

STUDIA REGIONALIA

Journal of the Polish Academy of Sciences:
Committee for Spatial Economy and Regional Planning
&

European Regional Science Association
(ERSA) Polish Section

Volume 49, 2017, pp. 123-141
doi: 10.12657/studreg-49-05

ANALYSIS OF POST-INDUSTRIAL SITES IN FUNCTIONAL URBAN AREAS. THE CAPITAL CITY OF WARSAW, PŁOCK, RADOM AND PIONKI CASES

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Abstract: The article presents results of the analysis regarding industrial zones of three Functional Urban Areas (FUA) – Warsaw, Płock and Radom with Pionki. The research was based on available source material: planning, strategic and operational documents, specialist studies and reports, and statistical data. The study included the assessment of the state of environment, socioeconomic status, infrastructure development and a legal and ownership context of brownfields. The structure of the article corresponds to the content of the report, i.e. presents the location of the post-industrial areas and their significance for the FUAs, results of social and economic analysis, a planning context for undertaken and planned actions, finally, major conclusions of the analysis.

Keywords: Brownfields, Functional Urban Areas, Pionki, Płock, Radom, Warszawa.

JEL codes: O11, R11

Introduction

Brownfields have recently been of particular interest to many cities and regions in Europe. According to the CABERTNET report brownfield sites are neglected and decapitated areas originated mainly from developed urban areas where negative effects of their previous use have been observed. Such areas need a public intervention to get their proper use restored (Fuerber *et al.* 2006). European initiatives and projects co-financed by the EU, in particular Interreg III, FP5 and FP6, have undertaken a variety of actions in the field of post-industrial areas (European Brownfield Agenda – EUBRA, Manager Coordinating Brownfield Redevelopment Activities – COBRAMAN, Towards More Effective and Sustainable Brownfield Revitalisation Policies – REVIT, among others) (Muszyńska-Jeżyszńska, Jasińska 2013). A number of projects have been completed and several urban networks dealing with integrated brownfield management and a common approach to the transformation processes of these areas in Central European cities have been established. These initiatives have also helped to develop a number of tools, strategies and models in order to improve brownfield management. Still, this problem remains a big challenge for urban areas and is one of the key themes of urban policy for Central Europe.

The article presents results of the analysis regarding post-industrial zones of three Polish cities: Warsaw, Płock and Radom with Pionki – situated in central-eastern part of Poland, in Mazovian Voivodeship. Warsaw, the largest city in Poland, the capital of the country and of the voivodeship is located in the central part of the region along the Vistula River. Płock is located at a distance of 110 km from Warsaw, in the north-western part of the voivodeship, also on the Vistula River. Radom is situated in the southern part of the region, around 104 km from Warsaw, on the Mleczna River. Pionki are in the immediate vicinity, around 30 km from Radom. The analysis covers a representative sample of Polish cities: metropolitan (Warsaw), subregional (Płock, Radom) and small urban centres (Pionki).

A current practice can still be substantially improved and awareness of the need to integrate brownfield revitalisation in sustainable urban development should increase. Professional stakeholder engagement in the western and eastern EU Member States may enhance the process of rethinking to reach a paradigm shift where more and more brownfield sites will be favoured over developments on greenfield sites.

Comprehensive data sets on brownfield land and other land uses would be useful to translate sustainable regeneration principles and objectives into actions at EU, national and regional levels. This will allow to develop indicators and to set operational targets for brownfield revitalisation and will help to set priority targets at the different levels of action.

Brownfield revitalisation is often a long term and complex process which involves a wide range of professional disciplines as well as political actors and different stakeholder groups. Co-ordination and communication are essential to sustain complex projects and the management of the process as such is more evident than sole technical aspects. There is a need for professional process management to develop and deliver opportunity plans and to steer revitalisation processes. Besides

a thorough consideration of process management aspects, the issue of community involvement as well as new market instruments to facilitate the redevelopment of brownfield sites should be main objective of future research and pilot projects.

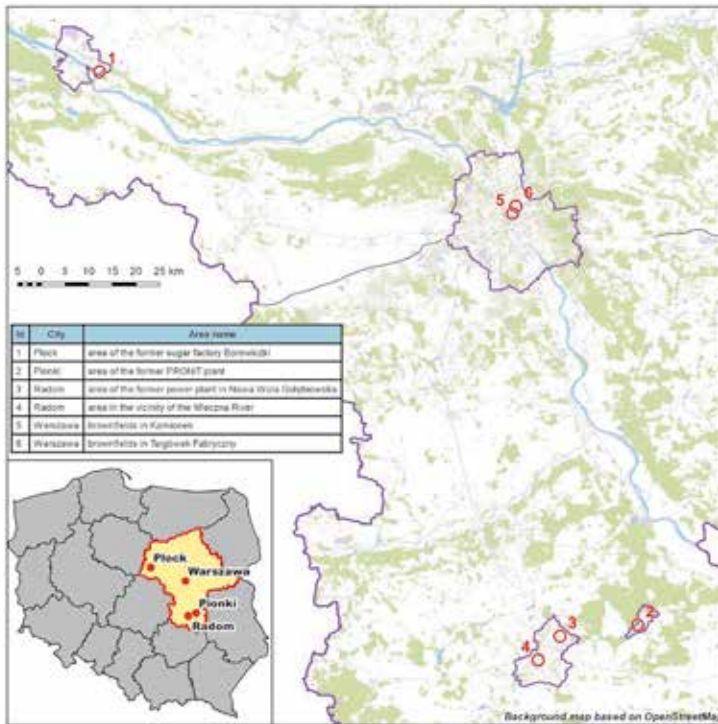


Fig. 1. Location of the analysed post-industrial areas on the background of Poland and Mazovian Voivodeship

Source: Institute of Urban Development.

