

Wrocław 2050

WRO 2050

Multi-Domain Scenarios for the Future



Dear Sirs and Madams,

over the past two years, the invisible virus has put many healthcare systems to a test, disrupted supply chains and caused the collapse of many thriving businesses. It has, in a sense, forced each of us to step outside our comfort zone, look ahead and seek answers to very fundamental questions – including what the post-pandemic world will look like, and what position we and our city will hold in it.

The recent two years have also boosted our patriotism and local identity. Being a sociologist, I am familiar with this phenomenon – the unification of a community in a moment of a common threat. Wrocław has emerged from this crisis stronger than before, from the social perspective. This is a great asset of our city – the hard-to-measure spirit of interpersonal solidarity and a strong bond with the city, regarded as a common resource, are qualities essential for surviving in the turmoil of the future.

As we stand here and now, on the threshold of 2022 we know that the future can take many forms. We want to explore them, learn their consequences, and equip ourselves and the city of Wrocław for the various possibilities to which the world will lead us. We can influence some of them. I believe that the knowledge of what might happen will allow us to face what is still unknown.

The scenarios for the development of Wrocław in the 2050 perspective, drawn up in cooperation with 4CF, are our first attempt to look into such a distant future. 30 years is a long time, more than one generation, but we are already deciding what Wrocław will look like in three decades. Let's take a look at the different versions of this distant world so that we can decide which one we wish to live in. With the awareness of the objective and with this imagination, we will be able to make the right decisions more easily. I invite you to read on.



JACEK SUTRYK
Mayor of Wrocław

Jacek Sutryk

Wrocław 2050

WRO 2050

**Multi-Domain
Scenarios
for the Future**

CONTENTS

Introduction **7**

Management summary **8**

Scenario creation process **10**

Scenarios for the surroundings of Wrocław 2050 **15**

SCENARIO 1 **Strong state 17**

International and domestic environment of Wrocław **19**

Wrocław and other cities in 2050 **31**

A day in the life of a strong state **36**

SCENARIO 2 **Hostages of the economy 39**

International and domestic environment of Wrocław **41**

Wrocław and other cities in 2050 **51**

A day in the life in a crisis **56**

SCENARIO 3	Slow life	59
	International and domestic environment of Wrocław	61
	Wrocław and other cities in 2050	71
	A day of peaceful life	76
SCENARIO 4	Technological expansion	79
	International and domestic environment of Wrocław	81
	Wrocław and other cities in 2050	89
	A day in the life in a high-technology world	94
	Wild cards 2050	96
	What next?	102
	Bibliography	103
	About the report	106
	Expert biographies	107

INTRODUCTION

As we present this report, which is the outcome of many months of work by the 4CF team in cooperation with the Strategy Office and a number of experts on various aspects from Wrocław and beyond, I am convinced that it reliably describes the challenges of the coming thirty years regarding the social, economic and spatial development of Wrocław and its metropolitan area in four future scenarios.

To achieve this goal, we have included a multitude of data, hypotheses, forecasts and even 4 short science fiction stories in the report. Some readers may be surprised by the breadth of the context and the size of the strategic landscape in which the report sets the Wrocław of the future. This is, however, necessary, since the aim of the report is to identify the areas in which the city should be involved in order to support the long-term development of Wrocław's self-sufficiency and resilience. The globalised world of dense connections and complex strategic flows is perhaps not a daily concern of the city's authorities, the task of which is to respond to the needs of the local community in a timely, effective and fair manner. Yet, whenever the time comes to redefine the strategic objectives, the basic directions of development and to discuss territorial development at the metropolitan level, it becomes essential to get reliable and structured knowledge on the realistic directions of changes in the environment.

The complexity and the surprising nature of the changes that shape our era were once described as the 'butterfly effect', a metaphor borrowed from meteorology to describe complex systems – such as the weather system. As the metaphor goes, the beating of a butterfly's wings at one end of the world introduces a certain amount of energy into the atmosphere which, when added together with other influences, can cause a hurricane at the other end of the world. Today, in 2021, while we are still struggling with the SARS-COV-2 virus pandemic, one might be tempted to use one more metaphor – the 'bat effect', according to which mundane events in an Asian bazaar may, after a couple of months, affect the lives of everyone on the planet, often in a dramatic way. Although it is not possible to consider the full spectrum of possible micro-changes in every corner of the globe in the management strategy of a city, we should at least attempt to organise the possible directions of development in those places, sectors and communities, the evolution of which influences – through long but explainable chains of cause-effect connections – the living conditions, the competitive environment and the space of freedom of Wrocław's citizens, companies and social organisations.

I invite you to such a journey into the future and I believe that our report will be a guide on the path to shaping plans, strategies and setting long-term goals not only for the city's institutions, but also for a large group of Wrocław citizens, who have been entrusted with strategic tasks in social organizations, institutions and state-owned and enterprises – those who contribute to the future of Wrocław every day.



KACPER NOSARZEWSKI
Partner – 4CF

MANAGEMENT SUMMARY

The scenario project for Wrocław was implemented from June to October 2021. In six consecutive stages, sources of data on trends and changes in Wrocław's surroundings were identified, uncertainties regarding the year 2050 were identified and classified, and those of key importance for Wrocław were pinpointed. Based on their possible future statuses, the framework of scenarios was constructed, and their storylines were narrated.

As a result, four scenarios of Wrocław's surroundings for 2050 were created. They can serve as a map of the city's future – a valuable tool supporting the process of creating Wrocław's strategy.

The 'Strong State' scenario describes a Poland, the system of which bears the hallmarks of soft authoritarianism. In this scenario, the key sectors of the Polish economy are nationalised, but they operate effectively due to advanced automation and production optimization using artificial intelligence algorithms. Cities in the 'strong state' scenario were almost completely deprived of their autonomy. Their strategies are shaped at the central level, and their current tasks are coordinated by a centralised smart city system called 'Miasta'. The country's society is ageing, and, despite the automation, there is a shortage of labour.

In the 'Hostages of the economy' scenario, the world faces an economic, social and climate crisis. This crisis is a consequence of the slowdown in transformation processes worldwide undertaken to rescue the economy after the turmoil of the SARS-COV-2 pandemic in the early 2020s. In this scenario, Poland is affected by the effects of climate change, faces massive economic inequalities and social tensions between the local population and migrants. Cities have a great deal of autonomy, but with this come great challenges and responsibilities. Due to the high level of inequality at the regional level, local government units are competing with each other for residents and entrepreneurs to ensure an adequate level of revenue for their budgets.

The 'Slow Life' scenario presents a world in which far-reaching changes have taken place in society and the economy. In particular, the ecological awareness of societies and the will to carry out energy and system transformation has increased. In this scenario, the economy is no longer subordinated to simple economic growth, but to sustainable development, with due regard for environmental constraints and the possibility of safeguarding the existence of future generations. In this scenario, Polish cities are green and peaceful. The working day has been shortened and interpersonal relationships and quality of life have become more important.

Finally, the scenario of 'Technological Expansion' describes a world in which technological development rescues humanity from its oppression like a knight on a white horse. It is a world where technologies are developed to achieve climate

neutrality while maintaining a high level of consumption. Automation has covered most areas of life in this world, while artificial intelligence helps not only in simple tasks, but also in managing the state and local government units, facilitating social participation and collective decision-making.

In addition to the four scenarios, there is also a description of ten 'wild cards', i.e. events that are so unlikely that they are not included in the scenarios, but with such a high potential impact on Wrocław that they should not be forgotten. The identified and described 'wild cards' include: halting of climate change progress, surprisingly low and very fast global demographic growth, stagnation of technological progress and Poland finding itself outside the European Union.

SCENARIO CREATION PROCESS

The objective of the foresight study commissioned by the Wrocław Municipal Office was to identify four future scenarios which would serve the purpose of developing a city strategy, a spatial development study and a supra-regional development strategy with a perspective towards 2050. The scenarios were intended to serve as a tool for realistic and ambitious formulation of the city's strategic objectives and selection of effective tools for their implementation, therefore they should have outlined a map of the future illustrating the conditions of the environment, in which Wrocław will be immersed 30 years from now. To ensure a high level of usability, this map should cover the widest possible spectrum of likely future developments. In other words, it should take into account possible options for all uncertainties which have a significant impact on the urban planning area. Scenarios describing the mapped futures should differ significantly from each other, have a similar degree of implementation probability and be internally consistent. The process leading to the achievement of these objectives was implemented in six stages, as described below.

1

STAGE 1 Identifying data sources

This step involved identifying the data sources from which information on the drivers of change and uncertainty in Wrocław's environment was drawn in subsequent stages. In particular, experts on the topic were invited to the study and research texts were selected and analysed in the course of literature studies.

The list of invited experts was determined in cooperation with the Municipal Office. The following individuals participated in the study: Adam Czerniak, PhD, Kornelia Kwiecińska, PhD, Wojciech Kazanecki, PhD, Jarosław Tworóg, PhD engineer, Joanna Erbel, Marek Wiland, msc engineer of architecture, Kamila Kamińska-Sztark, PhD, Magdalena Florek, PhD, professor of the Poznań University of Economics and prof. Janusz Zaleski.

While identifying the data sources, special care was taken to cover the thematic areas identified by the Ordering Party as particularly relevant.

These included issues concerning social and generational change, entrepreneurship, city financing and image development.

Literature sources were collected in a way which enables the analysis of environmental factors on three levels: global (analysis of megatrends), macro (analysis of [geo] political, economic, social and demographic, technological, ecological, legal and systemic factors) and micro (analysis of factors specific to cities). A full list of identified and used sources is included in the bibliography.

2

STAGE 2

Identifying uncertainties in the surroundings of Wrocław

In the second stage of the study, variables with a potentially high impact on Wrocław's management were identified in the environment (global, macro and micro) using the previously selected literature sources. Thereafter, the hypothetical states (variants) of these variables in 2050 were identified and the probabilities with which they would adopt them were preliminarily estimated. In the analysis, variables were initially assigned states resulting from continuation of current trends or cycles. Early signals of change indicating the possibility of disruptive (disturbing) phenomena for these trends and cycles, thus influencing the final state of the variable in 2050, were successively identified.

