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International environmental and climate policy and the directions of transport development at the national and regional level

Międzynarodowa polityka środowiskowa i klimatyczna oraz kierunki rozwoju transportu na poziomie krajowym i regionalnym

Abstract. The aim of this paper was to analyse the transport-related content of European environmental and climate policy documents and to identify those elements that will be key in shaping transport development in individual countries and regions in the coming decade. In the first part, the authors present an overview of the most important documents defining environmental protection and climate change goals in the European Union. In the second part, the most important guidelines, which should affect the actions undertaken in the field of shaping and developing transport, were indicated. A short analysis of the processes occurring on the transport market in Poland and their convergence with the recommendations included in the documents was also included. The summary presents conclusions concerning the necessity of complementing national documents with the latest EU recommendations.

Key words: climate policy, environmental policy, transport, transport ecology

Synopsis: Celem artykułu była analiza treści transportowej dokumentów europejskiej polityki środowiskowej i klimatycznej oraz wskazanie tych elementów, które będą kluczowe w kształtowaniu rozwoju transportu w poszczególnych krajach i regionach w nadchodzącej dekadzie. W pierwszej części autorzy przedstawiają przegląd najważniejszych dokumentów określających cele ochrony środowiska i zmian klimatu w Unii Europejskiej. W drugiej części wskazano najważniejsze wytyczne, które powinny wpłynąć na podejmowane działania w zakresie kształtowania i rozwoju transportu. Zawarto również krótką analizę procesów zachodzących na rynku transportowym w Polsce oraz ich zbieżność z zaleceniami zawartymi w dokumentach. W podsumowaniu przedstawiono wnioski dotyczące konieczności uzupełnienia dokumentów krajowych o najnowsze zalecenia UE.

Słowa kluczowe: polityka klimatyczna, polityka środowiskowa, transport, ekologia transportu

JEL codes: D62, F64, H23, L98, O13

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Introduction

December 2020 saw the publication of the Sustainable and Intelligent Mobility Strategy [European Comission 2020], the latest EU document prepared as part of the Sustainable Economy Action Plan under the European Green Deal [European Commission 2019b]. The main objective of this document was to bring about changes in the movement of people and transport of goods, in both cases emphasising the need to integrate different modes of transport. In the first area, the need to change bad habits, such as the excessive use of private cars, was pointed out, and in the second area, above all, the need to transfer as much transport as possible to ecological means of transport. Furthermore, green solutions for entrepreneurs have been proposed, in line with the objectives of the European Green Deal. The expectations for the transport sector were prepared during the crisis caused by the coronavirus pandemic. Therefore, in parallel with measures to strengthen a sustainable and competitive market, certain solutions were included to increase resilience to future difficulties arising in the transport market

Aim and methodology of the study

The aim of the research presented in this paper was to prepare an analysis of the most important documents influencing the EU climate policy and, on this basis, to indicate the most important elements, which should be included in analogous documents prepared at the national level. As these works are yet to be implemented, they haven't been compared to current scientifical researches (presumed as more teoretical) and thus one will find no references to those whatsoever.

The objective was achieved on two levels. On the one hand, by means of a critical review of documents related to the protection of the natural environment, pollutant emissions and climate change, and on the other, by confronting EU recommendations with trends currently observed in the transport sector in Poland.

In order to make the presented content clear and useful for future research, the most important documents were selected from a wide range of materials and described in detail. They were those that most closely corresponded to the current national transport problems and, at the same time, those that best characterised the subsequent stages of the evolution of the EU climate policy.

Results of the review and analysis

Since the beginning of the 21st century, a number of global and European documents have been prepared with the aim of convincing and committing individual governments to a systemic reduction in the environmental impact of the economy. Subsequent studies increasingly emphasised the need to correct the existing development policy also in the transport sector, including a gradual shift of emphasis from the doctrines of development through infrastructure to sustainable transport and demand management [Majewski 2016]. The recommendations formulated during this period focused on reducing negative external

impact, including emissions of greenhouse gases and other pollutants. The following studies were key in this respect:

- The Kyoto Protocol, adopted by the Conference of the Parties to the United Nations Framework Convention in 1997,
- The Paris Agreement [Official Journal.., 2016], adopted by the 2015 Conference of the Parties to the United Nations Framework Convention on Climate Change,
- A package of EU regulations, including the Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe and the Clean Energy for All Europeans package, elements of which entered into force in 2018 and 2019 [European Comission 2019a],
- The European Green Deal, adopted by the European Commission in 2019 [European Commission 2019b],
- European Climate Law, which entered into force in 2021.