The aim of the article is to present the results of comparative analysis of the Mazovia Functional Urban Area brownfields and recommendations for the post-industrial area management in other cities in the region. The analysis was performed on behalf of Mazovia Development Agency LTD (Agencja Rozwoju Mazowsza S.A., ARM SA) within the framework of the “Rehabilitation of Brownfield Sites in Central Europe” (ReSites acronym) CE 394 international project, financed by the Interreg Central Europe Programme 2014–2020¹. The project covered four cities: Warsaw, Płock, Radom and Pionki.

¹ ARM SA is one of the partners of the ReSite project and the leader of its part devoted to the implementation and evaluation of pilot activities. The Mazovia the pilot ReSite project will be conducted in the city of Radom, which is an associated partner of ARM SA; [<http://www.armsa.pl/pl/377-resites.html>, <http://www.interreg-central.eu/Content.Node/ReSites.html>].

The research was based on available source materials:

- planning documents (e.g. *Spatial Development Plan of the Mazovian Voivodeship* [*Plan Zagospodarowania Przestrzennego Województwa Mazowieckiego*], *Study of Conditions and Directions of Spatial Development* [SUiKZP] of the communes and local zoning plans),
- strategic documents (i.e. urban development strategies, economic programmes),
- operational documents (including local and municipal regeneration programmes, environmental programmes, air protection programmes),
- specialist studies (e.g. ecophysiological studies),
- documents and reports dedicated to the municipalities,
- statistical data of the Central Statistical Office of Poland, city offices, The Office of the Marshal of the Masovian Voivodeship, administrative bodies and cartographic materials.

The study included the assessment of the state of environment, socioeconomic status, infrastructure development and a legal and ownership context of brownfields. The structure of the article corresponds to the content of the report summarizing the results of the study. The first part presents the location of the analysed post-industrial areas and their significance for the Functional Urban Areas in which they are located. The following parts cover the results of social and economic analysis, a planning context for actions undertaken and planned in these areas. The article ends with the most important conclusions resulting from the analysis.

1. History and location of the post-industrial sites in analysed FUAs

The identification and assessment of the state of urban brownfield areas within three functional areas in Warsaw, Płock, Radom and Pionki was not an easy task. In Masovian Voivodeship information on post-industrial areas is scattered, incomplete and fragmentary. It is also difficult to get reliable data about the degree of the degradation of these areas. There is lack of comprehensive information about environmental hazards of the degraded areas due to industry and utility categories for the future economic potentials. Scattered information on post-industrial areas has a negative impact on their development management. Some basic information is derived from strategic and planning documents, developed both at the local and functional urban area (FUA) levels.

The Warsaw City Functional Area includes 40 local governments/municipalities, including the city of Warsaw as the core area and 39 municipalities making up the outer FUA zone. This structure is varied, it consists of the city with the rights of county (*powiat*), the city of Warsaw, 14 urban communes (*gmina miejska*), 12 urban and rural communes (*gmina wiejsko-miejska*) and 13 rural communes (*gmina wiejska*). The analysis of the current situation for the post-industrial sites in the capital city of Warsaw was prepared with regard to:

1. Relation between degraded areas and urban regeneration areas with particular emphasis on the priority areas identified in current and previous (2005–2013) regeneration programmes and microprogrammes.
2. Areas in need of spatial and functional transformation, rehabilitation and reclamation indicated in the SUiKZP.

Such an approach to the analysis points to the post-industrial areas that are unused or under-used and in need of regeneration and spatial and functional transformation and at the same time are crucial for the sustainable development of the whole city. Deteriorated post-industrial areas that were covered by revitalization activities in *Integrated Regeneration Programme of Warsaw till 2022* (Zintegrowany... 2015) and are indicated in the SUiKZP are located mainly in the areas Żerań (Praga Północ, Białołęka), Lucchini Ironworks (Bielany), Mechanical Plant “Ursus” (Ursus), Żoliborz Przemysłowy, Czyste and Odolany (Wola), Targówek Fabryczny, Służewiec Przemysłowy (Mokotów) and Kamionek (Praga Południe). These areas comprise industrial districts created in the late 19th and early 20th centuries, such as Wola, Targówek, Praga, and in the 1950s (Służewiec, Ursus, Bielany, Żerań). Currently they do not fulfil their primary function and existing buildings were significantly deteriorated. Degradation of these areas is related to, among others, the change in the structure of the industry and the collapse of area-consuming production branches. Within these districts, part of the area has been transformed in the last few years and now features service, office, commercial and cultural functions (Studium... 2006: 18). Taking into account the priorities of the urban regeneration policy in the ZPR, two areas located in the districts of Praga Południe and Targówek were selected for the analysis:

1. Kamionek.
2. Targówek Fabryczny.

This choice was also dictated by the fact that the ZPR foresees specific urban regeneration measures and a dedicated budget for these sites.

