NEW IDENTITY OF POST-INDUSTRIAL LANDSCAPE – BETWEEN ARTISTIC CREATION AND GREEN ENERGY PRODUCTION

1. INTRODUCTION

Urban and architectural planning often involves searching for solutions for the forms which lost content as a result of dramatic events or interruption of development processes. In particular, it concerns post-industrial areas, where production stopped because it was no longer profitable or it was technologically outdated, as well as post-mining areas, when mineral resources became exhausted. This situation can be observed in the Commune of Kleczew in the east of the Greater Poland region, where long-term open-pit mining for lignite, which was supplied to the nearby power station, caused irreversible changes in the landscape structure. The former farmlands changed into huge excavations. Rural settlements with the accompanying network of roads and buffer strips disappeared from the surface of the earth. There were dramatic, usually irreversible changes in the natural environment with consequences reaching far beyond the limits of the mining area or even the Greater Poland region. The lowering of the groundwater level caused the formation of a depression crater, which resulted in deterioration of the farmland quality and gradual disappearance of important waterbodies and watercourses (the water surface of Lake Gopło, which is about 30 km away, has dropped and some parts of the Noteć River have dried)[1]. As the Lignite Mine in Konin gradually occupied consecutive areas and made more pits, the commune became almost completely deforested. After long years of exploitation the mine finishes operation in the Commune of Kleczew and leaves a wasteland after permanent anthropogenic transformations. The consequences are not limited to aspects related with space, landscape and the environment. They also have significant socioeconomic influence. The mine, which has dominated the region economically, is the largest enterprise in the Commune of Kleczew as it employs about 10% of the commune inhabitants[2]. Damages paid by the mine are significant to the local budget. If these payments are stopped, the develop-

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[1] It causes protests of the inhabitants of areas located on the border between the Greater Poland and Kuyavia regions.
Source: www.greenpeace.org/poland/pl/wydarzenia/polska/Odkrywka-kradnie-nam-wode-protest-mieszkacow-nad-wyschnieta-Notecia/.

[2] A. Ostręga, R. Uberman, 2010. Kierunki rekultywacji i zagospodarowania – sposób wyboru, klasyfikacja i przykłady. Górnictwo i Geoinżynieria, 4. Uczelniane Wydawnictwa Naukowo-Dydaktyczne Akademii Górniczo-Hutniczej w Krakowie, pp. 445-460.

ment of the commune may slow down. The end of lignite mining due to the exhaustion of local deposits also causes serious energy problems. The consequences may affect all parts of Poland, because the lignite mined near Konin is used to produce about 9% of the total amount of energy in Poland[3].

In 2018 Jóźwin IIB, which is the last open pit from which lignite is mined in the Commune of Kleczew, will be closed. The local authorities will have to face a serious challenge then. The social, economic and energy problems will require the implementation of complicated technological and investment processes not only to repair damage to the environment and acquire energy from unconventional sources but also to create a stable basis for sustainable socioeconomic development in the region. The degraded landscape without content needs innovative and brave concepts to create new identity of the place.

2. THE USE OF POST-INDUSTRIAL AREAS – TRENDS IN TRANSFORMATIONS AND EXAMPLES OF SPATIAL, LANDSCAPE AND ARCHITECTURAL SOLUTIONS

Regardless of the type of resources acquired and their exploitation time, mining is only a specific period in the history of a particular area. When it is finished, the search for new forms of use, new functions and new spatial and landscape identity begins. Renaturation is a method of transformation of post-industrial areas. It consists in an attempt to restore the form which is as close to the original as possible. However, total reconstruction of the earlier landscape is usually impossible and the restoration of forms preceding anthropogenic interference is often a superficial action. The repair of major environmental damage is always a long and complicated process. Complete repair is usually impossible, especially when it comes to the reconstruction of imbalanced hydrological relations and the restoration of ecosystems. Another option is land reclamation, which consists in making repairs, allowing for the new environmental situation. The process consists in the restoration of natural and utility values in degraded areas and adapting them to new functions. Reclamation often involves giving an area new use, which is different from the one before exploitation[4]. Pro-ecological actions, such as afforestation and water land reclamation, are supplemented with the introduction of new houses or infrastructure for sports and recreation[5]. Due to the multidimensional character of the reclamation process its trend should be chosen with full awareness and it should be preceded by comprehensive analysis of environmental conditions and technological possibilities. It is also important to allow for the socioeconomic situation and development plans for the region where the area undergoing land reclamation is situated.