3

STAGE 3

Classification of uncertainties

The objective of stage 3 was to organise, structure and integrate the knowledge acquired in the course of the literature study in order to formulate the Delphi theses, which were used in the next step. When classifying the variables, the level of analysis and the subject area to which they were assigned were verified, and the territorial range to which they applied (worldwide, Europe, Poland, Lower Silesia) was determined. Relationships between variables at different levels and in geographical areas were also pre-specified in order to merge identical claims or to exclude contradictory claims. Additionally, the previously assigned probabilities were revised by taking into account key cross impacts. Further, the variables with extremely low and extremely high probabilities (extremely unlikely and extremely highly likely) were discarded. They later became the basis for defining the list of 'wild cards'.

4

STAGE 4

Identifying key uncertainties

The purpose of the fourth stage of the study was to verify the probability of realisation of certain variable states and to exclude from further analysis those variables which will not have a significant impact on the management of the city. For this purpose, the Delphi method was used, which promotes developing a common expert position based on informed discussion and the strength of arguments supporting the opinions of individual participants in the study.


WHAT IS THE DELPHI METHOD?

The Delphi method, developed in the 1950s and 1960s in the United States by the Air Force think tank, RAND Corporation, for the purpose of assessing the situation by decision-making and analytical military centers, is one of the basic tools of strategic foresight and modern strategic management. It is used by expert groups to reach a common view on analysed issues in a short period of time. In order to protect the results of the study from distortion by psychological, rhetorical and sociological factors which usually play a negative role in collective discussions (e.g. in the expert panel method), the Delphi method requires that the experts remain anonymous during the study.

The high degree of flexibility of the Delphi method makes it useful wherever consensus is sought within an expert group, however, it is mainly used in projects aimed at assessing the direction of future developments. Given this, it is hardly surprising that the Delphi method has been used in secret U. S. Air Force projects to develop consensus among high-ranking officers, scientists, civilian experts, and policy-makers. Since then, it has also proven effective in thousands of civil projects, including educa-

tion, technological development, spatial planning, protection of natural resources or regional development planning.

In its most classical formulation, the Delphi method is implemented in rounds. In the first round, an expert panel is asked to evaluate each of a set of several statements (Delphi hypotheses) against a set of measures (usually probability and impact on the area under the study). The experts who give the most extreme answers are also asked to argue for their position and explain their assessment in a short commentary. In the second round, the experts again evaluate the same hypotheses, supplemented by the survey organisers with the arithmetic mean of the values of the factors given in the previous round and anonymised comments from other survey participants. Having reviewed these justifications, the experts re-evaluate the Delphi hypotheses, which gives them the opportunity to revise and modify their previous answer. If a given expert's answer regarding the size of a particular factor differs significantly from the average (which is considered to be a kind of consensus), they are additionally informed about it and asked again to justify their answer with a comment, and to refer to the comments of other participants. Depending on the available resources, the study may end after the second round or be conducted for subsequent rounds until a satisfactory consensus is reached.



The project for the Municipality of Wrocław included a survey according to the RT Delphi method (Delphi in real time) using the Halnyx Delphi survey platform belonging to the 4CF. The real-time survey, in contrast to the traditional Delphi method, lacks roundness. This was replaced by the option for the participants to log in to the study multiple times from anywhere and at any time. As they logged in, the participants were alerted by the system whenever their answers differed significantly from the group average, and were encouraged to explain their judgement or change it under the influence of the arguments of others. Similarly to the traditional Delphi method, the study was conducted under single-blind conditions (its participants remained anonymous to each other). Each of the experts was asked to evaluate and substantiate the evaluation of the Delphi theses formulated based on a previously prepared list of classified uncertainties. Everyone evaluated exactly the same theses, attributing to each of them the probability of their occurrence in 2050 and the power of their influence on Wrocław, and supporting their position in the commentary. In the course of the study, the activity of individual experts was monitored and they were encouraged to log in again and refer to the opinions of others.

An analysis of the survey results resulted in a final list of key uncertainties, obtained by removing uncertainties considered by the experts to be of low relevance to the city and by shifting uncertainties with extremely low or high probability to 'wild card' groups and to factors to be included in each scenario, respectively. The final list was used to develop the scenarios for Wrocław in the 2050 perspective.

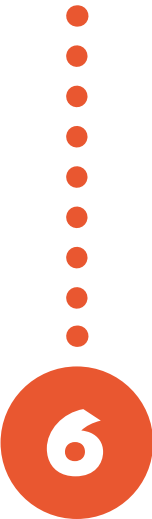
5

STAGE 5 Developing the scenarios

In order to produce internally consistent and significantly different scenarios, it was necessary to determine whether the different variants of each uncertainty were likely to combine with high or low probability and to group them so that they formed clusters of events with the highest probability of co-occurrence. Therefore, at the fifth stage of the process, each of the uncertainties identified in the Delphi study was assigned the remaining possible states (variants)* of it from the future, after which the correlation coefficients between all variants for all key uncertainties were indicated in a qualitative manner.

A modification of the statistical method of diagraphic clustering was used to identify clusters of future states. The statistical correlation matrix was replaced by a correlation matrix of uncertainty variants obtained in

* Possible states of a particular variable included the state which was the subject of the Delphi thesis and the opposite state(s).
For instance, for the Delphi thesis, which reads "In 2050, autonomous vehicles are widespread in Europe", the uncertainty options analysed in stage five were:
– In 2050, autonomous vehicles are widespread in Europe;
– Autonomous vehicles have not become widespread in Europe by 2050.



a qualitative way by the analysts based on predefined correlations and causal arguments given by the experts in the Delphi survey comments (with a preference for comments from experts in the particular subject area under study).

This stage produced four lists of co-occurring variants of uncertainty defining the initial assumptions of four future scenarios for Wrocław 2050.

STAGE 6

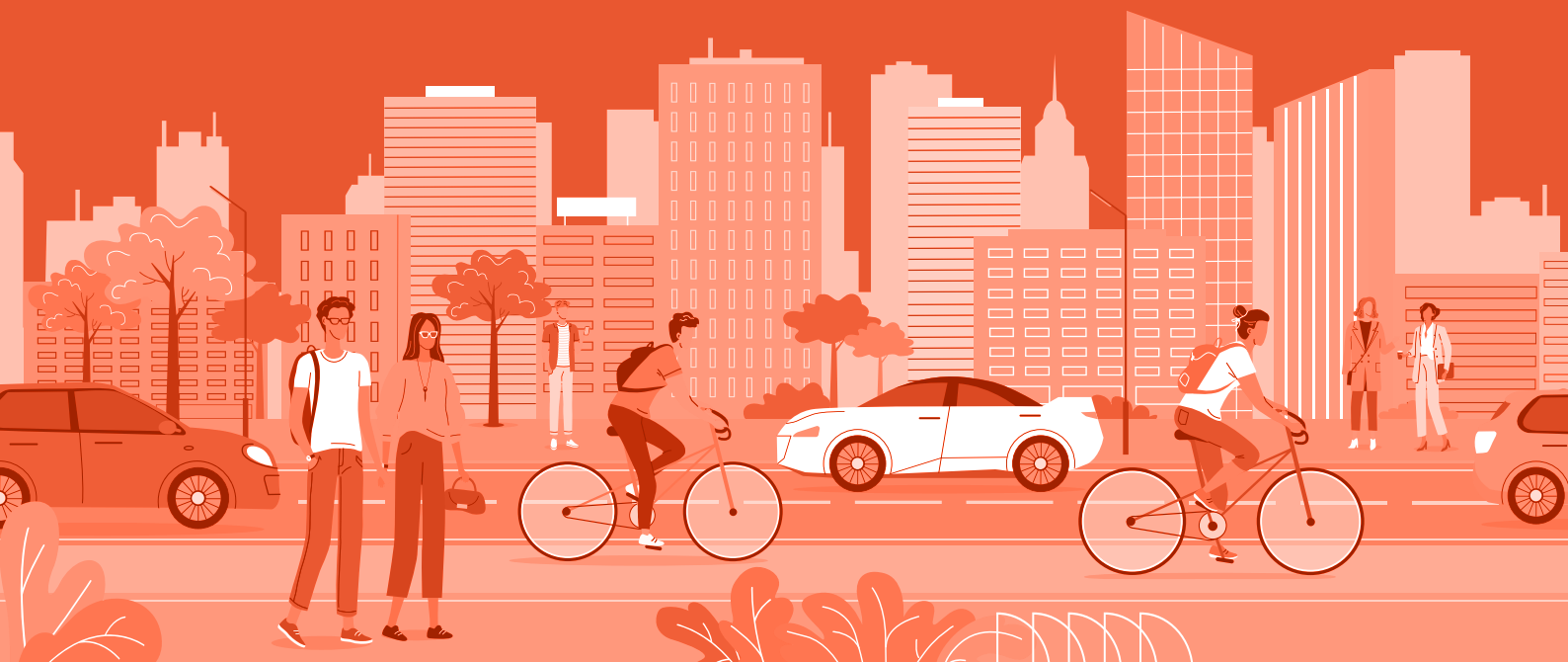
Fictionalizing the scenarios

In the course of the last stage of scenario development, the initial assumptions defining their framework were expanded with a description of mutual interdependencies of their components and cause-and-effect sequences, which would lead to the situation described by them in 2050. Additionally, in order to complete the picture of the world, the description of the scenarios has been supplemented with additional issues of interest to the Ordering Party that are consistent with the framework.

Afterwards, the content of the scenarios was presented to the experts, who evaluated it from a content-related perspective and raised their comments and objections. These comments were marked on the scenarios. Where there was a contradiction between the comments of different experts, the comment of the expert who was more strongly related to the relevant subject was decisive.

Finally, in order to make the content of the scenarios more understandable to the citizens of Wrocław, issues concerning Polish cities were presented from the perspective of Wrocław, assuming that its policy until 2050 will not differ substantially from the strategies pursued in the scenarios by other cities. Additionally, in order to make it easier for the audience to feel the vibe of the scenarios, a short story was prepared for each of them, describing one day in the life of a resident of Wrocław in 2050. The effects of these works are presented in the next chapter.