The Functional Area of Płock Agglomeration (FAPA) has been defined in the project “Cooperation in the Area of Functional Płock Agglomeration Key to the Integrated Development of the Sub-Region”, co-financed by the Technical Assistance Operational Programme (2007–2013). The Płock inter-municipal partnership is an institutionalized one, in the form of the Association of Municipalities of the Region of Płock. The strategy of urban regeneration, dedicated to the FAPA, is restricted to the area of the city of Płock and three other cities, which are the centres of urban and rural municipalities, *i.e.* Drobin, Gabin and Wyszogród. Those municipalities have a total surface of 13,900 hectares and 132,700 residents. The strategy for the FAPA urban regeneration created a system in which the action in Płock is completed by the projects planned to be implemented in small towns located concentrically in other three cities of the functional area (Strategia ... 2015: 7). The document states that the most of brownfield sites are located in Płock. As a result of actions taken by new investors, the industrial areas of a new have been partially developed and are currently being used. This applies in particular to areas with the best transport accessibility (*e.g.* the grounds of the former factory in Otolińska Street, the grounds of the former “Cotex” knitting plant, land river shipyard in Radziwie). For the

purposes of this analysis it should be noticed that the basis of indications of the FAPA brownfields are the arrangements of planning and strategic documents of Płock, i.e. *Study for Conditions and Directions of Spatial Planning in Płock* (SUiKZP) (Uchwała... 2013), *Urban Regeneration Programme for Płock* (Uchwała... 2016) and *Development Strategy of the City of Płock till 2022* (Uchwała... 2008).

The analysis of the current situation of brownfields in Płock was developed with regard to:

1. Relation between degraded areas and urban regeneration areas with particular emphasis on the areas identified in Płock regeneration programme.
2. Areas in need of spatial and functional transformation, rehabilitation and reclamation indicated in the SUiKZP.
3. Planned development areas identified in the SUiKZP and the *Development Strategy of the City of Płock*.

Such an approach to the analysis points to the industrial areas that are unused or under-used and in need of regeneration and transformation of spatial and functional that at the same time are crucial for the sustainable development of the city. The aforementioned criteria for a post-industrial site are only fulfilled by the area of a former “Borowiczki” sugar factory.

The Radom Functional Area (ROF) was defined in the project “The Strategy of Development of the City of Radom Functional Area (ROF)”, co-financed by the Operational Programme Technical Aid (2007–2013). The ROF has expanded the area defined during the project, which consists of Radom and the municipalities of Gózd, Iłża, Hawk, Jedlińsk, Jedlnia Letnisko, Kowala, Pionki (the rural commune and the city), Przytyk, Skaryszew, Wierzbica, Wolanów, Zakrzew and Orońsko. References to the post-industrial sites are abundant both in the Strategy for Development of the ROF and the documents created in the regeneration strategy. Post-industrial areas play an important role in the ROF, which is also underlined in the PEST analysis developed for the strategy, which identified them as an important element of technological environment. Strong emphasis on the importance of re-use of brownfield sites and making them the ROF asset results from diagnostic activities undertaken in the of the regeneration part of the strategy. In Radom identified areas are: Potkanów (one of the regeneration areas in 2007-2013), the area in the vicinity of the Mleczna River and the pilot area of the project, the area of the former power plant in Nowa Wola Gołębiowska. In Pionki analysis covered the area of the former “Pronit” plant.

Kamionek post-industrial site is located on the right bank of the Vistula River, in the north-western part of the Praga Południe district. Industrial character of the area began to take shape in the late 19th and early 20th centuries. When in 1889 Kamionek was incorporated to Warsaw, numerous industrial plants were located there due to the proximity to a junction railway station – Warszawa Wschodnia (former Dworzec Terespolski), the development of a railway network (rail from Lublin to Mława) and low price of land available for development. In this area were located manufactures for candles and soap, matches, brewery, winery, as well as dye bathes and laundry fabrics. In 1920 Jan Wedel built on the shores of Kamionkowskie Lake a chocolate factory, which previously was in the city centre

and became a well-known landmark for the whole district. In the interwar period Kamionek was a large industrial district (14% of total employment of Warsaw). The post-war development of the area was related to the development and location of several new industrial plants. Socio-economic transformation of the 1990s resulted in the closure of many factories, what caused a decrease of jobs. Unemployment has become the greatest social problem of Kamionek, although some of the factories have been transformed and adapted to new socio-economic functions.

Since the 19th century Targówek Przemysłowy has been a place of construction workers, factories and suburban farms. In the communist period this part of town has been earmarked for industrial development. For this purpose, a large part of former housing estate was demolished and many residents displaced. Unfortunately, these plants have not survived political changes. Currently, the area is among the most deprived in Warsaw. It is typical for former industrial areas with progressing degradation of neighbouring housing estate.

The area of the former "Borowiczki" sugar factory is located on the Słupianka River, near the Vistula. Industrial activity began there in 1900. In 1990 the sugar factory became an independent company and tried to meet market and environment standards. After a few years, in 2003, "Borowiczki" became part of the National Sugar Company. This decision ended a century-long activities of the factory and started a slow degradation of buildings due to the discontinuation of production on site. It is necessary to find a new function for the area – in accordance with the SUiKZP it should be devoted to service functions, helping to solve negative social phenomena diagnosed in other areas of the city, *i.e.* creation of new jobs, increase the education level and participation in public and cultural life.

The Radom power plant was a company with a great potential. Its bankruptcy was announced in 1998 as the debt prevented it from functioning and eventually ceased to discharge its liabilities. The potential of this area has not been used even though various possibilities for development were considered as the municipality of Radom became the owner of the land. One of the most important landmark of this area are six blocks of social housing, comprising dwellings for 300 families. Located in the outskirts of Radom, area became a ghetto where people complain about safety and problems with access to the city centre.

