|  |  |
| --- | --- |
|  |  |
| **Rocznik Ochrona Środowiska** |
| Volume 25 | Year 2023 ISSN 2720-7501 | pp. 301-311 |
|  | https://doi.org/10.54740/ros.2023.032 open access |
|  | Received: November 2023 Accepted: November 2023 Published: December 2023 |

The Transport System of MOF Olsztyn in the Light of Sustainable Development Policy

Stanisław Ejdys

Ignacy Moscicki’s University of Applied Sciences in Ciechanów, Poland
https://orcid.org/0000-0003-4312-7880

corresponding e-mail: stanislaw.ejdys@pansim.edu.pl

**Abstract:** Transport policy has always presented many dilemmas. Currently, its pro-ecological aspect, relating to the need to limit the negative impact of transport on the natural environment, causes the need to reconsider many issues related to the sustainable development of transport. The new approach should optimize activities in the areas of respect for the environment, technical progress and economic growth. According to the European Commission, this concept is gaining fuller understanding at the level of political discourse and, at the same time, becoming a horizontal principle
– the foundation of EU transport policy. However, this requires the responsible creation of transport policy and its consistent and effective implementation. Therefore, it has become the subject of consideration at the Olsztyn Functional Urban Area level. The study aims to identify documents declared as transport policies or strategies and evaluate them in the context of formal authorization, content, coherence and applicability in the Olsztyn MOF.

**Keywords:** passenger transport, transport policy, sustainable development, MOF

1. Introduction

The starting point of the considerations in the article is the formulation of the problem being analyzed. It is not an easy problem, at least for several reasons. Firstly, the idea of sustainable development has become one of the most important concepts regarding the development of both local and global economies (Rogall 2009). It can be argued that it has grown into a doctrine of economics. In Europe, it covers virtually every strategic document adopted at the EU level. Recent information on climate change and human impact on these changes included in IPCC reports has been identified as the scientific basis for actions under the European Green Deal.

Secondly, every economic activity, including transport, pollutes the environment (Manteuffel Szoege 2011, Zając et al. 2019). Its dynamic development in the 20th century significantly contributed to the increased consumption of non-renewable natural resources and environmental degradation, thus reducing the well-being of current and future generations (Organizacja Narodów Zjednoczonych 2015). Noise, smog and traffic jams, water and soil pollution do not constitute a complete list of costs generated by transport (Ladi et al. 2022, Rovnak et al. 2022, Makurat 2021, Guzdeg 2020, Dembińska 2017, Woźniak et al. 2018, Kumar et al. 2021, Sidorchuk et al. 2021, de Almeida et al. 2021, Jacyna et al. 2017, Jacyna et al. 2018, Petrice et al. 2021, Vajjarapu et al. 2023). The UN resolution of 2015 proves that the consequences of this state will be felt by future generations (Agenda 2015). Certainly, future generations who are not yet here cannot participate in today's elections. If they could defend their interests in the decision-making process, most of them would certainly be different.

No one needs to be aware of the serious challenges that decision-makers face in limiting the collision course of transport with nature (The Global Risks Report 2021, World Economic Forum 2021). Modern transport is responsible for ¼ of carbon dioxide emissions in the world (European Environment Agency 2023, Zajac et al. 2019). So far, no optimal technology or way to transition away from fossil fuels has been found. Therefore, to change this, an appropriate and effective transport policy is necessary, defined as an established course of action expressed in strategic documents identifying specific challenges and indicating goals and methods of achieving them (European Court of Auditors 2020). It is crucial for cities and their functional areas (Beim et al. 2023), which account for 70% of greenhouse gas emissions (National Urban Policy 2023). All the more so because cities are responsible for creating transport policy in their areas.

Thirdly, the design and organization of public transport systems in urban areas is a huge challenge (Chamier-Gliszczyński 2012). Decreasing population density and the growing dispersion of people on the outskirts of cities have made existing systems less and less effective. And servicing large suburbs with extensive development is becoming more and more expensive. Consequently, public transport systems lose the competition with individual car transport (Chamier-Gliszczyński 2012a). Of course, movement in Urban Functional Areas (MOF) depends to a large extent on the adopted transport solutions, traffic management methods and transport policy (Gajda et al. 2023).