Scenarios for the surroundings of **Wrocław** **2050**





Strong state

SCENARIO 1

IT IS THE YEAR 2050. The problems arising from the climate crisis and periodic outbreaks of infectious disease pandemics have forced the EU countries to gradually restrict civil liberties. In most of the Member States power has been strongly centralised and selected countries in Central and Eastern Europe, including Poland, have shifted towards soft authoritarian rule. The competences of local governments in the country have been severely limited and narrowed down to the implementation of only basic administrative tasks. Compared to other countries, Poland stands out with a relatively high degree of nationalization of key sectors of the economy and compliance with the absolute minimum of obligations and requirements set by the international environment. The economy is relatively efficient due to a high degree of automation and digital optimisation of production. Poland has almost full employment and there is a growing problem of labour shortage. Yet, we consistently refuse to accept migrants and to fully transition away from the use of coal in power generation. The quality of life in Polish cities is comparable to 2021. The troublesome consequences of climate change are balanced by adaptation measures undertaken by the state, a sense of basic social security and a high degree of automation in many areas of life.

INTERNATIONAL AND DOMESTIC ENVIRONMENT OF WROCLAW

POLITICS



1. Further trade and digital wars occurred between China and the us over the period from 2021 to 2050. The two countries attacked each other’s key IT systems. Other countries and regions of the world were indirectly victims of these wars due to collapsing supply chains.
2. At the same time, India’s economic and political power grew undisturbed. The political importance of the weakening European Union has diminished.
3. In 2050, there are three world powers, the impact of which is balanced on the international arena: the USA, China and India.
4. The countries of the world still cooperate at the UN forum.
5. Most global efforts in 2050 are aimed at stopping the ongoing climate change and at reducing its effects, including mitigating humanitarian crises. The measures taken so far have been insufficient.
6. Local armed conflicts break out in the regions of the world most affected by climate change. They frequently take the form of a fight for a place to live, water or food.



1. In the 1920s and 1930s, the number of competency conflicts between EU legislation and regulations in individual Member States was growing. This applied in particular to the countries of Central and Eastern Europe (Poland, Hungary, Bulgaria, Romania).
2. These conflicts paralyzed proceedings before national courts and resulted in many months of trials and high fines imposed by the CJEU. As a result, many member states, including Poland, began to consider leaving the structures of the European Union.
3. Growing separatist tendencies and the fear of preserving the unity of Europe in the uncertain times of pandemic and climate change prompted European politicians in the 2030s to renegotiate treaties in order to reduce the competences of the EU institutions in favour of national solutions. Thereby, the degree of the European Union’s integration has decreased, and its political power in

relations with third countries has diminished considerably.

4. In the year 2050, the Community law governs fewer areas of life, giving way to the internal laws of the Member States. At present, the most 'restrictive' regulations for all the EU countries are the Community regulations governing environmental protection and the fight against climate change, the necessity for which could no longer be denied.

5. The eurozone countries have retained a number of common regulations that previously spanned the entire Union in order to protect their currency. This has strengthened the division into the EU's 'different speed' zones. In simple terms, we are talking about the strongly integrated West and the loosely connected East,

although the term is somewhat imprecise due to the status of Lithuania and Slovakia, which are still in the euro zone.

6. There are also differences in the political systems of states between the East and the West of the EU.

7. In the countries of Western Europe, the political system has not changed significantly since 2021. They are democratic countries.

8. Central-Eastern Europe has seen a shift towards semi-authoritarian governments (flawed democracy, high levels of centralisation, nationalisation of industry, disruption of the separation of powers), while the Western countries have managed to maintain greater levels of decentralisation and social participation.



1. In 2050 Poland is considered a flawed democracy with authoritarian features. The country holds presidential and parliamentary elections, but due to the weak opposition (there are no conditions for equal opposition activity) they are won by the ruling party on each occasion.

2. The central government in Poland has been strengthened at the expense of local governments since 2021. The level of democracy at the local government level is higher and community representatives often win local elections. However, due to the low level of competence at local government level, they have little scope for action, restricted mostly to decisions of an administrative nature.

3. Compared to 2021 the powers of the uniformed services have increased significantly. At the same time, the state has a great deal of scope for restricting civil liberties because of the legislation in place to facilitate the declaration of states of emergency. Their introduction was justified by the repeated epidemics of infectious diseases and frequent occurrences of natural disasters.

4. The uniformed services have considerable technical and legal powers regarding far-reaching surveillance of citizens, which they often use in practice.

THE ECONOMY



1. Over the period from 2021 to 2050, years of global prosperity were intertwined with prolonged periods of recession. India was the major beneficiary of global growth during that period. The country grew stronger despite the severe setback it faced: high pandemic mortality rates and climate change which severely affected many of its regions. In addition to the trade wars between China and the us generating gaps on the markets that India has successfully filled, India's slow energy transition has also enabled its continued growth. In 2050 fossil fuels still account for over 40 percent of India's energy sources.

2. The negative climate impacts of the slow transformation of India and a few other countries in the world, such as Russia and Brazil, are felt throughout the globe today. Even more so as global energy consumption between 2021 and 2050 has increased by nearly 60 per cent. This increase has been driven by global population growth, the relatively slow development of energy-saving technologies and rising consumption levels in India and China, now home to more than 30 per cent of the world's population.

3. This does not mean, however, that the energy transformation has stopped completely. Change programmes have been successfully implemented in most European Union Member States, Australia and Canada, the United States and parts of South-East Asia. The decline in global demand for crude oil caused by the ongoing transformation caused a significant deterioration in the economic situation of the countries which have so far benefited from the sale of this commodity.

4. Since 2021 work automation has progressed with the development of digital technologies, robotics and artificial intelligence. More than 40 percent of human jobs in 2021 have been automated. Automation mainly affected jobs in industry, including the food industry, transport and trade. Some 'white-collar' jobs, such as translation and simple analytical work, have also been automated. Specialized artificial intelligence algorithms have replaced lower-level positions in the financial sector. The disappearing professions were replaced by new ones, including operation and supervision of autonomous systems and robotic devices.



1. The EU economy is relatively stable compared to other regions of the world. Compared to 2021, it has recorded a moderate increase.

2. At the same time, economic inequalities among the population have increased in the euro zone countries. There were essentially two causes for this: the problem of unemployment and the large number of accepted climate migrants who, unable to find employment, accepted low-

paid jobs, and the growing capital income of owners of autonomous technologies, which was not adequately offset by tax and social policies.

3. The continent has seen a re-industrialization of the economy forced by the rising costs of outsourcing, broken supply chains due to pandemics and trade wars between the USA and China. New European manufacturing companies are highly

automated and almost maintenance-free (operating in the spirit of industry 4.0).

4. Autonomous systems for industry and transport are the main export commodity and strength of the European Union' economy, in addition to green technologies, in 2050. India is their most important external recipient, but they also feed the internal market.

5. With the increasing automation and due to periodic infectious disease pandemics, e-commerce has developed and remote work has gained popularity. The society is slowly getting used to the need to increase social distance. Remote activity has reduced the economy's sensitivity to further constraints resulting from pandemics. Moreover, advances in digital

technologies have made remote work more attractive and less psychologically burdensome. Consequently, the share of e-commerce in retail now exceeds 75 percent, and the overwhelming majority of Europeans work remotely.

6. The popularization of remote work was a major challenge for large European cities such as Wrocław. This is because it required a shift in priorities. On the one hand, it was necessary to provide city dwellers with proper working conditions – be it adapting the requirements for residential space and its surroundings or creating co-working offices located in residential districts. On the other hand, urban transport, which has so far been one of the main concerns of local authorities, has lost its importance.



1. The Polish economy is marked by a high degree of nationalisation. Mostly strategic sectors of the economy have been nationalised, including mainly the following industries: food processing, production of pharmaceuticals, production of metals and metal products, production of computers and electrical equipment, production and distribution of energy and design of applications for autonomous systems.

2. Regardless of the nationalized industries, there is also private business in the country. Predominantly, in the field of services provided to the public.

3. Similarly to other European countries, Poland saw a reindustrialisation, but most of the newly opened industrial plants were owned not by private capital, but, directly or indirectly, by the State Treasury. Exports of goods produced by them feed the Polish budget today.

4. The bleak predictions of a centrally planned deficit economy have not proven to be true. In 2050 the State Treasury

uses optimization solutions applied by commercial entities. Using the analysis of large data sets and the planning and optimisation of production by artificial intelligence algorithms, the nationalised industry is achieving surprisingly good results.

5. The Polish economy stands out among the economies of other EU countries, especially those in the eurozone, with its relatively low degree of economic inequality. As it is mainly the state, rather than private entities, that owns autonomous technologies in Poland, the capital income of the population has not increased significantly.

6. Poland did not accept climate migrants. Due to xenophobic sentiments in the country and concerns about the safety of people coming to Europe, other EU countries have not pressed our country in this regard.

7. Therefore, Poland is one of the few EU countries that maintains almost full

employment in the economy and a low level of economic inequalities.

8. On the other hand, economic inequality is fostered in Poland by relatively low pensions. In spite of the ageing population and the shortage of labour, the retirement age in Poland is only 65 for men and women alike. Retirement at this age is associated with a low monthly pension. Therefore, the vast majority of people reaching the retirement age decide to stay on the labor market longer – if their health permits, even up to the age of eighty.

9. Faced by the challenges of the impact of climate change, the state supports agricultural production. In Poland, in addition to crop production, it is mainly

the breeding of insects for food and feed purposes. Poland is one of the European leaders in this domain.

10. In view of the occasional famine outbreaks in the poorer countries of the world, the state oversees the distribution of food in order to ensure the country's nutritional security, so that it can introduce a food rationing system if necessary.

11. Poland has seen a reduction in the production and consumption of meat, dairy products and fish due to the effects of legal restrictions introduced due to climate change (meat and fish are very expensive). Plant-based diet is predominant, mainly derived from local production. It is complemented with consumption of insect protein.

THE SOCIETY



1. In 2050, the world is home to around 9.8 billion people and the global rate of demographic growth is steadily slowing. The nearly ten billion-strong world population is putting enormous pressure on the environment and the climate. Climate change has rendered many of the previously human-inhabited areas of the world incapable of sustaining human life.

2. After 2021, pandemics of various infectious diseases have recurred intermittently. They have become a cyclical and expected phenomenon. The world had already developed procedures to slow down transmission and to develop and distribute

medicines, thus avoiding mortality rates comparable to those caused by the SARS-cov-2 pandemic in the early 2020s.

