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European Union Funds as a Growth Stimulant of Electromobility on the Example of Electric Public Transport in Poland

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Abstract

Urban electromobility is becoming a significant idea in shaping transport systems, in particular in towns and cities. The growth of urban areas and the lack of opportunities to develop road infrastructure at the same time as well as the impact of transport on the environment imposes on the national and local governments an obligation to develop a conscious regulation of transport policy with a focus on collective electric transport. The paper presents differentiation in spatial distribution of EU funds for electrified urban transport, broken down by city and state, and the extent of the variety of EU expenditure on electric transport.

Keywords: public transport, electromobility, European Union funds, sustainable development

Introduction

The idea of urban electromobility is considered to be a response to the growing problems of public movement inside heavily urbanized areas (as observed in increased congestion), and the need to take care of the environment of towns and cities (Kopeć 2012). Activities associated with the development of electromobility focus on improving the accessibility of urban electric transport which is the most environmentally friendly form of population movement. Even in the case of countries whose economy is based on energy from non-renewable sources, and where its production pollutes the environment, it is essential to reduce pollutant emissions in the vicinity of the means of transport. The answer to these demands is the idea of electromobility, which assumes the increasing importance of electric forms of transport, both collective and individual.

The European Union stimulates the growth of electromobility through a series of regulations, requiring all its members to implement them. The most important documents in the promotion of electric urban transport is the Green paper on the urban environment, the Plan for urban mobility and transport and the White book on transport (Załoga and Kłos 2011).[1] Among the most important tasks there is the promotion of the concept of sustainable development, which includes electromobility and improving social environmental awareness.

Measures focused at increasing electromobility can be divided into two groups. The first concerns the construction of the foundation for hard infrastructure (such as a transport network, interchanges, rolling stocks). The second is related to the soft actions gathered in the area of attitudes of passengers (such as organization of services, information, promotion).

1. See also: Action plan on urban mobility European Parliament resolution of 23 April 2009 on an action plan on urban mobility (2008/2217(INI)). OJ C 184E, 8.7.2010, p. 43–50 and „Tekst dokumentu Zielona Księga COM(2007) 551. W kierunku nowej kultury mobilności w mieście". Transport Miejski i Regionalny 11/2007, p. 19–32.

Funds given by the European Union aim primarily at improving the transport infrastructure, in particular their level of equalization among members. The European Union budget is concentrated basically on innovation, which includes the idea of electromobility. This attitude towards new investments allows members to have easier access to receive co-financing in improving the availability of urban electric transport. European funds received by Poland in 2004–2013 have largely been used for purposes connected with public transport, in particular those concentrated in large cities. There is a noticeable increase in investments related to electric transportation, trams and trolleybuses.

The article characterizes experiences with electromobility in public transport in Poland so far and presents the investments made in the field of urban electric transport co-financed from European funds in 2004–2013. It also states that European funds can be considered a dominant stimulant in this regard. Spatial differences in the use of EU funds for urban electric transport by provinces is also presented.

1 Experience in the field of electromobility in Poland so far

Polish experience in the field of electromobility has primarily been associated with the functioning of urban public transport, especially in the forms of a tram network (14), trolleybus (3), metro (1) and urban railway (2). Before accession to the European Union there was a noticeable stagnation in the function of these means of transport in Poland. This situation was primarily related to under-investment in the years before as well as a significant degree of overexploitation of infrastructure and rolling stock. For small tram networks (like the ones in Gorzów Wielkopolski and Grudziądz) there were some judgements promoting the liquidation of the system, as in the case of the three existing trolleybus networks (in Gdynia and Sopot, Lublin and Tychy) (Bartłomiejczyk and Połom 2011). Usually high awareness of the local authorities and public transport organizers or citizens' opposition saved the public transport systems from liquidation. In the 1990s three trolleybus networks were liquidated in Dębica (in 1992), Warszawa (in 1995) and Słupsk (in 1999). The last new electrical systems of public transport launched in Poland were the tram network in Częstochowa in 1959 and the now non-existent trolleybus networks in Słupsk launched in 1985 and Dębica in 1988.

Lack of sufficient financial resources for the development of high quality urban electric transport infrastructure caused a decrease in the share of these forms of transport in the total volume of public transport and resulted in the growing importance of traditional bus service. The decreasing concern for electric transport also resulted from the dynamic development of the growth of individual vehicle means of transport, which was underdeveloped prior to the period of economic transition in 1989. In addition, before Poland's accession to the European Union and apart from the collective extent of electric transport there were virtually no individual forms of electromobility — electric cars. The development of these means is associated with an increase in public awareness, wealth and technology, which took place during the accession to the European structures.

