which, however, were less represented in the industrial region Ruhr. But when the football clubs of the Ruhr were extremely successful in the Upper League West from 1947 onwards the image was formed by the fruitful connection between workers, football club and company (coal or steel). Supported by the companies, many clubs of region were very successful in those days, next to Borussia Dortmund and Schalke 04 clubs as Meidericher SV, Schwarz-Weiß Essen, Rot-Weiß Essen, Westfalia Herne, Hamborn 07, Spielvereinigung Erkenschwick.

Actually, most of these clubs are of minor importance, but the myth of the workers’ clubs that reached the goal by “hard labour” remained. A glorious year to petrify this myth was 1997 when Borussia Dortmund won the Champions League and Schalke 04 became UEFA Cup winner. Of course, there were no longer industrial workers of the region playing in these clubs but only professionals, and the clubs of the region had turned into professional clubs that are commercialized, are observed by the media and have to follow economic rules. But nevertheless, their successes supported the self-esteem and



3.6.1 Major leisure venues in the Ruhr

corporate feeling that gradually advanced in the changing region of the 1990s. Also the year 2011 saw a successful football in the region: Borussia Dortmund and Schalke 04 the modern arenas of which are generally sold out were German Master or advanced as far as the Champions League semi-final; Schalke 04 became German Cup winner.

But it is not only football as a professional or a mass sport that moves the population of the Metropolis Ruhr but a variety of other sports as well. There are some 5,400 clubs with 1.4 million members, for more than 80 sports disciplines there are 10,000 sports facilities. Since the 1920s these sports grounds are embedded in regional concepts that have been developed and



3.6.2 Fans in the South curve of the Dortmund arena



3.6.3 Arena AufSchalke in Gelsenkirchen, with the "lawn drawer" moved out and the roof closed

implemented at first by the Siedlungsverband Ruhrkohlenbezirk, since 1975 by the Kommunalverband Ruhrgebiet and today by the Regionalverband Ruhr (Regional Association Ruhr) in order to improve the living conditions in the region.

There are many football stadiums in the Metropolis Ruhr, some of them are

known world-wide. The earliest ones have either been built by the cities (Wedaustadion in Duisburg, 1921; Kampfbahn Rote Erde in Dortmund, 1928) or by the football clubs themselves (Glückauf-Kampfbahn by FC Schalke 04, 1928; Stadion am Uhlenkrug/Georg-Melches-Stadion by Rot-Weiss Essen, 1922/1939). The 1970s saw the next



3.6.4 Schweglern Stadium in Duisburg

"stadium boom" with the Parkstadion (FC Schalke 04, 1973/1998, capacity: 70,600/62,004 spectators) and the Westfalenstadion (Borussia Dortmund, 1974/1992, capacity: 54,000/80,645 spectators) being the most prominent ones. The most recent of the large football stadiums is the ArenaAufSchalke/Veltins-Arena (since 2005) (FC Schalke 04, 2001, capacity: 61,373 spectators) which the UEFA has classified as a 5* elite stadium thus being allowed to host UEFA Champions League and UEFA Europe League finals. This arena is a most spectacular



3.6.5 Football region Ruhr

building; the roof can completely be closed and the football pitch can be moved out in a “drawer”.

Taking into account the sports enthusiasm in the sports region Ruhr, the economic importance of sports has been analyzed and promoted by the Regional Association Ruhr since the 1990s. Headlined “Sports economy in the Ruhr”, all services are summarized that are connected with sports, i.e. the various branches of the sports business (running sports grounds, executing sports events, providing sports courses, sports administration etc.), the preceding branches (producing sports articles, construction of sports infrastructure etc.) and the following branches (sports tourism, media, health care etc.). From the perspective of sports there is a variety of relations to other branches: The spectators of a Borussia Dortmund match might use the local restaurants and pubs, might go shopping in Dortmund and might make use of the local hotels; next to the Schalke arena health management and sports medicine services have been allocated that can be used by professional and amateur sportsmen as well as by non-sportsmen; located on a waste tip in Bottrop between the motorways A2 and A42 the alpincenter has been established

in 2001 providing an indoor racing track which allows all-year-skiing; ski training courses, après-ski events and accommodation are offered as well. In 2011, a photovoltaic installation, with 13,499 square meters the largest in NRW, has been put into operation on the roof of the skiing hall.

A Gelsenkirchen university of applied sciences study on the 2004 Karstadt Marathon delivered insights in the economic effects of sports events. There were some 19,000 participants in the race which was seen by more than 500,000 spectators; the participants spent nearly 5 million Euros (preparation, travel to the event, accommodation and costs on the day of competition), the spectators spent more than 8 million Euros.

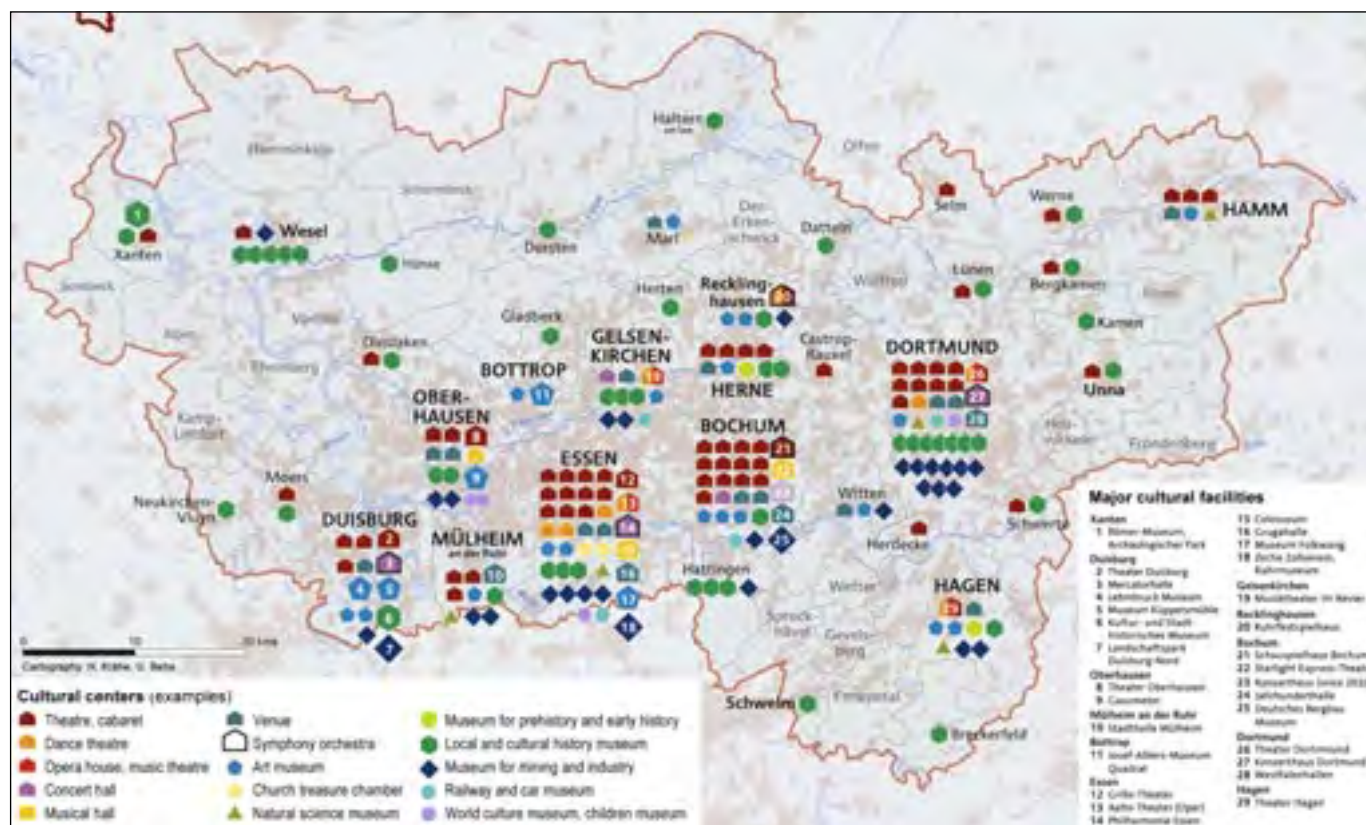
To use and to strengthen the great economic potential of sports the region has twice applied for the Summer Olympics (in 1996 and, as Rhine-Ruhr-Region, in 2012). It has been argued that there are sports venues for nearly all Olympic sports and a great sports enthusiasm in the region. Even if both these applications did not assert themselves, a new application is not unrealistic for the future. Another Gelsenkirchen university of applied studies study has shown in 2009

that the majority of major sports events carried out in Germany are carried out in the Ruhr, by far more than in Hamburg, Berlin or Munich.

The “Master plan Sports” is the action tool to strengthen sports and the sports economy in the region. It is the main objective to establish the Metropolis Ruhr as a prominent European sports region. Recommendations for the interlocal cooperation in the field of sports are given and the sports infrastructure is documented and evaluated. Furthermore, a regional bath and spa concept is being developed and the impacts of new sport trends are analyzed.

Culture economy

Culture economy in general and in the Metropolis Ruhr is an emerging economic branch. Its growth is fuelled by the fact that the people dispose of more time and money for their leisure: increasingly sports, leisure services and cultural activities are asked for. As in other metropolitan regions, there is a cultural milieu in the Metropolis Ruhr that allows a cultural economy to develop on both the supply and the demand side thus giving birth to cultural networks and clusters. This



3.6.6 Selected cultural venues in the Ruhr

Tab. 12: Development of enterprises liable to taxes and their turnovers in the cultural markets in the Ruhr 1996 to 2003

Cultural markets	Enterprises	Turnover	Enterprises	Turnover	Change	
	liable to taxes 1996	liable to taxes (‘000 Euros) 1996	liable to taxes 2003	liable to taxes (‘000 Euros) 2003	1996-2003 (percentages)	
					Enterprises	Turnover
Literature and books	1,800	3,538,632	1,714	3,852,905	- 4.7	+ 8.0
Music	1,251	592,001	1,123	403,944	- 10.2	- 31.0
Arts and design	5,915	1,638,106	5,581	1,620,829	- 5.6	- 1.0
Film and TV	1,118	923,325	1,209	601,806	+ 8.1	- 34.8
Performance and Entertainment	222	51,321	407	107,189	+ 45.0	+ 108.8
Culture economy, total	10,306	6,743,385	10,034	6,586,673	- 2.6	- 2.3
thereof “Creatives”	3,780	2,740,041	4,329	3,071,055	+ 14.5	+ 12.1
Branches of industry in the Ruhr, total	131,080	279,606,003	133,625	254,092,409	+ 1.9	- 9.1
thereof, culture economy	7.80 %	2.40 %	7.50 %	2.50 %		

Source: Wandel durch Kultur(Wirtschaft) im Ruhrgebiet. Kultur(Wirtschaft) durch Wandel. Ein Beitrag zur Bewerbung „Essen für das Ruhrgebiet – Kulturhauptstadt Europas 2010“

Tab. 13: Number of enterprises liable to taxes and their turnovers in selected branches in the Ruhr, 2003

	Enterprises liable to taxes	Turnover liable to taxes (‘000 Euros)
Selected branches of the literature and book market		
Self-employed writers	139	11,157
Translation agencies, interpreters	284	29,333
Publishing books	82	172,959
Publishing professional journals, general and other journals	73	1,060,355
Publishing daily, weekly and Sunday newspapers	40	1,006,616
Printing	640	854,486
Retailing of books and professional journals	224	330,418
Newspaper agents	99	37,290
Selected branches of the music market		
Self-employed composers, music arrangers	88	6,654
Discotheques and dancing locale	75	33,903
Publishing of recorded sound carriers	14	1,685
Publishing of music supplies	52	15,879
Production of recorded sound carriers	25	3,989
Production of music instruments	19	6,084
Retailing of consumer electronics devices	565	251,016
Retailing of music instruments and music supplies	115	46,147
Selected branches of the arts and design market		
Self-employed visual artists	220	19,186
Self-employed conservators	18	2,176
Design studios (industrial, textile etc.)	489	92,451
Advertising agency, distribution of promotion material	2,068	805,343
Architects, interior designers	1,222	231,583
Retailing of objects of art, applied arts, coins etc.	590	157,678
Museums and exhibitions	25	14,493
Selected branches of the performing arts and the entertainment business		
Self-employed actors (theater, film, TV, broadcast)	199	15,312
Self-employed performers	20	1,925
Vaudeville shows and cabarets	11	2,417
Theater and concert agents	39	45,213
Opera houses, theaters, concert halls	11	8,598
Other services and technical support	127	15,441

Source: Wandel durch Kultur(Wirtschaft) im Ruhrgebiet. Kultur(Wirtschaft) durch Wandel. Ein Beitrag zur Bewerbung „Essen für das Ruhrgebiet – Kulturhauptstadt Europas 2010“

creative milieu started in the 1980s when the creatives became the pioneers of many other institutional developments and were the first to initiate cultural activities in old and closed down industrial plants. By this form of re-evaluation they attracted a new and still relevant attention on the region.

But it was not only in the Metropolis Ruhr that the economic importance of culture has been recognized. In 1995 the "Arbeitsgemeinschaft (working group) Kulturwirtschaft des Landes Nordrhein-Westfalen" defined culture economy as "all economic enterprises and profit orientated activities that are engaged in the preparation, creation, maintenance und protection of cultural production, in the mediation of culture and/or the distribution by the media and that produce and sell products for these purposes."

The culture economy is divided in six markets. The music market comprises professions like musicians, composers, audio engineers and others and businesses as the production of music instruments, music shops and concert promoters. The

market for literature, books and press media comprises authors and journalists as well as publishers and newspapers agents. Of increasing importance are the multimedia and the film and TV businesses with actors and digital media designers that work for an increasing number of production firms.

Artists, dancers and performers employed at theaters and vaudeville shows are part of the performing arts and the entertainment business. The last markets of the culture economy are the arts and design markets comprising visual artists and their businesses as well as the design businesses as design, advertising and architecture.

Since the "Zeche Bochum" has been opened in 1981 – it saw concerts by Roger Chapman, BAP, Nena, Herbert Grönemeyer and others – a variety of cultural processes have taken place in the region, often supported by the Land and the cities. The Fifth Report on Culture Economy edited by the North Rhine-Westphalian Ministry of Economy in 2007 refers to the particular development and the record-

able success of the culture economy in the Metropolis Ruhr. The number of enterprises and the turnovers are shown in the tables; in 2005 the average turnover was 627,000 Euros per business. Culture economy is widely established in the Ruhr. In the region there are 200 museums, 100 cultural centers, 120 theaters, 100 concert halls, 250 festivals and fairs as well as 1,000 industrial monuments. These figures reflect both the grassroots initiatives that launched many alternative and social forms of cultural activities, events and sites (e.g. Carl mine in Essen-Altenessen, Langendreer railway station in Bochum) and the flagships of cultural policy with their impacts on the cultural region as a whole, as e.g. the worldwide renowned Museum Folkwang in Essen, the Ruhr Triennial theater festival with a global impact or the World Heritage Zollverein in Essen-Katernberg which has been converted into a center of culture and design. Within the structures of industrial architecture there is a museum for excellent contemporary design and, since 2008, the RuhrMuseum which, next to changing exhibitions of different themes, presents the natural and cultural history of the region in a permanent exhibition. The cultural landscape is continuously enlarged and upgraded; recently there have been the opening of the Emil Schumacher Museum in Hagen in 2009 and the re-opening of Museum Folkwang in Essen in 2010 in a new complex of exhibition halls designed by David Chipperfield Architects.

But the Report on Cultural Economy also states that this economy has to face numerous challenges due to changing customer demands, shorter product cycles and technical innovations as e.g. new forms of distribution in the internet. Competition is getting intense as there is not only the film and TV center Cologne and the media and design center Düsseldorf but there are also additional competitors in the enlarged European Union. Thus awarding the region the Capital of Culture 2010 title (Ruhr.2010) helped to strengthen the competitiveness of the regional culture economy. Ruhr.2010 also helped to recognize the Metropolis Ruhr as a changing region of (industrial) culture.

Tourism

Tourism is closely connected to the regional potentials in sports and culture. In these times of post-modern demands



3.6.7 The Cube constructed by the Japanese architect company SANAA on the World Heritage Zollverein site in Essen



3.6.8 Harenberg City Center (HCC) in Dortmund

Tab. 14: Overnight stays in selected cities of the region, 1990 to 2009

	Overnight stays				Average duration of stay 2009 (days)	Share of foreign guests 2009	4* hotels	5* hotels
	1990	2000	2009	increase 1990-2009				
Bottrop	37,900	66,000	73,300	93.4 %	1.7	29.4 %	1	0
Dortmund	445,800	597,000	749,300	68.1 %	1.5	20.2 %	9	0
Duisburg	261,400	322,300	361,600	38.3 %	2.0	16.5 %	3	0
Essen	674,100	910,600	1,067,800	58.4 %	2.1	16.9 %	12	1
Hamm	104,300	113,300	123,200	18.1 %	1.7	17.5 %	2	0
The Ruhr	3,598,300	4,677,700	5,777,500	60.6 %	1.9	16.1 %		
compared to:								
Düsseldorf	2,091,900	2,434,800	3,222,000	53.9 %	1.7	37.6 %	26	2
Köln	2,589,200	3,066,400	4,133,244	59.6 %	1.8	32.3 %	25	3

Source: Diercke 360° 02/2010, S. 16

for events and leisure the metropolitan regions of the world compete for the big economic potential tourism is going to promise. In this field the structural change turned the region by 180 degrees; in the industrial periods no tourist was interested in the region, of course, but nowadays the offers of events and leisure in an old industrial environment are promoted as unique in the tourist business.

And the region did quite well, as the number of nights spent in the region has increased in the last 20 years, unlike the overall trends in the Land. In Bochum, Bottrop and Gelsenkirchen the figures could be doubled, and Essen and Dortmund, the biggest and most important cities of the Ruhr, recorded an increase similar to those in Düsseldorf and Cologne. In Oberhausen the figures were even tripled from 1990 to

2009 due to the attraction of the Urban Entertainment Center around the CentRO. Even if these relative figures reveal remarkable increases, a total of 5.78 million nights spent in the Metropolis Ruhr in 2009 is still behind the total of 7.35 million in the major urban tourist destinations Cologne and Düsseldorf.

The different trends in the overnight stays reflect the particular economic orientations of the cities, e.g. high amounts of business travels in the fair and headquarter cities Essen and Dortmund. Moreover, there are new leisure attractions that have become the magnets of urban tourism in the region; in Oberhausen there is the CentRO, in Bottrop there are the Movie Park and the alpincenter for indoor skiing, Gelsenkirchen provides the Arena for major sports and culture events and Bochum



3.6.11 Promoting the Ruhr.Topcard



3.6.9 Entrance of the RuhrMuseum on the Zollverein World Heritage site in Essen



3.6.10 "Route of Industrial Culture" sign pointing out to the German Mining Museum

offers a long-lasting musical site. The region as a whole provides the unique feature of the industrial culture, not the least concentrated on the Landscape Park North in Duisburg, a favourite among North Rhine-Westphalian tourists, and the mine and coking plant Zollverein World Heritage site.

The actual positive trends in tourism are the results of a strategic tourism planning that has been initiated by the North Rhine-Westphalian Ministry of Economic Affairs in the 1990s. It has been the main objective of the 1996 "Masterplan Travelling into the Ruhr" to create a unique and asked for profile of the Metropolis Ruhr. Such a special and surprising profile has been created by re-using industrial brown-fields and industrial buildings. A virtue has been made out of necessity, as the many old industrial sites, buildings and plants gained new value by being changed into places and objects of industrial conservation and historical culture; they now serve as leisure areas and sites for the regional population, but also attract visitors from outside the region. The Masterplan also intended to give the scattered sites of industrial culture an

organizational and infrastructural framework. Nowadays, the "Route of Industrial Culture" connects the major anchor points, important workers' housing estates and amazing panoramas. The upgrading of many formerly unused sites was to strengthen the soft locational factors of the region.

The Masterplan is being implemented by Ruhr Tourismus GmbH which gives special attention to a coordinated marketing of the various attractions; products of these intentions are the visitor card "Ruhr.Topcard" and the "Extra Schicht" by which in one night various events at different places in the Ruhr are connected.

