

## Sustainable Mobility in the Cities and Agglomeration Areas

### Zrównoważona mobilność w miastach i obszarach aglomeracyjnych

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**Abstract:** The aim of this publication is to present the relationship between the dominant forms of urban mobility and the environmental pressures of the transport sector as well as the quality of life of the inhabitants of large cities and urban agglomerations. The presentation of trends and scenarios is based, on the one hand, on statistics describing current development trends and, on the other hand, on scenarios, recommendations, and commitments defined in European, national, and local governmental documents programming the socio-economic development of urbanised areas and the directions of climate transformation in their area. The article consists of a brief introduction, background on the latest regulations in the field of sustainable urban mobility, and a comparative analysis of environmental demands, along with actual trends observed in the transport sector in urbanised areas. It closes with conclusions relating to the validity and effectiveness of current transport and environmental policies, and recommendations, whilst identifying areas and instruments that increase the likelihood of achieving the stated objectives.

**Keywords:** urban policy, transport policy, mobility

**Streszczenie:** Celem publikacji jest prezentacja zależności pomiędzy dominującymi formami mobilności miejskiej a presją środowiskową sektora transportu i jakością życia mieszkańców dużych miast i aglomeracji miejskich. Z jednej strony ukazane zostały aktualne trendy rozwojowe, z drugiej zaś scenariusze, rekomendacje i zobowiązania definiowane w europejskich, krajowych i samorządowych dokumentach programujących rozwój społeczno-gospodarczy terenów zurbanizowanych oraz kierunki transformacji klimatycznej na ich obszarze. Artykuł składa się z krótkiego wprowadzenia, tła w postaci najnowszych regulacji z zakresu zrównoważonej mobilności miejskiej oraz analizy porównawczej postulatów środowiskowych i rzeczywistych trendów obserwowanych w sektorze transportu na obszarach zurbanizowanych. W podsumowaniu zawarte są wnioski odnoszące się do prawidłowości i skuteczności obecnej polityki transportowej i środowiskowej oraz rekomendacje, wskazujące obszary i instrumenty zwiększające prawdopodobieństwo osiągnięcia zakładanych celów.

**Słowa kluczowe:** polityka miejska, polityka transportowa, mobilność

## **Introduction**

The traditional concept of mobility is referred to in the literature as the efficiency of movement of people and goods. As such, it is characterised by speed, fluidity, and flexibility (Mężyk and Zamkowska 2004). In the individual dimension, mobility, apart from physical movement, is interpreted as a personality trait indicating activity, readiness to travel, to change the place of work or of living. In its broadest sense, it is identified with an active attitude towards changing environment and challenges of civilisation. In the latter sense, “mobility” comprises various aspects of movement, much broader than just travelling, and may define the attitude towards changes in the social and occupational position.

Referring to society or a selected community, mobility is also a part of the way in which distance is covered and used. This is particularly visible in urban and agglomeration areas, which do not seem to be able to function without this form of social activity. Moreover, despite the progressing process of digitalisation of contemporary forms of contact, the demand for increasingly diverse forms of covering distances is not decreasing. At the top of the list of priorities indicated by inhabitants of cities is good communication accessibility, ease and efficiency of travel, as well as developed transport infrastructure. In this dimension, mobility to a large extent determines the attractiveness of individual agglomerations, urban centres, or city districts. Well-connected and easily accessible areas are assessed positively and therefore valued more highly by the property market, for example.

At the same time, the point of view of an individual does not always go hand in hand with the expectations of the community. What is beneficial for an individual turns out to be inappropriate or even unacceptable for the community, for mobility is not confined to individual profits and losses, as it has too great impact on the surroundings, neighbours, other residents, and the environment. The key to analyses and evaluations of mobility, both personal and collective, is its significant impact on its surroundings, which takes a negative form when motorised forms of covering distance are used. Indeed, in the European Union, mechanised transport is responsible for a quarter of greenhouse gas emissions.

### **1. Purpose and methods of the research**

The aim of this article is to assess the trends driving urban mobility policies and to evaluate to what extent they are able to influence the socio-economic development of cities and urban agglomerations in practice. The text also describes the instruments used to shape this sphere of functioning of contemporary cities and lists recommendations addressed to the administration, business entities and inhabitants.