Fourthly, in documents describing the sustainable development of transport (Devi et al. 2022), there is a common belief that the preferred transport in urban areas should be public transport while travelling by passenger car should be of secondary importance (Rosik et al. 2017, Chamier-Gliszczynski 2015). However, if you compare it with reality, you may get a different impression, because the level of automotive congestion is still increasing. As a result, the question arises whether the provisions in strategic documents describing transport policy are implemented in practice?

Looking at transport policy through the prism of strategic documents adopted by local governments, a general tendency to redefine mobility (Chamier-Gliszczyński & Bohdal 2016) priorities towards preferences for the public transport system can be noticed (Grzelec et al. 2020, Gadziński eta al. 2019). The need for such a system in urban areas generally does not raise doubts among citizens and public authorities. However, controversies surrounding the concept of its organization and development are widespread and persistent (Burnewicz 2022). Generally, available diagnoses and assessments of modern transport (Woźniak et al. 2016) indicate that its condition is not changing intensively enough concerning the pace of economic life (Burnewicz 2012). These issues also raise increasing concerns among the inhabitants of Olsztyn's Municipal Functional Area (MOF). Hence, the author attempts to assess the compliance of Olsztyn's MOF existing policies and strategic documents with the principles of sustainable development. It also raises the question of who and what transport policy in its current shape is intended to serve. The analysis to answer the research question formulated in this way is based on desk research analysis. The basic research material is the content of identified strategic documents of one of the basic policies: transport policy on the local market.

2. From the Idea of Sustainable Development to Sustainable Transport

The idea of sustainable development, initiated on May 26, 1969, by UN Secretary General U'Thant, is still valid. Although it has evolved over time, its goals are timeless and generally applicable. It focuses on three basic components, perceived as different types of capital, which are to be managed to ensure people's well-being. According to the World Commission on Environment and Development, the first definition of sustainable development meant "development that meets the needs of the present without depriving future generations of the opportunity to meet their needs" (World Commission 1987). Currently, it is a response to the growing threats related to the depletion of natural resources, the degradation of the natural environment and the increasing distance between the economies of developed and developing countries (Płachciak 2011).

Contrary to emerging opinions, sustainable development should not be considered abstract. It is a set of specific guidelines for shaping socio-economic development. The importance of this concept is emphasized by the fact that it has become widely known and implemented in three dimensions: purposeful, territorial and temporal. The global and timeless dimension supported by the general nature of sustainable development has contributed to the creation of many definitions of this concept. A review of the literature conducted by John Pezzey in the 1980s indicates that there were already over a hundred definitions. Later, at the end of the 20th century, this term had over two hundred uses (Parkin et al. 2003). Of course, as time passed, the number of definitions increased. Barbara Carroll demonstrated the existence of over five hundred definitions of sustainable development (Woods 2006). Undoubtedly, the discussion on this concept continues today in general and sectoral systems. The observable increase in the number of definitions of this concept proves the gradual evolution of the idea and the continuous expansion of the scope of issues it covers. The most important events that influenced sustainable development in the world are presented in Table 1. Initially, sustainable development was only of interest to scientists. Since the beginning of the 1990s, this concept has appeared in various legal systems (Bukowski 2009). Thus, sustainable development began to influence global politics and economic practice (Jagiełło 2021). The chronology of events and their rank presented in Table 1 prove that the idea of sustainable development, after years of rapid growth in interest, has not been abandoned and is still important and constantly being developed. It is believed that it also takes on additional meaning, going beyond the concept of development and even beyond a certain ethical dimension. It is also a certain "fashion", and ecological products related to it are a symbol of modernity, e.g. electric vehicles (Dižo et al. 2021).