The development of Pionki started in the 1920s when first factory for the Polish army was located there. Pionki became part of the Central Industrial District (*Centralny Okręg Przemysłowy*, COP). The city had a typically industrial character with military, chemical and timber industries. In the 1990s large industrial plants closed leaving the residents of the city and the surrounding rural commune with a huge unemployment problem.

The investment area is equipped with a media necessary for production, *i.e.* medium and high voltage, water, sewerage and gas systems. The fenced area contains storage yards, paved asphalt roads, parking lots. Investment area is located by the district roads in close proximity of the railway. Investment plots are free of contaminants, ready for immediate development. In the immediate vicinity there are no settlements or inhabited areas. Entrepreneurs running or starting business in the

city of Pionki are offered concessions and tax cuts. In the immediate vicinity of the “Pronit” factory there is an abandoned building which, according to the plans of the city authorities, is to be transformed into a cultural institution.

All analysed areas possess a high degree of air pollution (PM10, PM2,5). The main source of air pollution is transport and industry but there are also specific factors, *e.g.* chemical industry in Płock, coal-fired power plants near to Targówek Fabryczny or single-family housing with coal-fired fireplaces and stoves in Radom.

Similarly, all analysed post-industrial areas have been heavily exploited by industrial activities, characterized by extensive use and depreciated infrastructure. Thanks to rehabilitation activities and a spatial and functional transformation undertaken in the past few years some industrial areas have been adapted to new functions such as residential, commercial and cultural.

The analysis show that the industrial activities carried out in the special zones had a significant impact on the socio-economic development of the cities and its decline as a result of the country political and economic transformation significantly inhibited the growth processes. The process of post-industrial zones slowing down the pace of development is the stronger, the smaller is the city.

In Warsaw, Radom, Płock and Pionki the abandonment of industrial activities in the analysed zones significantly affected their socio-economic and spatial situation and generated problems, both on the local and regional levels. The crisis has concerned primarily the socio-economic sphere. In the case of Pionki, but also Radom as a result of the collapse of industrial plants there was a significant reduction of development potentials and disruption of the economic system, which caused large social problems: high unemployment and depopulation. In these cities the problem has also had a regional dimension, as it has spread to neighbouring communes.

In the case of Warsaw and Płock disturbance in the functioning of the economic system, as a result of the extinguishment of industrial activities, occurred on a local scale, in some districts (*e.g.* Kamionek and Targówek in Warsaw and Borowiczki in Płock).

The presence of large compact brownfields but also smaller scattered areas in the spatial-functional structure of the analysed cities provokes problems in the spatial and technical spheres. They result from the decapitalization and technical degradation of many buildings excluded from the use due to the cessation of business activities. The spatial isolation of these areas is also to be noticed, as it limits their accessibility for new users. Unfavourable trends in the planning sphere are caused by post-industrial areas subject to uncontrolled transformation processes (Warsaw, Radom) and point-based actions. From a planning point of view the fact that many brownfields are not covered by local zoning plans cause also a problem.

2. Social background of future redevelopment of analysed post-industrial sites

From the point of view of post-industrial zone analysis it is very important to take into account their social environment, due to the fact that the condition of brownfield use defined in the Urban Regeneration Act of 9 October 2015 is directly related to the prevention of negative social phenomena diagnosed in other parts of the city.

The process of brownfield incorporation into an urban regeneration area in the light of the Act of October 9, 2015 requires:

- 1) a high social degradation of inhabited urban areas neighbouring a brownfield; based on the identified social crisis the boundaries of the degraded area are determined;
- 2) determination of the brownfield degradation in the economic, environmental, technical or spatial and functional sphere;
- 3) identification of the dedicated post-industrial activity impact on reducing the social crisis on the basis of which the degraded area has been designated.

Under such conditions the incorporation of brownfields into the urban regeneration area in accordance with the Art. 10, sec. 3 of the Urban Regeneration Act is possible. The procedure of carrying out regeneration activities in brownfield areas requires though social functions and goals, which means that those parts of cities which after the collapse of industry, are responsible for city socio-economic degradation processes, are to be re-used as a driving force for their development.

In the urban regeneration programmes of the analysed cities social objectives of the projects planned for in the brownfields include: job creation, increasing of education level as well as of participation in public and cultural life, among others (Uchwała Nr 492/XXVIII/2017: 46).

The socio-economic situation of the Kamionek post-industrial area should be viewed in the context of the whole district (Praga Południe) due to the fact that there are no permanent residents in these post-industrial areas. Though these areas are uninhabited functionally they are quite strongly linked to the former worker housing estates. Kamionek area due to the increasing negative social phenomena was indicated in the *Integrated Regeneration Programme of Warsaw till 2022 (ZPR)* as a priority area for regeneration activities. In 2013 the population of Kamionek reached 14,139 inhabitants, which was 7.93% of the whole Praga Południe population. The population density in the analysed sub-area was 161 persons per hectare, almost five times more than the population density of Warsaw. The largest group of sub-area residents were people from 20 to 65 years old (67.39% of the sub-area population). People over of 65 years old constituted 13.73% of the total population. Kamionek is inhabited by the Roma community (50 people) and 26 Vietnamese persons. For years the Praga Południe has experienced problems associated with unemployment. As for Kamionek in 2012 the long-term unemployment phenomenon affected 222 people, *i.e.* 10% of long-term unemployed persons in the district which is more than 45% of unemployed persons in the crisis area in the Praga Południe district. In the

Kamionek sub-area one observes an increase of unemployed persons: in 2010 there were 215 unemployed people, in 2011 – 275, in 2012 – 381, and in 2013 – 580.