The primary method of research adopted in the article is the analysis of literature in the area of transport and creation of public policies, programming of development of cities and agglomeration areas, and confronting experiences with the latest environmental trends as well as discussions on the negative human contribution to the climate change.

The selection of specific items from the wide range of documents and literature describing both the transport policy and the urban policy was determined by the search query

prepared in the initial phase of works. With this, it was possible to compile the sources and papers that best characterise the described issues in the social and environmental context.

## 2. Cities from the transport policy perspective

With the beginning of the 21<sup>st</sup> century, mitigating the negative impact that transport has on the environment has become increasingly important. This is because the measures taken so far have not produced the expected results. On the one hand, growing environmental problems and increasing public expectations on the other, led to the enactment of a package of EU regulations, with Directive (EU) 2008/50/EC of the Parliament and of the Council on Air Quality for Europe and a set of regulations referred to as the “Clean Energy for All Europeans” package as the first ones.

**Table 1:** The legal acts that make up the energy and climate change package “Clean Energy for All Europeans.”

Legal act	Published in the Official Journal of the EU	Entry into force
Directive 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency	2018.06.19	2018.07.09.
Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations	2018.12.12	2019.01.10
Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources	2018.12.18	2018.12.24
Directive 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency	2018.12.21	2018.12.24
Regulation 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC	2019.06.14	2019.07.04
Regulation 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators	2019.06.14	2019.07.04
Regulation 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity	2019.06.14	2019.07.04
Directive 2019/944 of 5.06.2019 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast)	2019.06.14	2019.07.04

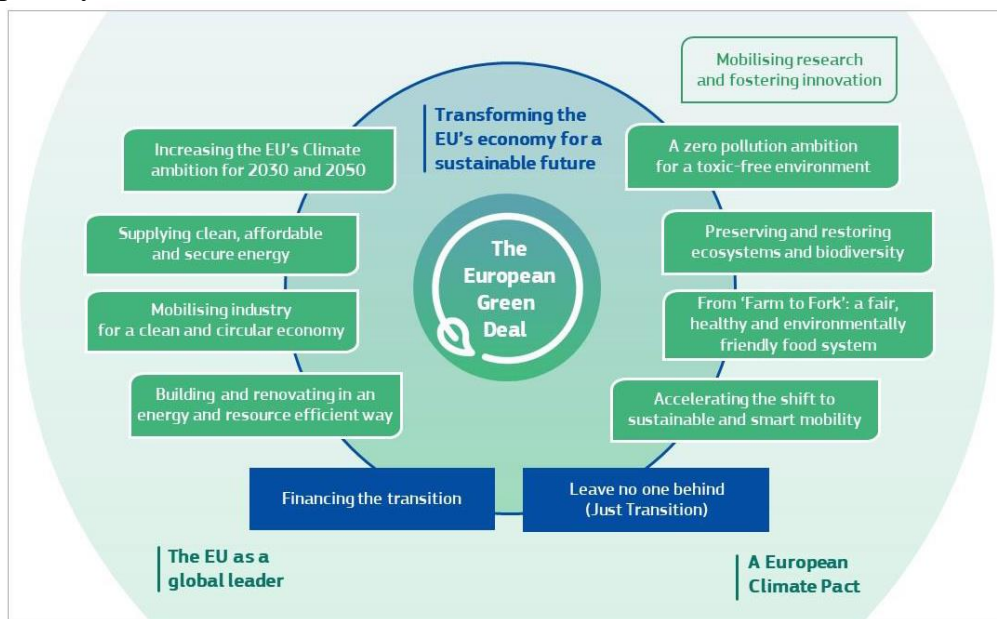
Source: ProKolej Foundation (2021), *Rail for Climate – a Summary Report*, p. 11.

Due to the scale and structure of the impact, gradually more attention was given to the expectations of the transport sector. As a result, a new sectoral document related to the transport and environmental policy was drawn up, namely the Transport White Paper entitled “Roadmap to a Single European Transport Area – Towards a competitive and resource-efficient transport system” (White Paper 2011). The proposed strategy showed the need for a profound remodelling of the entire transport system, not only at the international level, but also at the national, regional, and urban levels.

The document contained a comprehensive diagnosis of the state of transport and proposed measures, largely aimed at reducing negative impact on the environment. It further underscored the need to separate the unfavourable dependency between the economic development and the increasing transport intensity imposed by the growth of automotive industry. The need to shift passenger and freight transport from road to rail and water transport and, in the case of cities – to promote cycling and walking was pointed out.