**Table 1.** The most important events in the history of the idea of sustainable development

Source: United Nations, European Commission

**Table 1.** cont.

Source: United Nations, European Commission

**Table 1.** cont.

Source: United Nations, European Commission

Since the beginning of the 1990s, there has been much greater interest in sustainability in transport (Motowidlak 2017, Litman et al. 2006). Currently, the transport balancing effect is defined in different ways. In the literature, it is most often referred to as sustainable transport, environmentally sustainable transport and sustainable transport system, or process-wise as transport sustainability, balancing the transport system. The analysis of these concepts indicates that the differences in their definition are minor and, in principle, can be considered synonyms. According to T. Borys, their differences result not so much from the distinction between the concepts themselves but from the set of components of each of these concepts, and here, the choices and interpretations seem to be different (Borys 2008).

Paying attention to the issues related to defining the concept of sustainability in transport allows us to consider it justified to define it in the aspect of three interrelated factors: environmental, social and economic (Kostrzewski et al. 2022). Taking them into account, it can be assumed that sustainable transport enables the movement of people and things in a way that is safe for people and the environment, supports a developing economy, offers a choice of various means of transport, limits the consumption of natural resources and reduces traffic intensity, and therefore and noise, is available in space and price, and takes into account the principles of intergenerational justice. Due to the content of the proposed definition of this concept, it can be assumed that sustainable transport development is a planning concept constituting a long-term and integrated action plan, resulting in a sustainable transport system.

3. Transport Policy in the Development of Sustainable Transport

The global transformation process in transport is heading towards achieving strategic goals embedded in the general theory of sustainable development. The first objective – economic – is expressed by striving to improve the economic efficiency of transport of people and goods. The second objective is subordinated to activities related to improving the availability, quality and safety of transport. The third one – environmental – aims to reduce environmental pollution, greenhouse gas emissions, energy consumption, transport congestion and noise (an example may be the works presented in the publication Bujak et al. 2013).

Indications regarding the defined goals allow for the concentration of safe and sustainable transport activities. Numerous documents have been created and prepared in this area by groups of specialists. One is the European Green Deal (UE 2019), which aims to transform the European Union into a fair and prosperous society living in a modern and competitive economy that will achieve zero greenhouse gas emissions by 2050. As part of the actions to achieve this goal, we must reduce gas emissions by 90% compared to 1990. However, there are many indications that despite widespread awareness of this challenge, no concrete actions are being followed up on the declarations made by those in power. According to the International Energy Agency, the current level of greenhouse gas emissions is record-breaking and completely offsets the declines achieved during the pandemic (IEA 2022). Importantly, many experts claim that greenhouse gas emissions will increase by almost 14% in this decade (SDG 2022). It shows that humanity's and our planet's future is in our hands. The problem cannot be solved at the level it was created. We will need to rise higher to save the Sustainable Development Goals and remain true to our promise of a world of peace and prosperity on our planet (Guterres 2023).

In the era of modern transport problems, strategic documents developed at the European level significantly refer to sustainable development. In particular, they focus on improving its efficiency and safety level, reducing the impact on the environment, and ensuring a level of quality that will encourage changes in the communication behaviour of residents. In this context, the document sets out the most important directions of transport development at the national level: the Sustainable Transport Development Strategy until 2030. It considers the goals and priority directions of action identified in national and EU strategic documents. The strategy assumes increasing transport accessibility while improving the safety of road users and the efficiency of the entire sector by creating a sustainable transport system for its stakeholders (an example of which is the concept published by Woźniak et al. 2015). Achieving this goal will allow full use of the national economy's potential and uniform development of all regions.

The Voivodeship development strategy is a lower but equally important document: "Warmian-Masurian Voivodeship 2030. Socio-economic development strategy." The strategy is supported by the Spatial Development Plan of the Warmian-Masurian Voivodeship, the aim of which is to protect and shape spatial order, which is of fundamental importance for sustainable development, i.e. as a result of the rational use of the region's resources, taking into account spatial order from a regional perspective and local, as well as preserving the environment's and landscape's values. The Sustainable Development Plan for Public Transport supplements the indicated documents in the transport sector. The document required by the provisions of the Act on Public Transport indicates the need to develop the transport system sustainably, in particular in the development of public utility transport, complementing it with activities that should reduce the widespread use of one's own car when commuting to/from work, schools and other institutions. Certainly, the documents applicable at the regional level focus on shaping spatial order in which the demand for transport is limited. The transport sector, in turn, is shaped in a way that minimizes the impact on climate change and the environment, providing it with a quality that encourages changes in transport behaviour among the region's inhabitants.