3. Global inequalities have escalated. As many societies grew richer (especially the populations of India and China), an increasing proportion of the world's population lacks the basic necessities of life: shelter, water and food.

4. Numerous countries in southern Asia and Africa are facing a humanitarian crisis. This, combined with local armed conflicts, has triggered large waves of migration on an unprecedented scale.



1. Compared to 2021, the average standard of living of the European Union population has not changed significantly. How-

ever, social inequalities and the proportion of people living in poverty have increased significantly.

2. Most EU countries accept migrants who leave their home countries due to climate change or armed conflicts.
3. The refugee-hosting countries have not implemented effective adaptation programmes for the newcomers. The lack of adequate programmes and discriminatory behaviour on the part of some employers

have made it harder for migrants to secure well-paid jobs. As a result, the economic situation of migrants and their children is comparatively worse than that of 'old' EU citizens.

4. The countries with the highest rates of economic inequality have seen an increase in social tensions.



1. Unlike the European Union, Poland has seen a reduction in social inequality against year 2021.

2. On the other hand, Poland has one of the oldest populations in the EU and in the world – and it continues to depopulate. There are 33 million people living in the country in 2050, about 35 per cent of whom are over the age of 65. In 2050, the fertility rate in Poland is below 1.3 children per woman of reproductive age. It is rare to see parents with young children these days. Many Poles are unwilling to have children for fear of their future in a world threatened by disasters. In contrast, among those inclined to procreate, many face the problem of infertility.

3. Poles consistently display xenophobia and resentment towards refugees and refuse to accept climate migrants from the south, despite the difficult demographic situation in the country.

4. There is, however, a rather large Ukrainian minority living in Poland. Most people of Ukrainian origin have been living in Poland for more than a decade and have already been granted Polish citizenship. Due to the very high cultural similarities, no major linguistic differences or significant economic disparities, this does not pose any major challenges.

5. Social trust indicators have not changed significantly in Poland compared to 2021. It still remains at a very low level.

6. The demographic crisis has led to problems in the provision of care for seniors in Poland. Elderly and dependent people are placed in the care of their children (who receive a monthly payment from the state for the care) or are relocated to retirement homes. Responsibility for the day-to-day operation of such homes lies mainly with local authorities.

7. Public healthcare is centralised in Poland. There is a single public payer and the central government exercises direct control over all medical facilities. The standard of treatment is very low and the waiting times are very long. The low quality of medical services is due to their chronic underfunding. This is because the uniformed services and nationalisation of industry have been priorities in the country's budget over the recent decades. Wealthier individuals often receive treatment abroad.

8. Paradoxically, the difficult situation in the healthcare system has become an opportunity for Wrocław and other urban centres located close to the German border. Some of the affluent individuals chose to live in these cities due to their proximity to the border and access to better treatment options in Germany.

9. Life expectancy has fallen in Poland due to the poor quality of healthcare and recurring pandemics.

10. Poland is still a very conservative country, although less religious than it was



back in 2021. Given the demographic crisis, the state places great emphasis on the procreative role of the family. The country has still not legalised civil unions or gay marriages, which is the reason why some citizens emigrate.

11. Poles are not satisfied with the actions of the authorities and the legal and political situation of the country, but they appreciate the relatively high level of life security that Poland provides.

12. Most Poles are also wary of a return to the Western model due to greater

economic inequality and social tensions in the eurozone countries.

13. There has been a noticeable increase in the number of one-person households in Poland compared to 2021. For the most part, these are single, widowed seniors.

14. The increase in the number of elderly people who live alone has posed a major challenge for Wrocław. Due to the negative impact of loneliness on people's mental health and ability to meet their physical needs, the need for activities for senior citizens within neighbourhoods and housing estates has increased.

TECHNOLOGY



1. Digital and autonomous technologies as well as robotics have been developing since 2021. Particularly strong progress has been made in the field of artificial intelligence. It has contributed to the automation of many professions. AI, however, has not reached the level of singularity and this does not seem likely in the time to come. It has not fulfilled the many expectations placed in it so far in terms of support for development of technology and science.

2. The efficiency of RES and energy storage technologies has increased. In 2050, RES-based power is already cheaper

than fossil fuels and nuclear power in Europe.

3. The world has developed zero-emission transport. The first emission-free aircraft are currently flying on test routes.

4. A major part of the scientific effort is aimed at effective adaptation of humanity to the ongoing climate change. Weatherproof construction materials are being developed. Innovations are being introduced in water management and agriculture. Geo-engineering technology is being tested.



1. The European Union has subsidised the development of autonomous systems, especially systems for the industry and for transport management by European companies. The development of these technologies within the EU was a response to the system standards war between the

us and China. Since these systems were (deliberately) developed based on conflicting standards, a decision to implement any of them within the EU would have meant being tied to one side of the dispute, which was economically and politically unacceptable.



1. Poland has implemented autonomous systems based on EU standards. In 2050, autonomous technologies are widely used in commerce (e.g. for unmanned order processing in shops), industry and agriculture.

2. The spread of autonomous technologies has been a major challenge for the residents of Wrocław. As new technologies spread, employment in the Wrocław Industrial District fell sharply*. Most posts at lower professional levels have been

* The Wrocław Industrial District is understood here and in the following parts of the report as the industrial sites situated within the boundaries of Wrocław and Wrocław district.

gradually eliminated. The remaining staff included management positions and operators of autonomous production systems.

3. In view of the unfavourable demographic structure, the use of robots in elderly care is much more common in Poland than in other European countries.

4. Autonomous vehicles can drive on Polish roads. Relatively few of these are privately owned vehicles, due to their high prices.

5. Electric and hydrogen-powered vehicles are predominant in Polish road transport in 2050.

THE ENVIRONMENT



1. Compared to 2021, annual global greenhouse gas emissions have fallen only slightly.

2. Between 2021 and 2050, greenhouse gas emissions were reduced in particular by the European Union countries, the USA and China. In contrast, emissions have increased significantly in India.

3. Global average temperatures already exceed pre-industrial era temperatures by 20°C. IPCC RCP4.5 scenario is being fulfilled.

4. Environmental pollution has also increased globally, including, in particular, plastic pollution and artificial fertilisers.

5. As a result of pollution and climate change, global biodiversity has decreased significantly since 2021. Mass extinction of species is progressing.

6. Many places on Earth have become uninhabitable. This is particularly relevant in Africa and the southern regions of Asia.



1. In spite of large reductions in greenhouse gas emissions compared to the rest of the world, the EU has not yet reached climate neutrality. It has also failed to make the full transition to a closed loop economy. This means, therefore, that the EU Member States have failed to achieve many of the important objectives listed in the Green Deal.

2. Between 2030 and 2046, the continent faced a transient cooling of the climate associated with the disappearance of the Gulf Stream. A dynamic increase in average annual temperatures is observed currently.

3. Europe is confronted with violent weather phenomena and disasters caused by climate change.

4. As the ocean levels are rising, the Netherlands is allocating considerable resources to protect its land from flooding. Scientists

predict that, regardless of the efforts made, much of the country's territory could go underwater within the next 20 years.



1. Poland is one of the few European Union countries which have not yet completed a full energy transformation. Although it is presently more expensive, 25 per cent of the country's electricity still comes from coal. A further 50 per cent is renewable energy and the remaining 25 per cent is obtained from nuclear sources.

2. On the other hand, due to high public pressure, effective measures have been taken to eliminate the smog problem. By replacing heating systems, installing zero-emission heating and air filtration systems, the air pollution plaguing Wrocław and other Polish cities and towns has been eliminated.

3. In 2050, Poland is plagued by violent weather phenomena. The country is hit by heat waves, windstorms and floods.

4. The weather changes have posed a significant danger to Wrocław and its surroundings. Periods of drought have threatened agricultural crops and brought

a risk of drinking water shortages in Lower Silesia. The danger is particularly high in the northern and central regions of the province. On the other hand, periodic heavy rainfalls were a major threat to Wrocław due to its specific location on the Oder and its four tributaries.

5. The number of invasive plant and animal species is constantly increasing in Poland, while natural biodiversity is decreasing. The deforestation which took place in the 2020s has caused irreparable damage to the natural ecosystems. Planting is very rarely successful in 2050, due to unfavourable weather conditions. The weather is too unstable and the phenomena are so extreme that young trees cannot survive. A discussion is currently underway about planting trees with greater resistance obtained through genetic modification.

6. The problem of planting new vegetation strongly affects Wrocław, significantly hindering the regeneration and creation of new areas of urban greenery.

THE LAW



1. The European Union law does not allow for the construction of new power and heating plants using fossil fuels in 2050.

2. By 2050, the EU Emissions Trading Scheme already covers 95 per cent of all greenhouse gas emissions. This contrasts with around 40 per cent in 2021.

3. EU countries have strong legal restrictions on the production of meat from vertebrates, dairy products and fish. The EU law allows it only in exceptional cases and only on a micro scale. Industrial livestock farming was completely banned. The consensus is that such production is not only very harmful to the climate and



the environment due to high greenhouse gas emissions and pollution, but also so inefficient (a plant-based diet can feed

several times as many people) that it falls short of meeting humanity's full nutritional needs.



1. By 2050, the Polish legislation enforces a certain amount of care for the climate and the quality of the environment.

However, these provisions are set at the minimum level required by the adopted EU regulations and the international law.

Moreover, the country's regulations are not strictly enforced.

2. The uniformed services in Poland have high powers of surveillance and control over citizens.

WROCLAW AND OTHER CITIES IN 2050

THE ROLE OF CITIES

1. Significant urbanisation has occurred globally since 2021. Cities provide their residents with access to infrastructure and shelter from the consequences of climate change. Densely populated areas provide easier distribution of food and water and better access to medical services.
2. However, rampant urbanisation in developing countries has had its drawbacks. Above all, due to high population density, it encouraged the development of further pandemics. In addition, living in modern cities has a negative impact on the mental condition of the people who live there.
3. The elderly people are the ones who benefit most from living in cities in Poland in 2050. Compared to rural areas and smaller towns, cities provide seniors with a relatively high degree of convenience in their daily lives due to better access to care services and their daily necessities. The latter is made possible by urban infrastructure, which increases the opportunities and flexibility of delivery from online retailers.
4. The few people who have children usually prefer to live in cities due to the greater availability of schools and kindergartens. Although there are schools that provide remote classes, it is generally understood that pre-school and school-age children should be given the opportunity of direct peer socialisation.
5. Cities in 2050 are also venues for socialising and enabling cultural participation.