In recent years in the Targówek district a slight increase of inhabitants has been observed. In 2009 Targówek had 123,200 residents, in 2010 – 123,500, in 2012 – 123,500, and in 2013 and 2014 – 123,700 people. Negative demographic phenomena observed in the entire district are the reason for selection for regeneration activities.

The sub-area of Targówek Fabryczny because of its character is scarcely populated. The area was inhabited by 911 people in total – 135 adults were of post-working age, 187 persons of pre-working age and 589 adults of working age. The population density of the sub-area was 35 persons per hectare and was though higher than the population density of Warsaw (33 persons per hectare). In 2012 adults of working age were 608 and in 2013 – 589, while the number of people of not working age remained similar (in 2012 – 319 persons, in 2013 – 322).

The unemployment rate in the district of Targówek increases. The Targówek Przemysłowy sub-area is inhabited by 65 unemployed people, of which 24 are long-term unemployed. Compared to 2010 the number of unemployed persons in the area has increased almost five times (in 2010 5 persons were long-term unemployed).

In Płock, according to data published by the Central Statistical Office (GUS), the population at the end of June 2016 reached 121,468 persons. During the first half of 2016 577 inhabitants were born in Płock, while at the same time 663 persons died which resulted in a negative natural growth (-86). While the population of Płock was steadily decreasing in the years 2005–2013 (in 2013 a decrease of 4% compared to 2005), the population of the Borowiczki housing estate showed an upward trend – in 2013 there was an increase of 8% compared to 2005 – reaching 3,953 persons.

Table 1. Changes in population of Płock and the Borowiczki housing estate in 2005–2013 (number of inhabitants)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Borowiczki	3,660	3,680	3,684	3,580	3,645	3,879	3,918	3,924	3,953
Płock	127,461	127,224	126,968	126,709	126,540	126,061	124,317	123,627	122,815

Source: Institute of Urban Development.

By the end of the first half of 2016 registered unemployment in Płock reached 9.2% and was lower than the year before by 1.8%. There were 5,707 registered unemployed persons (1,129 less than the year before) at the Municipal Labour Office. By the end of 2013 in Borowiczki lived 259 unemployed persons – 3.1% of unemployed people in the entire city (8,338 persons).

In Radom population decreases because of a decreasing number of births and migration to large urban centres (Warsaw) and the neighbouring municipalities. Available data on the number of residents of the post-industrial area of the former power plant in Radom come from the *Study of Conditions and Directions of Spatial Development of the Municipality of Radom*, therefore they are out of date (2011). In

June 2009 the area was lived by 147 people and the population density was among the lowest in the city – 44 persons per square kilometre. In 2010 300 families were given social housing in block of flats. Current data comes the *Urban Regeneration Programme for the City of Radom 2014-2023*. The area is lived by 881 people, of whom 556 adults are of working age, and 90 of post-working age (p. 46). Most residents try to “escape” from the area. According to municipal data there are 304 apartments in the housing estate; there is a list of 20 applications for an exchange. It is a high amount compared to the entire city with 4,896 units of municipal social housing and a list of 220 applications for an exchange. The reasons for the submission of the applications are: long distance from the city centre, insecurity, growing family and a desire for a larger apartment.

The *Regeneration Programme for the Municipality of Radom 2014-2023* contains detailed information about social problems in this area, which are mainly long-term unemployment and poverty resulting from:

- total number of unemployed persons is 110 (out of 881 inhabitants),
- long-term unemployed people – 78,
- 49 among the unemployed persons completed only primary school,
- 124 persons get permanently the benefits of social assistance and 320 families have been granted some aid (p. 46).

It is worth quoting the diagnosis of the area given in the *Programme*: “The allowances given by social assistance to one family is PLN 4,736.01 and is significantly higher than the average for the city. The intensity of social problems in this area are illustrated by some indicators: the number of “blue cards” (regarding domestic violence) 1.59 units per 100 inhabitants, which far exceeds the average for the city; supplementary feeding amounting to 27.7% of the total population, high level of 66.97 units of the number of crimes per 1,000 persons. A significant problem in this area is unemployment. The share of long-term unemployed among people of working age is 14.03%. There is also a significant amount of the unemployed people with basic education – 44.55%. There is an important number of public housing and social services per 100 residents – 41.88 units (it should be noted that all municipal houses are equipped with central heating). Problems in the technical sphere in this area show the level of granted benefits for the purchase of fuel – 3.63% of the total population. 11 indicators confirm the crisis in this area (Program... 2016: 50–51).

In Pionki lived 19,168 people by the end of 2014. In last 5 years the number of residents fell by 3.64% and decreases annually. A decrease of population density that in 2010 represented 1,084.62 persons per square kilometre has also been noticed. In 2014 there lived 1,045.14 persons per square kilometre. The population structure is dominated by women (51.91%). Demographic problems of Pionki are typical for towns that lost their previous social and economic functions – an increase of negative birth rate (even -3 in 2011) and a negative migration balance. The analysis of migration trends shows that the majority (57.4%) of people chose close cities (Warsaw, Radom), others chose to move to the rural area within the Radom Functional Area, mostly to the rural commune of Pionki. In 2014 in Pionki 1,702 people were registered as unemployed. In following years, the unemployment rate was characterized by a downward trend.