4. Compliance of Applicable Documents with the Principles of Sustainable Development

The analysis of documents at the local level was preceded by research on documents of a supra-local nature, i.e. regarding the Olsztyn poviat and the functional area related to it. The Olsztyn County Development Strategy for 2016-2025, adopted in January 2017, is this level's most important strategic document. The vision specified in the document indicates the development directions of the area within the zone of direct influence of the provincial capital - Olsztyn. According to the creators of the strategy, the vision should be realized by implementing the main goal, which is to increase the district's attractiveness for residents and investors based on spatial integrity. The link between the main and strategic goals visible in the document and the assumptions included in higher-level documents is consistent with the principle of sustainable development (Ejdys 2009).

In the area of transport, Olsztyn County's strategy was supplemented with the concept of developing public collective transport (GF Transport Consulting 2019). The created concept aimed to create an offer of district communication lines of a public utility nature. The document indicates that the directions of development of public transport are intended, by subordinating them to the sustainable development strategy, to counteract social exclusion and meet the transport needs of citizens in the optimal way possible (Ejdys 2021).

Certainly, the documents prepared for the needs of the Olsztyn MOF, which covers 6 out of 12 communes of the Olsztyn poviat, have a smaller territorial scope than those at the poviat level. Two strategic documents were developed for the needs of these entities: the Olsztyn MOF Strategy, containing the Integrated Territorial Investments Strategy, and the Mobility Plan of the Olsztyn Urban Functional Area until 2025. Both of these documents contributed to a broader view of each commune on its transport problems, taking into account the metropolitan context. In this regard, the Mobility Plan of MOF Olsztyn indicates the main objectives:

* providing the inhabitants of the functional area with equal opportunities and transport options,
* promoting alternative, environmentally friendly means of transport;
* spatial integration of various modes of transport, enabling efficient change of means of transport;
* improving safety, reducing air pollution and limiting excessive noise;
* reduction of greenhouse gases and energy consumption;
* improving the efficiency and effectiveness of transport of people and goods;
* harmonious development of the city while ensuring adequate transport accessibility for residents and other road users;
* increasing the attractiveness of the area covered by the sustainable mobility plan and, therefore, its perception as an interesting place to live.

The indicated goals have been cumulated into a triad of strategic goals, defined as:

* improving the quality of public transport and road communication;
* improving the attractiveness of the space and safety;
* promotion and support of rational transport choices.

Of course, for each of these goals, operational goals and tasks have been assigned that bring individual communes closer to realizing the vision formulated for the needs of the MOF Olsztyn strategy. The effects of activities carried out under the Mobility Plan are consistent with the assumptions of sustainable development.

Importantly, the current socio-economic situation, considering the effects of the COVID-19 pandemic and ongoing climate change, forced a change in the approach to urban mobility and the strategic plans of MOF Olsztyn on the threshold of the new financial perspective. Therefore, a new MOF Olsztyn 2030+ Strategy was developed, which evolutionary develops the assumptions from the 2016 Strategy, specifying the vision with an element of local identity.

Based on the above findings, it can be claimed that the number and quality of strategic documents adopted in individual municipalities of the Olsztyn MOF depend on the number and size of diagnosed problems, the size of these municipalities, the potential of local government staff, the financial resources available for their preparation and the previously mentioned statutory requirements. Considering only the urban character and the resulting conditions, the city of Olsztyn has the largest number of strategic documents. Its most important document is the Development Strategy of the City of Olsztyn 2020, with a vision according to which Olsztyn was to become a modern agglomeration with well-developed metropolitan functions created by a unique natural environment.