2 Investments in urban electric transport in 2004–2013

In the period 2004–2013, and so during the first two budgets of the EU in which Poland participated, for the first time significant financial resources appeared to improve the quality of transport infrastructure. Among the main investment targets were those associated with public transport. This tendency fits perfectly in the idea of sustainable growth promoted by the European institutions. Completed projects can be divided according to their scope, size and type of transport. The main recipient of EU funds in this period was the tram system (fig. 1). Main efforts focused on modernizing the railway tracks and depots, building new roads and purchase of trams in 13 of the 14 existing tram networks. The only tram transport system which did not benefit from European funds, was a network in Gorzów Wielkopolski. The attitude of the urban authorities there concentrated on the liquidation of the system. This met with strong opposition from the local community, yet it has not resulted in the preparation and implementation of any investment projects through

the end of 2013. In addition, there were investments in all the cities with trolleybus networks — in Lublin with the greatest material scope (Połom 2011a; Połom and Tarnawski 2011). There were also the first projects for the purchase and introduction into service of hybrid buses (electro-combustion) and those fully electric. However, these were projects taken only up to initial conceptual stage and have not been included in this report.

Particularly noteworthy are the investments that were associated with the creation of entirely new systems of electric transport. The only new tram network is planned to be built in Olsztyn (fig. 1). It is an investment co-financed largely from European funds allocated for the poorest regions in the European Union, which includes Warmińsko-Mazurskie Voivodship. As part of the initiatives related to the construction of new transport systems there are plans for construction of urban railways. An example of such an enterprise is the Pomeranian Metropolitan Railway in its agglomeration, which in the first stage will be operated by combustion traction, but was primarily designed and built as an electric railway, and the development of an electric suburban train in Łódź. In the period 2004–2013 there were no plans for new trolleybus networks.

As part of the completed projects co-financed from EU funds in 2004–2013 the region with the highest expenditure on urban electric transport was Mazowieckie Voivodship with the sum of more than PLN 5 billion. The next region with approximately PLN 3 billion in expenses was the Pomorskie Voivodship. Expenses in other regions achieved the level of PLN 470 million up to 1 630 million (tab. 1). In counting the value of investments by region in terms of population the highest indicator belongs to Pomorskie Voivodship. In second place remains Mazowieckie Voivodship. Five regions did not see any investments and therefore have not been included in the analysis (fig. 2).

Participation of European funds and contributions from national funds in projects concerning urban electric transport were counted among the regions in which investments were made. Of the 11 regions in which such projects were taken, the share of European funding in the total sum of completed projects ranges from approximately 40% to more than 75% (fig. 3). There are three regions with particularly large share of funding — Pomorskie, Warmińsko-Mazurskie and Lubelskie. Two of these three regions qualifies among Poland's poorest regions. For these viovodships

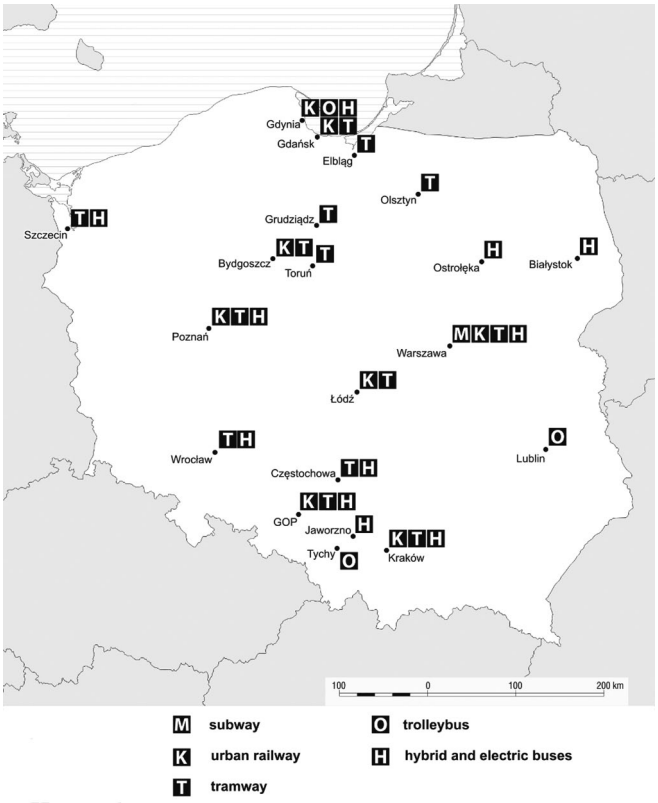

Fig. 1. Investments in electric urban transport in Poland carried out in 2004–2013 according to the division of the type of electric traction