CITY MANAGEMENT AND CITY FINANCES

1. The autonomy of municipal governments in Poland is very limited compared to the central government. They are mainly responsible for administrative tasks, such as repairs (but no longer construction) of public roads, maintenance of commercial sites, maintenance of cemeteries or day-to-day management of educational and care facilities (but no longer the medical ones). All strategic decisions are made at the government level.
2. The Polish cities, including Wrocław, have lost access to funding from the central budget

of the European Union. Following the relaxation of the European integration process, the maintenance of the European Funds as it was before was withdrawn. The only funds from the Community's central budget that the Wrocław local authority currently receives are aid funds for adaptation to climate change.

3. Not being able to benefit from EU programmes or funds, Wrocław has become even more dependent on the Polish central government.

4. The centralisation and restricted powers of local government represented a major threat to the people of Wrocław. As the local authorities and residents have lost their influence on shaping the city's budget, its ability to meet the needs of the residents has been called into question. Obtaining funds from the central budget has become the subject of behind-the-scenes lobbying with the central government. Moreover, due to limited awareness of local needs at the central level, there were concerns about the misalignment of the city's strategic policy priorities. Artificial

intelligence algorithms have not only been prone to overlooking certain issues of importance to the city, but they have not been and are not completely immune to conflicts of interest between regions that compete for funds and the favouring of those regions from which people in the central government come.

5. While the Wrocław of 2050 cannot boast financial autonomy, the resources at its disposal are sufficient to implement the tasks assigned to it top-down. Municipal budgets are relatively low, with nearly 80 per cent of their value coming from the central funds. These are, for the most part, targeted subsidies for the implementation of current tasks of the local government, distributed proportionally to the needs determined by the strategic objectives formulated at the central level. The remaining municipal funds come from local levies.

6. European cities operate based on the smart city model, for the most part. These systems use information technology, including

the internet of things and advanced artificial intelligence algorithms, in the day-to-day management of the city. The largest cities in Poland use one common system, which was applied centrally. The system, which has the homely name 'Miasta', increases the possibilities for central oversight of the day-to-day management of cities, while providing a greater scope for optimisation through the ongoing exchange of data from different centres.

7. Miasta system collects data on the current situation in cities (e.g. traffic volume, occupancy of means of transport, load on the power grid or weather conditions) and optimises the operation of individual urban subsystems. In 2050, it is Miasta system that determines the current settings of traffic lights and autonomous navigation systems in Wrocław, the routing of Wrocław's public transport or the activation of weather security systems. The current operational priorities for Miasta in Wrocław are determined by the Wrocław authorities, but are subject to oversight for consistency with the strategic objectives set by the central government.

CITY INHABITANTS AND CITY USERS

1. The population of Western European cities is very diverse in terms of economics, culture, age and lifestyles. Social inequalities and the unsuccessful integration of migrants have led to the emergence of exclusion districts in many European cities.

2. The population of Wrocław is very different from that of an average city of Western Europe. There is far less social diversity and no drastic economic inequalities. In addition, even less diversity of inhabitants in terms of lifestyle and values is visible in the surrounding

smaller urban centres (Oleśnica, Świdnica or Lubin).

3. The Wrocław of 2050 is a place where predominantly elderly people live. Nearly half of the population is over the age of 65. Due to very low demographic

growth, there are very few children in Polish cities – and the ones that were born usually do not have siblings.

4. Approximately 40 per cent of Wrocław's inhabitants run single-person households with no children. The majority of these people are widowed women in their 70s.

5. Many older people live in retirement homes located within

the city. These are mostly people who have become dependent and whose children have not been able to care for them.

6. Many senior citizens migrated to Wrocław due to better autonomous infrastructure and access to any medical care. Younger people with remote jobs and no children have often left Wrocław to move to smaller, quieter towns within the metropolis or to the countryside where there is more

peace and quiet, and better access to green areas.

7. The people who live in close proximity to Wrocław rarely go there. Only a small number of them work in Wrocław and are forced to commute there every day. The others come to Wrocław to visit their parents or to participate in major cultural events.

BUSINESS AND ENTREPRENEURSHIP IN CITIES

1. Automated production facilities have sprung up around many Polish cities, including the Wrocław Industrial District. For the most part, they are managed by the state. These plants employ a small number of people – mainly IT specialists and produc-

tion engineers, most of whom work remotely.

2. On the outskirts of Wrocław, there are numerous commercial warehouses from where goods ordered remotely by their buyers are delivered.

3. Private service facilities operate within the boundaries of Wrocław. These include restaurants, beauty and hairdressing salons and care facilities. Most of these are targeted at the specific needs of older people.

LIFE IN THE CITY

1. Inhabitants of Wrocław and other Polish cities spend most of their time in their homes.

2. The people of Wrocław occasionally meet up, either by visiting each other in their homes or by visiting restaurants

and bars located close to where they live (prices in most restaurants are high enough that not every pensioner can afford them). They dedicate their remaining free time to recreation and physical activity. This has produced a demand for

easily accessible sports facilities within housing estates.

3. A lot of senior people in Wrocław use the services of day care homes. These are not only people who need constant care and support in daily

activities (transported there by working children), but also independent people living alone

who appreciate the opportunity to spend time with other people.

4. Participation in cultural events is an important part of urban life.

Urban planning, space design and urban greenery

1. Due to the high average age of the inhabitants, the space in Wrocław had to be fully adapted to the needs of the disabled and people with reduced mobility, by removing architectural barriers.

2. The voice guidance system implemented as part of the Miasta system is one of the improvements made by Wrocław for the visually impaired.

3. Adapting residential buildings constructed in the 20th century to meet the needs of people with mobility impairments has proven to be the greatest challenge. Lower buildings often lacked lifts, and in higher buildings, you had to climb stairs to reach the lift. This turned the dwellings situated in them into traps. Wrocław partially contributed to the cost of these adjustments, particularly in the buildings in which it still owned a large proportion of municipal premises. The undertaking was difficult due to the need to lobby for a subsidy from the central government for this purpose.

4. With the decline in traffic associated with the development of remote work and the high propor-

tion of retired Wrocław residents, some of the existing cycle routes in Wrocław have been converted into quiet roads for bicycles and electric vehicles. Such roads can also be used safely by senior citizens on wheelchairs and scooters.

5. Abandoned school and kindergarten buildings are being converted into day care centres and retirement homes.

6. Due to the depopulation of Wrocław caused by the demographic collapse, housing prices have fallen and the supply of municipal resources has increased. This is because the central authorities bought up housing stock from foreign investors who were involved in institutional renting in the 2020s and 1930s, and transferred it to the cities for management.

7. Many of the purchased properties have small floor space and facilities for the disabled people. These apartments are offered by Wrocław to individuals who migrate here in their old age. The new residents cover their rent with funds obtained by selling their properties on the outskirts of the city.

8. Wrocław boasts efficient public transport, fully adapted to the needs of the elderly and disabled. For the most part, it is served by autonomous rolling stock, the movement of which is optimised by the artificial intelligence built into the Miasta system.

9. Urban green areas in Wrocław have mainly adaptive functions. Their main purpose is to protect the residents from the consequences of violent weather events.

IMAGE AND BRANDING OF CITIES

- 1.** Polish cities do not undertake independent actions aimed at building their image.
- 2.** The image of cities is dominated by the image of the country, which is shaped by central and political decisions.
- 3.** Local governments do not have the tools to freely decide and implement activities related to territorial marketing. The state's objective is to standardise instead of fostering territorial diversity, which undermines the point of building a distinctive image. Therefore all activities that affect the perception of cities are centrally planned and controlled.
- 4.** In such circumstances it may be more difficult for Wrocław to attract tourists or new residents who could boost the city's economic activity.
- 5.** Additionally, in the wake of ongoing social changes, the old image of Wrocław, which was based on diversity, has consistently lost its attractiveness.

A DAY IN THE LIFE OF A STRONG STATE

Nina shivered from the cold and shifted from foot to foot, following the trace of a steel cable stretched vertically into the depths with the visualiser's lens, disappearing into the dark depths of the Oder. Bubbles of air and indistinct patches of torchlight underwater, the creak of a crane – time seemed to flow in slow motion or rather in a closed cycle, without any progress and without the relief that a successful conclusion brings. Patience is a highly desirable trait for archaeologists, she thought, but unfortunately, patience training is not a subject at college. Although more coils of steel rod were being wound onto the spool, and the shape underwater was growing in size as it approached the surface, it was still impossible to see exactly what, or rather who, the monstrous bronze head, raised on ropes and chains from the river bottom, represented. Even the older and more experienced archaeologists and technicians, who stood on the barge leaning over the railing, only discreetly rubbing their hands together to warm up, stopped their conversations and waited expectantly.

Finally, the bronzed head of a colossus entwined in a web of steel mesh and chains emerged. Still surrounded by lumps of silt and dripping with dirty river water, swept by a dense network of laser beams mapping its shape. The scuba bots, already on the surface, were circling around the head surrounded by the bubble of the buoyancy balloon. Every now and then they emerged at the edge of the frame. 'Too close... dangerously close', Nina thought. She kept switching the view on the screen between bands of visible and infrared light every now and then. Suddenly the crane creaked ominously against the full weight

of the statue. A scream sounded – and one of the chains binding the discovery from underneath broke off abruptly, the head wobbled and tumbled towards a side of the archaeologists' barge. After a while, having torn off the remaining threads of its harness, it sank back to the bottom of the river. Nina raised her head from the visualiser on the tripod, speechless with surprise. From where she stood, for a brief moment she saw the face of the statue, a stern face, unpleasantly familiar – but not ancient, perhaps?

The find sank again into the murky depths off Szczytnicka Island, escorted away with a concert of sighs and curses by all the people gathered. 'So much for today! Technicians are requested for debriefing, the scuba bots may go to the charging station, the rest of you are free to go' – announced the manager.