The concept of sustainable development appears to a greater extent in other strategic documents of Olsztyn. They are treated as sectoral implementation documents of the city's strategy. In transport and mobility, the city adopted the Strategy for developing public transport in Olsztyn until 2027, together with the Sustainable Development Plan for public transport for the City of Olsztyn for 2012-2027. These documents show that rational use of transport is possible by ensuring the appropriate quantity and quality of services provided by public transport. This goal will be implemented in line with the preferences and expectations of passengers while being an alternative to travelling by private car. The weakness of these documents is that they partially duplicate the assumptions of the Update of the Low-Emission Economy Plan for the City of Olsztyn, i.e. a document indicating the goals and directions of the EU and national low-emission policy.

To sum up, Olsztyn's transport policy is built on the foundation of many documents. It is subject to a constant process of evolution expressed in new goals and in new strategic and operational documents. The multitude of documents and their different rank and impact make it difficult to variant and choose the optimal direction of transport development in the city and its functional area (Ejdys 2017).

Similar to Olsztyn, the concept of sustainable development in other municipalities, including Barczewo, was included in the Barczewo Commune Development Strategy for 2015-2025. A direct reference to sustainable development appears in one of the operational objectives and concerns sustainable spatial policy. Its creation will be achieved by appropriately locating the functions of the areas in the study of conditions and directions of spatial development and securing areas with significant natural and landscape values by including them in local spatial development plans. Since Barczewo belongs to the Citta-slow network of cities, this document also indicates the issue of sustainable development in the descriptive layer regarding the idea of Slow Cities. The descriptions of goals and activities included in the document indicate compliance with the principle of sustainable transport development. Nevertheless, when updating or preparing a new strategy, it is recommended to increase the role of sustainable transport already at the stage of strategic goals and to increase its monitoring with indicators directly related to activities related to reducing the impact of transport on the natural environment, included in operational goals.

Similarly, the main goal of the development strategy of the Dywity Commune was also defined. It indicates the Dywity commune as a place of high attractiveness for living and doing business in the Olsztyn metropolitan area. This document indicates the issue of sustainable development only in the descriptive layer of operational objectives concerning spatial policy. This narrative also includes the Low-Emission Economy Plan for the Dywity Commune, which is limited in its purpose and scope. It was defined as improving the condition of atmospheric air with a sustainable and effective use of energy carriers by supporting a low-emission economy. The plan's implementation is based on reducing the emission of greenhouse gases and other air pollutants and increasing the energy efficiency of municipal buildings.

The Gietrzwałd Commune has a different level of reference to sustainable development. Sustainable socio-economic development of the Gietrzwałd Commune based on the geographical location in the Olsztyn agglomeration and natural and historical conditions was defined at the level of the main objective. It concerns sustainable spatial policy and its creation through the appropriate location of the functions of areas specified in Municipal Spatial Development Plans. Limited in its purpose and scope, the Low-Emission Economy Plan of the Gietrzwałd Commune naturally fits into the principle of sustainable development. The document indicates activities for energetically and ecologically sustainable development and improvement of air quality in the Dywity commune using the activities described in the document.

The main objective of the Development Strategy of the Jonkowo Commune for 2016-2026, including sustainable development, was defined as: "Sustainable socio-economic development of the Jonkowo Commune will be based on the geographical location in the Olsztyn agglomeration and natural, cultural and historical conditions." Of course, as in other communes, strategic goals have been defined to achieve the main goal. A direct reference to sustainable development appears in the development vision and the second strategic goal, which concerns sustainable spatial policy and its creation through the appropriate location of land functions in studying conditions and directions of spatial development. The strategy clearly states that the development of the economy is consistent with sustainable development. Including sustainable development in the Jonkowo Commune Strategy not only at the level of the main goal and vision but also at the level of strategic and operational goals, together with the indication of specific actions, indicates a high level of awareness of this issue in the Commune.

The last strategic document in which sustainable development appears as the main objective is the Development Strategy of the Purda Commune for 2015-2025. Similarly to Jonkowo, several strategic goals were defined to achieve the main goal in Purda's strategy. It appears directly in one of the operational objectives and concerns sustainable spatial policy and its creation through the appropriate location of land functions. Moreover, the last strategic goal was fully incorporated into the Low-Emission Economy Plan, which naturally fits into the principle of sustainable development. The plan's agenda includes reducing greenhouse gas emissions using all possible means. It was also assumed that the Commune would take action to change residents' ecological awareness and consumption patterns. According to the authors of the Plan, implementing these activities was to contribute to achieving the goals set out in the climate and energy package.