The Masterplan also intended to open the region towards an event orientated entertainment. The sites of industrial culture, sports and leisure may have this potential but the postindustrial leisure society also requires new and artificial spheres of great experiences and consumption. Among them is the CentrO area and the Movie Park. But there are also the various musical theaters, first of all the hall of the world's most successful musical "Starlight Express" in Bochum. In the vicinity of the CentrO another musical hall has been built in 1999 which has now turned into the "Metronom Theater". In Essen, the musical hall Colosseum has been opened in an old Krupp workshop in 1995; however, the period of long-running musicals ended here in 2010, as did the musical "Les Misérables" in a purposely built theater in Duisburg. Both halls are now used for changing musical and concert events.

In terms of tourism, the 2006 Football World Championship has been constantly marketed around the stadiums of Dortmund and Gelsenkirchen. The tourism development of the Metropolis Ruhr has been highlighted so far by the events of the Capital of Culture 2010 campaign. The variety of the regional culture industry is well known for its networks of players and venues that have been used in the course of the Capital of Culture 2010 year. From a touristic point of view this major event has been a tremendous success. From 2009 to 2010 the number of overnight stays increased by 13.4 per cent to 6.5 million, with the largest share ever of visitors from abroad, particularly from the Netherlands and the United Kingdom. According to further data provided by Ruhr Tourismus GmbH the city of Essen took particular profit; the overnight

stays increased by 27 percent and the top attraction, the Zollverein World Heritage site, doubled the 2009 number of visitors to 2.2 million. On average, visitors stayed for four nights in the region instead of two nights and spent 28 Euro per day excluding the costs for accommodation; on weekends, all hotels had been better booked than in the years before. Attracted by industrial culture and events one third of the 2010 visitors had been in the region for the first time.

The 2010 campaign has established the Metropolis Ruhr as a European tourist destination. In the future an increase of the tourist figures above the pre-2010 average will have to be achieved without big events. There is, however, a lack of luxury hotels as there is only one 5-star hotel compared to five in Cologne and Düsseldorf. On the other hand the question remains whether high prices



3.6.12 Night of culture in the whole Metropolis Ruhr: Extra Schicht



3.6.13 Entertainment quarter "Bermuda3Eck" in Bochum: Opening party of the U20 Women's Soccer World Championship in 2010



3.6.14 Knirps mine in Bochum

Tab. 15: Gross domestic product per capita

	Gross domestic product per capita, 2009 (Euro)
Bochum	29,987
Bottrop	18,322
Dortmund	31,149
Duisburg	27,565
Essen	42,939
Gelsenkirchen	26,074
Hagen	29,774
Hamm	23,371
Herne	19,998
Mülheim an der Ruhr	31,706
Oberhausen	21,572
Ennepe-Ruhr-Kreis	23,395
Kreis Recklinghausen	20,642
Kreis Unna	21,182
Kreis Wesel	20,446
NRW average	27,733

Source: *it.nrw*

(http://www.it.nrw.de/statistik/querschnitts-veroeffentlichungen/Statistik_kompakt/ausgabe_2_2012/ausgabe2_2012_tab1.html)

(e.g. entrance fees) can generate a demand in the region. In general, there are ambivalent perspectives. The structures that have been developed in the last years and that have been expanded and consolidated in 2010 provide the basis for a booming urban tourism region. But tourist experts warn that leisure facilities that are orientated to consumption and events are quite fast moving. Furthermore it should be questioned whether the Metropolis Ruhr tourism is adjusted to the chances and demands an ageing society might express.

Regarding the musical development in the region, a pensive outlook seems to be appropriate as it has shown that success and failure are very close together in the event businesses. The risks that occur in developing events according to the zeitgeist became apparent by the Love Parade. In 2007, this biggest dancing and music event in the world had been transferred from Berlin to the Metropolis Ruhr for five years; since then it has been a great success for the organizers, the participants and the cities of Essen (August 2007, 1.2 million visitors) and Dortmund (July 2008, 1.6 million visitors) but ended in a disaster in Duisburg in 2010.

This chapter has shown that many aspects had influence on the economic develop-

ment of the region in the last decades and that the dominance of coal, iron and steel has been overcome. However, if these developments are integrated into an overall evaluation of the structural change of the Ruhr and its economic status quo the result is ambivalent.

On the one hand, there is a positive result. The spirit of the region has improved in terms of self-assessment and perception from outside. After the bank crisis has been overcome the regional economy keeps on growing. The economic climate index published by the Chamber of Commerce in 2011 is the second highest since 1990. The enterprises expect a positive development of business activities; single problems as rising prices for resources and energy are no longer referred to the region alone but are related to the national economy. The numerous cultural, sportive and tourism events and the positive spirit of the regional economy are recognized in North Rhine-Westphalia and in Germany as a whole, even if remarkably less abroad; to sum up, the old image of a region in crisis has been substituted by the image of region that is in progress again.

On the other hand, there are also figures that prove the economic lag of the region if compared to the average of the Land. The per capita income is well below the average, the number of employees subject to social insurance contribution has been decreasing for years in the Ruhr whereas it has been increasing in the rest of the Land; employment not only decreased in the industrial cities of the Emscher zone but also in the service-orientated centers of the Hellweg zone. The rate of unemployment is considerably higher than the NRW average.

Thus very likely the Ruhr will never achieve again the outstanding position it had in industrial times when being Europe's most important industrial region. Innovative segments of the economy have been allocated too late so that other regions find themselves at an advantage. Compared with competing regions the Metropolis Ruhr is unique as it is a service region with industrial culture that still exhibits many locational advantages as its size, its location in Europe, the good transport infrastructure, the high population density which causes a high purchasing power etc. From an economic perspective as well, the Metropolis Ruhr is more than an average region.

Tab. 16: Development of the persons employed subject to social insurance contribution (percentages; indexed 1980 = 100)

	The Ruhr	Rest of NRW
1980	100	100
1985	92.1	97
1991	93	100.5
1993	93.7	103.8
1996	98.7	112.9
1998	k. A.	109.1
1999	92	k. A.
2000	k. A.	107.9
2001	89.2	k. A.
2002	k. A.	107.6
2003	88.9	k. A.
2005	89.4	112.1
2007	86.2	108.5
2009	83.3	105.2
2011	84.3	107.6

Source: RVR

(http://www.metropoleruhr.de/typo3temp/pics/SVB_Index_2011_fb2fde09d6.jpg)

Tab. 17: Unemployment rate June 2012

Urban and Rural district of the Ruhr	Unemployment rate 6/2012 (percentages)*
Bochum	9.8
Bottrop	8.6
Dortmund	13.0
Duisburg	12.8
Essen	12.4
Gelsenkirchen	14.4
Hagen	10.1
Hamm	10.5
Herne	13.2
Mülheim an der Ruhr	7.8
Oberhausen	11.6
Ennepe-Ruhr-Kreis	7.2
Kreis Recklinghausen	10.5
Kreis Unna	9.4
Kreis Wesel	7.1
NRW, total	8.0

*percent of all civil workforce (depending civil workforce, self-employed and helping household members)

Source: RVR

(<http://www.metropoleruhr.de/regionalverband-ruhr/analysenstatistik/regionalstatistik/arbeitsmarkt/arbeitsmarkt-monatlich.html>); Statistik der Bundesagentur für Arbeit (http://statistik.arbeitsagentur.de/Navigation/Statistik/Statistik-nach-Regionen/Politische-Gebietsstruktur/Nordrhein-Westfalen-ab-01-2010-Nav.html?year_month=201206)

4. METROPOLIS RUHR – DEVELOPMENT PROCESSES

4.1 Housing, traffic and logistics

Housing

It has already been mentioned that the Ruhr has developed from a sparsely populated agrarian landscape to an urban-industrial region of high density. It has also been mentioned that various post-war urban guidelines (the car orientated city etc.) left their imprints on the region and its housing quarters. Life in the Metropolis Ruhr has in the last years also been influenced by programs that accompanied the post-industrial urban development by means of public subsidies (Soziale Stadt NRW, URBAN I and II, Stadtumbau West). It remains to be stated that the housing situations in the Metropolis Ruhr are affected by the special economic and social circumstances of the region, i.e. the extensive supply of brownfields, the demographic change and the precarious situation of the local budgets; in addition, the decline of public housing has deregulated the housing market and stressed the lower segment. Recent examples shall now be presented that explain the heterogeneity of housing in the region and that show that the actual housing situation is increasingly implemented into social and ecological trends.

The recent trend “back into the city” can also be recognized in the Metropolis Ruhr. After decades of suburban expansion a new urbanity is being assigned to the core cities. Well educated young people and well-off old persons with a consumptive life-style move back into the centers and prefer new and old luxurious houses. This trend cannot (yet) be proved empirically. But the cities promote this development by campaigning for these new citizens whose in-migration has become a normative goal of the development policy, not

the least for monetary reasons. In Dortmund on a former barracks area close to the arterial road B1 and the city-center the Stadtkrone East project has been started. More than 2,000 new jobs (IT businesses, insurances, services) have been allocated and a housing quarter for sophisticated demands has been realized. The housing area is still being extended as the easily accessible location, the attractive landscape and the select architecture meet an increasing demand. In the meantime a kindergarten has been built and a private secondary school been opened.

The large housing estate Clarenberg has been built in the steel workers’ district Dortmund-Hörde in 1973. More than 3,000 persons live in 25 blocks with 4 to 17 floors; 25 percent of them have a migration background. Unlike other large housing estates there are no vacant flats. On the contrary, there is a long waiting list because since 1997 severe damages have been removed by means of some 20 million Euros of public and private investments. The building fabric has fundamentally been renovated, the facades have been given an artistic make-up and new open spaces have been laid out. A house service (conciierge) and video surveillance have been installed; the participation of the tenants has been improved. Unlike the New Town Wulfen (s.a.), no buildings have been dismantled or demolished, but the costly modernization has changed Clarenberg into an asked for housing quarter in the lower price segment.

Duisburg-Marxloh has been affected by the steel industry as well. Unlike Dortmund-Hörde there is still a working ThyssenKrupp steel works in the immediate vicinity to the housing quarters of the district. Since the early 1960s this workers’ quarter has been the main destination of



4.1.1 Dortmund-Clarenberg after modernization

migrants, particularly from Turkey. The ThyssenKrupp works area encloses Marxloh on two sides, the 15 percent share of green space is clearly below average, and ThyssenKrupp is still the biggest employer. The motorway A59 divides the district not only geographically but also ethnically; east of it there is middle class and upper middle class quarter with predominant German population and in parts a high housing standard. The area west of the motorway, however, is adjacent to the industrial site and the living quality is clearly lower. In some housing blocks the share of the Turkish population is above 90 percent, an ethnic segregation is prevailing. There are 17,500 inhabitants in the Marxloh district 58 percent of which have got a migration background, another 35 percent are foreigners (city of Duisburg averages: 32 and 15 percent, 2005/2008). As in other districts of the region, the share of foreigners goes along with an above average birth rate and an above average share of children and young persons. Nevertheless the Marxloh district has lost 30 percent of its population in the last years by out-migration. Particularly the migration balance of the German population has become negative due to the socio-economic situation, severe environmental problems, bad housing conditions and the high share of foreigners.



4.1.2 Former British barracks site in Dortmund East, 1996



4.1.3 Conversion of the former British barracks site in Dortmund East, 1996



4.1.4 New housing quarter on the Dortmund Stadtkrone East, 2009

Since the 1980s strategies of an integrated urban renewal have been applied in the Marxloh district to improve the housing conditions as well as the social, cultural and economic situation. Since 1993 these integrated aid programs have been applied in the course of the North Rhine-Westphalian action program for districts with particular demand of renewal and in the course of the EU program URBAN (1995 to 2000). In the meantime some favourable developments have been initiated. The local ethnic economy is now regarded as an important part of the district, because the readiness to invest exhibited by non-German enterprises is appreciated. Local politicians wholeheartedly emphasize the internationality of the district, a desegregation that could be achieved by reducing the share of population with migration background is no longer the aim of development. In contrast, the integrated renewal initiative tries to achieve a strengthened local identity, an improved housing quality, a positive change of the image and a reduction of conflict in order to stop the socio-economic decline.

The Marxloh example reveals the dilemma of the urban and housing policies. On the one hand, the concentrations of poverty shall be abandoned and transfers from ethnic segregations into the social majority shall be made possible, on the other hand, general economic and social trends reinforce the socio-economic and ethnic segregation. As public means increasingly become deficient, districts like Marxloh are more and more forced to rely on their own development potentials. In Marxloh a prime potential are the efficient structures of co-operation that have been developing since the 1980s.

As already mentioned in 2.3, Germany's largest mosque has been dedicated in Marxloh in 2008; its costs were seven million Euros with the Land participating with 3.2 million. Unlike other cities where large mosques are going to be built, there were no protests against such a building in Duisburg. Quite obviously, decades of common working and living have ceased the reservations; moreover, the mosque community has been very cooperative. Next to the mosque an open education and meeting center has been built and the community agreed not to build a tall minaret and to refrain from a muezzin calling. In total, all groups involved regard the new building as enriching for the district and as a symbol of a successful integration.

Further south along the boundary of the KruppThyssen site there is the district of Duisburg-Bruckhausen where the structural problems are severer than in other deprived districts of the region. Despite of the measures that have been undertaken to improve the housing and living conditions, Bruckhausen is characterized by a high rate of unemployment, a high share of foreign population, bad housing conditions and a pronounced amount of vacant flats. The housing quarters of Bruckhausen are in the immediate vicinity to the Krupp-Thyssen steel works with its new blast furnaces, separated only by a street and a wall that surrounds the industrial site. This close proximity of housing and working that has been developing here since 1895 has once been seen as favourable. Today, however, only the high air and noise pollution, the exceedance of respirable dust and pollutants limit values, the dilapidating facades, the not existing free spaces and the missing infrastructure are recognized.



4.1.5 Not only churches and mosques but also the big Hindu temple in Hamm demonstrate the wide range of religions in the Ruhr

After all, the efforts of the last decades had minor effects in the fields of education (primary school) and culture ("Kulturbunker") but could not fundamentally change the conditions especially because the new blast furnaces will have a lasting industrial effect on the housing quarters. Therefore the local planning authority decided in 2006 to start the dismantling of Bruckhausen. In the next ten years some 300 houses will be torn down; despite of the vacancies some 2,000 persons will be resettled with the support of a social plan. After the dismantling the construction of an anti-noise barrier will be combined with the layout of a green belt (250 m wide) that will work as buffer between the industrial site and the housing quarters and will improve the quality of housing and living. The costs of 72 million Euros will equally be shared between ThyssenKrupp on the one side and by the state of North Rhine-Westphalia and the European Union on the other.



4.1.7 Dieselstraße in Duisburg-Bruckhausen



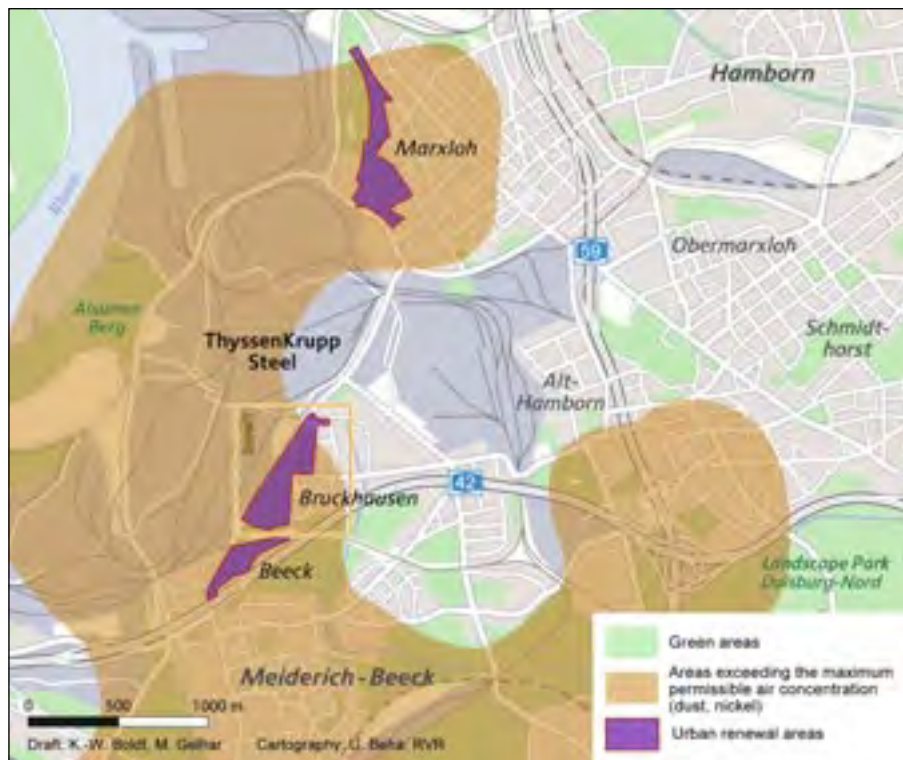
4.1.6 Ethnic segregation in Duisburg-Marxloh

The local inhabitants fear that the existing community will not survive in Bruckhausen and they are anxious that the development of the green belt will cause increased rents and consequently an expulsion of the population. However, by investing in this green belt ThyssenKrupp invests in the operational capability of its production site Bruckhausen, so that the environmental stipulations will be fulfilled even if the site will be expanded. It is widely held that this development is the logical consequence ensuing from the severe deprivation of the housing quarter Bruckhausen. As the demographic change proceeds such a dismantling might prove as a sensible final solution in other cities as well; in shrinking cities housing quarters that increasingly lack demand have not to be maintained any more.

Since the shut-down of the Consolidation mine in 1993 an increasing number of brownfields, a shrinking population and low public budgets have been the challenges for the Gelsenkirchen districts of Bismarck and Schalke-Nord. Here as well the living quality and the local economy have been strengthened by using the brownfields left behind by the industry for new developments. From 1995 to 2004, this revitalization of Gelsenkirchen-Bismarck/Schalke-Nord has been supported by the joint national and North Rhine-Westphalian program "Districts with particular development demands – Social City".

Both districts happened to see considerable population losses. The decline of the coal, iron and steel industries caused many persons of the working age to move out of Bismarck and Schalke. From 1961 to 2010, the population decreased by 5,000 to 21,000 persons. A remarkable event in the period of decline was the closure of the Consolidation mine. 4,000 miners were set free, the rate of youth employment raised, the purchasing power of the population decreased and many houses lacked investments for modernization. Extensive brownfields, facades needing repairs and vacancies characterized the urban appearance of Bismarck/Schalke-Nord.