Tab. 1. The total value of EU projects related to urban electric transport (in PLN billions)

Voivodship	Value of EU co-financed investments	Value of funding	Own contribution
Mazowieckie	5,09	2,02	3,07
Pomorskie	2,94	2,18	0,76
Małopolskie	1,63	0,75	0,88
Łódzkie	1,57	0,80	0,77
Wielkopolskie	1,15	0,52	0,63
Kujawsko-Pomorskie	1,07	0,50	0,57
Śląskie	0,87	0,47	0,40
Dolnośląskie	0,86	0,40	0,46
Warmińsko-Mazurskie	0,57	0,40	0,17
Lubelskie	0,53	0,36	0,17
Zachodniopomorskie	0,47	0,23	0,24

Source: Author's description based on the scattered materials

Note: [In the journal European practice of number notation is followed — for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style). — Ed.]

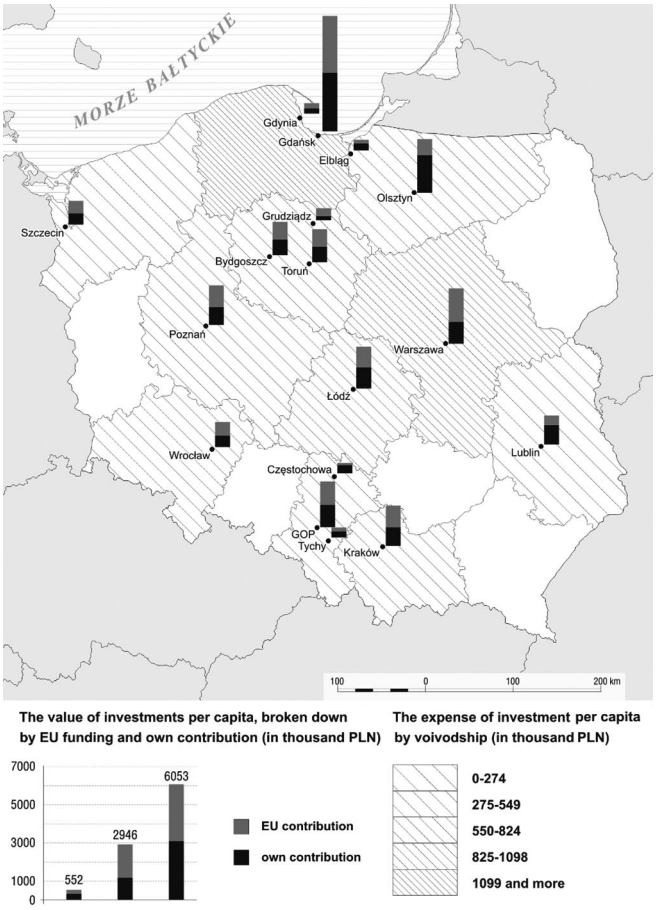

Fig. 2. Investment in the electric urban transport in Poland carried out in 2004–2013, characterized by financial efficiency

the European Union prepared a separate budget within the Operational Development Project of Eastern Poland. Pomorskie region gained primarily on the construction of the Pomeranian Metropolitan Railway, which was financed with funds distributed centrally by the Ministry of Regional Development (Kołodziejski and Wyszomirski 2014).

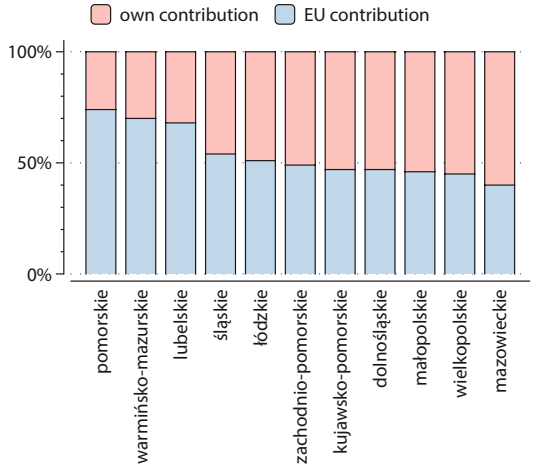

Fig. 3. Diversity of participation of EU and national funds for projects completed in 2004–2013