[3] According to data provided on the website of the Pątnów-Adamów-Konin Power Station Complex S.A.: www.zepac.com.pl.

[4] A. Berger (ed.), 2007. Designing the reclaimed landscape. Taylor and Francis, London and New York

[5] D. Wieruchowska-Janik, W. Siera, 2004. Rekultywacja terenów przekształconych w wyniku odkrywkowej eksploatacji węgla brunatnego na przykładzie KWB "Adamów" i „Konin". Roczniki Gleboznawcze LV. Polskie Towarzystwo Gleboznawcze Warszawa, pp. 493-507.

After intensive and usually irreversible transformations post-industrial areas are no longer associated with nature and picturesque landscape. The scale of destruction justifies different experimental actions taken in these areas. They often become an arena for artistic activities and a context for contemporary works of art. Artists often find inspiration, attractive space for exhibition and new recipients there[6]. Contemporary landscape architecture projects, which concern the creation of new scenic complexes in these areas, are particularly attractive[7]. Large, deserted spaces without utility value receive new functions. They become specific laboratories or areas where new technologies are tested and experiments on production, cultivation, building and power supplying are conducted. The Staffordshire Potteries in the West Midlands, UK, is a project implemented in the 1960s. It is a perfect example of an unconventional and creative approach to the use of post-industrial areas. For over 200 years this region was famous for the production of ceramics, which were made from materials acquired in the region. The industrial development of the area finished after World War II. The remains of a freight railway and post-industrial relics were ubiquitous elements of the landscape. They were evidence of the heyday of region and its poor condition at a later period. In 1966 Cedric Price, a British architect, presented an ambitious and visionary plan to revitalise post-mining areas, which was known as the Potteries Thinkbelt[8]. The concept was based on the assumption that the development of new technologies and higher education would be logical continuation of the industrial past. The disseminated technical infrastructure was to be used as the basis for a complex functional and spatial system promoting new forms of education and inhibiting the socioeconomic decline of the region. The project assumed using the existing railway track as a carrier for mobile elements of architecture in the form of lecture halls. Modules moving along the old routes where raw materials used to transported were supposed to stop at stations located near workmen's estates (Fig. 1). According to the project, mobile objects were to be combined into larger units. In consequence, a complete university campus with laboratories, offices and halls of residence

[6] Barbara Stano presents the results of an artistic project in a Silesian post-mining landscape. B. Stano, 2015. A marriage of art and industrial space in post-industrial landscapes / Mariaż sztuki i przestrzeni przemysłowej w postindustrialnym krajobrazie. Landscape Architecture / Architektura Krajobrazu 4, pp. 34-47. Aleksandra Idziak and Krzysztof Herman describe the concept of a landscape art workshop for students 'The Grand Canyon of Art. The Mining Landscape', which is implemented in the lignite mine in Bełchatów. Idziak A., Herman K., 2008. Między kopalnią a krajobrazem. Transformacje sztuki krajobrazu. Instalacje, rzeźba, performance jako formy rekultywacji krajobrazów postindustrialnych [In:] Zarządzanie krajobrazem kulturowym. Prace Komisji Krajobrazu Kulturowego PTG 10 Sosnowiec, pp. 386-394.

[7] The Eden Project by Nicholas Grimshaw, a British architect, is one of the most spectacular examples. This huge botanic garden with characteristic biome domes in Cornwall is located in an exploited clay pit. It is an area of attractive landscape, on the one hand, and a place where energy is produced from renewable sources and where local people are employed, on the other hand. Pearman G., 2009, 101 things to do with a hole in the ground. Eden Project, UK

[8] S. Hardingham, K. Rattenbury, eds., 2007. Cedric Price: Potteries Thinkbelt (SuperCrit., Routledge London.

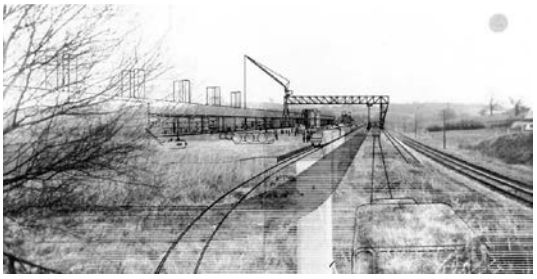

Fig. 1. Potteries Thinkbelt, a university campus located in a post-industrial landscape (source: www.discoversociety.org, drawing by Cedric Price)

was to be built[9]. However, this futuristic concept did not eliminate the history of the region. New elements of architecture, with brave forms, were to be erected among heaps of coal and factory stacks, indicating the industrial tradition of the place. Although Price's concept was never implemented, like his other visionary concepts, it considerably influenced contemporary architecture[10].