Kyoto Protocol

The Kyoto Protocol to the United Nations Framework Convention on Climate Change [2008] was published in 1997. Due to the fact that it laid the foundations for the modern approach to emission reductions, and at the same time was finally ratified and entered into force in 2005, hence the authors assumed that it would open this analysis.

The authors of the Kyoto Protocol focused primarily on limiting carbon dioxide emissions as the main cause of global warming. The countries accepting the assumptions of the Protocol undertook to reduce the level of greenhouse gas emissions, including CO_2, from their economies and declared a number of actions aimed at reducing the climate warming. The key environmental policy tools to achieve this included: researching, supporting, developing and increasing the use of renewable energy sources, carbon capture technologies, and eliminating tax incentives in sectors that emit greenhouse gases. In the case of transport, the need to take measures to reduce greenhouse gas emissions was emphasised.

It was also agreed that the parties to the Protocol would prepare and implement national and regional programmes to mitigate climate change. The measures to be taken in this respect were also indicated in relation to the transport sector, although they were rather brief and did not refer to the need to develop low-carbon modes of transport while reducing road traffic.

The Kyoto Protocol is considered one of the main international agreements that define the task of improving environmental quality and counteracting climate change in a concrete, unambiguous and effective way. The Doha Amendment [Official Journal..., 2015] to the Kyoto Protocol set a legally binding target for 2013–2020 for EU countries to reduce their greenhouse gas emissions by 20% with respect to the base year. The measures that were necessary for the EU and its Member States to meet their commitments in this respect were introduced in the Climate and Energy Package until 2020. The document also has a practical dimension, because, based on its findings, Poland has met its targets, reducing its greenhouse gas emissions by 30% between 2008 and 2012, compared to the base year of 1988.

Paris Agreement

The aftermath of the Kyoto Protocol was the subsequent meetings within the framework of the United Nations Conference. These served to update and discuss the continuation of global environmental action. At one of the meetings held in Paris in 2015, a pact was agreed, which, according to the European Commission, became "the first ever universal, legally binding agreement on climate" [European Commission]. The Paris Agreement was signed by almost 190 countries. It was ratified in 2016 by 55 countries generating 55% of global greenhouse gas emissions. In this document, combating climate change has been approached differently than in the other documents analysed. The main objective is not to reduce emissions, but the average global temperature. It was assumed to decrease it to a level of 2°C above the pre-industrial level and to make efforts to limit this level to 1.5°C, recognising that this would significantly reduce the risks associated with climate change and its consequences [Olkuski et al. 2017].

The general assumption of the Paris Agreement is international and interregional cooperation, consisting mainly of support from richer countries to developing countries, including financial assistance provided for this purpose. It is also the first document of its kind to recognise the very significant impact of urban areas on global climate change. There were no direct references to transport in the Paris Agreement, despite the high awareness of the direct and strong links between this sector of the economy and the global rise in average temperatures.

Package of EU directives and regulations

The EU directives and regulations which define the directions of European environmental policy and oblige EU members to reduce emissions also set guidelines for national legislation. The basis for the air protection system is Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (often referred to as the CAFE Directive). It regulates air pollution from particulate matter (PM2.5, PM10), nitrogen oxides, sulphur dioxide, benzene, lead, ozone and carbon monoxide. It is complemented by Directive 2004/107/EC on arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. Directive 2008/50/EC defines the basic concepts of air protection, requires air quality to be measured, specifies the minimum number of measuring stations and sets air quality standards in the form of limit values for the concentrations of individual substances which are binding throughout the EU.

Growing public pressure and the escalating consequences of climate change resulted in the entry into force of the "Clean Energy for All Europeans" package in 2018–2019, which included directives and regulations that implement the idea of an energy union. As part of the energy and climate package, solutions for reducing greenhouse gas emissions within the European Union and the emissions trading system (EU ETS) were introduced into EU legislation [European Environment 2019a, b]. However, these regulations did not cover all sectors, leaving out, among others, transport, agriculture, the municipal and household sector and waste management. EU legislation has regulated this area and imposed emission reduction targets on Member States, divided into two settlement periods 2013–2020 and 2021–2030.

Table 1: The legal acts that make up the energy and climate change package "Clean Energy for All Europeans"
Tabela 1. Akty prawne składające się na pakiet energetyczno-klimatyczny „Czysta energia dla wszystkich Europejczyków"

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 – Summary report, p. 11.

The set of directives and regulations subordinated to the principle of maximising energy efficiency covers the entire energy chain from generation, through transmission, distribution, to final consumption. The objectives defined as the next steps in climate protection include: reducing greenhouse gas emissions, improving air quality, improving the health of the population. The energy union also assumes the introduction of ten-year integrated national energy and climate plans. The first of these cover the period 2021–2030.