3 Soft EU projects stimulating change in the behavior of urban transport passengers

In the process of organization and management of public transport vital are those aspects of transport policy instruments that support the use of new communication infrastructure and affect the unfavorable preferences of citizens in the field of urban transport travel by individual means. Implementation of even the largest infrastructure investment will not change anything if passengers do not benefit from them. The choice of transport policy by local government directly affects the standard of living. The desire to reduce the negative effects of individual travel requires new measures to support behavioral change in inhabitants' transport preferences (Kauf 2013).

The city of Gdynia serves as a case study in this article. Gdynia was one of the first cities in Poland where the local authorities decided to reform the organization by separating the roles of transport manager and public transport operators. In 1992 local authorities established the Public Transport Authority, whose role was to organize and manage public transport (Wyszomirski 2012). Gdynia authorities, aware of the importance of sustainable development, for many years have reached for the so-called "soft" EU projects, usually carried out by international consortia These projects were supposed to help bring to life concepts of sustainable transport. Particularly noteworthy were the educational projects implemented by the established Public Transport Authority, aimed at younger children and students (Transport Education, Project YOUTH — fig. 4, Mom, Dad, I choose econtransport — fig. 5). The TROLLEY project, in which Gdynia's

Fig. 4. Trolleybus pasted in advertising promoting the use of public transport (project YOUTH). Photo by author.

Fig. 5. Promotional poster "Mom, Dad, I choose ECOtransport"

Source: ZKM Gdynia materials

trolleybus network was presented as a model, also played an important role. The "products" of the project focused on promoting the development of transport infrastructure It also produced analysis of trolleybus transport as the most cost-effective means of transport — taking into account the external costs — cheaper than diesel-powered buses (Hebel and Wyszomirski 2014; Połom 2011b; Wyszomirski 2014).

4 The prospect of investment in urban electric transport in Poland in 2014–2020

Public transportation requires high expenses financed constantly in order to maintain its potential. An aging fleet and high resources for its reproduction is the most important element planned in the budgets of transport companies. Innovation and technological development stimulates purchases on a higher level, including financially. The positive experiences of Polish transport companies and local authorities in the field of investments co-financed from European funds can help in predicting the situation in the new funding period 2014–2020. It is expected that not only cities and regions that have already co-financed projects in the previous term, but also all those that previously did not do that, will make efforts to reach for them.

Based on already published ideas and initiatives in the regions as well as the preparations undertaken for the new EU budget, an estimated volume of investments planned for the coming years can be predicted. The biggest projects are planned in Warsaw, where the initial expenses are estimated at PLN 2,2 billion, and will result in purchase of nearly 200 new vehicles (mainly trams). Next is the city of Łodź with the plans of approximately PLN 1,5 billion. In this city, a significant share of the expenditure is to be placed in the modernization of tram routes, neglected and under-invested in previous years. At a high level, planned expenditures will also take place in Wrocław (nearly PLN one billion) and Bydgoszcz (PLN 870 million), Gdańsk, Upper Silesian Industry Region (GOP), Kraków and Toruń (approximately PLN 700 million).