3. Economic background and regeneration plans in analysed post-industrial sites

Although in Praga Południe and Targówek there are plenty of registered business entities, the post-industrial sites note an accumulation of social, economic and infrastructural problems. This is a dysfunctional area with a low activity of residents and entrepreneurs and a visible underinvestment. Targówek statistics show one of the lowest rates of entrepreneurship measured by the number of entities per 1,000 persons. In 2014 this indicator amounted to 156 entities per 1,000 persons. In 2014 there were in total 19,317 registered entities in Targówek. The Kamionek area is characterized by a big amount of local zoning plans. Ultimately, local plans should identify development areas and areas to be protected because of their unique character. It is important for the potential development of the priority area resulting from the already adopted local plans (ZPR: 135). The ZPR expresses a need for a quick adoption of local plans for specific areas of Targówek Przemysłowy: the area between Radzywińska, Rozwadowski, Księcia Ziemowita, Naczelnikowska Streets, the region of Księżna Anna Street. It is necessary to reduce the permissible nuisance localized in the area of establishments engaged in the business of waste gathering and processing. The local zoning plan of the area of Rzeczna, Ziemowita and Klukowski Streets is important for the regeneration of the area, for the improvement of buildings and land quality and aesthetics, in particular by renovation or replacement of degraded buildings with a new ones providing housing and commercial service functions, elimination of disharmonious elements such as advertising media, temporary buildings, etc.

In Płock at the end of June 2016 12,373 business entities were registered. According to the Central Statistical Office (GUS) the vast majority, i.e. 8,757 entities, were one-man businesses mainly covering trade and vehicle and motorcycle repair (2,306), professional, scientific and technical (1,098), construction (991), transport and warehousing (895) and manufacturing (698). Within manufacturing section the following companies operate in the area: PKN Orlen S.A., PERN Przyjaźń S.A., OLPP Sp. z o.o., Basell Orlen Polyolefins Sp. z o.o., CNH Industrial Polska Sp. z o.o.; Levi Strauss Poland Sp. z o.o.; Dr. Oetker Dekor Sp. z o.o.; Flexpol Sp. z o.o., Bildau & Bussmann Polska Sp. z o.o., Centromost – Stocznia Rzeczna w Płocku Sp. z o.o., Petro Remont Sp. z o.o. The largest construction companies operating in Płock include: Mostostal Płock SA, Energa-Operator Eksploatacja i Inwestycje Płock Sp. z o.o. Amabud Nieruchomości Sp. z o.o., Izokor Płock S.A., OPEUS Sp. z o.o. The economic potential of Płock is also supported by Płocka Rada ds. Innowacyjności i Działalności Badawczo-Rozwojowej (*Innovation, and Business Research and Development Council*) established by the Regulation no. 3358/2013 by the President of the City of Płock of 19 July, 2013. The council is an advisory body to the President of Płock as for promotion of innovation, research and development projects important for the city. Business environment institutions operating in the zone of the former sugar factory in Borowiczki have a significant impact on the planning of the Płock economic development, creating a climate for future investments. By the end of 2013 in the

Borowiczki housing estate there were 302 businesses registered, which is 2.4% in comparison with the total number of entities in the city (12,537).

For the post-industrial area of the former Borowiczki sugar factory there is a valid local zoning plan of the Imielnica and Borowiczki housing estates with Ośnica in Płock adopted by the Resolution no. 673/XXXI/00 by the City Council of Płock of 19 Sept, 2000.

It was decided that the area with the former sugar factory buildings should preserve its existing industrial and storing functions with the reduction of environmental nuisance to the primary function area or the one determined by an administrative decision. The local plan also provides a possibility of expansion, reconstruction and modernization of large structures and equipment, including the industrial wastewater treatment plant, and sustainable land management.

As for the main historic building of the sugar factory the obligation to obtain an agreement or a decision of the State Service for Protection of Monuments in case of renovation or reconstruction, and other activities that might result in changes of building or its environment was established.

The resolution no. 860/L/2014 by the City of Płock of 26 Aug, 2014, the above-mentioned local zoning plan was considered outdated and intended for change. The resolution no. 163/IX/2015 by the City of Płock of 30 June, 2015, proceeded the change of the existing Borowiczki housing estate plan. The need to change the local plan resulted, among others, from an obligation to adjust the plan to flood hazard and flood risk maps for these areas. The owner of the land and buildings of the former sugar factory in Borowiczki is Krajowa Spółka Cukrowa S.A. (*National Sugar Company SA*). The complex organizational structure and ownership of the National Sugar Company justifies the purpose of the operation in the post-industrial area in Borowiczki, i.e. the creation of the common documentation service centre in the historic buildings of the sugar factory.

In Radom the post-industrial area of the former power plant is owned by the municipality. It is characterized by a relatively low level of entrepreneurship – the number of registered business entities is 6.7 units per 100 people, and at the same time by a relatively high number of deregistered entities – 1.14. There is no support from business environment institutions for companies operating at this site. The area of the former power plant does not appear in the strategic documents, with the exception of the *Study of Conditions and Directions of Spatial Development of the Municipality of Radom* (SUiKZP). There is an information about the need of a local plan (23 Apr, 2007, 108/2007), but works on preparing the plan for this area have not started, yet.