The IBA – Internationale Baustellung is one of original methodological and practical tools supporting spatial planning and providing inspiration for new design solutions in Germany. The undertaking stemmed from building exhibitions made in the first half of the 20th century, where current trends in housing architecture were presented. The exhibitions were held in different German cities and they concerned numerous contemporary problems of architecture and urban engineering. In 1989 the IBA was organised in the Ruhr District to develop new concepts of revitalisation of post-industrial areas. A similar problem was considered as part of actions taken in Lower Lusatia in 2000. The main subject discussed at the IBA in 2000 was redesigning the landscape degraded by lignite mining in large areas in the southeast of Germany. About 30 individual projects were made under the large undertaking known as *Landscape Islands*[11]. These are theme islands – areas of different character, resulting from their local specificity, but interconnected into one coherent system by effective passageways. The leitmotif, which is noticeable in the whole complex, was to protect and promote the heritage of the region, especially industrial heritage. Anthropogenically formed terrain, post-industrial structures and abandoned technical infrastructure were treated as the context for creative search, the basis for creation of new forms of landscape, architectural and urbanistic solutions. Vast pits left after lignite mining are used in different ways. Some of them were transformed into artificial water bodies with tourist resorts equipped with rich infrastructure for recreation. However, other excavations did not undergo any land reclamation and were left as a specific memento with

[9] The project of a mobile University on rails was Price's specific political manifesto, where he criticised the traditional university system. In his opinion the system concentrated on academic theories too much and did not provide enough practical and technical education. Hardingham, Rattenbury, *op. cit.*

[10] Price's concepts may have inspired the designers of the Pompidou Centre in Paris or the London Eye. In 2014an exhibition of Price's designs was opened in Cambridge. At the opening ceremony the speakers stressed the fact that Cedric Price was both known for the concepts which were implemented and his visionary designs which have never been implemented. Source: Anti-building for the future: the world of Cedric Price, University of Cambridge, www.cam.ac.uk.

[11] http://www.iba-see2010.de.

preserved traces of expansive exploitation of resources. They are a dramatic set for cultural events – artistic performances, workshops and concerts.

Fig. 2. The viewing platform in the Welzow-Sud open-pit mine (source: photo by Frank Döring, www.coalscapes.com)

Monumental landscapes near the town of Welzow are popular and particularly attractive tourist destinations (Fig. 2). Degraded areas in Lusatia were treated as a huge laboratory for spatial, landscaping, architectural and artistic activities under the IBA project. Experimenting on the post-industrial landscape is not limited to visual aspects only. It is very noticeably related with all aspects of sustainable development, i.e. the economic, ecological and social aspects. This is the area where art met latest technologies. For example, some post-mining pits were excluded from agricultural production and used as a huge experimental field for energy crops[12].

3. A CONCEPT OF DEVELOPMENT OF THE LIGNITE OPEN PIT JÓŹWIN II IN KLECZEW

So far actions taken to redevelop the areas degraded by open-pit lignite mining in the Commune of Kleczew have mostly concentrated on land reclamation for water recreation[13]. Old excavations are being transformed into artificial lakes with beaches offering facilities for sports and recreation. Local authorities would like to continue this activity. They are planning to make a motocross circuit and build a ski slope on one of the heaps. It seems that this unidirectional revitalisation strategy may result in an excess of sports and recreational facilities in the region. It does not make a distinct and competitive offer, nor does it provide an answer to the existing and increasing energy problems.

The concept presented in Marcin Szelejak's master thesis[14] is an attempt to give a creative answer to the problems of redevelopment of degraded areas and to create new space and landscape quality. It describes Jóźwin II B – the last lignite open-pit mine in the Commune of Kleczew (Fig. 3). The concept is based on two pillars and two main goals, i.e. 1) to create the image of the place and

[12] http://www.iba-see2010.de/en/verstehen/projekte/projekt9.html.

[13] Z. Kasztelewicz, A. Michalski, Z. Jagodziński, P. Czaplicki, 2007. Zagospodarowanie terenów pogórniczych w KWB Konin w Kleczewie S.A. Górnictwo i Geoinżynieria, 2, 331--337.