Since 1995 the former site of the Consolidation mine (27 hectares) has been regenerated into the new center of the district in the course of applying the integrated district program "Social City" (s. fig. 5.1.3). The head frame and a power house have been converted into



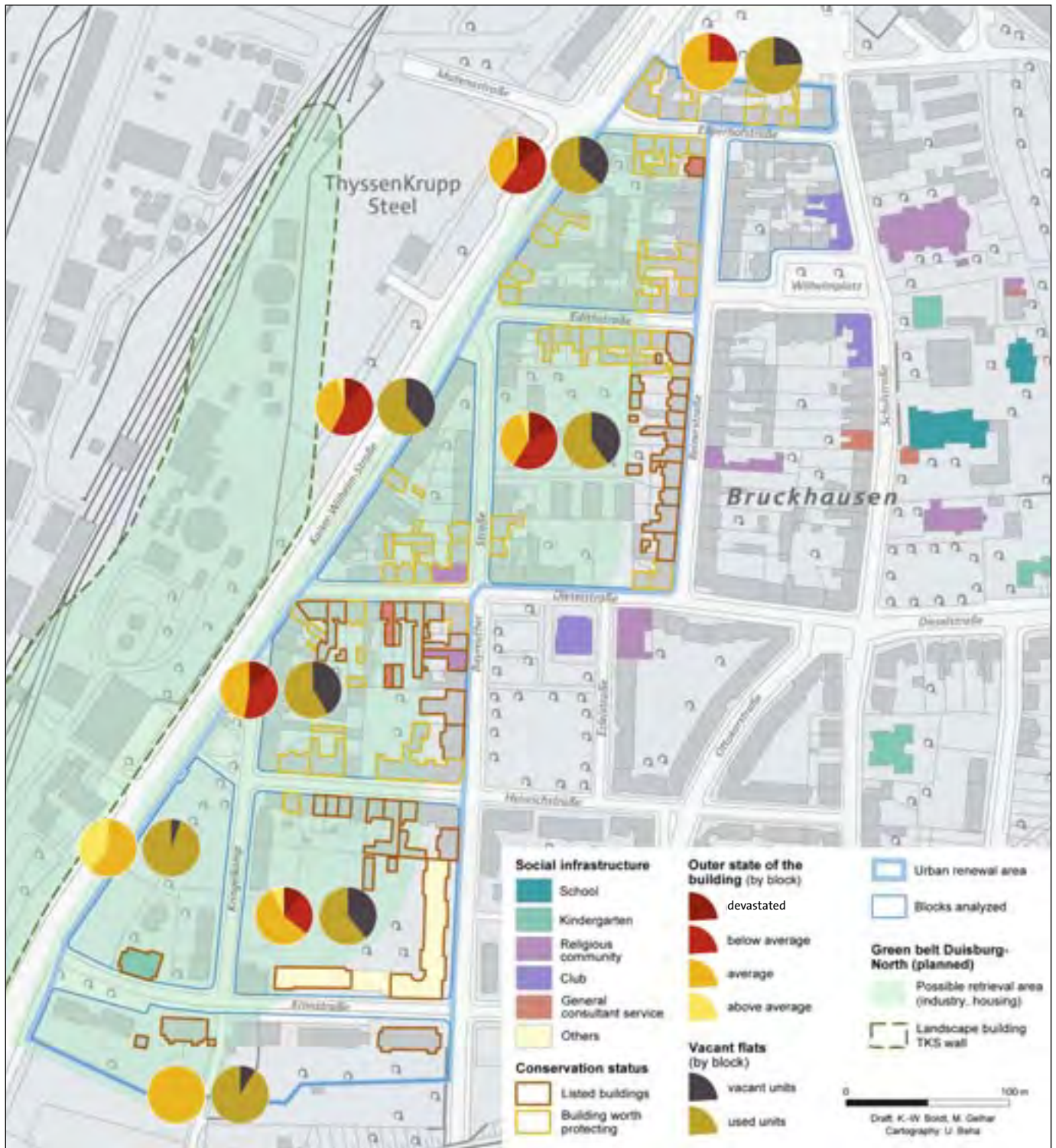
4.1.8 Air pollution in Duisburg-Bruckhausen, 2005



4.1.9 Extension of the planned green belt in Duisburg-Bruckhausen

a center of culture and events; a wide-ranging cultural offer has been established in the middle of Gelsenkirchen-Bismarck (youth theatre, music center with 38 rehearsal rooms for local bands, see fig. 2.5.4; mosque and Turkish community center). New housing quarters have been established; new shops and an attractive park have been planned and realized in cooperation with the population. Another successful lead project was the opening of a new comprehensive

school which has been well established as multi-cultural and ecological district school and which is regionally appreciated for its innovative school program. In the immediate vicinity of this school the first solar-powered housing estate of the Metropolis Ruhr has been erected, comprising 74 detached houses. As a result of all these measures the out-migration of the population could almost be stopped and Bismarck achieved a positive inner-urban migration balance.



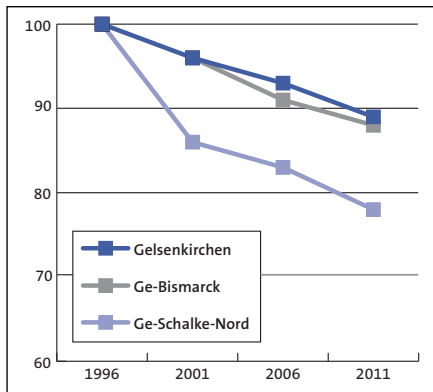
4.1.10 Building conditions and social infrastructure in Duisburg-Bruckhausen

To create an innovative city worth living in it was the aim of a 2010 competition launched by the Initiativkreis Ruhr. The cities of the Ruhr could apply for the title "InnovationCity Ruhr". The city chosen is to be a model of the future climate city in terms of energy efficient architecture, housing and living together. In this city both the consumption of energy and the carbon dioxide emissions will be halved, with the quality of life increasing. The city of Bottrop has been the winner of the

competition and is going to apply a sustainable concept that might be transferred to other cities in the future. In 2012 more than 100 projects have been started in the Bottrop, the InnovationCity Ruhr. Three existing houses – a detached house, a multi-story housing block and a commercial building – are taken as examples and are converted in plus-energy-houses that produce more energy than is needed by the households living in them. The expansion of a decentralized energy supply

for private, industrial and public purposes shall be enhanced and the energy efficiency shall be increased thereby.

In general, it can be stated that the districts of the northern Ruhr and particularly of the Emscher zone still have to cope with the consequences of the industrial impact. It was here that the old industries had reached their maximum stage of development and it is here that the impact caused thereby is still very strong. The



4.1.11 Population development in the city of Gelsenkirchen and its districts Bismarck and Schalke-Nord, 1996 to 2011 (indexed 1996=100)

examples presented have shown that the change of the economic structure also requires an urban development that is innovative and pragmatic alike in order to maintain or to create an attractive environmental quality for housing and leisure.

Traffic and transport

A major function of metropolitan areas is their gateway function, i.e. they have to give access to people, knowledge and markets. This is a precondition of a thriving economic development in a globalized world that requires a quick processing of transports. This demand is particularly true for the polycentric metropolis Ruhr as its geographical position in the middle of



4.1.13 Logo of the InnovationCity Ruhr campaign

Europe is a locational advantage. This favourable position should be used in an optimal way by outbound connections and an inner network. That is why sound motorway, railway, shipping and air traffic systems are of utmost importance.

Areas used by any form of traffic sum up to 7 percent of the total Ruhr area. Because, tendency increasing, more than every second inhabitant of the region is a car-owner the motorized individual traffic is important in the Metropolis Ruhr. The network of 4,700 kilometers of regional roads is highly connected, with a remarkable share of motorways; the share of the Metropolis Ruhr is 12.9 percent, in contrast to the 7.4 percent NRW average and just five percent for the whole of Germany. Due to the massive freight and long distance transports and the high amount of commuters traffic, jams on the motorways and the arterial roads are the normal case. Road freight transports and long-distance road traffic have increased above average in the last years because the region has

been well connected since the 1970s. There is the motorway A2/A3 connecting the Metropolis Ruhr with the economic regions of Hanover and Cologne, the A1 connects it to the German North Sea ports and the A3 to the ports of Rotterdam, the A45 provides the connection to the Rhine-Main conurbation and the A44 into the Kassel area. The motorways of the region are also important transit lines between Western and Eastern Europe. Because this traffic will increase in the future a constant maintenance and extension of the most congested traffic axes is carried out, quite recently the A40 extension to six lanes between Essen and Dortmund.

The overloading of the road traffic becomes also apparent when the modal split data of the Metropolis Ruhr are analyzed. Statistically the modal split exhibits the distribution of the transport quantities on the various means of transport. The motorized individual traffic is by far the most frequent mean of traffic in the Rhine-Ruhr region and thus the main cause of the daily jams and the overall problems.

Traffic jams are a big and fundamental problem in all modern conurbations; they cause stress and enormous delays. German car-drivers spent approx. five billion hours per year in traffic jams thus causing extremely high costs. The risk of traffic jams is high in the Metropolis Ruhr simply because of its size and regional position. There are numerous efforts to understand the emergence of traffic jams and to find solutions. Since 1997 there is the unique chair for the physics of transport and logistics at the University Duisburg-Essen. Traffic jam research has produced analytical models to explain jams and to predict and simulate them. In the meantime these traffic simulations are adopted by an online traffic information system for the whole of North Rhine-Westphalia (www.autobahn.nrw.de). Even if traffic jams cannot be prevented by this system, it reliably calculates the time necessary for a planned route. As a result of their research, the physicians recommend not to exit a motorway in a case of jam and re-enter it again behind the jam as this very seldom brings a gain of time. Changing the lane in a traffic jam is not worth the trouble either. Abrupt braking should be avoided, a jam should not be re-ended too close, and speed should be accelerated after the jam has dissolved. In general, to avoid traffic jams on motorways a speed limit would help to balance the differences in speed that are the main



4.1.12 Protestant comprehensive school and solar-powered housing estate in Gelsenkirchen-Bismarck

Tab. 18: Degree of motorization (cars by 1,000 inhabitants) in metropolitan regions

Rhine-Main	589
Munich region	582
Hamburg region	541
Metropolis Ruhr	510
Berlin region	450
Île-de-France	439
Greater London	343
Amsterdam region	336

Source: Wirtschaftsförderung Metropole Ruhr: *Mobilität in der Metropole Ruhr im Vergleich mit anderen Metropolen – Analysen, Leitbild, Konzepte, Maßnahmen. Kurzfassung, State: August 2008; p. 7*



4.1.15 Motorways network and airports in the Ruhr

causes of traffic jams. One of the devices developed by this traffic jam research is the traffic lights controlled access on a motorway that has been implemented on many slip-roads in the region.

To reduce the massive lorry traffic on the regional motorways the idea of “CargoCap” has been developed at the Ruhr University Bochum. This system consists of underground tubes in which self-driving capsules (caps) that can convey two Euro palettes transport the freight from one logistics and freight center to another. In comparison to lorry transport this system can deliver pieces of freight faster, better on time and eco-friendly. To put CargoCap into reality a new infrastructure – a network of tubes with an inner diameter of 2 meters – had successively to be constructed. Within six years the first and cost-efficient track could be operated over the 80 kilometers dis-

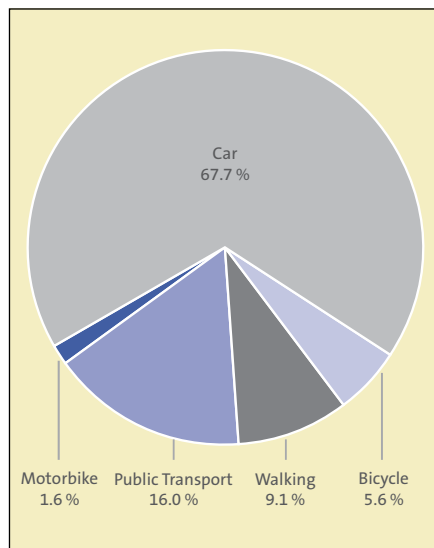
tance between Dortmund and Duisburg; this track could become the spinal cord of a regional CargoCap tube network.

A useful and already existing solution to relieve the lorry freight traffic is the combined transport (rail/road, road/waterway and rail/waterway), as containers can be transported not only on roads but also on rails and waterways. This is important because freight transport on the regional waterways is still below the capacity limit, even if the transport volume of the inland navigation is constantly increasing. However, the higher costs that accrue with cargo processing and the greater complexity of the transport chain prevent enterprises from using the combined freight traffic.

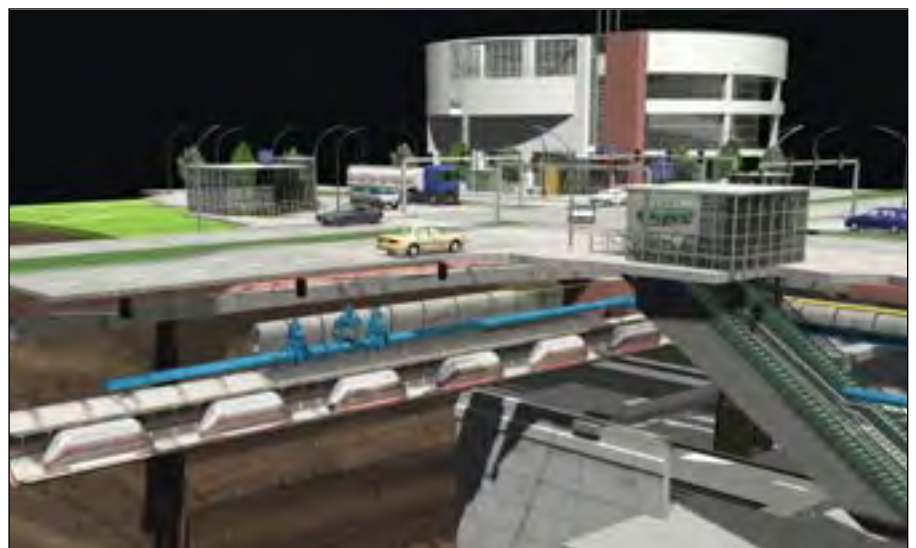
As the waterways system has been very well developed in the industrial past, the

network of canals and harbors is able to meet the modern logistical demands. With 270 kilometers of inland navigation routes and a variety of harbours and terminals it is Europe’s densest harbour and canal system. Next to the river Rhine and the navigable part of the river Ruhr there are the Wesel-Datteln Canal, the Datteln-Hamm Canal, the Dortmund-Ems Canal and the Rhine-Herne Canal. These canals have purposely been built as transport routes and had to meet the 20th century demands of coal mining and the iron and steel industries.

In 1899, the Dortmund-Ems Canal has been laid out pushed by the basic industries in order to export coal from and to import ores into the eastern part of the Ruhr. To overcome 14 meters difference in height on the way to Dortmund a ship lift has been constructed between Castrop-



4.1.14 Modal split Rhine-Ruhr



4.1.16 Model of a CargoCap station



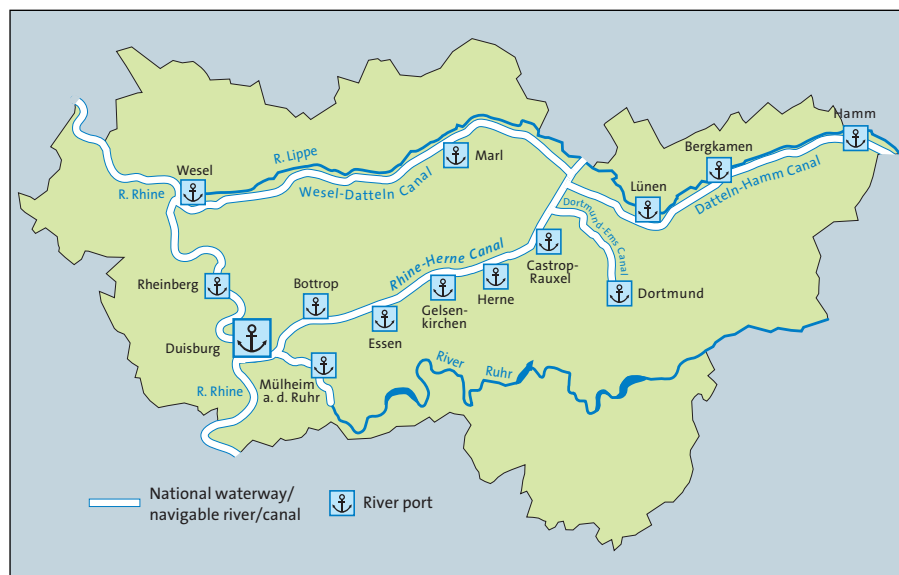
4.1.17 Section of the Duisburg ports: the former North harbour has been filled up in 2009 to gain more area above the flood mark; on the banks of the South harbour combined freight traffic facilities are to be seen

Rauxel-Henrichenburg, Datteln and Wal- trop; later a second lift and two sluices have been added.

Since 1914, the Rhine-Herne Canal has served as a connection between Dort- mund and Duisburg. But very soon its traffic has been so busy that, since 1930, the Wesel-Datteln Canal has been built as a spillway section in the north. Since 1914 as well, the Datteln-Hamm Canal, built as a branch canal, opened up the area around Hamm. With all canals being directed into

this area, Datteln became the hub of the regional canal network (“Dattelner Meer”).

In total, there are 12 public harbours and 30 works docks in the region. Worth mentioning are the harbours in Duisburg and Dortmund, the first being Europe’s largest inland harbour, the other Europe’s largest canal harbour. The inland navigation of the region is an energy efficient, eco- friendly and safe mode of traffic that holds a general growth potential.



4.1.18 Waterways and harbours in the Ruhr

Tab. 19: Cargo handling in the Metropolis Ruhr harbours and in Hamburg, 2010

Harbour	Cargo handling (million tons)
Duisburg	52.9
Marl	5.0
Gelsenkirchen	3.8
Hamm	2.7
Rheinberg	2.0
Dortmund	1.7
Essen	1.4
Lünen	1.4
Bergkamen	1.2
Bottrop	1.0
Herne	0.9
Mülheim an der Ruhr	0.8
Wesel	0.6
Castrop-Rauxel	0.5
Hamburg	121.2

Sources:
http://www.it.nrw.de/presse/pressemitteilungen/2011/pdf/108_11.pdf und
<http://www.hafen-hamburg.de/node/590/backlinks>

Because an efficient railway network has been the precondition of the regional industrial development it has been extensively laid out already in the 19th century. Still today, the network with its five big marshaling yards in Hamm, Wanne-Eickel, Oberhausen-Osterfeld, Schwerte und Hagen is very functioning for rail freight services. The combined freight traffic, i.e. the combination of road, waterways and rail freight traffic is served at the container terminals in Duisburg, Voerde, Hagen, Herne and Dortmund. Nevertheless, rail freight traffic could be used more in the Metropolis Ruhr in order to relieve the overstrained road freight traffic.

The rail passenger traffic can rely on a dense network serving national, regional and local lines. There are 70 railway stations in the Metropolis Ruhr that shall gradually be modernized according to the development plan of the Land NRW; and to relieve the road traffic the railway network shall be extended. Due to the high densities of both population and working places public transport in the Metropolis Ruhr is of greater importance than in less populated areas. Yet the modal split shows that the share of public transport is quite small even if the number of public transport passengers has increased in the Rhine-Ruhr region in the last years (1.1 billion passengers in 2010); a public transport ride is cheaper and often faster



4.1.19 Sluice Park in Waltrop (from left to right): old ship lift (1899 to 1969), old air lock (1914-1989), new air lock (since 1989) new ship lift (1962 to 2005)



4.1.20 Waterway hub Datteln: Dortmund-Ems Canal (bottom), Datteln-Hamm Canal (to the right), Wesel-Datteln Canal (to the left) old and new speed of the Dortmund-Ems Canal (top)



4.1.21 Europe's largest canal harbour in Dortmund

than using the car in times of rising petrol prices and everyday traffic jams. In total, there is in parts a competition between the transport of persons and the transport of goods on the same intensively used railway network. On the other hand, the more than four million passengers per weekday have brought the public transport of the Verkehrsverbund Rhine-Ruhr (VRR, Transport Association Rhine-Ruhr) to its capacity limit. The peak period overloads and delays of the public transport have generated the plan to look for an additional and efficient rail-bound mode of traffic.

For the lines between the Rhine area and the Metropolis Ruhr that are intensively used by daily commuters a system of accelerated regional trains is planned. This Rhine-Ruhr Express (RRX) moving on a high speed line between Cologne/Bonn and Dortmund shall become the premium offer (fast, comfortable) of public transport. Due to cuts of the national budget RRX is unlikely to be realized before 2020.

As far as air traffic, the Metropolis Ruhr has indirect access to the international airline network via the international airports in Düsseldorf and Cologne/Bonn. The regional airport Dortmund, opened in 1926, has gained importance for business and holiday flights after a 2,000 m runway and a new terminal building have been opened. The airfields in Essen/Mülheim, Marl and Dinslaken are nothing but an addition to the system. It has been missed in the 20th century to provide the region with an international airport that is appropriate to its size and economic power. So the international connections have to be operated via the airports Düsseldorf, Cologne/Bonn, Frankfurt and Amsterdam; an extension of the existing smaller airports and airfields or even the construction of a new major airport is impossible to realize in the densely populated Metropolis Ruhr.

The traffic infrastructure is one of the most important determinants of the future development of the Metropolis Ruhr. The demands will increase as participating in global processes increasingly requires efficient and faster logistics. In addition, the individual demands of the population for the traffic infrastructure are constantly growing. In the Metropolis Ruhr wide ranging road, rail and waterways networks represent a modern traffic infrastructure; at the same

Tab. 20: Rail freight traffic and public transport

	Rail freight traffic as share of total freight traffic (percentages)	Public transport as share of total person transport (percentages)
Metropolis Ruhr	19.2	11
Hamburg region	13.3	16
Berlin region	10.0	25
Île-de-France	4.5	18
Greater London	2.5	19

Source: Wirtschaftsförderung Metropole Ruhr: Mobilität in der Metropole Ruhr im Vergleich mit anderen Metropolen – Leitbild, Konzepte, Maßnahmen – Kurzfassung, State: August 2008, p. 11 and p. 16

time, the region is suffering from massive overloads despite of all efforts that have been made to alleviate them. According to traffic jam research, a reduced traffic impact can be expected not prior to 2025, a positive side effect of the demographic change.