The current Development Strategy of the Stawiguda Commune for 2016-2025 is based on the vision of the commune as a place of high quality of life and business, supporting and taking full advantage of its location in the Olsztyn agglomeration. This document indicates the issue of sustainable development in the descriptive layer regarding spatial policy and increasing the protection of areas with significant natural and landscape values. Limited in its purpose and scope, the Low-Emission Economy Plan of the Stawiguda Commune naturally fits into the principle of sustainable development, particularly concerning reducing greenhouse gas emissions. The issue of sustainable development was also raised in another sector document of the commune, i.e. the Concept for the development of public transport in the Stawiguda Commune, the update of which clearly indicates the connection of the document with the Commune Development Strategy, the Mobility Plan of MOF Olsztyn and the implementation of the goals indicated therein by increasing the importance of public transport and alternative means of transport to the car, as well as reducing the level of transport exclusion of the commune's inhabitants in the transport system.

Summary

To sum up, the strategic documents developed by all Municipalities of the Olsztyn MOF recognize sustainable development in a way that can be taken into account, often even indicating it at the stage of the main goal. The actions proposed in the documents, apart from generally indicating their importance for the development of individual Municipalities of the Olsztyn MOF, do not include elements that have become crucial from the point of view of sustainable development in recent years. In particular, this applies to shaping spatial development that will, to the smallest possible extent, require using an emission-intensive means of transport, such as a passenger car.

The review of documents indicates that the development of sustainable transport in MOF Olsztyn is based on the foundation of many documents. It is subject to a constant process of evolution expressed in new goals, as well as in new documents of a strategic and operational nature. The multitude of documents and their different rank and impacts make it difficult to variant and select the optimal direction of development of the transport system of the entire functional area. The simplest solution seems to be adopting a sustainable transport development strategy. However, this requires understanding the essence and principles of sustainable mobility and then cooperation between officials of each commune and residents in shaping the transport system. Only when these elements work perfectly together will the vision of a modern urbanized area come true, in which sustainable transport will not be an overused and, therefore, empty slogan. From the point of view of the development goals of MOF Olsztyn and the aspirations of its inhabitants, it is important that the transport system ceases to be a barrier hindering the area's economic development and becomes an element that significantly contributes to this development.

In this situation, it is difficult to disagree with the statement that while economic conditions determine the shape of the Olsztyn Functional Urban Area Olsztyn transport system in a natural way, initiated by market participants, legal conditions are capable of modifying their behaviour in a different way than expected. Therefore, one of the main goals of all local government units constituting Olsztyn Functional Urban Area Olsztyn should be to create conditions for efficient, safe and effective travel while limiting the negative impact on the natural environment. The cooperation and involvement of all JSAs is crucial in ensuring appropriate conditions for the sustainable development of the Olsztyn Functional Urban Area Olsztyn transport system.

References

Beim, M., Mazur, B., Pistelok P. (2023). *Zrównoważona mobilność w polityce transportowej miasta. Badania Obserwatorium Polityki Miejskiej*. Instytut Rozwoju Miast i Regionów, Kraków-Warszawa. (in Polish)

Borys, T. (2008). Raport z Realizacji Ekspertyzy „*Analiza istniejących danych statystycznych pod kątem ich użyteczności dla określenia poziomu zrównoważonego rozwoju transportu wraz z propozycją ich rozszerzenia*”, Jelenia Góra-Warszawa.

Bujak. A., Zając P. (2013). Monitoring of cargo in logistic systems of transport and storage. *Activities of Transport Telematics: 13th International Conference on Transport Systems Telematics*, Katowice-Ustroń, Poland, October
23-26, 2013, Selected Papers 13. Springer Berlin Heidelberg, 2013.

Chamier-Gliszczyński, N. (2012). *Modeling system mobility in urban areas*. Congress Proceedings, CLC 2012: Carpathian Logistics Congress, 501-508, 111467.

Chamier-Gliszczyński, N. (2012a). *Structure analysis of system mobility in urban areas*. Congress Proceedings, CLC 2012: Carpathian Logistics Congress, 509-515, 111467.