[14] M. Szelejak, 2016. Krajobraz epoki antropocenu. Koncepcja zagospodarowania terenu odkrywki węgla brunatnego Jóźwin IIB w Kleczewie. A master thesis written at the Faculty of Architecture and Design, University of Arts, Poznań, Poland, supervised by dr hab. inż. arch. Elżbieta Raszeja (PhD, Architectural Engineer), University Professor. In 2016 the thesis received the main prize in the competition 'My Greater Poland Region' organised by the Poznań Branch of the Association of Polish Urbanists.

Fig. 3. The post-mining landscape in the commune of Kleczew (source: photo by Marcin Szelejak)

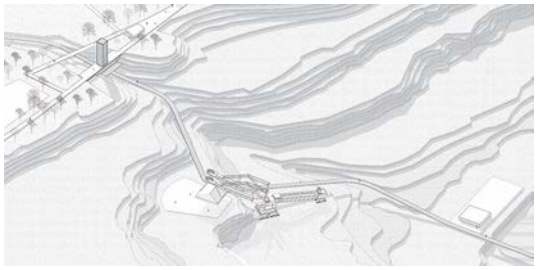

Fig. 4. A concept of a tourist trail in the Jóźwin II B lignite open-pit mine in Kleczew (source: Marcin Szelejak 2016)

build new identity of the landscape with tools used in scenography and narrative space design, 2) to offer new functions related with the production of green energy by means of modern technical and technological solutions.

The implementation of the first goal is manifested by the concept of a tourist trail promoting traces of the mining and power industries (Fig. 4). It is part of a larger complex, i.e. the trail running along railway tracks used for the transport of lignite from mines to power stations, which are scattered all over the Konin Lignite Basin. The trail presents different stages and methods of energy production. It runs between reclaimed post-mining areas, operating lignite power stations and abandoned open pits. The trail ends in a tourist centre located at the edge of the scarp of the Jóźwin II B open pit. There is a tower with a viewing platform, which helps to grasp the enormous scale of the whole complex (Fig. 5). Visitors can enter the mine at this point. This part of the excavation has not undergone any land reclamation. Mining machinery and cascade forms of the excavation make a distinctive set and add drama when we talk about the history of this place. Abandoned heaps of lignite and dilapidated mining infrastructure give evidence about the industrial period in the history of Kleczew. An amphitheatre and an educational centre are new facilities fitted into the austere forms of the post-industrial landscape. They can be accessed and visited by a specially designed system of ramps, terraces and educational paths. There are different options and lengths of sightseeing tours. At some places the trail bifurcates and its branches connect to the external recreational loop running around the entire open-pit mine. The spot where the trails connect is also the place where two contrasting landscape solutions clash with each other. The dramatic character of the remaining ruined post-mining space is even more noticeable when it is combined with areas which are to be reclaimed and afforested or covered with plant compositions.

The implementation of the second goal of the project consists in making a technological park in the deserted area. It will concentrate on the production of green energy from unconventional sources. Energy crops will be grown in the degraded area after reclamation. On the one hand, they can be used as mate-

rial for the production of ecological fuel. On the other hand, they have salutary influence on the regeneration of soil, which became sterile over the years. Plantations were designed as a buffer zone of the former mining area. The zone is divided according to the rhythm designated by neighbouring fields. The commune biogas plant complex is located among the fields. Agricultural waste will be delivered from all parts of the commune and converted into energy, which will meet the annual demand of all households in Kleczew. The biogas plant complex consists of a few centric structures standing on the mine escarpment (Fig. 6). They are one of the dominants designating the main scenic axes of the entire project. According to the rules of sustainable development, the project assumes diversification of the sources of energy. The zone of algae production and processing is the last element of the technological park. Laboratories, refineries and bioreactors are located in barn-shaped greenhouses. The location of these facilities on terraces facing the south ensures adequate insolation, which is the most important condition in the algae breeding process. Apart from the production of clean energy, the algae farm reduces the amount of carbon dioxide emitted into the atmosphere by nearby power stations. The creation of alternative sources of energy is not only an attempt to continue the power-supplying tradition of the region but also to follow the idea of sustainable development in designing. The new identity of the landscape is expressed both in its forms and content[15].