Logistics

Logistics is defined as the planning, handling and controlling of flows of material, information, values, persons, and energy along a value-added chain or a supply chain. The field can be divided in logistics of warehousing, transport, procurement, production, distribution and disposal. Logistics, one the supported competence fields in the Metropolis Ruhr, is of great economic importance. In 2008, some 5,700 logistics enterprises with nearly 80,000 employees generated a turnover of 18.7 billion Euros, i.e. 8.3 per cent of the regional gross domestic product (European average: 5.4 per cent). As there are additional 80,000 logistical jobs in other economic branches, the field of logistics can reasonably be regarded as a motor of the regional structural change. The geographical position of the Ruhr in the middle of Europa gives access to some 50 million consumers within the reach of three driving hours. The European expansion to the east was to strengthen this position even more, with Duisburg and its largest European inland harbour being the most important European interface of road freight, rail freight and ship's freight. As mentioned above, the system of waterways is well developed, and the river Rhine connects the region to the North Sea and numerous upstream ports. The dense canal system gives access to the North Sea via Emden and to the Baltic via the rivers Weser, Elbe and Oder. At the crossing point of important north-south and west-east traffic lines (Rhine ports and canal ports, motorways and railway tracks) Duisburg and its harbour have been established as the most important logistics site of the region.

The port of Duisburg which is called at by 20,000 vessels per year is the central reloading point in the hinterland of the great sea ports Amsterdam, Rotterdam and Antwerp (ARA ports). Since the 1990s it holds the status of a sea port and comprises a free port; thus goods that are shipped from all over the world to Duisburg, can be stored there tax free and can be refined and further transported. The connections to international ports are intense, as the local shipping companies keep up river-sea lines to about 100 ports. The port authority keeps up a strategic alliance with the corresponding authorities of Dortmund, Bilbao, Memphis (USA), Xiamen (China), Rotterdam, Middelburg and Antwerp.

In 2011, the Duisburg port authority ("duisport") had employed 700 persons. There is a total of more than 40,000 persons employed working in 250 port related enterprises and representing 14 per cent of the total Duisburg labour force; a turnover of 2.7 billion Euros has been generated. The total harbour area comprises 1,350 hectares; the cargo handling uses 21 docks (water area 180 hectares) with quaysides of 37 kilometers, 16 kilometers thereof with side tracks. In 2011, 64 million tons of goods have been handled; if the cargo handling in the eight company ports is included, the total handling sums up to 125.6 million tons. With container handling constantly increasing since 2006, there has more general cargo been handled than bulk goods.

Tab. 21: Airports – Passengers and air freight

Airport	Passengers (millions)	Air freight (tons)
Frankfort	53.00	2,308,000
Düsseldorf	18.99	88,164
Cologne/Bonn	9.85	626,120
Dortmund	1.75	33
Münster/Osnabrück	1.33	131

Source: Verkehrsaufkommen Flughäfen (2010) Luftverkehrsbericht 2010, S. 60

The port offers a wide range of services to the customers. There are eight container terminals with 16 container gantries; two of these container terminals are equipped with up to nine parallel rail tracks allowing the simultaneous handling of block trains. In addition, there are two roll-on/roll-off sites to load and unload RoRo ships; the goods are transported on and off the ships by lorry or railway.

The development of the port of Duisburg goes back to the 16th century. The first port in the present district of Duisburg-Ruhrort has been but a mooring place capable to take small trading vessels heading for Holland. In the first half of the 19th century the outer and inner harbours close to the historical center of Duisburg have been reloading points, at first for mine timber and coal, later for grain. In the 1960s the combined and constantly extended ports of Duisburg and Ruhrort have fundamentally been re-structured meeting the demands that have been caused by the handling of mineral oil and containers. In Ruhrort container terminals have been built that allow trimodal traffic (road, rail, waterway).

In the 1990s, plans have been promoted to use new areas in order to extend the port of Duisburg and change it into an even larger logistical interface of road, rail and waterway traffics. To achieve this purpose the site of the former Krupp steelworks in Duisburg-Rheinhausen on the left side of the river Rhine is being used. After the steelworks had been shut down in 1993, it was dismantled, industrial halls were converted and the area was marketed as 'logport'. The logport area has become a symbol of the structural change in Duisburg, as nearly the complete site of 265 hectares has been leased to large logistics companies (e.g. Kühne + Nagel, Rhenus logistics, Schenker). It also includes the Duisburg Intermodal Terminal (DIT) which has become the logistical center of the Duisport harbor group and is intensively used; it allows an adequate interchange between ship, railway and lorry.

The success story of the logistics site Duisburg is still going on. In 2008, the logport 2 logistics center (35 hectares) has been opened which is the second phase of the harbour extension on the right side of the river Rhine, right opposite to logport 1. In addition, there is the logistics park Kasslerfeld and the logistics center Ruhrort.



4.1.22 Krupp Hüttenwerk in Duisburg-Rheinhausen, 1980



4.1.23 Duisburg: Logport construction site, 2002

Next to Duisburg, the modern traffic infrastructure of the Metropolis Ruhr has brought forward other interchanges that serve as logistics hubs. Even if it cannot be compared to Duisburg inland harbour, the Dortmund harbour has become Europe's largest canal port with three million tons of cargo per year (mainly containers, building material, mineral oils, iron and steel, scrap, coal and coke). According to

Dortmund's image as a technology site, e-port-dortmund has been allocated in the port in 2002; it is a start-up and competence center to support the allocation of innovative new logistics enterprises and the expansion of existing ones.

Another traffic hub of the Metropolis Ruhr is the Kamener Kreuz; its direct motorway connections provide ideal locational

conditions for logistics companies. The Kamener Kreuz connects the important six-lane motorways A 1 (North-South axis) and A 2 (West-East axis) and is used as an interchange by 160,000 vehicles daily. The locational potential has attracted some enterprises already many years ago. Since the 1970s extensive retailing outlets and markets (furniture, toys, gardening, DIY, cars) have been established in the vicinity



4.1.24 Duisburg: Logport, 2012

Tab. 22: Cargo handling in Dortmund harbour

Main items	2011 (percentages)
Container, incl. cargo	33.4
Mineral oils	22.4
Rocks, soils, gravel, sand	21.2
Iron and steel, iron and steel goods	10.0
Scrap	8.6
Coal and coke	3.9
Wood and wooden goods	0.2
Grain	0.2
Others	0.1
Fertilizers	0.0
Foodstuff	0.0
Pulp, paper	0.0
Total	100.0

Source: Dortmunder Hafen AG

of the exits; they were followed by transport and removal enterprises. From 2000 onwards, the area turned into an important logistics site when large enterprises were allocated. In 2007, Deutsche Post DHL Exel Supply Chain opened the Logistik Campus Unna; on 240,000 square meters logistical services are provided for cosmetic brands, up to 1.5 million palettes are turned over per year. The DHL central warehouse for Karstadt Deutschland, providing 1,500 jobs, has been allocated as well. Further industrial estates to be used by logistics enterprises are planned.

Next to the motorway A 2, there is another logistics site on the Ellinghausen waste tip

in Dortmund. In 2003, IKEA opened a distribution center from which to manage home delivery for customers in Germany, Belgium and the Netherlands; in 2007, the complex has been enlarged to a European distributions center. The full-automated high-bay warehouse provides a capacity for 430,000 palettes; 10,000 different small-volume articles and promotion merchandise are stored and delivered from here to

all of the 180 European shops of the company. The delivery and dispatch is carried out by means of more than 1,000 loading ramps that are reached by 500 lorries daily; the site has its own rail siding. More than 1,000 persons work directly in the distribution center; another 300 are employed by subcontractors. Due to shortage of capacities the center has been extended for another time in 2010.



4.1.25 Kamener Kreuz, 1980: the ideal shamrock of a motorway interchange



4.1.26 Kamener Kreuz, 2012: optimized traffic routing

4.2 Education and research

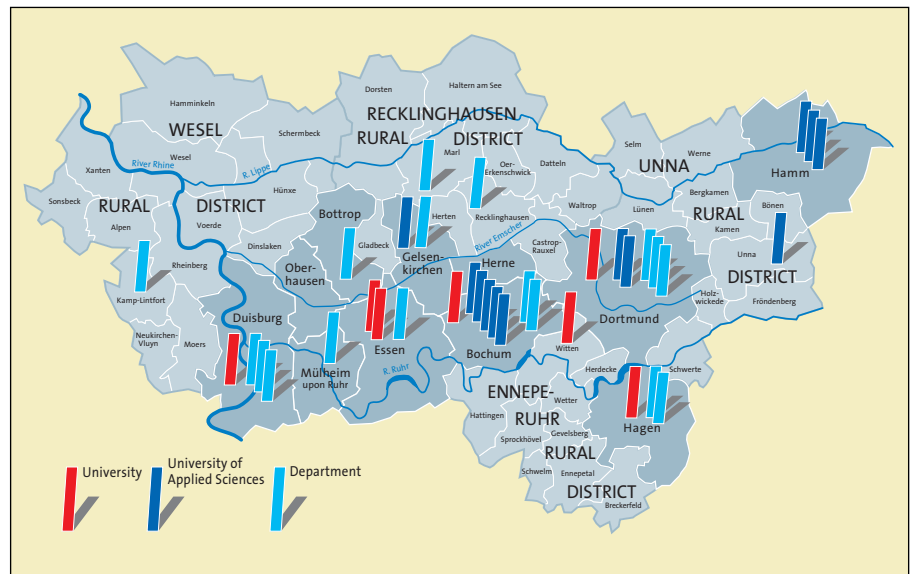
As in all metropolitan regions of the world knowledge and expertise, produced and delivered by institutions of education and research, are important locational factors. For education influences the ability to innovation and creative education milieus produce a workforce potential fit to meet the corresponding demands. The Metropolis Ruhr provides a dense network of educational institutions. There are some 1,700 schools and 20 universities, universities of applied sciences and schools of art taking 560,000 pupils and 180,000 students. But this dense network has been developed not until the last decades. As already mentioned, up to the 1960s the region suffered from an “educational blockade”. Since then the actual dense network has been developing and is now being optimized. Headlined “Bildungsregion Ruhr 2018” (Education region Ruhr 2018), the urban and rural districts of the region pursue an educational profiling of the region and an increase in quality.

Education

In order to optimize the regional education system education analyses are carried out since 2010 that describe the actual state and give recommendations for action; it is divided into modules along the individual educational biography from pre-school to university.

The pre-school education in the Metropolis Ruhr is widely depending on socio-spatial parameters. The regional poverty rate of 24.6 per cent is considerably higher than the NRW average (16.8 %). The necessity of language training is above the NRW average, with remarkable differences within the region. School entry studies reveal the influences of various social milieus concerning divergent potentials in terms of incentives and support. Day care facilities and child care facilities for below 3-year olds are claimed for below average. That is why studies recommend to extend the childcare facilities for below 3-year olds and to increase the attendance quota of these facilities by children from precarious social environments. A systematical pre-school language training is recommended as well.

A pre-study on the educational situation maintains that the Metropolis Ruhr provides a dense network of primary and



4.2.1 Distribution of universities and universities of applied sciences

secondary schools, but facing the comprehensive quantitative and qualitative changes it is doubted whether the structure of the regional school system still meets the needs. The demographic change is going to influence the demands for school forms, in particular for the secondary schools. In the course of a recommended reformation of the regional school structure more all-day schools shall be provided and the integration of and the support for children from migrant families shall be enhanced in sub-regions with strong needs.

The study stresses that vocational training and advanced and further training have grown in importance and that the transfer from school to job is a central field of action.

As far as the informal education is concerned, the impact of the relevant facilities on the development and education



4.2.2 Day care center “Lummerland” in Breckerfeld



4.2.3 Public primary school Veen, Alpen community, district of Wesel



4.2.4 Institute for Waldorf pedagogics in Witten, focusing on inclusion und intercultural relations

of children and youths is often underestimated. The programs and initiatives offered are particularly used by children and young persons from migrant families and those with lower educational levels. A qualitative and quantitative survey of these offers and their impacts is recommended.

With reference to the tertiary education, the education blockade mentioned above has been overcome and a dense network of scientific and research institutions has come into being.

Research

Since the 1960s the Ruhr University Bochum, the Technical University Dortmund, the universities of Duisburg and Essen – merged to the University of Duisburg-Essen in 2003 –, the Fernuniversität Hagen and the Private University Witten/Herdecke have been founded. In addition, there are 13 widely accepted universities of applied sciences (Fachhochschule) as e.g. in Bochum, Duisburg, Dortmund, Essen, Hagen, Hamm and Gelsenkirchen. Quite recently some new universities of applied sciences have been founded. In winter term 2009/2010 the Fachhochschule Westliches Ruhrgebiet has been opened in Mülheim an der Ruhr and in Bottrop comprising the faculties of mathematics, IT, sciences and technology. With the same set of faculties the Hochschule Hamm-Lippstadt has been founded. In Kamp-Lintfort a branch of the newly founded Hochschule Rhein-Waal in Kleve has been established.

In total, there are more than 175,000 students at the universities and universities of applied sciences, a third of them studying economics, law and social sciences, about a quarter languages and humanities and another quarter is go for a degree



4.2.5 University Duisburg-Essen, Essen campus



4.2.6 Technical University Dortmund

in natural sciences, mathematics, information technologies or engineering.

Outside the universities various forms of research are conducted in four Fraunhofer institutes, four Leibniz institutes, three Max Planck institutes and in 60 other institutes with a scientific staff of more than 2,000 persons. The research activities are focused on nano and plasma technology, energy production, logistics, information technology and biosciences. As the universities, the non-university research institutions try to cooperate with the economy. To promote this cooperation between the sciences and the regional economy nine technology transfer agencies and some 30 start-up and technology centers have been founded; some of them are integrated into the university structures. The successful technology center attached to the Technical University of Dortmund has already been mentioned above.

To enhance the cooperation between the universities of the region by developing common fields of teaching and research the universities of Bochum, Dortmund and Duisburg-Essen have created the University Alliance Metropolis Ruhr (UAMR). With some 90,000 students, 1,250 professors and a budget of 840 million Euros this alliance is better recognized in the scientific communities as would be the universities alone. Moreover, 47 non-university and university research institutions are organized in the Wissenschaftsforum Ruhr e.V.

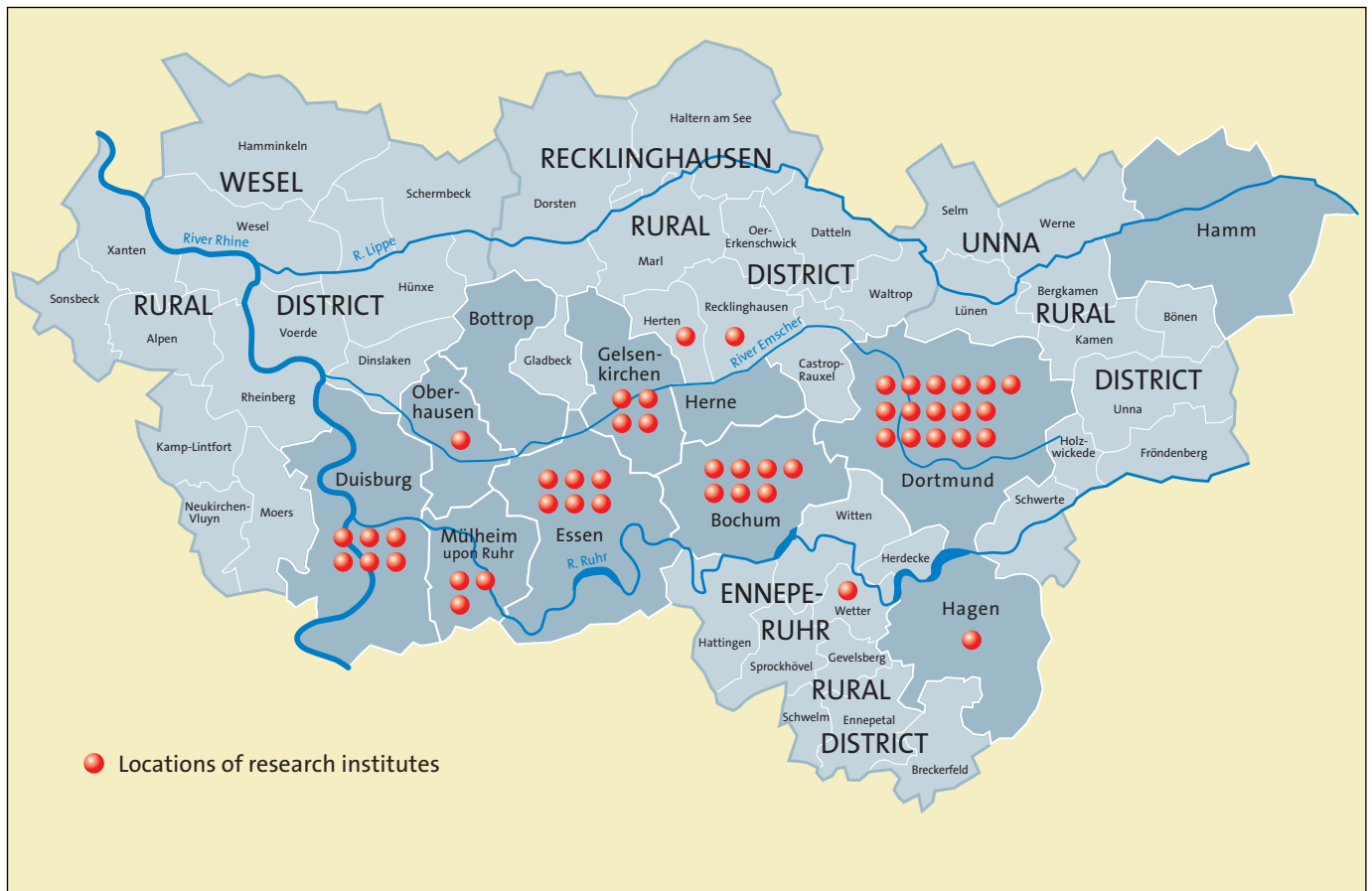
To be able to estimate the quality of the science region Ruhr that has been developed in the last decades, in 2011 the Mercator Foundation commissioned a study that compares the Metropolis Ruhr with the metropolitan regions Berlin, Munich and Zurich and reveals the strengths and weaknesses. The Metropolis Ruhr scores

Tab. 23: Universities in the Metropolis Ruhr, winter term 2011/2012

	Year of foundation	Number of students	Scientific staff (excl. professors)	Professors*	Number of faculties	Special Research Fields
Ruhr University Bochum	1965	36,693	2,710	462	20	12 (incl. cooperations)
Technical University Dortmund	1968	27,010	1,510	285	16	5 (incl. cooperations)
University Duisburg-Essen	1972	37,401	1,632	370	11	7 (incl. cooperations)
Fernuniversität Hagen	1975	79,906	294	68	4	None
Private University Witten/Herdecke	1983	1,417	191	44	3	None

*without faculty of medicine

Source: Information provided by the universities



4.2.7 Distribution of the research institutes of the Wissenschaftsforum Ruhr

better in terms of private funding in the fields of mechanical engineering (28.2 million Euros, with Munich achieving 26.9 million Euros and Berlin achieving 26.5 million Euros). Concerning the applications approved by the Deutsche Forschungsgemeinschaft the strength of the regional mechanical engineering becomes apparent even more; here the Metropolis Ruhr universities achieve 55 million Euros which is twice as much as Munich (27.2 million Euros) and Berlin (25.8 million Euros).

Next to these research achievement academic teaching has been detected as strength. In Zurich the professor/student ratio is 1:33, with 1:49 and 1:50 in Berlin and Munich respectively; in the Metropolis Ruhr, however, the ratio is 1:65. But the students regard the quality of academic education in the Metropolis Ruhr as high as in the other regions disregarding this unfavourable relation. Despite the negative migration balance the share of persons aged 6 to 18 is higher in the Ruhr than in the regions compared and is therefore regarded as an important potential of talents. A particular chance might be given by integrating a higher amount of students from

migrant families. And finally, another potential that could be used more extensively is the proximity to strong enterprises that have not yet been cooperated with so far.

The lack of financial means has been detected as the definite weakness of the science region Ruhr. Whereas the universities of Zurich, Berlin and Munich dispose of annual budgets of 1.9 to 2.4 billion Euros, the budget of the Metropolis Ruhr universities is as low as 1.4 billion Euros per year. This is to explain the unfavourable professor/student ratio, the – again in comparison to the other regions – low numbers of PhDs, habilitations and patent applications. And finally, there are less non-university research institutions in the Metropolis Ruhr than in the other regions. The attractiveness of a science region is influenced by the socio-cultural infrastructure; this is regarded as less attractive in the Ruhr as there are less doctors and artists and the child care participation quota is lower than in Berlin, Munich and Zurich.