Chamier-Gliszczyński, N. (2015). *City logistics – sustainable urban mobility*. Congress Proceedings, CLC 2015: Carpathian Logistics Congress, 263-268.

Chamier-Gliszczyński, N., Bohdal, T. (2016). Urban mobility assessment indicators in the perspective of the environment protection. *Rocznik Ochrona Środowiska, 18*(1), 670-681.

Devi, P., Kizielewicz, B., Guleria, A., Shekhovtsov, A., Watróbski, J., Królikowski, T., Więckowski, J., Sałabun, W. (2022). Decision support in selecting a reliable strategy for sustainable urban transport based on laplacian energy of t-spherical fuzzy graphs. *Energies*, *15*(14), 4970. https://doi.org/10.3390/en15144970

Dižo, J., Blatnicky, M., Semenov, S., Mikhailov, E., Kostrzewski, M., Drozdziel, P., Stastniak, P. (2021). Electric and plug-in hybrid vehicles and their infrastructure in a particular European region. *Transportation Research Procedia,* 55, 629-636. https://doi.org/10.1016/j.trpro.2021.07.029.

Ejdys, S. (2021). Model of a Sustainable Transport System on the Example of Olsztyn. *Rocznik Ochrona Środowiska*, *23*, 811-822. https://doi.org/10.54740/ros.2021.055

Ejdys, S. (2017). Spójny i zrównoważony system transportowy Warmii i Mazur. Optimum. *Studia Ekonomiczne*, *4*(88), 199-212. (in Polish). https://doi.org/10.15290/ose.2017.04.88.15

Ejdys, S. (2009). *Zrównoważony rozwój jako perspektywa funkcjonowania transportu miejskiego*. [w:] D. Kiełczewski, B. Dobrzańska (red.), *Ekologiczne problemy zrównoważonego rozwoju*, Wydawnictwo Wyższej Szkoły Ekonomicznej w Białymstoku, Białystok, 199-209. (in Polish)

Europejski Trybunał Obrachunkowy (2020). *Zrównoważona mobilność w miastach w UE – bez zaangażowania ze strony państw członkowskich nie będzie możliwa istotna poprawa*. *Sprawozdanie specjalne nr 6*. (in Polish). Available at: https://op.europa.eu/webpub/eca/special-reports/urbanmobility-6-2020/pl/#chapter10

Europejski Zielony Ład (2019). *Komunikat Komisji do Parlamentu Europejskiego*, *Rady Europejskiej, Rady, Komitetu Ekonomiczno-Społecznego i Komitetu Regionów KOM* (2019) 640, Bruksela. (in Polish)

Gadziński, J., Goras, E. (2019). *Raport o stanie polskich miast*. *Transport i mobilność miejska*, Instytut Rozwoju Miast i Regionów, Warszawa. (in Polish)

Gajda, A., Kulig, M., Ogórek, P. (2023). *Transport publiczny w miastach i miejskich obszarach funkcjonalnych*, Badania Obserwatorium Polityki Miejskiej, Instytut Rozwoju Miast i Regionów, Warszawa-Kraków. (in Polish)

GF Transport Consulting (2019). *Koncepcja rozwoju publicznego transportu zbiorowego dla powiatu olsztyńskiego.* Olsztyn. (in Polish)

Grzelec, K., Hebel, K., Wyszomirski, O. (2020). *Zarządzanie zbiorowym transportem miejskim w warunkach polityki zrównoważonej mobilności.* Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk. (in Polish)

Jacyna, M., Wasiak, M., Lewczuk, K., Karoń, G. (2017). Noise and environmental pollution from transport: Decisive problems in developing ecologically efficient transport systems. *Journal of Vibroengineering*, *19*(7), 5639-5655. https://doi.org/10.21595/jve.2017.19371

Jacyna, M., Wasiak, M., Lewczuk, K., Chamier-Gliszczyński, N., Dąbrowski, T. (2018). Decision Problems in Developing Proecological Transport System. *Rocznik Ochrona Srodowiska*, *20*(2), 1007-1025.