The successor to the “Clean Energy for All Europeans” package is the European Green Deal, a universal strategy for climate and the environment and for achieving climate neutrality of the continent. The main demands made in the document were as follows:

- ✓ development of renewable energy sources and phasing out of coal-based energy sources as well as measures aimed at promoting green energy,
- ✓ further reduction in CO<sub>2</sub> (by more than 50% by 2030), including a 90% reduction in emissions from the transport sector by 2050,
- ✓ development of the Emissions Trading Scheme and its extension to emissions from the transport sector,
- ✓ support for green products and services,
- ✓ financial support to countries most prone to the negative effects of decarbonisation processes,
- ✓ financing of pro-environmental objectives, including the reduction of environmental poverty.



**Figure 1. European Green Deal**

*Source: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the European Committee of the Regions, A Sustainable Europe Investment Plan, A European Green Deal Investment Plan, p. 2.*

Transposition of the European Green Deal to the transport sector has forced the next update of the transport policy. As a result, in 2020 the Sustainable and Smart Mobility Strategy was adopted at the EU level. The programme for the transformation of the transport sector was prepared during the crisis caused by the coronavirus pandemic. Therefore, simultaneously with the efforts to strengthen the single market, it comprises increased investment in green

modernisation of vehicles and infrastructure to make the European transport sustainable and competitive, while at the same time resilient to future shocks.

The purpose of the document is to trigger a change in the way people move and goods are transported and to make it easier to combine various modes of transport in a single journey. At the same time, green solutions for entrepreneurs are proposed, in line with the objectives of the European Green Deal.

Changes are to be implemented in an inclusive way. Transport is to connect peripheral areas and provide good social conditions and attractive jobs. According to the assumptions of the strategy, as a result of the transformation, transport is supposed to become environmentally friendly (90% reduction in emissions by 2050), sustainable, intelligent, affordable and resilient to crises in the future. This will become possible through the following measures:

- ✓ dissemination of zero-emission vehicles, vessels, and aircraft,
- ✓ dissemination of renewable energy sources and low-carbon fuels – including public charging points,
- ✓ creation of zero-emission airports and ports,
- ✓ sustainability of inter-urban and urban transport structures (e.g., rail transport, development of cycling infrastructure),
- ✓ promotion of green freight transport (increase in rail freight traffic by 50% by 2030 and by 100% by 2050),
- ✓ introducing a fair and efficient system of fees for access to transport infrastructure and linking it to greenhouse gas emission.

In the area of urban mobility, thanks to innovation and widespread digitalisation, the system will be based on an automated, multimodal transport network, intermodal e-ticketing, integrated information, and travel planning systems using artificial intelligence.

### **3. Mobility from the perspective of urban policy**

Transport elements have been appearing in urban policy for a long time. Initially, their environmental dimension was secondary to functional issues, and the priority was given to economic aspects and solutions which were to remove obstacles to the development of rapidly growing centres and their immediate surroundings. Gradually, however, the issues of interrelations between transport and its environment started to gain importance. They have evolved from a focus on technological and inner problems, through analyses of the impact on the surroundings, to the influence of mobility on the structure and character of cities.

A similar process could be observed in the transport policies of the individual major agglomerations, although there, due to the scale and diversity of the problems, the calls for a change in previous priorities appeared as first. As a result, in 2016, the so-called “Pact of Amsterdam” or Urban Agenda for the European Union, indicated that urban mobility should be among the priorities for the future transformation of urban areas. At the same time, not only infrastructure or public transport were mentioned as tools for shaping it, but also mobility behaviour and even the role of walking and cycling. At the same time, the importance of public space and the accessibility of individual areas and facilities for people with reduced mobility for sustainable mobility was underscored (Agenda 2016). Not only residents were mentioned