To sum up, in the last decades the Metropolis Ruhr could establish itself in terms of

education and research. But qualitative challenges will still have to be met in order to evolve to an innovative region of education by 2018. Experts regard this aim as realistic if the indispensable political and financial support is given.



4.2.8 Fernuniversität Hagen



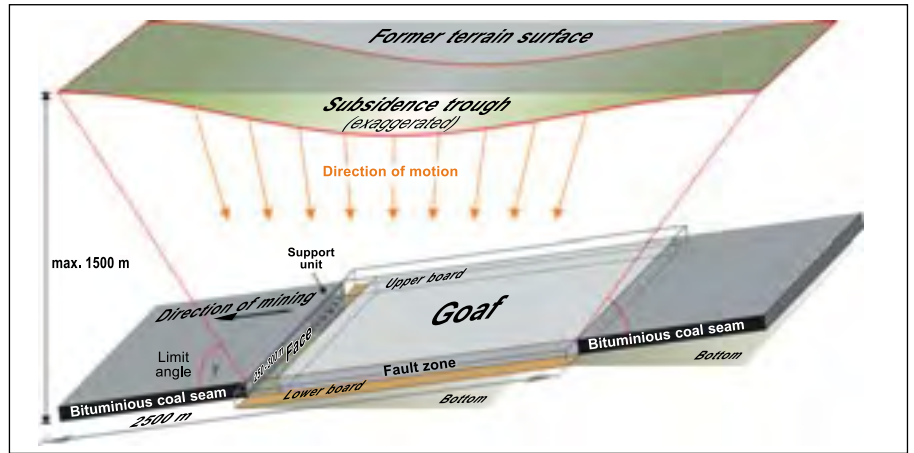
4.2.9 Private University Witten/Herdecke

4.3 Nature, recreation and leisure

As mentioned above, the former sparsely populated agrarian landscape of the Ruhr has fundamentally been changed by the impacts of industrialisation and urbanization. The natural conditions have adjusted to the needs of the industries and a growing number of population; the development and the repeated reconstruction of the rivers Ruhr and Emscher are good examples. On the one hand, the old industries have degraded the natural potential; on the other hand, the industrial heritage is creatively addressed since the 1990s by using industrial nature and industrial culture for recreation and leisure purposes.

But the industrial past is not only reflected in form of new recreation and leisure sites, but also takes influence on the everyday life of the population. Dangerous cases of subsidence are still a legacy of the industrial past and may induce damages on buildings, roads, railways and supply lines. What are the causes? The coal deposits are formed as layers of different thickness (seam) and are accompanied by surrounding rocks (mine waste). The extraction of coal and surrounding rocks produces extensive subterranean cavities that up to the 1960s had been refilled with mine waste. Since then this method has been given up and, consequently, the overlying rock layers broke; the breaks continued up to the surface. Taking the about seven billion tons of coal that have been excavated since the beginning of industrialisation a regional average subsidence of three meters can be calculated. Locally, subsidence of 20 meters and more can be recognized.

In the mining districts of the Metropolis Ruhr subsidence can be recognized in form of cracks in buildings, leaned walls, burst pipes and rewetted agricultural areas. These damages appear in active mining areas and in abandoned areas as well because the process of subsidence shows a certain time-lag and extensive effects can occur a long time after the close down. The cooperation of house-owner damaged by mining has to deal with 6,000 cases per year and the Deutsche Steinkohle AG service center is confronted with an annual amount of 35,000 complaints. In Bochum-Wattenscheid the spectacular 2000 subsidence caused a crater of 40 by 40 meters when the ground above a former coal mine



4.3.1 Development of a subsidence caused by mining



4.3.2 Damage caused by subsidence in Bochum

yielded unexpectedly. Luckily only two garages disappeared in the hole and there were no casualties. In the very end is has been figured out that already in 1907 a tower, 25 m high, had crashed into the shaft and had blocked it in a depth of 40 meters. The rest of the shaft had been filled with concrete in 1991 but an open space remained underneath. Eventually, the remains of the former tower could no longer stand the pressure and caused that spectacular event.

Subsidence areas of about 75,000 hectares are permanently artificially be drained; they concentrate in the middle



4.3.3 Aerial of the nature reserve Hallerley in Dortmund

of the Metropolis Ruhr, in the catchment areas of the river Emscher and Lippe. Over a length of 32 kilometers the river Lippe has been dyked. Because the river courses themselves have been affected by subsidence they had to be raised, transferred and dyked. Very often a junction of the tributaries with the river itself is not possible anymore. Because the precipitation has to be pumped out of the raised rivers as well more than 100 pumping stations have to be operated to guarantee that the subsidence areas of the middle Emscher will not turn into a landscape of lakes in which most parts would be more than ten meters below the water level.

But there are also positive consequences ensuing from the extraction of coal and mine waste; waste tips and subsidence lakes are features of a “second-hand natural landscape”. Subsidence lakes occur when the groundwater rises to the surface and fills the dell of subsidence. Subsidence lakes are quite frequent in the Emscher and Lippe zones. The already existing Hallerley flat in Dortmund has been affected by an additional subsidence ensuing from the mining activities



4.3.4 Vegetation in the Hallerley nature reserve in Dortmund

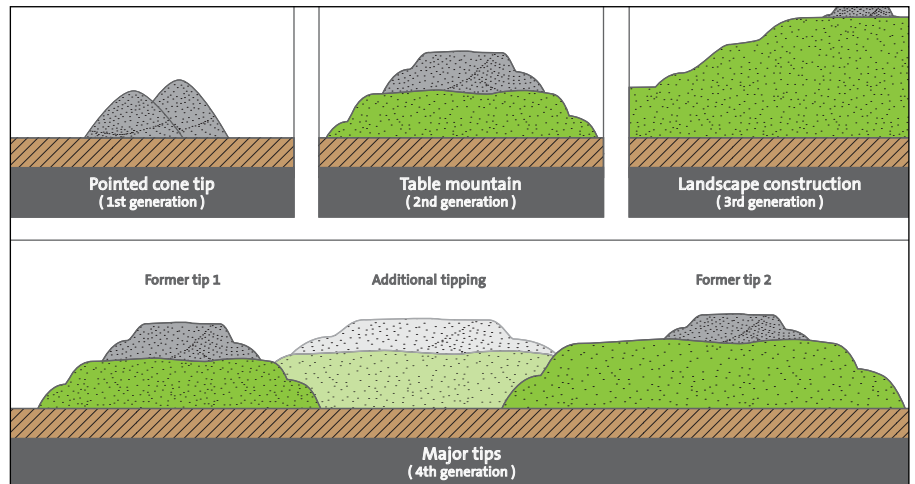
of the Dorstfeld mine nearby. Some subsidence lakes gradually formed a continuous water and swamp area of 32 hectares which is distinguished as an important breeding, resting and transit area for wading and water birds. Due to the great variety of species large areas of the Hallerey have been declared a nature reserve already in 1977.

By tipping the mine waste at the surface many waste tips have been scattered over the Ruhr. First generation tips were heaped up in the immediate vicinity of the mines by carrying material by means of conveyor belts and forming a tipped cone. The tips of the next generation grew in size and were formed like flat summit mountains. The last generation of tips is the large designed landscape building that deliberately combines various forms.

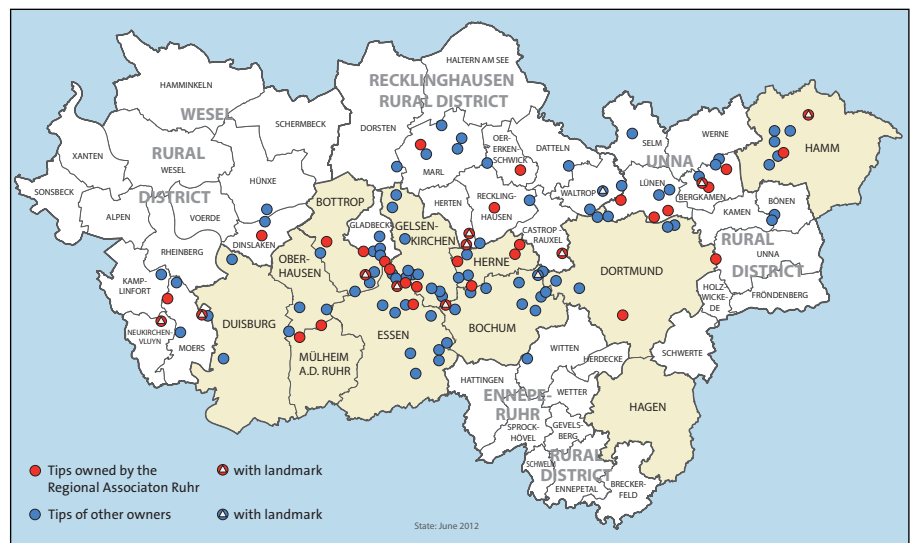
Actually there are 20 large tip complexes that are sometimes regarded as the fourth generation of tips. When the subsidies for coal mining will cease in 2018, tipping and the landscaping of waste tips will cease as well. Some tips are owned by the Regional Authority Ruhr and are developed and maintained for recreation, others are managed by industrial enterprises and development companies.

Even if these tips are “second-hand natural landscapes” designed by landscape architects, they have an ecological potential as they provide inner-urban environments for plant and animal species; on laid out paths they can also be used by walkers. In the north-east of Dortmund an extensive dump and tip area has been designed. At the bottom a forest area of hornbeams, common oaks and small-leaves limes has been planted which is followed uphill by grass and shrub fields.

Thus different habitats are offered to different animal species and an overgrowth of the tip is prevented as well so that they still serve as viewing points for visitors. Tips have different functions for leisure, sports and recreation activities. On the tipped cone tip of the former Schleswig mine in Dortmund-Asseln a mountain biking area has been designed. In the hall of the alpincenter on the Prosper tip in Bottrop the difference in altitude of 80 meters can not only be overcome on skies but also by means of a summer toboggan run of 1,000 meters. Other tips are sites of arts and parts of the



4.3.5 Types of tips



4.3.6 Distribution of waste tips in the Ruhr

route of landmark art (see below). Before a tip can be used for new purposes the danger of fire must be excluded as fractions of coal remaining in the tip material can inflame under pressure and can smolder in the inner body of the tip for a long time.

Next to the cases of subsidence and the waste tips the influence on the river Emscher is among the major impacts of coal

mining. The various activities of the Emschergenossenschaft, founded in 1899, have already been mentioned. Since the 1990s it is the company’s main task to change the “black Emscher” into the “blue Emscher”. Step by step the river and its tributaries are being recultivated and the sewage waters are being conveyed in subterranean canals; 8 to 40 meters below the surface this subterranean sewage water canal is being built parallel to the



4.3.7 Lake Bever in Bergkamen created by subsidence



4.3.8 The longest skiing hall of the world in the alpincenter on the Prosper tip in Bottrop

river Emscher. This canal is a concrete tube of 2.8 meters in diameter that contains the sewage water and leads it through two intermediate pumping plants to the sewage plants in Bottrop and at the Emscher mouth. By 2017 the present-day open sewage system shall be converted into this subterranean canal of 51 kilometers. Above surface there will be the new Emscher running in a nature-orientated streambed. Retention basins will allow a controlled overflow in case of flooding. These retention basins are indispensable, as the July 2008 centennial flood has shown when in the west of Dortmund wide housing areas have been flooded for hours and million Euro damages have been caused.

In total, the EmscherGenossenschaft is going to install some 400 kilometers of new sewage canals by 2020 and some 350 kilometers of surface water streams are to be ecologically changed and improved. By these measures the EmscherGenossenschaft intends to upgrade the Emscher area. For decades a zone protected by barbed wire, this Emscher area shall be returned to the public as a piece of nature that can be used for leisure and recreation; safety provided, fences shall be torn down and landscape is made available to experience. Particularly the so called Emscher island, 30 meters to two kilometers wide and extending over 34 kilometers from Oberhausen in the west to Castrop-Rauxel in the east shall be changed from an unattractive and inaccessible industrial backyard into a leisure area that is open to the public; on average, every 400 meters a bridge connects the Emscher island with the surrounding areas.

Not only has the topography of the Ruhr been changed by human impact but its climate as well. For compared to a less populated umland urban environments induce climatic changes that are addressed as urban climate. As in other urban areas, temperatures that are higher than those of the umland are the most prominent characteristics of the Metropolis Ruhr urban climate. Higher temperatures are clearly recognizable at night and in summertime "heat islands" occur. The overheating is mainly caused by the urban architecture as buildings can store the heat longer than areas that are not being built or covered by vegetation. Urban architecture also diminishes the wind speed by blocking the circulation or due to rough surfaces. Because of the reduced air circulation urban areas are liable to an

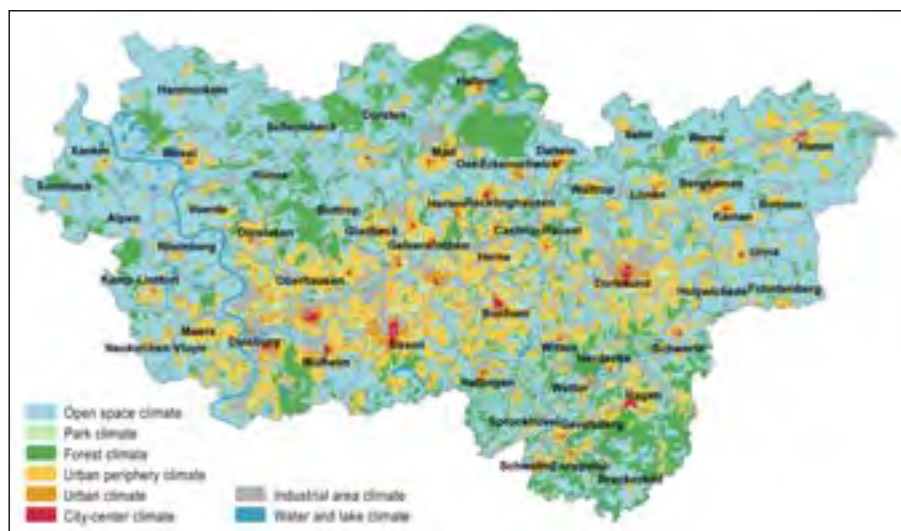
increased accumulation with air pollutants. In certain high pressure situations a haze dome can develop over the Metropolis Ruhr. The overheating is additionally been caused by the high degree of sealing and by waste heat. An extensive sealing allows the precipitation very quickly to drain off into the sewage system thus preventing evaporation; evaporation heat is

withdrawn from the air and a cooling is thus provided. In winter waste heat is produced by heating systems, in summer by air conditioning systems. High amounts of waste heat are also produced by the industries and the traffic systems.

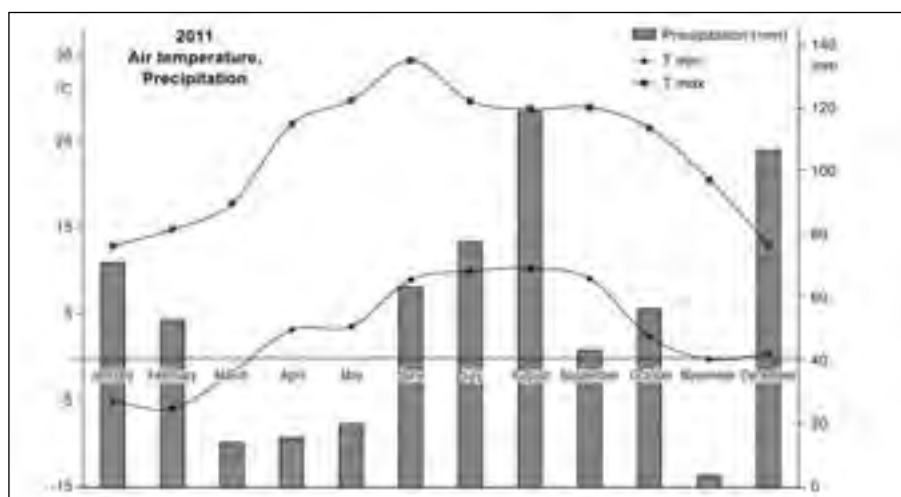
Disregarding the urban climate characteristics, the climate of the Metropolis Ruhr is



4.3.9 Emscher mouths, sewage canal and sewage plants



4.3.10 Climatope map of the Ruhr



4.3.11 Climate diagram of Mülheim an der Ruhr

dominated by westerly winds, cool summers and moderate winters; the relative proximity to the Atlantic Ocean and to the Gulf Stream causes this maritime climate. As westerly winds constantly transport mild air, the annual amplitude of the temperatures is relatively low and precipitation is widely equally distributed over the months of the year. Steady rain in winter and short but extensive outburst of rain in summer are normal; July is the wettest month of the year. The details and the changes of the regional climate have been recorded in the cities of the Ruhr for decades. Local data are provided online by the climate server (www.metropol Ruhr.de/regionalverband-ruhr/umwelt-freiraum/klima/klimaserver.html).

The old industries had degraded the natural landscape of the region. So the de-industrialisation not only required an economic turn but also social and ecological ones. Still in the 1980s a high amount of brownfields was the visible sign of the Emscher zone crisis in the middle of the Ruhr. Summing up to thousands of hectares, the brownfields with their multitude of old plants and vacant halls were a stressing legacy for the cities and the region as a whole. To support the change the NRW government established the Grundstückfonds NRW (Estate Funds NRW) in 1979. As the brownfields should not be left vacant, the Estate Funds was a proposal to the cities to start the recycling of the brownfields thereby following the objectives

- to provide attractive sites for commercial/industrial investments,
- to create urban environments of high quality,
- to secure jobs,
- to guarantee a responsible and cost orientated treatment of the pollution,
- to design new areas for leisure and culture.

By means of development programs (EU, Germany, state of North Rhine-Westphalia) the Estate Funds was able to provide two billion Euros to buy sites, to dismantle plants, to decontaminate sites and to develop a new infrastructure on them. In addition, there were revenues from estate sales, rental and leasing income. From 1980 to 2006, a total of 2,700 hectares of brownfields have been

bought, some 1,700 hectares of them could be marketed again.

The Estate Funds NRW was the starting point of a new regional policy that accepted the crisis and the shrinking as a chance; after a period of transition a new approach to the brownfields was established. At the end of the 1980s the new concepts were highlighted by a wide-ranging structural program for the Emscher zone, the International Building Exhibition (IBA) Emscher Park. In the period from 1989 to 1999 new impulses were given to re-construct the Emscher zone ecologically, economically and socially. In the course of those ten years 120 projects were put into reality on old-industrial brownfields. This success was necessarily based on the cooperation of the urban and rural districts of the northern Ruhr, the former KVR, the IBA Emscher Park GmbH and others. Brownfields and old halls were re-used to establish new industrial and office enterprises. To take the former mining and coking site of the Erin mine in Castrop-Rauxel as an example, the 33 hectares of brownfield have been bought by the Estate Funds in 1985. Situated close to the city-center, the IBA activities converted this area into an industrial estate attractively lined and crossed by green spaces for leisure and recreation.

By investing a total of 2.5 billion Euros, the IBA Emscher Park projects have been designed to reconnect and upgrade a landscape that had been fragmented by settlements, production sites and traffic lines. The Emscher Landscape Park, comprising 320 square kilometers became the central project to reconstruct the landscape. It is a co-operative project of the Regionalverband Ruhr, of 20 municipalities, of two rural districts, of three Regierungsbezirke, the state of North Rhine-Westphalia, the Emschergenossenschaft and the Lippeverband and has been continued after the IBA Emscher Park was ended. The Landscape Park was the stage for some of the 2010 Capital of Culture events. It will be developed further until 2020; already today, it is Europe's largest regional park and documents the successful change of the regional landscape.

On some former brownfields a specific mixture of plants and animals produced a characteristic urban ecology. What came into being on these sites that have been reclaimed by nature is referred to by the



4.3.12 Industrial and office park on the site of the former Erin mine in Castrop-Rauxel

contradictory term Industrial Nature, for the ecological conditions on these sites seem to be contradictory. The former industrial use had its impacts. Some of the soils – contaminated or not – have been massively changed or are absolutely unnatural (industrial soils) as they consist of debris, ashes or cinder which is a waste of the iron smelting process. When these sites had become brownfields, plants and animals could develop undisturbed. Thus the special conditions allowed the development of the special industrial nature.