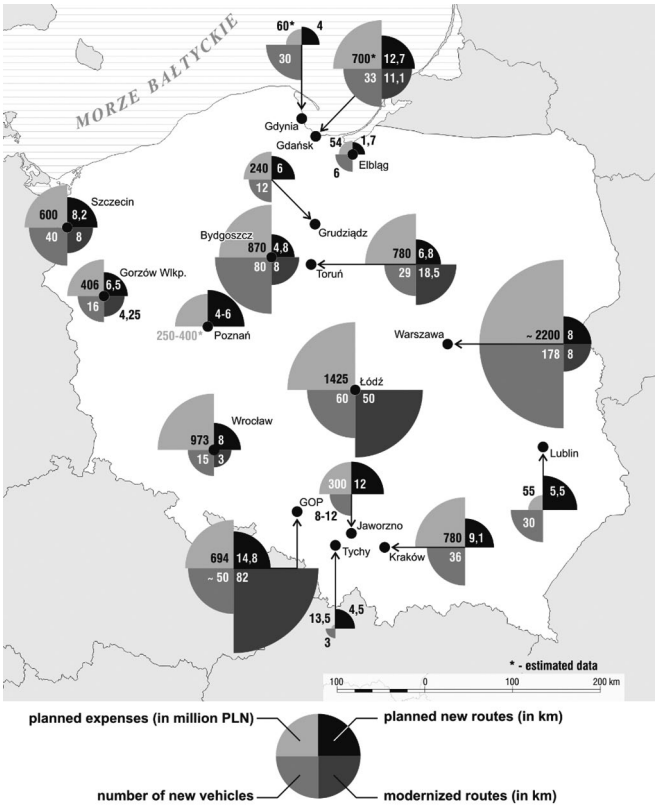

Fig. 6. The planned investments in the electric urban transport in Poland in 2014–2020 as of October 2014.

Source: own study based on scattered materials

With the analyzed investment plans so far all city centers with tram and trolleybus networks plan stock and infrastructural investments. The cities with tram networks seem to dominate among other investments in expense, due to its much higher investment costs. Big plans for the tram network are located in Gorzów Wielkopolski, where no projects co-financed from European funds in 2004–2013 were conducted. In addition, the three trolleybus transport networks are expected to invest in the purchase of new vehicles and the construction of new routes.

Summary

The development of electric transport is considered by many researchers in engineering and economics of transport as the only way forward in developing public urban transport. Increasing public awareness in the matter of impact of transport on the environment, further stimulated by international legal regulations (e.g., the European Union) and the rapid development of technology, which reduces manufacturing costs and operating all-electric means of transport, can confirm this thesis. Before Polish accession to the European Union, there was above-average growth of individual vehicle transportation, far ahead undertaken road projects in each spatial scale, setback of rail transport and urban electric transport. The collapse of public transport was mainly related to a lack of investment measures. All investments then aimed at improving the general condition. Electric transport was more expensive in investment costs, mainly due to the diverse infrastructure, and was therefore in the situation of disadvantage. This resulted in focusing all efforts almost entirely on bus transport, in which faster and more significant image improvement is easily achieved. Before 2004 small infrastructure investments in urban electric transport and slight vehicle purchases did not meet with public requirements. The final period of negotiations on Polish accession to the European Union provided the possibility of predicting a level of aid from the European budget for transport investments and preached signs of recovery in investment planning.

Most urban authorities, which remained decisive on the matters of electric transport, managed to use the European funds for the modernization and development of the network in 2004–2013. High level of success remains in the hands of cities such as Gdańsk, where the size of the investment, calculated according to the number of inhabitants, was the biggest in Poland. Great successes were also achieved in Warsaw, Łódź and Olsztyn. Given the fact that a significant portion of investment funds were distributed as part of regional contracts, it is estimated that the most pro-electromobile regions are Pomorskie and Warmińsko-mazurskie. Particularly noteworthy are the investments that were associated with the creation of new systems from scratch – such as the tram network in Olsztyn and city agglomeration rail in Łódź and Tri-City (Gdańsk, Gdynia and Sopot). The most negative example of missing the opportunity for the development of sustainable mobility concerns Gorzow Wielkopolski authorities. In this city he neglected tram network did not receive any funds from the European Union. The policy of the city authorities sought to dismantle the system. This situation directly violates the horizontal policy objectives of the European Union. These activities ceased only after the intervention of citizens and currently the authorities are planning a significant investment in the next funding period. Among other regions, there were also those who do not invest in electric transportation at all—those did not have this form of transport and did not plan any new urban transport systems (Lubuskie, Opolskie, Podkarpackie, Podlaskie, Świętokrzyskie).

The predicted significant financial resources supporting transport, negotiated by the Polish government within the European budget for 2014–2020, are a great opportunity to improve infrastructure and rolling stock and perhaps invest in new systems. Among the known projects, the proposed investments in Warszawa, Łódź and Upper Silesian Industry Region (GOP) are most noteworthy. The project of Gorzów Wielkopolski's authorities should also be evaluated positively.

The European Union's support focuses on equalizing economic development among new members. One of the important factors related to the functioning of the economy is public transportation. Polish cities and regions were most successful in exploiting the possibility of co-financing from European funds in 2004–2013 and referred to the policy adopted in Europe concerning reduction of liquid fuel powered transport (Perujo, Van Grootveld, and Scholz 2012). In summary the two tasks of overtaking malpractices from past decades on the one hand and making a technological leap to new trends on the other were fulfilled.

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