Since autumn works began at the underwater site on the Oder, Nina's route from the excavation site to her apartment usually led across the Zwierzyniecki Bridge and on foot through the campus of the Medical University. That day, however, was Tuesday, and on Tuesdays, Thursdays and Saturdays Nina visited the senior citizens' club at the Centennial Hall. It didn't make her uncomfortable, and it was also an obligation under the student housing contract, under which Nina could choose a communal flat for independent living instead of a shared room at the Ołówek dormitory. 'Independent' in her case meant that she lived there with her boyfriend and this solution was absolutely ok. The seniors at the club were very nice.

On that day, due to the nice weather, the seniors were outdoors and kept company by both

their (less numerous) robots and their (more numerous) adult children with nursing pensions. And of course Nina. The sight of elderly people spending their days in the company of their slightly more capable children was not surprising – given the collapse of the healthcare system and care facilities, many people had to give up paid work to look after their elderly relatives, sometimes even more than one generation of them. But there were also a few lucky ones among the attendees, who came accompanied by the hilarious robo-guards. The waiting line for such self-propelled gadgets provided by state insurance was long, but apparently, you could live to see the moment. A part of the group was playing cards at tables, while another part was gathered around a stone plinth, spreading modest refreshments on paper napkins.

The venue for the gathering was quite pleasant – the small section of parkland around the Centennial Hall, renovated a couple of decades ago, was now perhaps a little wild and run-down, but at least it provided a bit of secluded space and light at dusk. During the day, it was occupied by high school teens sitting on a centrally placed granite monolith, while in the evenings it attracted groups of senior club members who, in the light of the lanterns, spent time like they did in the old days – playing cards, computer games, role-playing games and tinkering with the help of robo-guides.

Among the seniors at the card table, one seventy-year-old stood out, particularly cheerful. He was probably the addressee of the words on the banner that Nina passed at the entrance to the club premises: ‘Welcome back to your homeland, Martin, with your own arm’. It seemed that the residents were celebrating the man who, whenever anyone approached him, grinned and showed off his brand-new forearm bioprosthesis. Although the tone of the banner was perhaps a little grotesque, Nina did not even smile. Her own grandfather had been waiting for urgent orthopaedic surgery for some time, and fundraising for it in Germany had unfortunately still not yielded sufficient funds. No wonder the lucky man’s friends wanted to congratulate him. Mr Martin, carried by the energy of his club friends’ affection, won one hand after another.

It seemed that this little spot of old people’s happiness in the lantern light had enough energy

to sustain them until the morning. Unfortunately, a power cut caused the atmospheric lighting to go out. The seniors reacted with a long murmur of dissatisfaction and disappointment – after all, the evening had promised to be so splendid. ‘Ladies and gentlemen, this is how it goes unfortunately, we all know it’ – Nina began. ‘Here’s a message from the city app that MiasTa, the state-run smart city system, has again shut down electricity as a precaution in the area of the Zoo and Centennial Hall because a big storm is coming. I think we’re all starting to get used to it by now’, she added in a sad and sorrowful tone, just as she felt it was necessary to deliver bad news to the elderly. ‘Ma’am, it’s not like that!’ – exclaimed Mr Martin from across the table. ‘It’s not prevention, it’s centralisation. MiasTA is up to something again because the bloody central government, instead of letting people live, is hogging electricity for its grandiose investments. They’re playing pharaohs!’.

The mood broke rather quickly and the seniors, assisted by their carers, abandoned the picnic, said goodbye to everyone and headed for the tram stop at Wajda Street. Some walked with difficulty, while the fitter ones helped the others. Nina, still talking to one of the seniors she knew from previous visits, somewhat unexpectedly realised that she was left almost alone in this part of the park. It got very empty around her, but she still wanted to sit down for a while. She approached the pedestal where the wind blew paper napkins with abandoned snacks. The cold granite was not a good fit for sitting for very long. Still, she sat down for a moment, to collect her thoughts and to read the news on her tablet. ‘Oh, they did pull that head out after all’ – she said to herself, surprised. ‘What an ugly face’. The cold granite was uncomfortable, the girl stood up and leaned against it with one leg to maintain balance. The evening sky was getting cloudy. ‘What a monument was it, anyway?’ – she thought, looking at the pedestal. ‘Not too old, probably. I wonder why it was dismantled?’ On the top, beyond the trays with food, traces of letters were still visible – a name that was familiar, unpleasantly familiar. She frowned. ‘Some politician, I suppose?’ From the beginnings of this Poland of ours? From the twenties?’.



Hostages of the economy

SCENARIO 2

IT'S 2050. Besides the progress in automation, no changes have emerged in the world to move humanity away from the spectre of climate catastrophe. Quite the contrary. The inflation rising in the wake of the pandemic of the early 2020s led central banks to return to restrictive monetary policy. The unfavourable impact of rising interest rates on the economy was offset by loosening market regulations, business facilitation and by stimulating private consumption through tax cuts. It was, in fact, a return to the premises of the neoliberal economy. The countries that have not yet managed to embark on the energy transition path have been postponing this moment so as not to fail in the global economic race. The countries that had already been on this path, have slowed down the pace of change slightly, by redirecting funds to fight unemployment. This has encouraged a further increase in global greenhouse gas emissions. Despite their successive, increasingly ambitious declarations of climate action in international forums, the politicians made their decisions mainly driven by the prospect of the next elections, for which economic indicators were crucial. The dramatic impact of these changes on climate and the environment is now being felt around the world. There has not been much political change in the European Union. In Poland, the competences and budgets of local governments have grown over the years. The lives of people in the country and abroad are getting worse due to the migration crisis and the drastic intensification in extreme weather events. The accumulating problems are patched by social agendas and *ad hoc* remedial actions. In 2050, very high social tensions are visible. Massive protests carrying the most disparate of banners and accompanying riots are commonplace.

INTERNATIONAL AND DOMESTIC ENVIRONMENT OF WROCLAW

POLITICS



1. At the end of the 2020s, the world saw a break in the trend of weakening democracy observed at the beginning of the 21st century. Not only did democracy begin to consolidate in already democratic countries, but also previously authoritarian states began the process of political change.
2. In the 2030s, China underwent a partial system transformation, reforming the Chinese Communist Party and gradually opening up public access to the debate between its individual factions. The next step was to allow citizens to vote for party faction programs in general elections. The system is now an imperfect equivalent of a multiparty system, and China is currently a quasi-democratic country.
3. The shift towards democracy has been driven by, among others, increasing digitalisation and improved global connectivity. It was no longer possible to simply block and control access to information from the central level. In particular, the increasingly cheap and easy access to satellite internet has lifted all network blockages imposed by countries with authoritarian regimes.
4. A partial, slow transition towards democracy has also taken place in Poland's immediate neighbourhood, namely, in Russia and Belarus.
5. The changes in the world have, paradoxically, made international cooperation more difficult. The governments of individual countries 'defended' their internal interests to an increasing extent, in order to maintain economic growth and gain internal support for the next elections. The world has reached an impasse on issues related to climate policy and the reduction of global CO₂ emissions. Everyone believed it was necessary, but no one wanted to make the effort of transformation.
6. In 2050, no country dominates the international arena any more. China, India, the United States, Russia, the European Union, Brazil and Nigeria have a relatively strong position. The latter – mainly due to its large population of over 400 million.



1. Until the mid-2030s, European politicians were afraid to implement the bold transformation programs adopted in the previous decade. This was due to fears of a decline in the competitiveness of the European economy. Subsequent declarations made at the EU and international forums did not translate into actual actions. The European population, exhausted by the sanctions and the economic downturn caused by the coronavirus pandemic, was not prepared to make the further costly

sacrifices necessary to halt the progress of climate change.

2. Large-scale changes were not introduced until the 2040s, when the effects of climate change and environmental pollution became overwhelmingly palpable and severe.

3. The accumulating social problems are patched up with *ad hoc* remedial actions and social programmes.



1. In 2050, Poland is a fully democratic country. It has a multi-party system, a factual tripartite separation of powers is ensured, independent media operate, civil liberties and terms of office of state organs are preserved.

2. Power in Poland has been decentralised to some extent. First of all, the financial autonomy of local governments has increased, as they have been granted a greater share in income taxes from natural and legal persons at the expense of targeted subsidies from the state budget.

3. A number of previous restrictions on the areas of responsibility of local authorities have also been removed, increasing their actual ability to shape policy. For instance, in the area of health care, the National Health Fund has been replaced by local government payers, and in education, local governments have been given partial competences in shaping curricula and supervising educational institutions.

4. For Wrocław, these changes represented an opportunity for development. The higher budget and level of self-governance provided more opportunities to stimulate social participation and implement bottom-up initiatives of the inhabitants.

5. The increased degree of decentralisation has exacerbated inequalities between different regions and cities of Poland. In response to the growing level of inequality, the amount of Robin Hood subsidies and general subsidies for the poorest regions was increased. The vast majority of the subsidy money goes to social assistance for people who live below the breadline.

6. These changes were not irrelevant to Wrocław. On the one hand, due to its favourable location at the German border and its good transport infrastructure, it has found itself among the most prosperous cities. On the other hand, however, both the Lower Silesian province and Wrocław have become major sponsors of subsidies to Poland's poorer regions and cities. This was met with much discontent from some Wrocław residents.

7. Due to intensified territorial competition and the battle for tax revenues, there have been problems with cooperation and coordination between various local governments in the country.

THE ECONOMY



1. Inflation rising in the wake of the coronavirus pandemic has prompted a return to restrictive monetary policies by central banks of many countries around the world. There have been many attempts to counterbalance the unfavourable impact of rising interest rates on the economy by easing market regulation, providing relief to entrepreneurs and stimulating private consumption through tax cuts. It was, in fact, the return of the neo-liberal approach to the economy.

2. The global demand for electricity increased by approx. 80 percent compared to 2021. This was driven by the global demographic growth, fast economic development of India and China and the growing popularity of devices operating within the Internet of Things. At the same time, the world experienced stagnation in the development of energy-saving technologies.

3. In 2050, the global economy found itself in a slump. The collapse came after years of growth. At the turn of the 2020s and 2030s, both world production and consumption grew rapidly, driven by the development of South Asian countries, especially India.

The demand in the countries of Europe, both Americas and China did not decrease either.