On the open oligotrophic industrial brownfields with their small-scale spatial differences rare endemic plants are to be found that do no longer exist on agriculturally cultivated sites. But the extreme industrial soils as well as the high summer temperatures that ensue from the dark soil colour are also accepted by “in-migrant” plants that are not endemic in the region. These neophytes have been imported into the Ruhr with the raw materials from abroad as e.g. the iron ores from Africa and South America; one of these neophytes is the South African *Senecio inaequidens*. This wild and spontaneously expanding industrial nature is spreading in a great variety as man does not interfere. So, the vegetation can develop from a thin herb layer over various stages of succession to a wild forest within a few decades. As this wild vegetation on the industrial nature sites has become the habitat for many animals completely new biocoenoses have developed. Bird species that accept the former

brownfields as their new habitats are e.g. the little ringed plover, the wheatear or the stonechat; similarly do the midwife toad, the natterjack toad, the common lizard and other amphibians and reptiles.

By admitting a wild and undisturbed succession of vegetation the open space planning departments of the cities, of the Regional Authority Ruhr (RVR) and of the corresponding NRW ministry follow the concept of a sustainable landscape development that

- allows natural processes of reclaiming and regeneration,
- retains the specific aesthetic quality of industrial nature,
- releases the public budget as this new type of landscape requires only low expenses for development and care.

After a few decades of unregulated succession a forest will have developed on the former brownfields. To create this new wilderness has been the aim of the IBA Emscher Park project “Industrial Forest Ruhr” that has been continued since then to 17 sites in the Emscher Landscape Park comprising a total of 244 hectares. Next to the uncontrolled development of nature the industrial forest concept includes the free access for recreation and leisure purposes, as these sites shall be used harmoniously by nature and man alike. Industrial nature sites that are safe in terms of contaminations are also used as external education and event places by children and young persons, landscape artists use them as their studio. A remarkable example is the industrial forest on the Rheinelbe site in Gelsenkirchen-Ückendorf. As the mine had been shut down already in 1930 a high forest with species-rich shrubs has developed on 42

hectares. In the course of the IBA Emscher Park existing trails or paths on old railway tracks have been consolidated. Children and young people use this forest as an adventure playground, adults for walking, cycling and jogging. The adaptation of the area has been strengthened by Herman Prigann’s sculptures; his sculpture “Stairway to Heaven” on the Rheinelbe Spiralberg tip has become one of the most prominent viewing points in the Metropolis Ruhr.

Former brownfields also exhibit a potential for tourism, the coincidence of industrial culture and industrial nature creates a specific aesthetic dimension of harmony and contrast. That is why these sites have been integrated into the urban planning of the adjacent housing quarters and have been opened by bicycle paths (Emscher Park long distance bicycle path) and by the Route of Industrial Nature. This route com-



4.3.13 Industrial forests and places of observation and study on the Industrial Nature Route

prises 17 sites of particular interest in the Emscher Landscape Park; the anchor point is the visitor center in Ripshorst House in Oberhausen.

Of even greater importance than the Industrial Nature is the Industrial Culture, a term created by the IBA Emscher Park to develop an appropriate approach to the numerous monuments of the industrial past. The old industrial plants and buildings often located in the center of the

cities or districts were given a new value by not tearing them down but by changing them into locations of regional history and culture. Recognized from outside the region as well, many of these industrial monuments have become symbols of the unique history and the extraordinary change the region has undergone in the last decades.

The year 1994 was the turning point towards a new and positive assessment of

the built industrial legacy, when there had been more than 450,000 visitors of the exhibition on the industrial history of the Ruhr in Europe's biggest gasometer in Oberhausen. The Jahrhunderhalle in Bochum, the Hansa coking plant in Dortmund, the Landscape Park Duisburg North and, of course, the Zollverein mine are prominent examples of conservation and revitalization. In the course of the IBA Emscher Park old industrial buildings and groups of buildings have been given a new



4.3.14 Sites on the Route of Industrial Culture

meaning and appreciation, sites have artistically been staged and re-used: Big industrial halls have been converted into venues for concerts and theater events, blast furnace sites have turned into open-air cinemas, and waste tips have become impressive landmarks.

The most prominent of these sites and buildings have been connected in the Route of Industrial Culture, a circuit of 400 kilometers. Among them are six museums of technical history and social history as well as 13 important workers' housing estates. The significance of both the route and the industrial culture as a whole is very high because the past is a constituent part of the regional identity and is at the same time a potential for a successful future.

Another theme route is the "Route of Landmarks" that connects special waste tips. But these tips are not only green hills made accessible by footpaths but they have been topped by landscape sculptures and have thus been converted into landmarks. The best known example is the triangular pyramid that has been constructed on the Beckstraße/Prosper tip (80 meters high) in Bottrop in 1991. From the three platforms that hang in the open steel construction wide views over the post-industrial Metropolis Ruhr are opened. At night green and yellow light bands change the tip into a lighting event. Besides the waste tips other distinctive large-scale buildings are parts of the Route of the Landmarks, as the Gasometer in Oberhausen, the Landscape Park in Duisburg, the Zollverein mine in Essen and the Mont Cenis Academy in Herne. The route has been designed to materialize the regional awareness. All the 20 landmarks on the route are widely accepted by the population and by visitors; they are accessible at any time and are free of charge. They allow overviews and give new insights – into the smooth transitions between the nearby cities and the multitude of green spaces.

The reinterpretation of the old industrial sites can generally be regarded as a success; they are widely used for leisure and recreation purposes and are sites of identification for the regional population. From outside the region the Metropolis Ruhr is realized as a region of industrial culture, increasingly industrial culture has become an urban tourism attraction and has enhanced the scope of soft locational factors. The people's attitude towards the



4.3.15 Jogger near the "Stairway to Heaven" sculpture on the Rheinelbe tip in Gelsenkirchen



4.3.16 Industrial forest Rheinelbe in Gelsenkirchen



4.3.17 Brownfield of the former coking plant Hansa in Dortmund

regional heritage promoted the decision to declare the Ruhr the 2010 Capital of Culture which itself promoted the manifestation of the new Metropolis Ruhr identity.

One of the best known and most prominent examples of varied new land uses on old industrial sites is the Landscape Park Duisburg North that comprises industrial nature, industrial culture, events as well as educational and leisure aspects.

Surrounded by various housing quarters in the north of Duisburg, the Landscape Park extends over an area of 200 hectares. Its central part is the site of the former blast furnace and smelting plant Meiderich that has been closed in 1985; this site has been merged in the west with the site of the former Friedrich Thyssen 4/8 mine and in the east with the former manganese iron ore storage space and some agricultural pieces of the Ingenhamms farm. The industrial history goes

far back into the 19th century when the industrialist August Thyssen was looking for an area appropriate to build a new smelting plant which was to supply pig iron to his steelworks and foundries already existing in Duisburg and Mülheim. The present Landscape Park area promised to be a perfect site as there was coal underneath and the Cologne-Minden railway line nearby.

The mine and the coking plant didn't yet exist anymore when the smelting plant has been closed in 1985. It has not been dismantled because the costs necessary would have been higher than those estimated for maintaining and securing it. Following this calculation, the city of Duisburg decided to conserve the buildings and allow the vegetation to reclaim the adjacent areas. When the site had been declared an IBA Emscher Park project in 1989, the idea was developed to use the unique conditions of this brownfield and create a new type of park. The "traces of

the place" should be made visible again and the social, aesthetic and ecological potentials should cautiously be formed and developed. Following the new park concept, in the following years the old material bunkers have been designed to bunker gardens, numerous dams of the old works railway that intersected the landscape have been transformed into a network of footpaths and the blast furnace 5 has been promoted to an open and walk-through object of study and a viewing point. Due to these and other prototypical changes that retained the industrial past of the site, the Landscape Park Duisburg North became the most prominent IBA Emscher Park showpiece next to Zollverein. Because the history of coal mining and iron steel has been brought back to life and has been made a vivid experience here, the Landscape Park has been declared one of the anchor points of the European Route of Industrial Culture and provides a visitor center on the regional Route of Industrial Culture.



4.3.18 Spontaneous vegetation on the coking plant Hansa area in Dortmund

The Landscape Park Duisburg North has become one of the most vibrant tourist attractions in North Rhine-Westphalia.

Next to the industrial culture it is the industrial nature which is unique in the Landscape Park. Detailed floristic surveys since the beginning of the 1990s have proved that there are more than 300 plant species in more than 80 biocoenoses in the park. A survey of the species exhibited more than 1,800 plant and animal species. On the one hand, it is the undisturbed condition allowing biotopes to develop over a longer period of time that makes the ecological value of the park, on the other hand, it is the small-scale spatial heterogeneity in terms of nutrients supply, soil acidity and water shortage. In addition, there is not only a great variety of species but there are also many rare and endangered ones. As a park of high ecological dynamics the Landscape Park fulfills the IBA goal of the ecological renewal of the region. It offers the urban population the experience and the discovery of nature, individually or on guided tours. Given these circumstances the environmental education on the Ingenhamms farm is of particular importance. The farm has been founded in the middle ages and, after the smelting plant had been established, provided food for the shops of the company. After having been reorganized, Ingenhamms farm has become the extracurricular, experience-orientated place of learning, with its six hectares of fields and meadows being worked ecologically. All over the year chil-

dren can come to know all aspects of living on a farm.

More than 500,000 visitors per year use the Landscape Park Duisburg North free of charge. Next to recreation in nature various leisure, sports and culture facilities are provided. The old smelting plant power center and the blasting hall have been converted into multi-purpose halls without destroying their historical character. The old gasometer has been filled with water and offers diving adventures in an underwater world, the bunkers are being used for climbing and the former casting hall has been remodeled into an open-air cinema. All these leisure facilities receive a particular charm by the location – an industrial ruin reclaimed by both nature and man. But even if the Landscape Park has become a magnet of leisure and events it has not been commercialized.

As widely known as the Landscape Park Duisburg North is the Zollverein mine and coking plant site in Essen-Katernberg. Although it is a large area as well as (100 hectares), it is different and hardly comparable to the Landscape Park. The Zollverein mine has been shut down in 1986; the coking plant was closed in 1993, ending the long industrial history of the site that had started when the industrialist Franz Haniel had founded the mine in 1847. As in Duisburg it has widely been held in Essen as well as that it would be more favourable to dismantle the above ground plants. But industrial historians prevailed and the Estate Funds NRW purchased the

site, the buildings were given strict protection by conservation regulations. The intentions of the IBA Emscher Park were helpful as well and step by step the mining site of Zollverein has been changed into an industrial heritage site. From 1929 to 1932, the world-wide known industrial buildings have been built according to the drafts made by the architects Fritz Schupp and Martin Kremmer by setting the Bauhaus style cubic buildings in clear geometric arrangements. The clear outer steel lattice shell contained the most modern mining technology of the 1930s. Since then many new and efficient mines have been built but due to its unique architecture Zollverein mine has always been regarded as “the most beautiful mine of the world”. The shaft XII headframe is often addressed as the Eiffel Tower of the Ruhr, a comparison that is striking when looking up from the bottom of the construction.

Zollverein mine has become the landmark of the region and, since the 1990s, the symbol of the structural change; in 2001, Zollverein mine and coking plant have been included into the UNESCO World Heritage list. Since the last years the restored halls have been used by arts and design activities. PACT Zollverein (International Center for Dance and Performing Arts) has moved into the former pithead baths of shaft 1/2/8; in the power house, redesigned by Lord Norman Foster, the NRW design center and the permanent exhibition of the red dot design museum are located. The coke ovens of the coking plant are the scenery of a swimming pool in summer and an ice rink in winter. 840,000 people visited the Zollverein site in 2008. In 2009, a new visitor attraction was opened, when the RuhrMuseum that exhibits the history of the Ruhr moved into the former coal washing plant. Finally, in 2010 the Zollverein assembly of buildings was the prime reception venue of the European Capital of Culture activities.

To sum up, the natural and open spaces of the Metropolis Ruhr have received special imprints by the built remains of the industrial past and have thus become an attractive recreation and leisure landscape, appreciated by locals and visitors. Both industrial nature and industrial culture provide great potentials. In times of climatic change and turns on the energy market they provide an ecological potential; in terms of soft locational factors they can be considered as an economic potential; and for the users of the new open spaces they are an important social potential.



4.3.19 Walk-through sculpture “Tiger & Turtle” in Duisburg

4.4 Sports and culture

Sports

As mentioned above, the Metropolis Ruhr could be particularly proud of its successful football clubs in 2011. Borussia Dortmund became German Champion; Schalke 04 achieved the UEFA Champions League semi-final as did the FCR Duisburg in the corresponding women's tournament. Besides the top-class sports there is a wide scope of mass sports activities in the various clubs of the region. The regional enthusiasm for sports has grown over the decades and is the basis of a multitude of clubs and sports venues for various sports. The Regional Authority Ruhr communicates the sports landscape of the Metropolis Ruhr ("sportplatz-ruhr") and conceptualizes it in the Master Plan Sports in order to guarantee that the Metropolis Ruhr remains one of the most important European regions of sports.

Some of the countless 2011 regional sports events shall be presented to exemplify the top-class and the mass sports of the



4.4.1 Indoor hockey, German Championship

region. In January 2011, men and women hockey teams took part in the final round of the German Indoor Hockey Championship in the Rhein-Ruhr Halle in Duisburg. In February the best table tennis players of the world met in the Westfalenhalle in Dortmund for the German Open 2011, Timo Bell entered the men single semi-finals. This tournament was an important test for the 2012 World Championship for teams. By the end of March the European Wrestling Championship was held in Dortmund, the seat of the German Wrestling Union. In the Westfalenhalle some 500 male and female participants from 43 countries contested for 21 European titles.

After the Football Champions League semi-finals in Duisburg (women) and Gelsenkirchen (men) in April the Canoe Sprint World Cup took place in the Sportpark Wedau in Duisburg in May. More than 500 athletes from more than 50 countries contested in races over 200, 500 and 1,000 meters. In summer the Women's' Football World championship took place in Germany. The Ruhr contributed because the German national team had its training camp in the SportCentrum in Kamen-Kaiserau, because six FCR Duisburg players were in the national team and because the stadium in Bochum was one of the nine World Championship venues.



4.4.2 Biathlon in the Gelsenkirchen Arena

Tab. 24: Sports clubs registered by the Landessportbund NRW and number of members, 2012

	Number of inhabitants	Number of clubs	Degree of organization (percentages)	Male members	Female members	Total members
Bochum	373,748	384	21.68	49,045	31,984	81,029
Bottrop	116,580	127	22.91	16,148	10,562	26,710
Dortmund	580,335	515	29.52	117,464	53,857	171,321
Duisburg	488,410	467	20.25	62,067	36,867	98,934
Essen	573,372	566	22.25	78,423	49,185	127,608
Gelsenkirchen	257,285	251	59.82	113,902	40,012	153,914
Hagen	188,033	226	22.75	25,850	16,945	42,795
Hamm	181,842	161	24.61	26,771	17,997	44,768
Herne	164,355	187	19.60	19,631	12,595	32,226
Mülheim an der Ruhr	167,091	171	24.79	23,656	17,773	41,429
Oberhausen	212,714	211	19.29	26,037	14,998	41,035
Ennepe-Ruhr-Kreis	330,620	418	30.97	57,654	44,758	102,412
Kreis Recklinghausen	626,864	717	25.24	94,348	63,903	158,251
Kreis Unna	410,669	468	27.10	65,609	45,700	111,309
Kreis Wesel	467,859	531	30.49	82,297	60,389	142,686
Ruhr, total	5,139,777	5,400	26.78	858,902	517,525	1,376,427
NRW, total	17,836,512	19,496	28.48	3,085,056	1,995,186	5,080,242

Sources: Landessportbund Nordrhein-Westfalen

A typical mass sports example was the City Race in Herne over 25 kilometers in April 2011; some thousands participants had twice to complete the 12.5 kilometers circuit from the city center via the Flottmannhallen, Strünkede Castle, the Westfalia stadium and back into the city-center. Another important mass sports event in April was the Fair for Fitness, Wellness and Health (FIBO) in twelve halls of the Essen Fair that presented recent fitness trends and information about health promotion, prevention and nutrition. In April as well, the Regional Authority Ruhr and the Sauerländische Gebirgsverein organized the Walking Day Ruhr; in the Kirchhellen Heath six courses of different lengths and levels of difficulty had been prepared for walkers, cyclists, families and handicapped people.

Particular efforts have been taken to support the promotion of young talents in the sports clubs; eventually numerous top

athletes have been generated. The Ruhr Olympics that have been founded in 1964 are a particularly important event for the young athletes of the region. Thousands of them contest in the various sports competitions; advancement awards are given to hopeful talents. There are also many possibilities to do trend sports. The skater tracks alongside the Lake Baldeney and the Lake Kemnade have been established venues for many years. Many other venues for trend sports as climbing, diving, beach sports, BMX riding and skating have been established in the last years, very often on redesigned old industrial brownfields; e.g. mountain bikers use laid out tracks on former waste tips for their practice.

Culture

The industrial past and the industrial culture deriving from it is a great and unique asset of the Metropolis Ruhr culture.

Already for decades there have been other manifold and high rank cultural venues; at present the regional supply comprises 120 theaters, 100 concert halls, 250 festivals, 100 cultural centers and 200 museums. The regional culture is characterized by established and alternative venues; since the 1990s the industrial culture has been added providing new sites and provoking for extraordinary forms of staging. In 2002, the Ruhr Triennale as a premium cultural festival has been started; it is the political intention by means of this festival to make the regional change known outside the Ruhr and thus to improve the image. This combination of cultural and structural policy reached its peak when the region applied for the 2010 European Capital of Culture by stating “Change by Culture – Culture by Change”. In the course of “RUHR.2010” a budget of 60 million Euros allowed some 5,500 events to be carried out which more than 10.5 million visitors participated in. The



4.4.3 Training of the so called “gold” rowing eight on the Dortmund-Ems Canal near the national training center in Dortmund



4.4.4 Ramblers in Breckerfeld



4.4.5 Competition track in the middle of a city: wildwater canoeing on the river Lenne in Hagen-Hohenlimburg



4.4.6 Mountain biker on a tip

“RUHR.2010” program followed three main themes: to understand the Ruhr myth, to shape the metropolis and to move Europe.

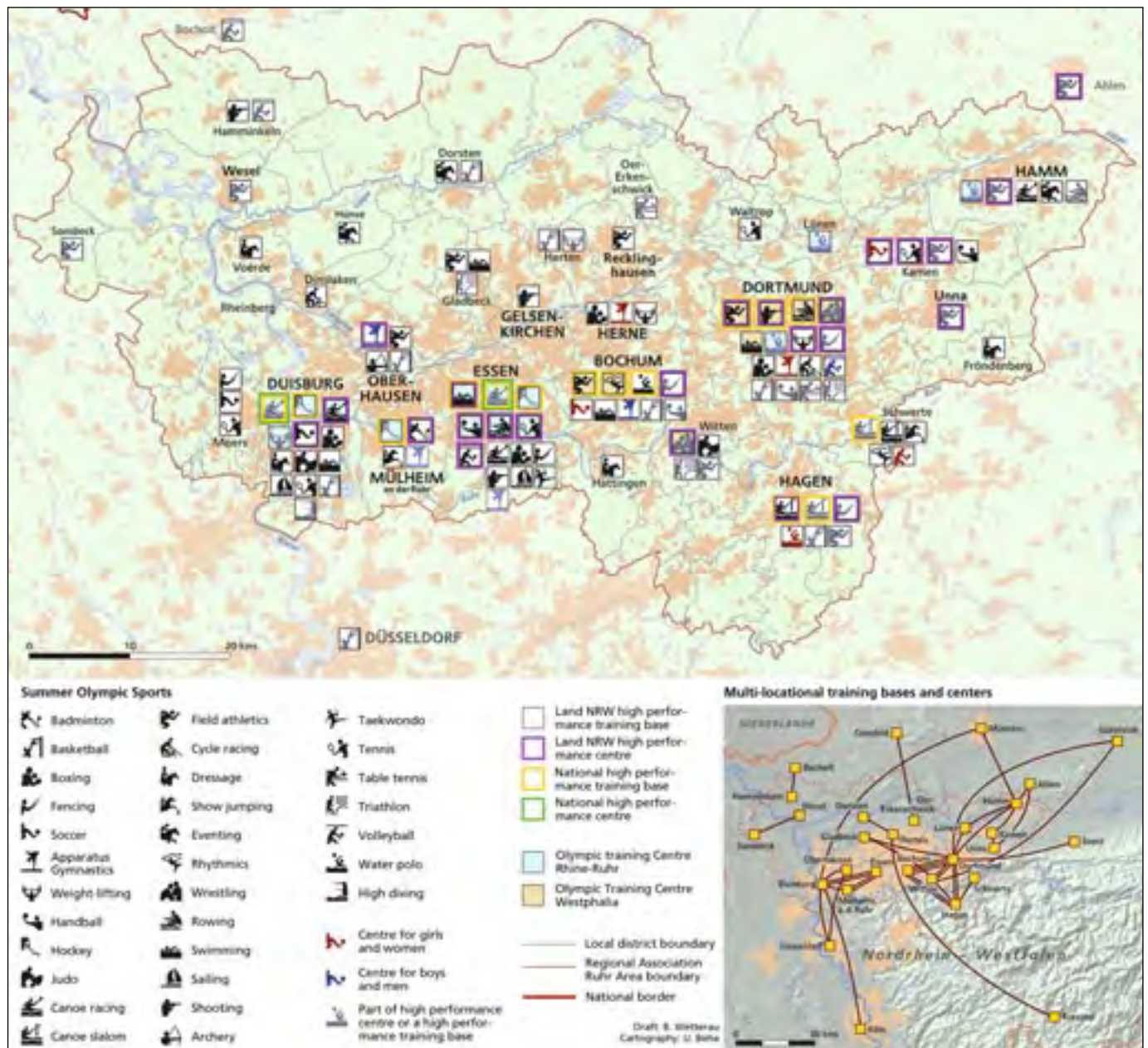
The main theme “To understand the Ruhr myth” comprised the industrial past and its socio-economic consequences but also the search for the future identity; it was its aim to conceive the cultural identity of the region. The project SchachtZeichen that has been created to bring the change of the Metropolis Ruhr on stage, is to exemplify this connection. The idea behind was to refer to the many mining sites that once had their impact on the region; the signs of shafts were yellow balloons with a diameter of 3.7 meters at the ends of 80 meters long ropes. For one week they

stood over more than 300 former mining sites and were lighted at night. The SchachtZeichen sites forced the visitors to think about the change of the region when being confronted with new land-uses on old industrial sites.