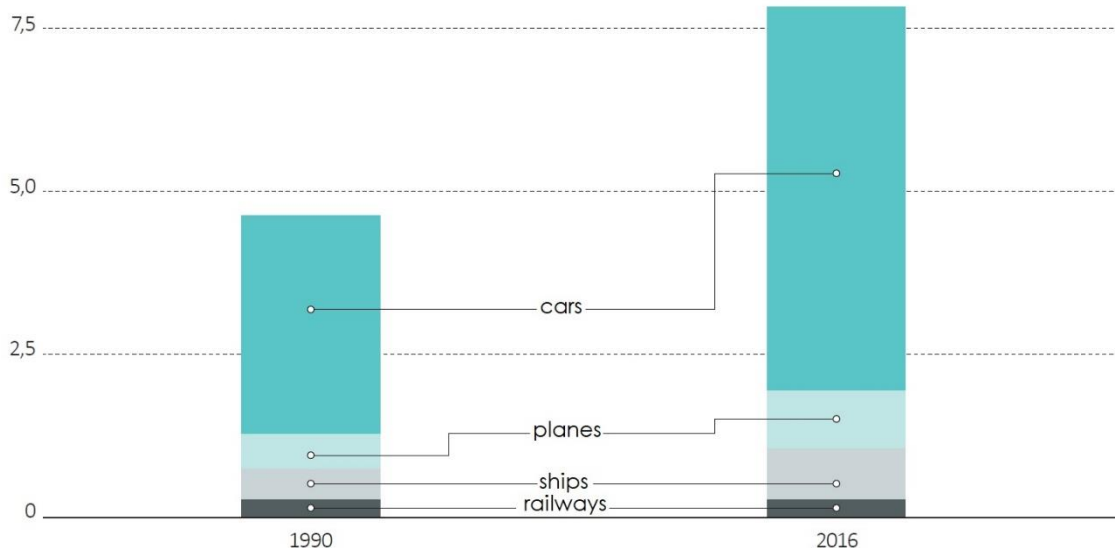
as the main stakeholders of changes in the mobility model but also local authorities, who should have the greatest benefits from the practical implementation of the new demands (Strategy 2016).

Following the Low-Emission Mobility Strategy, the European Commission adopted further “Europe on the Move” mobility packages in 2017 and 2018 respectively. The first one emphasised the need to change mobility patterns and to integrate public transport and urban planning (Strategy 2018). The following year, these issues were also presented in detail in the analytical paper “Towards a sustainable Europe by 2030”, which identified sustainable mobility as one of the main drivers of the transition to a clean, resource-efficient and carbon-neutral economy (Paper 2019).

Also, the European Court of Auditors, in its special report 06/2020 on policy and financing mobility in the EU cities, called for a review of its implementation in cities, pointing to the need for legislative action in relation to the adoption of sustainable urban mobility plans. The report pointed out that “six years after the Commission called for a step-change, there is no clear indication that cities are fundamentally changing their approaches. In particular, there is no clear trend towards more sustainable modes of transport. Although cities have put in place a range of initiatives to expand the quality and quantity of public transport, there has been no significant reduction in private car usage” (Report 2020, 41).

#### **4. Contrast between assumptions and evolution of the sector**

Contrasting the provisions of the policy documents relating to urban mobility presented in the previous chapters, it is possible to see a growing emphasis on issues not only of ecology, but also of social integration. This is the more important as previous transport policy documents have been dominated by economic and investment topics, often approached on a sectoral basis. Areas such as needs management or attitude shaping took a secondary place. At the beginning, in transport documents in particular, environmental issues were treated similarly. They were not so much an objective, but rather a background, creating constraints and obstacles to development. Over time, however, they have gradually gained importance. Two key factors affected the change: general environmental pressure and systematic increase in transport emissions (cf. Figure 2). Indeed, by that time, awareness was already being shaped that transport should fulfil tasks resulting from horizontal policies, including rational spatial management and environmental protection (Przybyłowski 2011).