Two of the five targets set out in the document, i.e. energy efficiency and decarbonisation of the economy (systematic reduction of carbon emissions until they are completely eliminated), are closely related to transportation. In addition, the "Clean Energy for All Europeans", which is part of the package [Directive 2018/2001] establishes rules for the use of energy from renewable sources also in the transport sector and sets out rules for greenhouse gas emission reduction for biofuels.

European Green Deal

The most recent European strategic environmental document is the European Green Deal, which is the concept of the European Green Deal for climate and environment and for achieving climate neutrality in Europe. The key ideas covered by the document:

- development of renewable energy sources (RES) and phasing out of coal-based energy sources, as well as measures to promote green energy,
- further reduction of CO_2 (over 50% by 2030), including reduction of emissions from the transport sector by 90% by 2050,
- development of emission trading system, support for ecological products and services, financial aid for countries most exposed to negative effects of decarbonisation processes,
- financing pro-environmental goals, including reduction of ecological poverty.

The development directions defined in the European Green Deal are relevant for the entire continent, also for Poland, where the actual efficiency of power plants is between 30% and 50% [Kasztelewicz and Patyk 2015], while the coal mined in the country is expensive and of low quality. As a result, domestic demand is supplemented by imports, generating additional transport needs, which cause further excess emissions.

From Poland's perspective, the most important task of the new strategy will be to phase out coal-fired power plants, which are the primary source of electricity used in the country. No less important will be a thorough change in transport policy, which currently differs significantly from the directions set out in EU documents.

European Climate Law

The European Green Deal strategy lays the foundations for a new European law promoting the pursuit of improved environmental quality and a significant reduction in human impact on the climate. The legally binding goal of climate neutrality by 2050 and reduction of greenhouse gas emissions by 2030 was enforced in the Regulation of the European Parliament and of the Council (EU) of 30 June 2021 establishing a framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 [Regulation (EU) 2021/1119 L 243/1].

Another step towards the implementation of the European Green Deal strategy is the "Fit for 55" package, which aims to adapt EU regulations to the requirements of the European Climate Law. The package, once approved by the European Parliament and the European Council, will be the main tool to achieve the goals of reducing emissions by at least 55% by 2030 and achieving climate neutrality by 2050. They are intended to be fair and socially equitable, to maintain and enhance innovation and competitiveness of EU industry, to ensure a level playing field with third country operators and to support the EU's leadership in the global fight against climate change. The package includes, among others, legislative proposals and policy initiatives related to the energy and transport sectors, i.e.:

- revision of the Effort Sharing Regulation concerning Member States' reduction targets in sectors not covered by the EU ETS;
- the extension of the EU ETS to emissions from maritime transport;

- the Fuel EU Maritime initiative for a green European maritime space;
- the revision of legislation on aviation emissions;
- the ReFuelEU aviation initiative on sustainable aviation fuels;
- the establishment of a separate emissions trading scheme for road transport;
- the revision of the regulation setting CO2 emission standards for cars and vans;
- the revision of the directive on the development of alternative fuels infrastructure;
- the revision of the directive on renewable energy sources;
- the restatement of the Energy Efficiency Directive;
- the review of the Energy Taxation Directive.

It should be noted that the concept of the European Green Deal includes the broadest references to transport issues among the documents analysed in this paper. What is more, the document contains a declaration concerning the preparation of a detailed plan of changes in the transport sector, assuming the reduction of emissions in the sector by 90% by 2050. This can be achieved by including road transport in the European CO_2 emission allowance trading system. This will make European transport low-carbon and multimodal. The integration of different modes of passenger and freight transport is to ensure availability and high efficiency of services at both national and international level. Increasingly stringent emission standards are to apply to all combustion engine vehicles. In addition, there are plans to universalize and improve the execution efficiency of the road toll system. A special place in the system is to be occupied by the railways, which, thanks to several times lower emissions, are to take over traffic from the roads and aviation.

The EU recommendations versus the reality of the Polish transport sector

It may be observed in the documents discussed that all the provisions relating to individual elements of the transport system are becoming increasingly detailed. This is all the more important given that as recently as the late 1990s, issues concerning transport policy were either omitted or given a secondary position. Transport issues gained in importance in subsequent periods, but still gave way to sectoral issues - especially those relating to industry. This is mainly due to the scale of the pollution from industry and utilities observed at that time.