The main theme “To shape the metropolis” deals with the vision for the metropolis. Following the successful IBA ideas, impulses shall be given to promote a cooperation of artists, planners and architects to achieve a new quality of life in the polycentric Metropolis Ruhr. In the course of “RUHR.2010” the former Union Brewery tower in Dortmund has been renovated and became the sign of the “Dortmund U”, a center for arts and creativity with flexible rooms for exhibitions

and events. Next to the architectural aspect, the renovation of the “Dortmund U” had economic aspects as well. It is part of the creative economy project “Kreativ-Quartiere” and shall give an initial ignition for establishing architecture, arts, culture, education and the creative economy in the adjacent quarter.

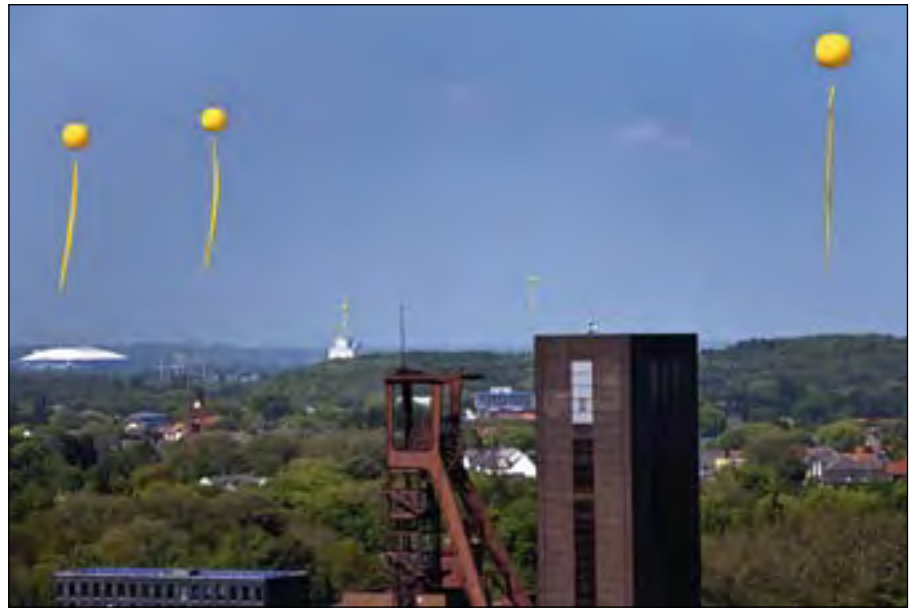
The main theme “To move Europe” is focused on the traditional role of the Ruhr as a region of migrants. Culture and intercultural living together are regarded as the essence of the European society of tomorrow. The MELEZ festival was to present internationality, cultural variety and intercultural activities. In October 2010 the MELEZ train rode through the region and was used as a stage, a



4.4.7 Training centers and training bases for Olympic sports

laboratory or a studio to present readings and concerts, international cuisine, dance, theater and exhibition; this project was concluded by a fest for four days.

The results of "RUHR.2010" and the sustainability of its impacts could be discussed in many ways, but only three positive aspects shall be mentioned here. There have been many unforgettable events as e.g. "Still-Leben A40" (Still-Life A40), when the A40/B1 motorway had been closed for traffic on 60 kilometers from Duisburg to Dortmund on July 18; the main arterial road of



4.4.9 SchachtZeichen



4.4.8 Dortmund U: once a cooling tower of the Union Brewery, now a center of culture with a video installation

the Ruhr had been turned into a promenade for more than three million walkers and cyclists ambling along a table of cultures. Many venues that have been established in the course of "RUHR.2010" have benchmarked the regional cultural geography (Dortmund U, Museum Folkwang in Essen, RuhrMuseum in Essen, Museum Küppersmühle in Duisburg etc.). A new sense of unity could be developed

within the region and the new image of the Ruhr has been recognized from outside.

To sum up, it can be stated that the wide range of sports and culture of the Ruhr is unique in Germany. Where in another region of 100 kilometers in diameter can be seen so many new, special and high rank events?



4.4.10 Still-Leben A40 (Still-Life A40)

4.5 Image

If a region is so varied as the Metropolis Ruhr and, above all, has continuously and stronger been changed in all spheres of life, its image cannot be unambiguous. But there are some aspects that had effects on the image of the Ruhr in the last years.

Quite often the image of the Metropolis Ruhr is still far from reality and orientated to the past. This outdated perception is taken up and reproduced by the media in either a negative or a glorifying and romanticizing way. There is the crime series “Tatort” with the inspector Horst Schimanski that is set in the dirty, loud and industrial north of Duisburg but, at the same time, traces the cliché of the hard working but just and likeable pal. Old school text-books have kept on spreading the traditional image of the industrial region. It is only in the most recent versions of these text-books that the structural change towards the Metropolis Ruhr and the modern developments are dealt with. But many people still adhere to the old images and only reluctantly allow new evaluations of the grid-locked regional image. There are traditional images of the region as the pigeon breeding, the allotment gardens, the “Bude” (kiosk) at the corner of the street and the small or famous football club nearby; they are still parts of the mentally shared identity even if they do no longer exist in reality given the present era of individualism (“Here you can live with football and beer, you are not alone with us here” is a line in Wolfgang Petry’s song “You are the Ruhr”).

But a distinction has to be made between the perceptions and evaluations of the regional population (living sphere) and the aspired evaluations of the decision-making groups (politicians, entrepreneurs, representatives of regional institutions, scientists etc.; systems sphere). Thus depending on the associations the respondents have, the region is highlighted in quite a different way. As with other regions, self-perception and external perception have to be distinguished. From outside the image of the region is still dominated by coal mining, industries and large enterprises. When visiting the region, people mostly change their attitudes and evaluations (“I wouldn’t have thought that there is so much green.”). Since the 1980s attempts have been made to overcome the discrepancies between the mental images and the changed realities by means of image campaigns (“Das Ruhrgebiet. Ein starkes Stück Deutschland”, “Der Pott kocht” etc.) which produced new



4.5.1 “Ruhr” associations and connotations

images to invite the people into the region. Eventually, the success of these campaigns depends on their authenticity; so it was plausible since the 1990s to transform and to upgrade the old industrial sites and buildings into venues of industrial culture. By staging them, these symbols of the past (Landscape Park Duisburg North, Zollverein etc.) have attained a new socio-cultural function, are of individual value to the visitors and may even produce a new identity. And they allow new ways of looking at and on the region, as e.g. the triangular pyramid on the Beckstraße/Proseper tip in

Bottrop allows alternative views on the river Emscher. As the landmarks of the industrial culture are the representatives of the new region and, at the same time, the symbols of the past and they are mental and spatial links of the region. Whereas the regional population of the 1980s still exhibited a paramount mental disengagement the landmarks of the present reflect the common past and allow the population to regard the region as a unity. Furthermore, they are the proofs of joint processes of change and the unique characteristics of the region. This successful development



4.5.2 Allotment gardening in Bochum



4.5.3 Illuminated blast furnace in the Landscape Park Duisburg North

has been perpetuated by establishing further viewing points and panoramas (e.g. Dortmund U, shaft tower of the Nordstern mine).

Another aspect of the region is its name. The name of a region has influenced and influences its publicity but also the evaluations connected with it. As mentioned above, the region along the river Ruhr is not a historical one but has been constituted in the course of the 19th century industrialization. As late as the 1920s, the region was referred to as "Ruhrgebiet", but there were also alternatives (then: Ruhr district, Ruhrpott, mining district; today: Ruhr city, Metropolis Ruhr) indicating a certain

skepticism towards the term "Ruhrgebiet" (The Ruhr). In the first chapters of this booklet that deal with the foundations the term "Ruhrgebiet" (The Ruhr) has been used, the modern developments, however, more adequately take place in a region tagged "Metropolis Ruhr". Since 2005 this term is used by the Regional Authority Ruhr and its economic development agency metropol Ruhr (wmr) to refer to the changed region. Since then, the region is named as Metropolis Ruhr on tourism and estate fairs, in all publications and on all events. The term has drawn attention and caused fewer controversies as there had been in the discussion about the term "Ruhrstadt" (Ruhr City). A branding by

means of the term "Metropolis Ruhr" shall promote the developments in the new Ruhr area. However, this term does not refer to the living sphere but to the system sphere. When asked where they come from most of the regional inhabitants use the name "Ruhrgebiet" or name their hometown, disregarding the region completely.



4.5.5 Typical location of a crime story starring Götz George as Schimanski: tunnel in Matenastraße, Duisburg-Bruckhausen



4.5.6 Love Parade 2008 on the B1 arterial road in Dortmund



4.5.4 Borussia Dortmund, German Champion 2011 and 2012

5. METROPOLIS RUHR – PERSPECTIVES

5.1 Think globally – act regionally

As could be shown, a variety of developments have made the Metropolis Ruhr Europe's largest and most important polycentric conurbation. Based on the complex status quo the question for the future perspectives of the Metropolis Ruhr shall be answered.

As with other economic regions in the world, the future developments of the region are embedded in the global tendencies of change and progress. Thus global trends have to be considered and accepted as an exogenous framework in which the endogenous potentials have to be used and unfolded regionally in the sense of "think globally – act regionally".

The most important global tendency is the ongoing process of globalization. Particularly by new information, communication and transport technologies the transfer of information, goods and persons has accelerated to a degree that the world has

downright shrunken to a "Global Village". These global dimensions also apply to the action spaces of the economy and society of the Metropolis Ruhr. They open new chances, but they also increase the number of competitors in the global competition for locations.

If globalization is considered in the context of the general technological and economic progress it can be stated that both these processes caused a worldwide change from an industrial society to a service and eventually a knowledge-based society. Like other regions in developed countries the Metropolis Ruhr is on its way to turn into a nodal point of the new knowledge economy; here the periods of time necessary to generate, apply and distribute knowledge will be constantly decreasing. Consequently, the demands on the employees' qualifications will increase; at the same time important jobs of the classical industrial production methods are shifted to more favourable locations or are substituted by automatized processes.



5.1.1 BioMedizinZentrum Bochum on the Ruhr University campus



5.1.2 University Duisburg-Essen, campus Duisburg



5.1.3 Social City: Consol Park in Gelsenkirchen-Bismarck – Cultural center (foreground) and the district park planned with the participation of the local population



5.1.4 With 850 square kilometers Europe's largest environmental zone

Based on the superior tendencies of globalization and technological and economic progress the fundamental structural change from an old industrial region Ruhr to a modern knowledge-based Metropolis Ruhr has been accompanied by social changes. The increasing qualitative demands on the employees produced new middle classes but put unqualified or low qualified persons at the risk of being affected by structural unemployment. These different socio-economic tendencies are also reflected by the outer appearance of urban quarters and are combined with tendencies of spatial segregation.

The ecological development of the Metropolis Ruhr has also to be seen within the global tendencies of change and progress, even if ecological aspects have lost their importance both globally and regionally. Whereas a sustainable development had insistently been pursued both socially and politically after the World Summit of Rio (1990), the "Lokale Agenda 21" processes

launched in those days lost their influence in the Metropolis Ruhr.

That the efforts for a sustainable development have not stringently been continued in the Metropolis Ruhr is astonishing if the globally effective and acknowledged processes of climatic change are taken into consideration. For the Metropolis Ruhr as well has to face increasing risks by climatic anomalies as events of heavy rainfall, storms and heat periods. In the meantime a regional strategy is aspired that strengthens the region in ecological terms; initial projects are "Innovation-City", Green Capital, Decades Project, and dynaklim (dynamic adjustment to the effects of the climatic change in the Emscher Lippe region).

Another not global, but national trend is the demographic change; in the Ruhr is takes place earlier and more intensive than in NRW and in Germany as a whole. Decades of negative natural balances and

a negative migration balance produced an unfavourable age structure. Thus the demographic change does not only imply a constantly decreasing population, but also an increasing share of elderly people and lacking offspring; long-since the regional demographic pyramid has changed into the shape of a fungus. Another aspect of the regional demographic change is an increasing ethnic heterogeneity which is due to larger shares of inhabitants with a migration background.

This change described by "less, older and more colourful" produces severe consequences. Adaptions are necessary in retailing, on the labour market and in terms of infrastructure. The region is summoned to overcome the various effects of the demographic change and should regard some of them as a chance that allow positive developments.

At the end of the first decade of the new millennium is can be said that global and national development trends require regional action to shape the future of the Metropolis Ruhr successfully. In the following chapter the players and the fields of action shall be introduced and, finally, the perspectives of the Metropolis Ruhr within the network of European regions shall be discussed.

Tab. 25: Population prognosis Ruhr and NRW, 2015 to 2050 (millions, rounded)

	2015	2020	2025	2030	2035	2040	2045	2050
Ruhr	5.08	4.99	4.89	4.79	k.A.	k.A.	k.A.	k.A.
NRW	17.78	17.67	17.53	17.33	17.06	16.74	16.37	15.93

Sources: RVR-Datenbank, it.nrw

5.2 Institutions and networks

The major obstacle of a consistent regionalization of the Ruhr is the still prevailing inter-municipal competition caused by policies that are more locally orientated (Parish-pump politics). Local governments prefer the short-term success instead of a regionally coordinated perspective action. Even if there have been regional authorities as the Siedlungsverband Ruhrkohlenbezirk (SVR) and its successors KVR and RVR (Regional Authority Ruhr) since 1920, they often lacked the political will of their members and the legal competences necessary to accomplish the additional regional value also against opposition. First of all, a stronger regional impact is prevented by the administrative fragmentation of the Ruhr; for the competence for 53 municipalities is shared between three regional political bodies (Regierungspräsidien), two regional cultural bodies (Landschaftsverbände), 20 economic development agencies, 24 public transport organisations and six chambers of commerce.

Nevertheless, since the successful cooperative management of the IBA Emscher Park in the 1990s an increasing coordination can be observed on the regional level. The following institutions and networks take part in this process:

The main task of the Regional Authority Ruhr (RVR) is to coordinate the interests of the urban and rural districts in the Ruhr. Since October 2009 the RVR has resumed the governmental regional planning of

the Ruhr. The Economic Development Agency Metropolis Ruhr (wmr) has been founded in 2007 as a subsidiary of the RVR and deals with the regional economic consulting and marketing. Since 1988 the Initiativkreis Ruhr is another regional player that comprises the leading enterprises in order to promote the Ruhr region.

In 2003, the cities of Duisburg, Oberhausen, Mülheim an der Ruhr, Essen, Gelsenkirchen, Herne, Bochum and Dortmund joined together in the Städteregion 2030 (urban region Ruhr 2030) in order to intensify their interurban cooperation. In 2006, the Städteregion 2030 published the first draft of the Masterplan Ruhr stating commonly agreed spatial development strategies in the fields of housing, region and water, and urban development. In 2007, the first version of a Regional Land-use Plan has been presented as it has been commonly developed by the cities of Oberhausen, Mülheim an der Ruhr, Essen, Gelsenkirchen, Herne and Bochum. In 2007 as well, the cities of Bottrop, Hamm and Hagen joined this group. Since 2009 another product of this cooperation is the permanent regional housing market report.

There are many other organizations that want to join the regional forces by cooperation as e.g. the initiative “pro ruhrgebiet” since 1981, the union of the regional chambers of commerce, and the University Alliance Metropolis Ruhr (UAMR) founded in 2007.

In the course of these regional efforts the Ruhr region is consequently named and

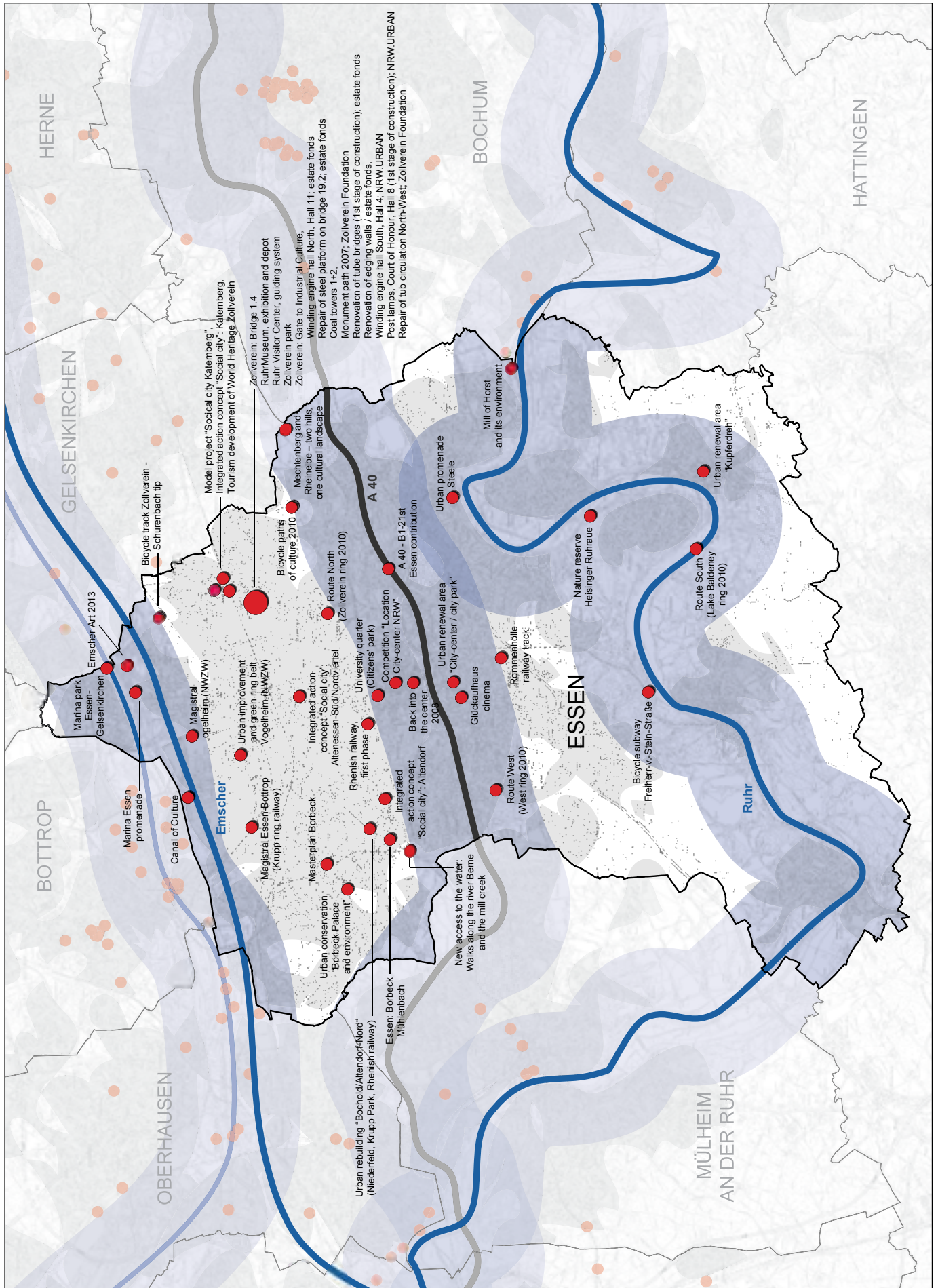
marketed as Metropolis Ruhr; this term is used to make clear that the region does no longer correspond with the image of the (old) Ruhr. The word composition has been selected for two reasons. The term “metropolis” shall indicate the size and importance of the region; it follows the standards of the German and European regional development policies that regard a metropolis and metropolitan regions as the driving forces for development in the globalized locational competition. The term “Ruhr” has been selected because it is comprehensible on the regional and national levels as well as internationally accepted (The Ruhr); following the same considerations, the Initiativkreis Ruhrgebiet has been renamed Initiativkreis Ruhr in 2008.