The SUiKZP suggests the following recommendations for the plan:

- enable investment, service and industrial activities in the area of the power plant and on adjacent plots by increasing service and production functions,
- realization of the objectives in the field of construction of basic transport system (road on the western side of the railway),
- regeneration of the degraded brownfield and change of use of agricultural land for the building and service industry purposes,
- implementation of applicable laws on the protection of the environment,

- intensification of investing procedures in the selected areas (according to SUIKZP),
- improving the investment attractiveness of the city and create jobs by increasing the supply of land for production and service functions.

These recommendations are important for re-landscaping purposes.

The economic structure of Pionki is diverse. Pionki was an industrial town, where chemical industry played a dominant role. The collapse of the “Pronit” factory seriously disturbed the functioning of the town economic system. Then the town gradually changed the orientation from the typical industrial one to the commercial service activities, to which currently most of business entities are related. Commercial activities, mainly shops – approx. 150, play a dominant role. The town has high economic and human potentials, and has become an attractive place to invest. In case of Pionki the evaluation of the *Study of Conditions and Directions of Spatial Development of the Municipality* is difficult due to poor availability of this document, available only in a paper version, which may be a barrier for potential investors. There is the local zoning plan covering the post-industrial area that maintains the existing functions and allows carrying out investment activities outside the Natura 2000 areas.

The Warsaw urban regeneration processes were programmed by *Zintegrowany Program Rewitalizacji m.st. Warszawy do 2020 roku (Integrated Regeneration Programme of Warsaw, ZPR)*. The programme was run under the Art. 18., par. 2., sec 6 of the Act of March 8, 1990 on Commune Self-Government in the partner-expert process. It resulted from co-operation between inhabitants and the city, host of the urban regeneration process of the capital, represented by the City Council – Office of Housing and Urban Regeneration Policy, which coordinated the work on the programme. The procedure for preparing the document included broad social participation, in the form of public debates, district meetings and workshops for residents.

In the *Integrated Regeneration Programme of Warsaw (ZPR)* both Kamionek and Targówek Fabryczny have been identified as the key areas for the urban regeneration projects. The planned activities are designed to develop and increase the attractiveness of both crisis areas (Kamionek, Targówek Fabryczny) for residents and investors, by preparing existing brownfields for different new functions (economic, residential and recreational) and to reduce the negative impact on the environment. The programme intends to focus on activities around local centres.

Recently, in Kamionek post-industrial zone many various activities have been realised, including the following regeneration projects: the Lubelska 30/32 centre, Soho Factory (25 Mińska Street), the District Centre for the Promotion of Culture (2 Podskarbińska Street) or modernization of buildings.

The key ZPR planned projects in this area are:

- transformation and increase of attractive public spaces between: Skaryszewska – Lubelska – Zamoyskiego – Targowa Streets and Kamionkowska – Bliska – Mińska-Chodakowska – Groszowicka – Terespolska – Grochowska Streets,
- upgrading of the existing heating system and elimination of individual heating,
- improving building standards: renovation works and modernization of houses (27 buildings – 482 units),

- exploiting the potential of public spaces, which through an appropriate transport policy can strengthen development processes in the area – changes in the transport system, construction of the second metro line,
- renovation of existing facilities for cultural and social functions, e.g. the seat of the Sinfonia Varsovia orchestra,
- development of social and cultural functions of street fairs,
- creating a multi-sites places for local activity – the continuation and development of the Social Centre Paca 40.

Urban regeneration projects for stimulating sustainable development of Targówek Fabryczny, the district struggling with social and economic problems, started some years ago. Recently renovation and modernization of several buildings have been completed, some green areas and a park renovated, landscape renovations have been carried out as well as road infrastructure. In the area of Targówek also several social projects have been implemented and the new ones are foreseen:

- transformation and increase the attractiveness of public spaces between: Siarczana – Naczelnikowska – Ziemowita – Dziewanny Streets and in the Targówek Mieszaniowy sub-area between Radzywińska – Biezuńska – Rajgordzka – Radzywińska Streets.
- upgrading of the heating system and elimination of individual heating,
- improving the building standards: renovation works and modernization of houses (19 buildings – 200 units)
- preparing flats for rent – construction and modernization of buildings with flats for rent (Skaryszewska and Dziewanny Streets),
- creating a place for local activities at 6 Siarczana Street.

Creating the space for city sports and liquidation of small-scale architectural barriers are common for both areas.

The town authorities, represented by the Department of Development and Economic Policy, are the hosts of the urban regeneration processes in Płock. The city regeneration programme was based on the Art. 14, par. 1 of the Urban Regeneration Act of 9 October 2015, prepared with a vast participation of stakeholders and adopted by the City Council (Uchwała nr 492/XXVIII).

In Płock the *Urban Regeneration Programme of Płock* defines the main goal for the brownfield site of the former sugar factory in Borowiczki as “protection of historical buildings and the use of the potential of space to develop new social and economic functions.” The regeneration programme assumes that any action taken in the former sugar factory should serve the prevention of the negative social phenomena in the form of:

- reducing the unemployment rate (based on social clauses) and poverty,
- increasing the level of education through the organization of professional training, educational activities for children and adults, influencing the increase of social capital and social attitude formation,
- implementation of measures that will contribute to the increase of participation of other regeneration sub-areas inhabitants in public and cultural life.

The programme assumes that the regeneration process of the area will be done in stages:

- phase I covers the process of historical building protection and their adaptation to new functions in accordance with the provisions of the local zoning plan,
- phase II covers activities associated with the development of free space in order to fully exploit the potential of the area; these activities must be preceded by planning and conceptual works.