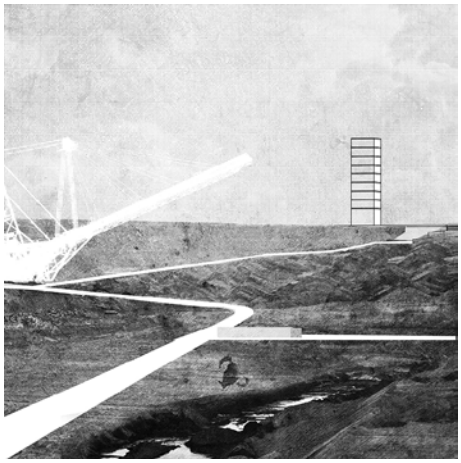

Fig. 5. The concept of a tourist trail in the Jóźwin II B lignite open-pit mine in (source: Marcin Szelejak 2016)

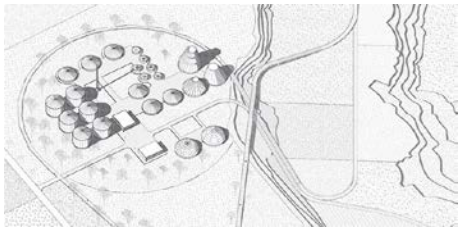

Fig. 6. A concept of a biogas plant in the Jóźwin II B lignite open-pit mine in Kleczew (source: Marcin Szelejak 2016]

4. SUMMARY

Traces of industrial history are still present in the landscape of many regions of Poland and Europe. They determine the image of these regions and are rooted in the local culture, although the industry is no longer the driving force of their

[15] E. Raszeja, 2016. Poszukiwanie tożsamości krajobrazu w procesie planowania i projektowania [in:] 40 lat bioniki w Uniwersytecie Artystycznym w Poznaniu. Projektowanie krajobrazu jako nieodzowna część ochrony środowiska przyrodniczego (ed.) S. Dreszer, Uniwersytet Artystyczny w Poznaniu, pp. 62-77.

development[16]. On the one hand, the redevelopment of post-industrial areas requires respect for their specific character and tradition written in the cultural space. On the other hand, it requires prudence and courage in thinking about their future. In recent years industrial relics have increasingly often been adapted to contemporary functions and they are attractive elements used for designing new architectural forms. Redevelopment of post-industrial areas is a much more complex problem due to their large space, the scale of environmental destruction and landscape transformations, complicated social and economic relations as well as new development tendencies, which need to be considered before taking strategic and designing actions. Most remedial plans are oriented at land reclamation in order to compensate the environmental loss, restore soil fertility and recover scenic and recreational values in their traditional sense. Apart from these actions, there are other, unconventional ideas for the redevelopment of post-industrial areas. The intensity and scale of mining processes in the past and the irreversibility of transformations created an absolutely unique starting situation for the creation of their new space and landscape identity. Vast spaces and spectacular anthropogenic terrain forms become a set for artistic performances, background for modern art exhibitions and context for brave architectural forms. Simultaneously, post-mining areas are attractive places for research projects searching for unconventional sources of energy, for large plantations of energy crops and for facilities producing green energy and using latest technological achievements and experimental engineering solutions. The concept of redevelopment of the lignite open-pit mine in Kleczew refers to the trend of thinking about the future of post-industrial areas which is based on the idea of integrating art and technology.

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NEW IDENTITY OF POST-INDUSTRIAL LANDSCAPE – BETWEEN ARTISTIC CREATION AND GREEN ENERGY PRODUCTION

SUMMARY. Urban and architectural designing often involves searching for solutions for forms which have lost their identity as a result of dramatic events or interruption of current development processes. It concerns in particular post-industrial and post-mining landscapes. Such a situation occurs in the eastern part of Greater Poland in the area of Kleczew, where the long-term exploitation of lignite has permanently changed the structure of agricultural landscape which after many years has become "lunar landscape". The article presents the concept of a tourist route in the area of former open-cast mine Jóźwin II B in Kleczew. The track exposes marks of mining and energy industry of the region. Preserved anthropogenic forms of terrain, abandoned machines and relicts of infrastructure create

an expressive scenography and add dramatic effects in telling the history of this place. The end of exploitation also raises serious energy problems at regional and national scale. Transformation of the area of former mine into the technological park focused on producing renewable energy is the proposed solution to this problem. This project is not only an attempt to create a new identity of degraded space but also to solve economic, spatial and social problems. It is a proposal for post-mining future implemented according to the principles of sustainable development, combining the region's tradition with modern technologies.

Key words: post-industrial landscape, reclamation, revitalization, art, energy