4. The climate breakdown, environmental crises, migrations, shortages of raw materials and drastic increases in production costs in offshore locations led to a rapid economic collapse at the turn of the 2030s and 2040s. The crisis has primarily affected the countries that relocated production to cheaper locations abroad at the turn of the century.

5. In the 2040s, most of the world's economies began to return to increased market regulation. This was caused, on the one hand, by the dramatic climate situation and the sharp decline in existential security (including food security) and, on the other, by the very large increase in economic inequality resulting in a decline in public support for the previous policies.

6. Hastily imposed and not very well thought-out regulations have contributed to the collapse of several important global corporations and to a decline in their investment and innovation potential.



1. The EU economy in 2050 is stagnant.

2. Most of the commodity needs of European citizens are still met by products imported from outside their home, although there has been a consistent shift of production to the Old Continent.

3. Given the high availability of labour due to the large influx of migrants to

Europe, labour costs on the continent are relatively low relative to the purchase price of autonomous manufacturing technologies.

4. Despite that, a large part of the professions in Europe have been automated. These included mainly lower-level white-collar positions: translators, lower-level analysts, accountants,

lower-level customer service staff. High unemployment and very high availability of unskilled labour mean that, despite technological accessibility, it is not viable to deploy expensive autonomous technologies for performing complex tasks in industry.

5. As a result, the European society experiences very high economic inequalities.



1. Poland's economy is slightly worse off than the EU average. Not only was it severely affected by the global economic collapse, but it also incurred high costs of adapting to new regulations related to environmental and climate protection. Polish entrepreneurs, unlike companies in Western Europe, did not prepare in advance for the necessary changes, negating their sense.

2. In 2050, the registered unemployment rate in Poland is 20 per cent, rising to as much as 30 per cent in the east of the country.

3. This situation can be treated both as an opportunity and a threat to Wrocław. As a wealthy city with many jobs in services and industry in the Wrocław Industrial Area, Wrocław attracts the most talented workers from other regions, thus benefiting from the brain drain phenomenon. On the other hand, in addition to the highly qualified and sought employees, Wrocław also attracts individuals for whom the city does not offer jobs. This puts pressure on an increase in unemployment and threatens with the expansion of poverty districts.

4. The state budget and budgets of most local governments are highly indebted. Infrastructure investment has

6. In 2050, fresh food and basic necessities (personal hygiene products, clothing, housing) are very expensive. Many people would not be able to afford them if they did not benefit from various forms of social assistance, the availability of which has been steadily increasing for several years. Many people consume inexpensive vitaminised supplements and high-protein meals of synthetic origin.

slowed down in many poorer regions of the country.

5. Agriculture is facing a drought problem caused by climate change. Much of the 2021 farmland is now wasteland. Drought tolerant GMO crop varieties are being massively introduced in agriculture to alleviate the problem. The purchase of seeds is co-financed from the central budget of the European Union.

6. Agriculture in the area around Wrocław was also affected by drought and difficult weather conditions. This has reduced agricultural production and employment in the sector. Individuals who have lost their jobs are looking for new opportunities in Wrocław.

7. The retirement age in Poland is 67 for men and women equally.

THE SOCIETY



1. About 2050 billion people live in the world in 10 and the pace of global demographic growth is slowing.
2. A pandemic with a scale and impact comparable to the COVID-19 has not occurred over the last three decades.
3. The global society is plagued by humanitarian crises resulting from climate collapse and environmental pollution.
4. Due to deteriorating living conditions, life expectancy has been decreasing for more than a decade.



1. Compared to 2021, the quality of life of citizens in the European Union has deteriorated significantly and economic inequalities have increased. Two key factors are directly and indirectly responsible for this: climate change and economic collapse.
2. The countries of the Community have received and still receive migrants from the South, who abandon their native countries due to climate change or armed conflicts. They are mainly people coming from Africa and Middle Eastern countries. It is estimated that there are around 45 million of the 220 million climate refugees living in the European Union in 2050.
3. In spite of the enormous migratory pressure, however, the EU countries have not adopted coherent policies for the adaptation of refugees or the rules for their relocation. Due to the very large number of immigrants and the difficult economic situation, it is hard for the Member States to pursue an individual, rational migration policy, which would ensure new citizens an equal start. As a result, migrant districts of poverty and exclusion are formed in European cities, creating a mosaic of closed communities with a common ethnic or class profile. This leads to a lot of dangerous social tensions.
4. In 2050 they are already very clearly visible. Massive protests carrying the most disparate of banners and accompanying riots are commonplace. They are alternative means of expressing frustration and hopelessness, and they destabilise the lives of major cities.
5. In addition to immigrants from outside the continent, the problem of internal climate migrants is growing in the EU. These are Europeans who have lost their homes to natural disasters caused by the global warming or have lived in coastal areas that have been flooded with rising sea levels.
6. However, despite high inequalities and social tensions, the individual crime rate is not increasing. This is due to an advanced system of monitoring, early warning and prevention. Offenders are effectively identified, tracked down and brought to justice. The inevitability of punishment deters most people from attempting a criminal act.
7. The European Union is no longer facing the problem of an aging society. The young immigrant community is offsetting the ageing population of native Europeans.
8. However, due to the growing absolute number of elderly people, there was

a noticeable increase in the number of one-person households run by such people in the EU countries.

9. At the same time, there is much less living space per European citizen than in 2021



1. In 2050 the fertility rate in Poland is over 1,3 children per woman of reproductive age. Despite the low demographic growth, due to the large influx of migrants from beyond the eastern border (in the 2020s) and climate migrants (in the last two decades), there are around 39 million people living in Poland currently.

2. As in other EU countries, social inequalities have increased compared to 2021. Today, Poland is home to around 1 per cent of very rich people and 2 per cent of wealthy people classified as upper middle class. About 15 per cent represent the middle class. It is primarily these three groups that are enjoying the fruits of the technological advances that have taken place in recent decades. This is because most people living in the middle and upper classes did not want to change their habits and give up their high level of consumption. For the rest, i.e. the lower middle class, the working poor and the poor, living below the poverty line, life is the same or worse than it was in 2021.

3. This unfavourable social situation posed a major challenge for Wrocław. It had to confront the problem of social polarisation, which began to manifest itself in the development of the city as well. The rich started flocking to separate neighbourhoods. Fenced estates destroying public space have re-emerged. Enclaves of poverty have emerged in the cheaper districts and outskirts of the city. This has made it difficult for the city to maintain a cohesive social fabric and ensure that its residents have equal access to basic services and infrastructure.

4. Growing areas of poverty are a nationwide problem. Nearly one in four

inhabitants of Poland has difficulties in satisfying basic living needs on their own, in particular with regard to food, and is forced to rely on social assistance. Its effectiveness, especially in terms of food, is a guarantee of public safety in a society eager to protest and demonstrate.

5. Similarly to the other EU countries, climate refugees from outside the Community integrate poorly into the local community. They usually join the ranks of the underprivileged and benefit from social welfare. This creates tensions between them and both the Polish population and the Ukrainian minority that has lived in Poland for decades. The tensions are primarily of an economic nature. Poland's seniors are concerned about the availability of funds for social assistance and about jobs. Racist and discriminatory sentiments are on the rise in this context.

6. This is a major problem for large urban centres such as Wrocław. Firstly, increased tensions between inhabitants and social conflicts make it difficult for cities to implement coherent policies addressing the problems of all inhabitants. Secondly, growing social unrest creates the risk of repeated violence or even terrorist attacks, which desperate people are not deterred from undertaking by the threat of punishment. This significantly reduces the capability of local governments to ensure the safety of residents.

7. Consequently, local governments are trying to fill a gap in state policy by organising social integration programmes to reduce the scale of conflict between immigrants and refugees and other residents. These include both programmes aimed at immigrants, such as Polish

language courses or vocational training, and programmes for the local population aimed at reducing the fear of strangers and increasing tolerance towards the newcomers.

8. Apart from the difficulties related to the adaptation of people coming from the South, Poland also has a problem with internal migration. Many people who have left the flooded areas of the Vistula Marshland are seeking refuge in other regions of the country.

9. Domestic migrants often choose the wealthy Wrocław to start a new life here. This raises challenges for the city in terms of being able to provide them with start-up assistance.

10. The problems of everyday life and the uncertainty of tomorrow have caused

a mental health crisis. Many citizens face the problem of depression and anxiety disorders.

11. Healthcare is decentralised in Poland. There are many healthcare service payers. These include local government (provincial) health funds on the one hand and private insurers on the other. The healthcare level is comparable to that in the other European countries. Modern services are provided and medical and support staff are well paid. The care is, however, expensive. There are still waiting lists in the public system. Co-payment for medical services has also been introduced for everyone except welfare recipients. Private healthcare, if financially accessible, is of poor quality. Otherwise, it is very expensive and only available to the wealthiest.

TECHNOLOGY



1. Digital and autonomous technologies and robotics have been developing since 2021. Likewise, there have been noticeable advances as regards artificial intelligence, which has contributed to the automation of many professions. Artificial intelligence, however, has not reached the level of singularity, and this does not seem likely in the near future. It does not either fulfil the hopes placed in it so far, as regards the possibility of accelerating the development of science and technology. Robotic and autonomous technologies are still very expensive.

2. The development of technologies designed to adapt to climate change is steadily advancing. In particular, new solutions are emerging in the field of

agriculture: new species and varieties of genetically modified plants are being introduced, new ways of cultivation are being developed. New approaches to treating drinking water from seawater or air are also gaining in popularity. Residential water recycling systems, new coastal protection technologies and wind protection are also being developed. Such technologies, however, are emerging with a delay. They respond to changes that are already taking place and the effects of which have affected hundreds of thousands of people.



1. Autonomous vehicles have not become widespread in Europe. They are mainly used by the richest. They are only used in public transport for underground lines, trams and selected train services. This is because these vehicles are still very expensive to maintain on an ongoing basis.

2. Within the existing budgetary possibilities, the European Union subsidises the development of technologies intended to facilitate adaptation to climate change.



1. The level of innovation in Poland in 2050 is still low. On the other hand, companies producing cheaper substitutes for highly innovative goods from the European Union for the construction, automotive, processing and public sectors are doing well. Products from these companies include renewable energy sources. Since Polish manufac-

turers bypass patent protection by using technologies similar but different from the original, the quality and efficiency of these products significantly differs from the imitated products. High environmental requirements are met mainly in theory. Most of the production is exported to poorer countries which cannot afford to buy the genuine products.