The Radom urban regeneration processes were programmed by the *Program rewitalizacji Gminy Miasta Radom na lata 2014-2023 (Urban Regeneration Programme of Radom 2014-2023)* based on the Art. 14, par. 1 of the Urban Regeneration Act of 9 October 2015 and adopted by the City Council (Uchwała nr 346/2016).

The *Urban Regeneration Programme of Radom* does not foresee any action in the area of the former power plant in Radom. The area is recognized as part of the investment offer of the municipality of Radom, listed in the *Study of brownfields located in the Municipality of Radom for investors*.



Photo 1. Investment site at the former power plant in Radom

Source: *Studium pozyskania inwestora dla terenów przemysłowych Gminy Miasta Radomia*.

The *Urban Regeneration Programme of Pionki after 2013* is still being prepared, therefore activities regarding the post-industrial area are presented in a historical perspective. Currently the only planned activities are related to the development of the investment zones in the former “Pronit” factory and the creation of cultural complex situated in a huge building of the former power plant located in the vicinity of some old plant buildings. The *Local Urban Regeneration Programme* as for post-industrial areas in Pionki planned the following activities:

- regeneration of industrial and post-industrial area and facilities (the former “Pronit” and “Chemontaż” factory areas) for the State Fire Service Training Centre,
- regeneration of post-industrial areas of “Chemontaż” for the Department of Research in the Field of Fire Safety run by the Building Research Institute,
- incorporation of the part of the former “Pronit” area to the Special Economic Zone EURO-PARK WISŁOSTAN,
- establishment of the Industrial Park on the part of the former “Pronit” area.

Most of the projects were implemented. Additionally, the renovation of a historic casino building located next to the area was accomplished – the works included: renovation of the facade, strengthening of the floor, putting a new roof, reparation and construction of partition walls, changing windows and doors while maintaining architectural elements (the form of the windows, decorative elements), restoration of the facade (cornices, portal), furnishing of the building, arrangement of an adjacent plot. Currently, there is a centre of local activity here, which concentrates on projects activating local community.

Conclusion

In the Mazovian Voivodeship information on its post-industrial areas and environmental conditions is scattered, incomplete and fragmentary. It is also difficult to get reliable data on the degree of the given area degradation. There is lack of comprehensive information about environmental hazards of the degraded areas due to industry and utility categories for the future economic potentials.

Scattered information on post-industrial areas has a negative impact on their development management. Currently, there is lack of centralised knowledge sources about the post-industrial areas on the regional level as well as the mass inventory and area valorisation system. Post-industrial area inventory information is given for instance by The Institute for Ecology of Industrial Areas (IETU), The Central Statistical Office (GUS), local governments (area intended use foreseen by local zoning plans, among others), The General Directorate for Environmental Protection (GDOŚ) – as far as environmental damages and accidents are concerned. However data on post-industrial areas got from the above mentioned institutions are incomparable and incompatible as for the number and total surface of the areas.

The lack of a consolidated social and economic development of post-industrial areas planning system. At present some elements regarding the development of post-industrial areas are included in many strategic documents prepared to support the management of the whole municipality such as the City Development Strategy, the Environmental Protection Programme, the Study of Conditions and Directions of the Commune Spatial Development, the Regeneration Programme. The Study of Conditions and Directions of the Commune Spatial Development identifies degraded areas for their spatial, functional, technical and environmental aspects by showing areas in need of transformation, land rehabilitation or decontamination. Though according to the article 9, section 1, of the Regeneration Act the degraded area is determined for the regeneration programme taking into consideration the concentration of negative social phenomena mainly such as unemployment, poverty, crimes, low education or social capital level as well as the insufficient participation in public and cultural life, co-existing with at least one of the negative economic or environmental, or spatial and functional, or technical phenomena. So, it may be concluded that each of the above mentioned strategic documents treats differently

degraded post-industrial area data and dedicates them different development directions and tools.

According to the Regeneration Act of 9 Oct, 2015 while running regeneration processes it is possible to integrate regeneration policies into spatial planning but only regarding inhabited areas. One of the major problems of post-industrial areas is the fact that it is impossible to connect economic planning with the spatial one. Only in the regeneration programming phase there is a possibility of preparing regeneration projects for post-industrial areas located within the regeneration areas in long-standing perspective – in case of private ownership situated there. Yet, regeneration project rules limit long-standing economic planning, preparing financial plans, project pipeline in regeneration programme. In the city and economic development strategies priorities are mainly dedicated to the local government regarded as the leader of the development processes.

In case of private ownership there are no legal basis for post-industrial rehabilitation guided by public institutions. There is lack of good practices as far as processes of degraded post-industrial areas management are concerned. At present there is no regional strategic document enabling the consolidation of knowledge about planned operations to be taken in the post-industrial areas by all parties. There is lack of information about total private capital to be engaged in operations related to post-industrial land rehabilitation. There is lack of knowledge about the scale of planned projects. The lack of knowledge limits the possibility of managing financing sources dedicated for example to environmental or area improvement or by the subvention donors.

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To cite the article:

Jadach-Sepiolo A., Muszyńska-Jeleszyńska D., Spadło K. (2017), Analysis of post-industrial sites in functional urban areas. The capital city of Warsaw, Płock, Radom and Pionki cases. *Studia Regionalia* 49: doi: 123-141, 1012657/studreg-49-05