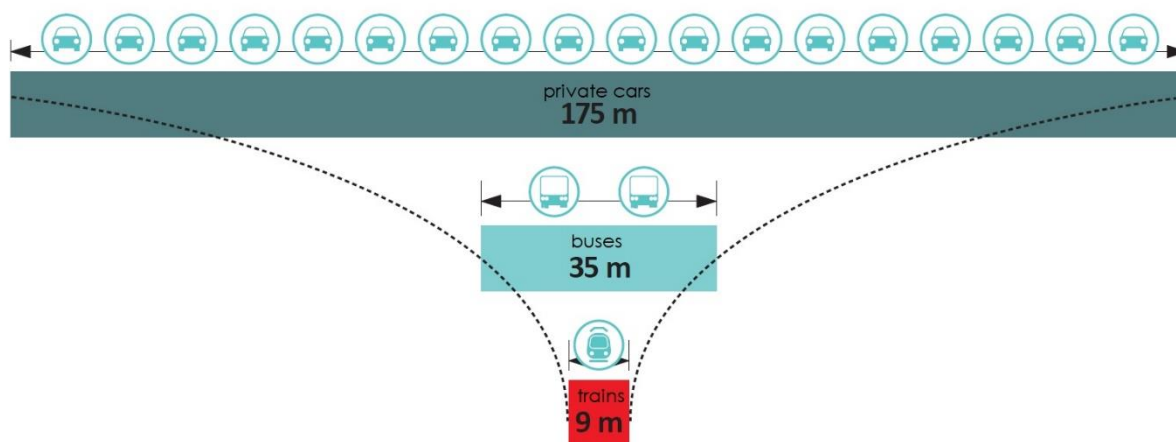


**Figure 2. Structure of CO2 emissions in transport [Gt CO2]**

Source: ProKolej Foundation (2021), *Rail for the Climate – a Summary Report*, p. 25.

The uninterrupted growth of motorisation and road traffic, continued virtually unabated over decades, has changed the travel structure and urban mobility pattern in an unprecedented way. Moreover, as a result of the parallel processes of degradation of public transport, car dependency has further increased, leading to so-called forced mobilisation, which implies the need to move by this means of transport (Orchowska 2022, 115).

The scale and dynamics of the described phenomena were so intense that any attempts to decongest traffic by expanding infrastructure and increasing capacity proved completely inefficient. The freed capacity generated additional induced traffic and the bottlenecks in the traffic system rapidly exhausted their capacity, generating the need for their further expansion. Indirect results comprise mainly negative environmental effects (pollutant emissions, noise) and a deterioration in the quality of life of residents caused by increased amount of time spent travelling and the degradation of urban space.