The European transport sector accounts for 5% of EU GDP and more than 10 million jobs (Eurostat). It is also crucial to virtually all businesses and global supply chains. At the same time, it exposes society to serious costs resulting from 28% of greenhouse gas emissions and pollution, as well as noise, road accidents and congestion. The scale of these risks is large, and emissions alone account for about a quarter of total EU greenhouse gas emissions. In Poland, these disproportions are more pronounced. The "transport and storage management" segment accounts for 6.6% of GDP and ranks third, after energy and industry, in greenhouse gas emissions (15% of total emissions of all gases) [GUS 2021a].

In recent years, improving air quality has become a political issue due to growing public expectations. Of the three main groups of sources of air pollutant emissions, transport emissions are currently the least regulated. Their share in total pollution emissions is steadily

increasing, which is particularly noticeable in the largest agglomerations and in city centres with high-density housing.

The identification of problems and preparation of documents defining the expected changes in prove to be insufficient in the case of transport. Regrettably, the strategies for reducing the impact of the transport sector on the environment described in international and national documents fall short of reality. In 2017, the four modes of transport accounted for almost a quarter of all greenhouse gas emissions in the EU (road transport alone was responsible for 20%). It was the only sector of the economy where GHG emissions were higher than in 1990 and rising, despite efforts to reduce them [Wiśniewski 2020].

Reversing the increase in the emissions trend, as recommended by the EU and promoting low-carbon energy sources, is therefore a great challenge. Increasing the EU reduction target to – 55% in 2030 means that emissions in the non-ETS sector, which includes transport, must be reduced not by 7 but by 16%. At the same time, the European Green Deal sets a completely new target of reducing transport-related greenhouse gas emissions by 90% by 2050.

The dominance of road transport means very high environmental impact indicators. This problem is aggravated by the very high age of cars and thus the widespread low emission standards. Disparities in the distribution of transport tasks can be seen in virtually all market segments, but the most extreme example is freight transport. Railway transport remains quite constant at around 50 billion tkm per year, while road transport is growing dynamically. As a result, the rail's share in the transport market has halved from 28% to around 14% [GUS 2021b].

Summary and conclusions

Base on the review of key strategies prepared at the EU level or in international structures in which the European Union countries actively participate, the importance of natural environment and climate is growing steadily. These areas are becoming increasingly interdisciplinary in nature and also determine the directions and forms of socio-economic development. This trend is very clear in the case of transport, all the more so as this sector cannot demonstrate pollution reduction comparable to that observed in other sectors of the economy. Moreover, emissions from transport activities are becoming one of the key barriers to achieving the EC's climate objectives. The trends described are confirmed by scientific research [e.g. Pawłowska 2018, Domagała and Górecka 2019, Zych-Lewandowska 2020, Zych-Lewandowska et al. 2020, Domagała and Zych-Lewandowska 2021] and also by the extensive transport and infrastructure components of expansion programmes, socio-economic activation and, more recently, recovery from the post-pandemic crisis initiatives.

Reversing the growth of the emissions trend, as recommended by the EU, in favour of low-carbon energy sources is therefore an enormous challenge. If Europe is to be a climate-neutral continent, a change in transport policy is inevitable. It is not enough to change power systems in individual branches and introduce alternative fuels. Change means reviewing and

remodelling the distribution of transport tasks, renewing the fleet, both private and that operated by public authorities and companies. It requires digitalisation, automation, and the preparation of innovative mobility and freight platforms.

In order to reduce the harmful effects of transport on our health and the environment, the widest possible range of organisational and technological solutions should be applied. The key change should be to develop the economy and social relations in such a way as to reduce the demand for transport. The next step is to minimise external costs by exploiting the potential resulting from the reallocation of transport tasks and giving preference to non-motorised forms of transport, followed by rail transport and other low-emission transport modes.

Importantly, past experience shows that the reason for failure in reducing environmental impacts has not been lack of knowledge or availability of instruments, but insufficient consistency and ineffectiveness of transport policy. The analysis of market development trends shows that actions at each level – national and regional – are of key importance. In practice, this is where specific actions are implemented, which may change both the level of demand for transport and its structure. Thus, they should be the main area for the implementation of key EU recommendations.

In this paper, the authors analysed international documents on environmental and climate protection and their links with transport. The second stage of the research was the analysis of Polish studies in this field and their connections with EU documents as well as their quality. The results of this analysis will be presented in the subsequent article. A continuation of our research is scheduled in order to meticulously analyze a real influence the implemented strategies and directives might have on the transportation market, as well as the way it affects population and environment. These tests are to estimate a selected range of indicators pointing out the negative external effects transport could have, such as CO_2 emissions, pollution and noise. The results are to be presented in the articles yet to be published, where one will also find further recommendations for administration, business and individuals as to how to properly counteract above mentioned externalities in the future.

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