It is among the positive effects that in 2007/2008 the regional cooperation has produced strategic concepts for the future of the Metropolis Ruhr; however, these concepts have been developed by two different groups of regional players and have not been aligned.

In 2008, the Economic Development Agency Metropolis Ruhr published the “Konzept Ruhr” as a joint strategy of the urban and rural districts for the sustainable urban and regional development in the Metropolis Ruhr. In 2009, 35 cities and three rural districts of the Metropolis Ruhr joined the concept and cooperate in 274 aligned projects. Within ten years 400 projects shall be realized that would mobilize 1.6 billion Euros of public funding and would be backed by 4.4 billion Euros of private investments. “Konzept Ruhr” is



5.2.1 Logos of selected regional players



5.2.2 Konzept Ruhr projects in Essen

tied up to successful regional activities as e.g. Emscher Landscape Park 2010; existing regional master plans and development initiatives (e.g. Stadtumbau West, social City) are picked up.

Because the concept as a whole and the different projects are orientated to the EU standards, all measures of regional development could financially be supported by European and NRW funding in the period 2007-2013. The variety of projects has been bundled to five approaches:

- **ruhrlines:**
extension of the four dominant development axes of the Metropolis Ruhr (river Ruhr, A40/B1, river Emscher, river Lippe) by 90 projects
- **ruhrcities:**
reinforcing the city-centers and district centers by 120 projects
- **ruhrexcellence:**
developing sites of economic and urban attractiveness by 35 projects
- **ruhriinvest:**
private investments in the region
- **ruhrevents:**
promotion of major regional events

Whereas the “Konzept Ruhr” had jointly been developed by the urban and rural districts and the Economic Development Agency Metropolis Ruhr, the simultaneously presented Konzept Zukunft Ruhr 2030 (Concept Future Ruhr 2030) reflects



5.2.3 Updating of the Konzept Ruhr



5.2.4 A prominent “ruhrevent”: European Capital of Culture 2010

the regional visions of the big enterprises joined in the Initiative Ruhr. In this strategic concept as well, various projects are the means by which a processual regional development shall be initiated. The concept that has been developed by entrepreneurs and corporate consultants unfolds four central fields of action:

1. Economy and innovation
2. Infrastructure
3. Quality of life:
Health, Education, Culture
4. Regional marketing

The central idea of the “Economy and innovation” field of action is the transformation of the old industrial strengths of the Ruhr to the new strengths of the Metropolis Ruhr: from coal to energy, from steel to new materials, from transport to logistics. These new strengths shall be flanked by other branches as IT and business services. Among the future fundamentals of the Metropolis Ruhr development are also fields as education/training/research, infrastructure and health care.

However, it must be stated that the visions of the Initiativkreis Ruhr are focused on economy and suppress important themes of the future as ecological sustainability, social stability and demographic change that are relevant also for the economic development of the Metropolis Ruhr. A widened regional cooperation with other players might produce an integrative and promising approach.



5.2.5 Investment for the future: the university quarter in Essen



5.2.6 An alternative concept for the future of the region

5.3 The “Europe of the Regions” and the Metropolis Ruhr

Since the 1980s the European regional development forces the development of regions and metropolitan regions. At first there have been eye-catching spatial images to explain the interconnection of the European metropolitan regions. In 1989, the French geographer Roger Brunet invented the “Blue Banana” which comprised the economic core region of that time from London, via Randstad Holland, Brussels, Rhine-Ruhr, Rhine-Main, Rhine-Neckar, to North Italy. Extended spatial constellations followed, as e.g. the European Pentagon that also trapped the metropolitan regions that had not been parts of the Blue Banana (Paris, Hamburg, Munich). Appreciating the regions with the highest growth rates in South and Eastern Europe ended up in the “European Grapes” that represent a great variety of important metropolitan regions. Finally, there is the graphic idea of “Central Europe” that takes into account the metropolitan region of the extended European Union (Berlin, Warsaw, Budapest, Bratislava, Vienna, Prague).

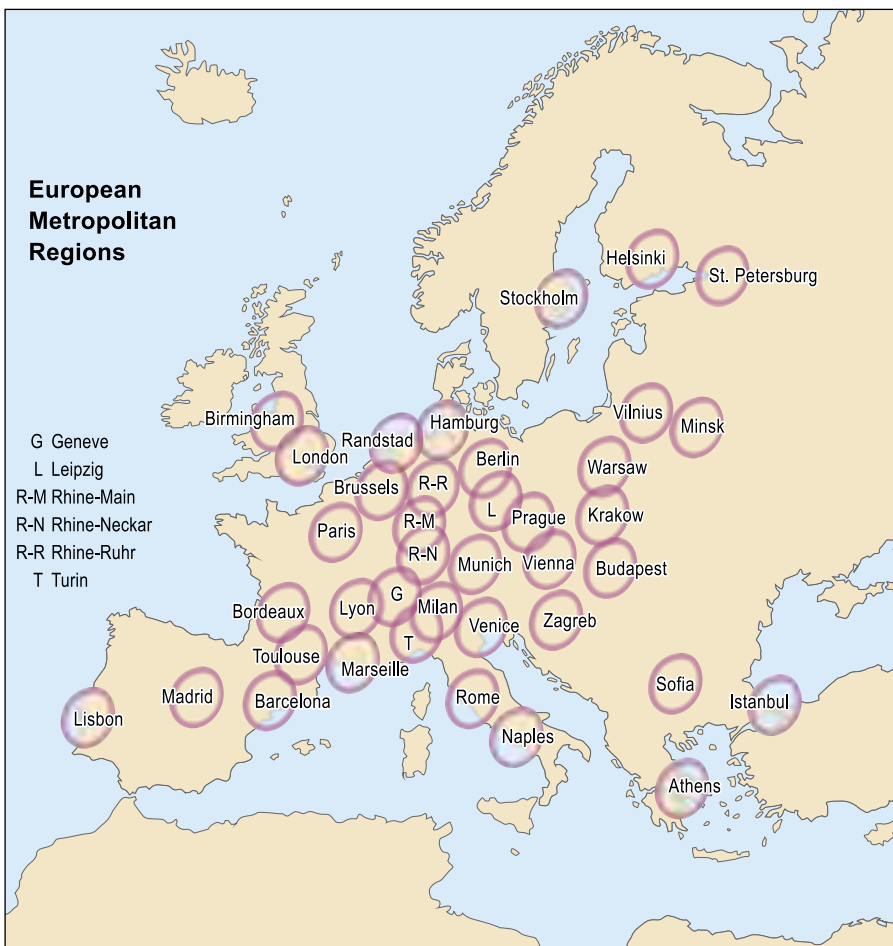
These changed spatial images reflect Europe’s new geography after the fall of the iron curtain. A new system of metropolises and metropolitan regions (“nodes”) is developing which is part of the European and the global networks (network nodes). The Metropolis Ruhr is situated in the center of the new Europe.

Despite of different languages and cultures the European Union intends to achieve the networking and the integration in a short period of time by applying a double development strategy. On the one hand, the supranational level has to be kept strengthening. In a global perspective, the European member states can only maintain and extend their welfare when they are organized as a union (economy, currency, security, education etc.). On the other hand, this comprehensive integration has to be reflected on the small-scale regional level where it has to be practiced and accepted by the population. That is why it has been conceptualized to promote the various regions and to support their regional autonomy within the integrating Europe (“The Europe of Regions”).

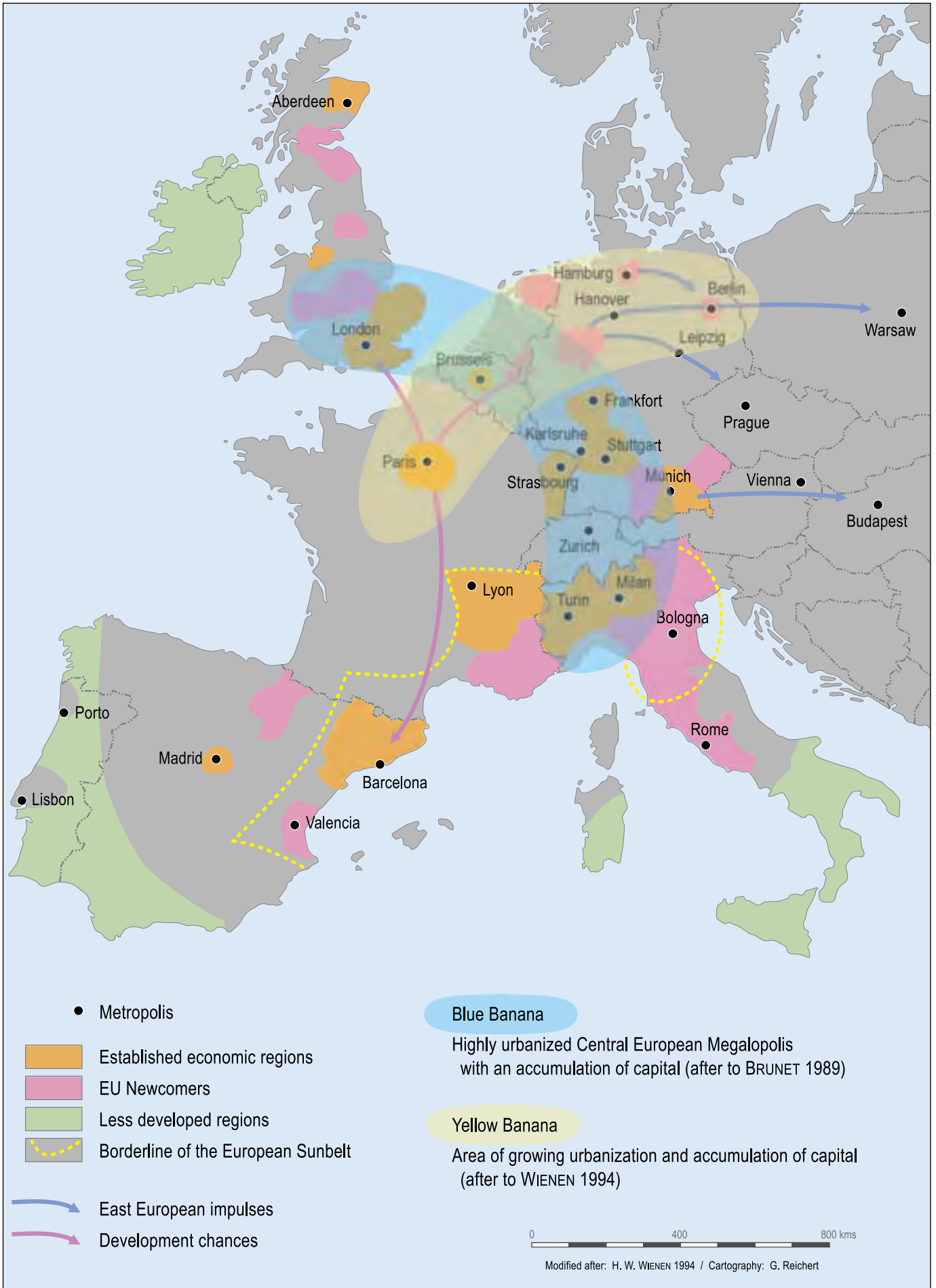
Of particular relevance is the EU declaration presented in Lisbon in the year 2000 (Lisbon strategy) according to which the European Union intends to turn into the No 1 of the knowledge-based economic regions of the world by 2010. Orientated to growth and competition the development potentials in the fields of education, research and development shall be concentrated in the metropolitan regions of Europe. In Göteborg this growth strategy has been enhanced by social and ecological aims in 2001 (Lisbon-Göteborg strategy). The European regions contribute to this integration and development process both in a cooperative and in competitive way.

The competition of the German metropolitan regions is mitigated by the fact that metropolitan functions are shared between them; e.g. Rhine-Main is Germany’s prime finance region and the Metropolis Ruhr is characterized by a concentration of trade and energy enterprises. This shared spatial organization is a consequence of the federal national system and a regionally balanced development that has been pursued for decades. Nevertheless, also in Germany metropolitan regions are regarded as important factors to maintain and develop Germany’s economic performance and competitiveness. So since the 1990s regional development planning follows the ideas of a “growth-orientated concentration” and the “strengthening of the strong”. Since 1995 the Ministerkonferenz für Raumordnung (MKRO; minister conference for regional development) declared eleven German metropolitan regions as European metropolitan regions (EMR) that are to be enhanced. To be able to fulfill their node functions within the European network and in a globalized world the German metropolitan regions are assigned the following functions:

- Decision-making and control functions (Public and private institutions are located in metropolitan regions, e.g. the headquarters of important enterprises)
- Innovation and competitive functions (Creation of knowledge, attitudes and products, e.g. university sites)
- Gateway functions (Access to people, knowledge and markets, e.g. important traffic hubs, media and fair sites)
- Symbolic function (Culture, media, events, architecture, image)



5.3.1 The “Grapes model”, a strategic map of the European economic regions



5.3.2 The “Banana model”, another strategic map of the European economic regions

In this concept the Metropolis Ruhr is the northern part of the European metropolitan region Rhine-Ruhr. With more than eleven million inhabitants this polycentric metropolitan region is by far Germany's largest conurbation. With a size like this and the concentrated power of the Metropolis Ruhr, Düsseldorf and Cologne/Bonn this metropolitan region is competitive in a global perspective as well. However, the European metropolitan region Rhine-Ruhr is nothing but

a regional construction, a metropolitan region "made" for strategic reasons only. Simply because of its size and its heterogeneity this metropolitan region has not yet come across to the self-conception of the local players and the population of the 2013 Rhine-Ruhr region.

Within the Metropolis Ruhr the districts are most likely prepared to cooperate. In recent years regional cooperation has made joint successes possible, as e.g. the

IBA Emscher Park, the joined development of master plans, the coordinated realization of major events as the European Capital of Culture 2010 year.

It is still striking that cooperation in the Metropolis Ruhr is yet limited to "soft" and conflict-free fields like landscape and culture planning. But facing the future perspectives of the cities and rural districts on the rivers Ruhr, Emscher and Lippe it is necessary to foster this



5.3.3 The eleven metropolitan regions in Germany

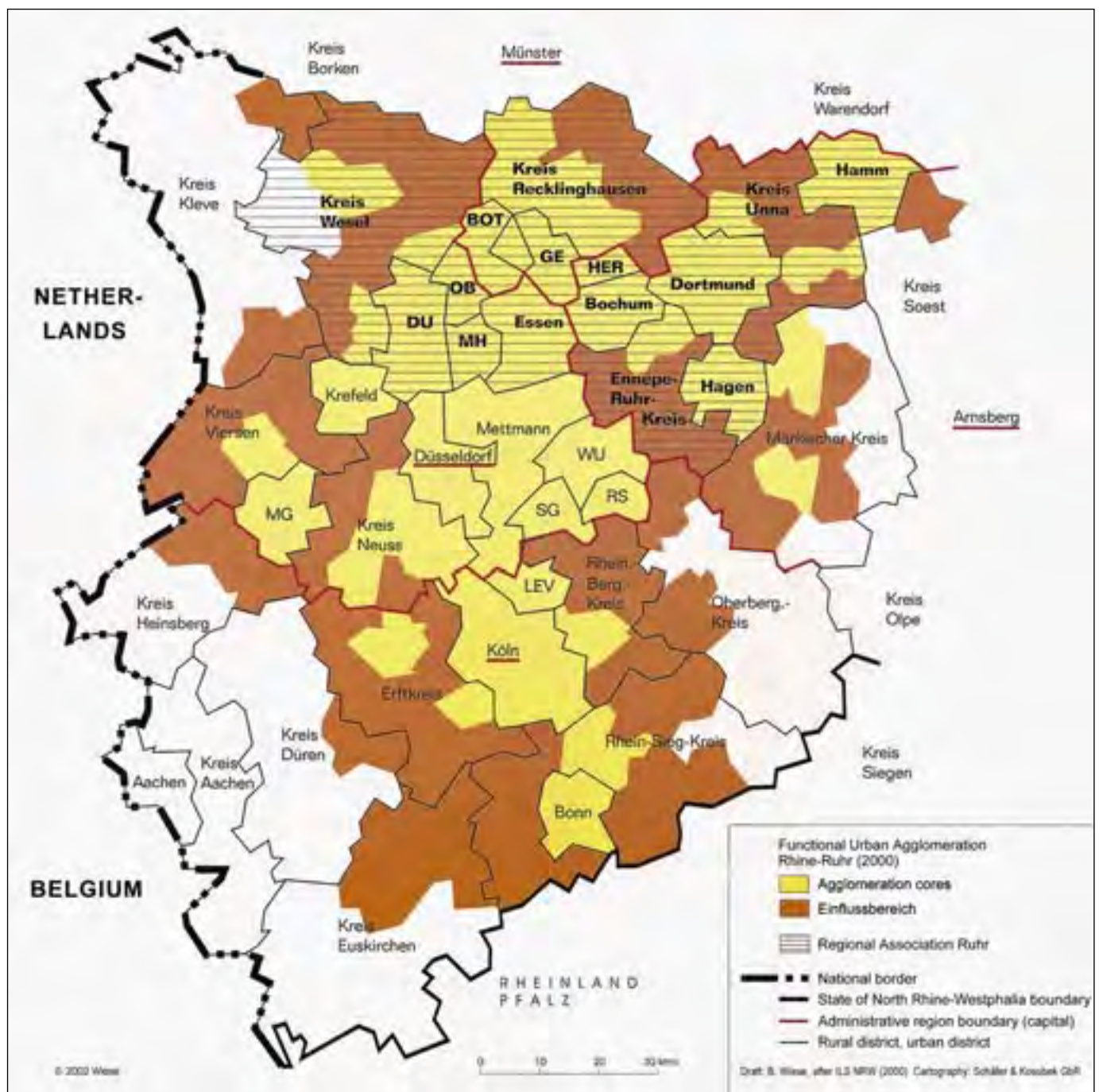
willingness to cooperate as a new potential of the Metropolis Ruhr and extend it to the “hard” and economically relevant fields; for actual measurements of the German cities have shown that the individual cities of the Ruhr are still far behind the cities of Berlin, Munich, Hamburg, Frankfurt, Düsseldorf, Cologne, Hanover and Stuttgart in terms of “metropolitanity”.

If, however, the cities of the polycentric Metropolis Ruhr are perceived as a cooperating metropolitan region the region as a whole will achieve a much higher rank among the German metropolitan

regions. To consider cooperation as a prime issue for the future, as it is done in “Konzept Ruhr”, has to be accepted as the appropriate strategy for the future development. Consequently, both the European Union and NRW will no longer fund local projects but only projects that are regionally adjusted.

Next to an increased willingness to cooperate the future success of the region will have to rely on the regional strengths that have to be used and extended, i.e. to use the given polycentricity, the central location in the new Europe, the many positive developments of the recent past,

the unique characteristics as well as the major events (e.g. RUHR.2010) that have jointly been developed and organized. But it would be unrealistic to think that the Ruhr could ever achieve again the dominant economic position the region had in times of the flourishing old industries of the 19th and early 20th centuries. A sustainable regional development strategy should strive for a growth that is based on a broad basis and that is socially and ecologically balanced. Then the Metropolis Ruhr will remain a livable region for some million people and an attractive region for investors and migrants.



5.3.4 Metropolitan region Rhine-Ruhr

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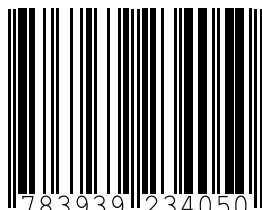
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The Metropolis Ruhr and its municipalities



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