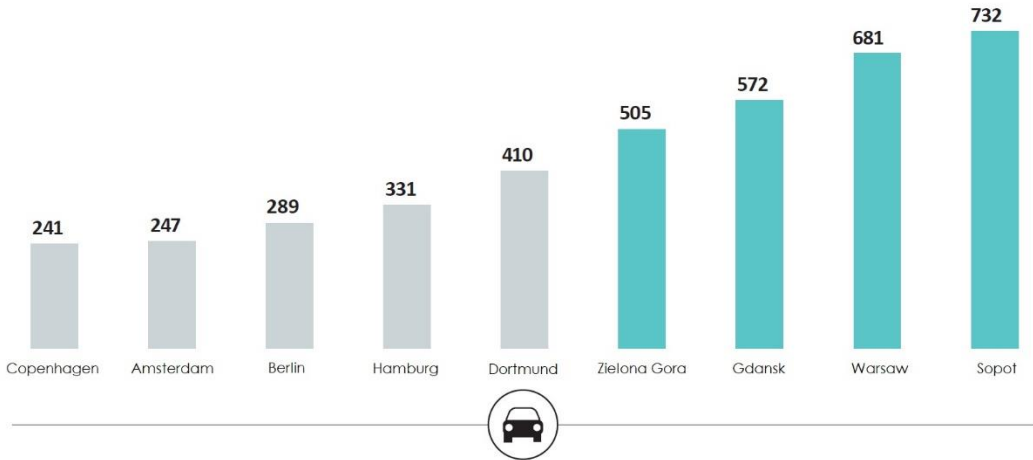


**Figure 3. Use of space in transport,**

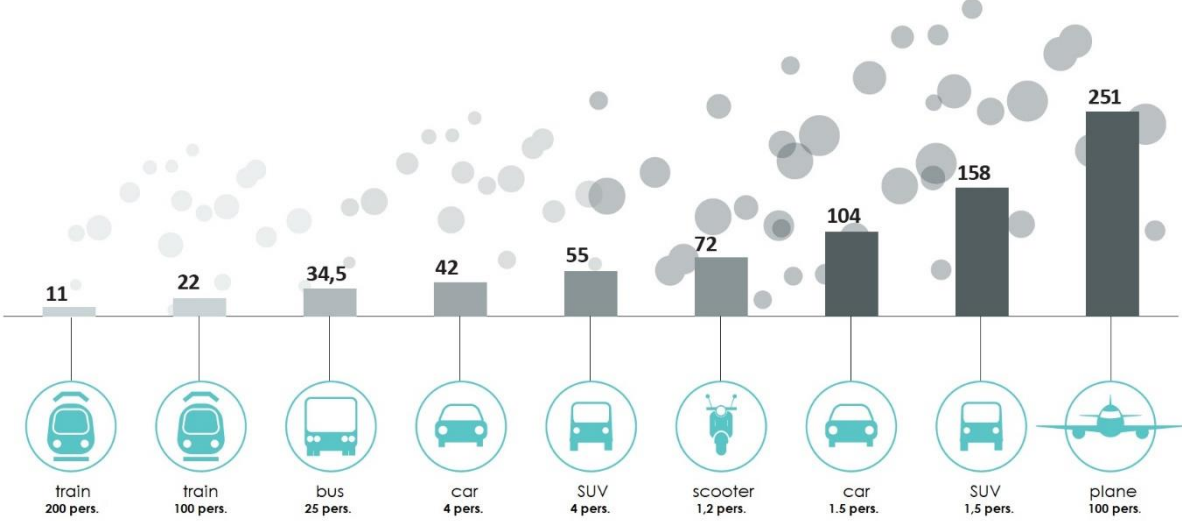
Width of land with capacity of 50 thousand passengers per hour. Source: [www.prokolej.org](http://www.prokolej.org).

Currently, the highly developed countries emphasise the importance of sustainable development in transport and urban policies. This applies both to the problems of direct emission of pollutants, noise or land occupation, as well as to the wider problem of relations with the environment.

In the countries on lower development level, however, addressing the problems that exist in this area is still a fundamental challenge. In many cases, it is attempted to continue the existing development strategies based on traditional mobility solutions. Many cities in Poland may be an example, where the economic transformation has triggered a rapid and uncontrolled growth of motorisation. As a result, the vehicle rate, measured as the number of cars per thousand inhabitants, has exceeded the average for the European Union and its level has clearly surpassed the values recorded in many Western European metropolises (cf. Figure 4).



**Figure 4. Motorisation rate in selected cities of Europe,** number of registered vehicles per 1000 inhabitants. *Source: www.prokolej.org.*



**Figure 5. CO2 emission per passenger** Expressed in grams/passenger-kilometre depending on the number of passengers. *Source: ProKolej Foundation (2021), Rail for the Climate – a Summary Report, p. 51.*



Satisfying the demand that is growing this way is costly and yet in many cases impossible. Unsustainable mobility model translates into increased traffic, the direct effects of which include widespread congestion, parking spots deficit and degradation of spaces uncontrollably consumed by transport functions (Policy 2015, 37). Inefficient infrastructure expansion policies are not able to keep up with the growing demand for travel. With the monoculture of passenger cars, the intra-urban traffic adds up to traffic from the functional area of the city, and often to long-distance and transit transport<sup>1</sup>. At the same time, the alternative being the public transport continues to lose its significance as, with no customers, it reduces its range and thus its advantages of high frequency and accessibility.

The scale of the described phenomena is enhanced, in the case of Polish cities, by a disorderly spatial policy, including especially chaotic spatial development of peripheral districts and suburban areas, resulting first and foremost from uncontrolled suburbanisation. It leads to the generation of new journeys, longer commuting distances and times, a general increase in transport intensity and dependence of residents on the use of passenger cars (Policy 2015, 37). The growing traffic congestion as well as permanent overloading of infrastructure and car parks are one of the main challenges of the Polish cities and agglomerations. These phenomena are uncontrolled, and without a strong policy assuming a thorough remodelling of mobility and the involvement of authorities at various levels of local government, no improvement in the situation is to be expected.

### **Summary and recommendations**

A comparison between, on the one hand, the directions defined in policy documents prepared at international level and, on the other hand, the practice observed in a significant part of urban transport systems, indicates a significant gap that separates expectations and socio-economic reality. Analysing trends in this respect, it can be assessed that successive strategies place an increasing emphasis on sustainability not only because of the worsening climate crisis, but also as a response to the inadequacy of former impact tools.