Kostrzewski, M., Eliwa, A., Dawood, A. (2022). Autonomy of urban light rail transport systems and ITS influence on users expenditures, and operational costs. *Transport Problems*, *17*(4), 165-175. https://doi.org/10.20858/TP.2022.17.4.14.

Ladi, T., Mahmoudpour A., Sharifi A. (2022). Assessing Environmental Impacts of Transportation Sector by Integrating DPSIR Framework and X-Matrix. *Case Studies on Transport Policy*, *10*(1).

Manteuffel, Szoege, H. (2011). Optymalny poziom zanieczyszczenia środowiska w zależności od trwałości zanieczyszczenia. *Ekonomia i Środowisko*, *1*(39).

Ministerstwo Infrastruktury (2019). *Strategia Zrównoważonego Rozwoju Transportu do roku 2030*, Warszawa. Dz.U. z 2019 poz. 1054. (in Polish)

Motowidlak, U. (2017), Rozwój transportu a paradygmat zrównoważonego rozwoju. Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach. Zarządzanie 12, Nr 337. (in Polish)

Organizacja Narodów Zjednoczonych (2015). Agenda na rzecz zrównoważonego rozwoju 2030, A/RES/70/1. Nowy Jork.

Petrica, BG., Ciobanu, RI., Dobre, C. (2021). *Automatic Traffic Light Preemption for Intelligent Transportation Systems*. International Symposium on Parallel and Distributed Computing,1-8. https://doi.org/10.1109/ISPDC52870.2021.9521638

Płachciak, A. (2011). Geneza idei rozwoju zrównoważonego. *Ekonomia Economics*, *5*(17).

Rogall, H. (2009). *Podstawowe założenia ekonomii zrównoważonej*, [w:] D. Kiełczewski (red.), Od koncepcji ekorozwoju do ekonomii zrównoważonego rozwoju, Wyższa Szkoła Ekonomiczna w Białymstoku

Rovnak, M., Kalistova, A., Stofejova, L., Benko, M., Salabura, D. (2022). Management of sustainable mobility and the perception of the concept of electric vehicle deployment. *Polish Journal of Management Studies*, *25*(2).

The Sustainable Development Goals Report, (2023). Special edition. Towards a Rescue Plan for People and Planet. United Nations.

The Global Risks Report, (2021). World Economic Forum 2021. Available at: https://www.weforum.org/reports/the-global-risks-report-2021

Woźniak, W., Stryjski, R., Mielniczuk, J., Wojnarowski, T. (2016). *The concept of the profitability for the transport orders acquired from the transport exchange market*. Proceedings of the 27th International Business Information Management Association (IBIMA), ISBN: 9780986041969, 4-5 May 2016, Milan, Italy 2375-2383.

Woźniak, W., Kielec, R., Sąsiadek, M., Wojnarowski, T. (2018). *A Functional Analysis of Selected Transport Exchanges and Tendering Platforms in the Transport Orders Market*. Proceedings of the 31st International Business Information Management Association (IBIMA) ISBN: 9780999855102, 25-26 April 2018, Milan, Italy, 5047-5055.

Woźniak, W., Wojnarowski, T. (2015). *The method for a fast selection of the profitable transport offers derived from the freight exchange market.* Proceedings of the 25th International Business Information Management Association Conference (IBIMA), ISBN: 9780986041945, May 2015, Amsterdam, Holland, 2073-2085.

World Commission on Environment and Development, (1987). Our Common Future, University Press, Oxford, 54

Vajjarapu, H., Verma, A., Allirani, H. (2023). Evaluating the Climate Change Mitigation de Oña J., Estévez E., de Oña R., 2021, Public transport users versus private vehicle users: Differences about quality of service, satisfaction and attitudes toward public transport in Madrid (Spain), Travel Behaviour and Society

Zając, P. Haladyn, Sz., Kwaśnikowski, S. (2019). Concept of reducing harmful emissions by road transport vehicles in the tourist route Karpacz-Jelenia Góra. *E3S Web of Conferences,* 100,00091, 148594. https://doi.org/10.1051/e3sconf/201910000091