Comprehensive measures aimed at changing travel patterns are coming to the fore in a situation in which technological change cannot guarantee the achievement of objectives. It is no longer the responsibility of public authorities, at both urban and regional level, to build and maintain infrastructure or even the public transport network, but to consistently manage the forms of transport services used by residents. In a modern, sustainable city, the mobility model for residents must ensure that objectives are achieved easily, efficiently and without excessive costs. Moreover, it must not burden either the environment or fellow residents.

It is worth noting that in this respect, transport policy is becoming similar to horizontal, social and cohesion policy at various levels. “Cohesion policy, in its modern sense, is not about levelling revenues but about levelling opportunities. Its essence is not about social transfers,

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<sup>1</sup> Traffic from the outer areas of the agglomeration is responsible for congestion on the routes leading to the centre, the main streets serving the neighbouring districts and practically the entire inner city area. Cf. National Urban Policy.

but institutional solutions and infrastructural undertakings that contribute to increasing the access of individuals to various forms of capital and remove any discrimination” (Hausner 2008).

While the definition of global goals and strategies is often the domain of discussions at the international level, most of the activities that make up transport policy are the responsibility of cities and agglomeration governments. They are responsible for both the preparation and enforcement of plans and regulations binding in their subordinate area and the actual implementation of the selected transports. The priorities for the self-government's green policy of sustainable mobility should be (ProKolej 2021, 65):

- ✓ reducing transport intensity through spatial planning,
- ✓ organising and financing attractive and competitive public transport,
- ✓ consistent reduction of car traffic.

Creating sustainable mobility in the functional area of a city, focused on providing journeys in the number and of length that are needed to satisfy the demand of the inhabitants, requires a change in mobility behaviour, especially a reversal of the trend towards increasing dependence on the daily use of private cars. The best solution in achieving this goal turns out to be spatial planning. The majority of problems resulting from the negative impact of transport – from negative noise effects to space occupation and generation of excessive travel – are rooted in town and country planning. Blocking development in areas without public transport or industrial developments without rail access, planning polycentric and multifunctional towns and optimising infrastructure will minimise the impact of transport on the surroundings (ProKolej 2021, 66).

In addition, spatial planning directly determines the transport intensity. The choice of means of transport is indeed to a very large extent affected by distances. Shorter distances encourage the use of non-motorised forms of mobility, including walking and cycling. The longer distances, the more often a car is chosen. On the other hand, higher population density, careful selection of functions to individual areas and diversity of spatial use provide the inhabitants with access to services close to their places of residence. The more dispersed the sources and destinations of travel, the more difficult and less convenient it is<sup>2</sup>.

Involving budget resources to finance sustainable mobility is justified primarily by environmental and social policy. On the one hand, the service offer should not be an obstacle to mobility in cities and agglomerations, and on the other hand, it should be competitive with the use of own passenger cars, whose excessive share in local and regional transport entails high external costs (Wyszomirski 2008).

One needs to remember that giving up travel, changing modes of transport or investing in environmentally friendly technologies is not just a decision for public authorities. Their

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<sup>2</sup> Currently, solutions such as 15-minute cities, which allow the citizens to reach daily services on foot or by bicycle within 15 minutes, are considered to be optimal. The authorities in Paris, Helsinki and Ottawa, among others, want to introduce such solutions in order to encourage citizens to resign from their cars.

considerable part belongs to residents and the businesses they run. Responsibility for changes in the transport market cannot be placed solely on the public side. The administration should support consumers and companies in choosing the least harmful forms of transport, but it will not make the final choices. A new mobility model must be developed and accepted by society and, in many cases, by entrepreneurs<sup>3</sup>.

The improvement of a highly efficient public transport system in agglomeration areas is particularly urgent. Investment in infrastructure, including transfer nodes and rolling stock, as well as tariff and information integration are both necessary. The largest groups of travellers and the busiest routes should be operated by rail transport.

The decisions and transactions made in practice show that, despite the development of the digital economy, individual and collective mobility is still an important development factor. It is therefore to be expected that the shape, functionality, and quality of transport systems – as a universal component of all economic processes and manifestations of social life – will continue to determine the attractiveness of cities, both as places to live and to invest in, for a long time to come.

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<sup>3</sup> Social mobilisation around sustainable mobility policies has an additional advantage, in a situation where the authorities are elected and depend on the expectations of the public. City or neighbourhood residents, for whom safe and healthy living conditions are a priority, are the best foundation for building sustainable urban policies.

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