THE ENVIRONMENT



1. Global greenhouse gas emissions have increased compared to 2021, which is considered a great failure of the global community.

IPCC RCP 6.0 and RCP 8.5 is becoming reality). Global average temperatures have already exceeded the pre-industrial era temperatures by nearly 2.50°C. The level of the seas and oceans has risen by nearly 0.5 metres.

2. Due to the delay in the decarbonization process, the pace of climate change has accelerated rapidly over the recent decades. We are witnessing the realisation of one of the worst possible climate change scenarios (the scenario between

3. The world has seen a dramatic reduction in global biodiversity and a significant increase in environmental pollution.



1. The entire continent has seen a significant increase in average annual temperatures in comparison to those at the beginning of the 21st century.

3. The EU countries are plagued by violent weather phenomena: heat waves and extreme temperatures, droughts, forest fires and storms. The European Union is experiencing recurring flooding and problems with the availability of fresh water.

2. Due to the rising sea levels, many coastal areas in European countries have become flooded. This problem is particularly pertinent to the Benelux countries, Germany and Denmark.



1. In 2050, coal accounts for 10 per cent of electricity production in Poland. It was still 35 per cent in 2040. At peak demand, Poland imports more than 50 per cent of its energy from Germany. We have one nuclear power plant. We cover around 30 per cent of our demand from renewable energy sources.
2. Extensive areas of the country are affected by steppe formation and desertification. Drinking water deficits are starting to emerge. This problem affects the central part of the country in particular.
3. Poland is affected by extreme weather conditions. Massive heatwaves, torrential rains, gales and hail occur.
4. Due to the rising sea levels, some coastal areas have been flooded. The Pomorskie and Warmińsko-Mazurskie provinces were most seriously affected. The Vistula Marshland is now under water. In 2046, the last inhabitants of Elbląg were evacuated due to repeated floods.
5. The northern and central parts of the Lower Silesian province (including Wrocław and its surroundings) are affected by steppe formation and months of agricultural drought. Wrocław also faces periodic drinking water shortages. The drought problem affects the southern edge of the province on the Czech border to the least extent.
6. The agricultural areas around Wrocław have been subject to degradation, thus reducing the local agricultural production and employment in this sector. Substantial parts of the Wrocław metropolitan area are confronted with periodic shortages of drinking water, which is supplied by Wrocław. During particularly severe droughts, with very low water levels in the Oder and its tributaries, there is a need to ration water to industrial plants and city residents.
7. In the summer, Lower Silesian cities face heat waves. Due to the phenomenon of urban heat islands, air temperature can reach over 50°C, which translates into fatalities among the elderly and children every time. Keeping the residents cool during a heatwave is a major challenge for Wrocław.
8. Lower Silesian cities are also struggling with flooding due to storms. Given its specific location on the Oder River and its tributaries, Wrocław is at extreme risk from flooding.

THE LAW



1. As the technology of the Internet of Things and security monitoring systems became more widespread, the European Union loosened regulations on privacy

and image protection in the 2030s. These changes received public approval because they were intended to help combat rising crime levels.



1. In 2050, there have been regulations introduced in Poland out of concern for the climate and the quality of the

environment. However, restrictive pro-environmental regulations were introduced only in the mid-1940s,

implementing the EU-wide transformation provisions.

2. Currently, strict regulations are in place regarding the maximum permissible levels of emissions from the industry, very stringent regulations for product packaging and requirements for waste treatment and recycling.

3. This is of great importance for Wrocław, as the packaging and waste management remains in the competence

of local governments. The city is responsible for introducing appropriate programs and providing infrastructure which enables disposal and recycling of waste from the city and its surroundings, pursuant to the law.

4. Due to rising housing prices, regulations in Poland allow dividing residential premises into smaller ones. The minimum size of an apartment handed over in 2050 is only 10 square metres. This compares with 25 metres in 2021.

WROCLAW AND OTHER CITIES IN 2050

THE ROLE OF CITIES

1. Globally, significant urbanisation has taken place relative to 2021. Cities provide people with access to infrastructure and shelter from the effects of climate change. Densely populated areas provide easier distribution of food and water and better access to medical services.

2. As manufacturing companies are located in urban areas, in many regions of the world cities are still the place where it is easiest to find a job.

3. In the European Union, cities play a role equivalent to that of 2021, but in addition, due to their relatively high degree of adaptation to climate change, they provide a safer refuge for their inhabitants from violent weather conditions. European cities provide basic living conditions for climate migrants from the EU and other countries of the world. They are also the birthplace of social movements and civic initiatives.

4. The average Polish city is more poorly adapted to climate change than the typical European city. However, a great diversity can be

observed between centres in the country in this regard, which results from the budgetary status of the individual local authorities. The Wrocław local government had good conditions for implementing adaptive solutions. It was favoured not only by a relatively good budgetary situation, but also by a rather favourable location away from the sea coastline.

5. The problem of insufficient adaptation to climate change, however, significantly affects poorer cities and smaller towns. Inadequate adaptation to changing climatic conditions is an important migration factor. Smaller cities are getting depopulated. Their richer inhabitants move to the countryside, while poorer people seek refuge in larger centers which provide better protection against extreme weather conditions.

6. Due to the uncontrolled growth and densification of Polish cities in the 2020s and 2030s, they now do not provide enough green areas to prevent the phenomenon of urban heat islands. Protection against heat waves currently relies heavily on urban cooling systems.

7. Residents of Wrocław are not in the worst situation, as the city is surrounded by many green areas, rich in forest and water resources (especially in the neighbouring eastern and northern municipalities). This slightly offsets the temperature rise on the outskirts of the city.

8. Polish cities also deal with drought and flood problems comparatively worse than the EU average, although they are constantly improving their competence in this regard. Lack of funding is currently the main constraint for this.

URBAN MANAGEMENT AND CITY FINANCES

1. Urban local governments in Poland have relatively high financial autonomy. The opportunity to independently shape urban policy and plan expenditures was a great development opportunity for the Wrocław local government.

2. Large Polish cities commonly operate on the smart city model, using information technology, including the internet of things and advanced artificial intelligence algorithms, in their day-to-day city management. Implementing a smart city system was a great opportunity for Wrocław to effectively manage the everyday life of the city, including reducing the problem of traffic jams or improving the organisation of public transport.

3. Smart city systems of Polish cities do not communicate with each other and are not integrated with each other in any way. Integration would be difficult or impossible due to incompatibility. The cities independently chose the providers and operators of their

systems and in doing so, they did not consider the possibility of exchanging data with other local authorities.

4. One exception in this context are urban surveillance systems, which analyse the movements of individual residents and inform the municipal police of perceived acts of violence and their perpetrators. They use a common database of personal data owned by the police.

5. The municipal police play an important role in Wrocław and other Polish cities. Due to frequent waves of protests and the need to prevent criminal attempts, it has been given new powers, close to those of police patrols.

6. Average city budgets have increased compared to 2021. As the area of competence of local governments has increased, so has their financial autonomy. They currently retain most of the revenue from CIT and PIT payments, and have a great

deal of freedom to shape the scope and level of local taxes and charges.

7. Despite the moderate improvement in the financial standing of cities, due to the increase in territorial inequality, many centres are in a relatively worse position than they were three decades ago. These are mainly centres with a low number of active enterprises and a high unemployment rate.

8. Cities which have been hit particularly hard by the effects of climate change and cities which host the greatest number of climate migrants from EU areas receive additional aid from the Community budget. Climate and environmental aid account for a large proportion of municipal budgets. Due to the high number of migrants, Wrocław had the opportunity to benefit from solidarity aid.

9. In 2050, Polish cities have less access to the EU funds, the amount of which has been reduced several times.

CITY INHABITANTS AND CITY USERS

1. A very high diversity of social fabric is observed in Polish cities. Climate migrants

account for around 25 percent of the population in Polish cities. Most of them live in large urban

centres, where it is easier to find a job. Most of the Poles and representatives of the Ukrainian

minority are already over 60 years of age.

2. It has been a challenge for the Wrocław local government to provide adequate infrastructure in all neighbourhoods and to foster social integration, so that minority groups and different social classes are not isolated from each other (and no ghettos are formed). The challenge for the self-government of Wrocław was to ensure adequate infrastructure in all districts and to foster social integration, so that minority groups and various social classes are not isolated from each other (and no ghettos are created).

3. The population living in cities and suburbs is on average less well-off than those living in more remote municipalities, which provide a higher standard of living in 2050. This is the case despite the poorer infrastructure in villages – mostly due to the much greater availability of green areas, less congestion, noise and light pollution. However, securing homes against violent weather conditions is an essential pre-requisite for a fully comfortable life outside the city. The richest ones moved their houses partially underground, building them according to the *earth shelter*

model popular in the 1970s. The richest ones moved their houses partially underground, building them according to the *earth shelter* model popular in the 1970s. The poorer ones strengthen the structure of the existing buildings and install cooling systems. Whoever cannot afford the security measures would sell their plots of land and move to the cities.

4. The big cities are experiencing a growing problem of organised crime, which is massively recruiting people from poor suburbs into its ranks.

BUSINESS AND ENTREPRENEURSHIP IN CITIES

1. The image of entrepreneurship in Polish cities is not very different from what was the standard in 2021. After a wave of bankruptcies associated with the global economic crisis, new businesses slowly began to emerge in response to the changing market demand. These are both small companies, developed from scratch by Polish investors, and branches of larger Polish and foreign enterprises.

2. At the same time, Wrocław remains a city attractive to investors and entrepreneurs due to the city's relative prosperity and its location near the German border. This location encourages trade and tourism.

3. Depending on the target clientele, companies operating in Wrocław can be divided into two groups. These are either specialised companies offering higher-margin products and services to representatives of the affluent bourgeoisie, or companies focusing on the non-affluent mass customers, who compete on the market primarily with the product price.

4. Organised crime is the bane of small entrepreneurs.

LIFE IN THE CITY

1. In many ways, life in Wrocław resembles the situation as it was three decades ago. The individuals who have a job, as in 2021, live in a constant state of flux and devote most of their day to it. Those who work remotely gain some

time saved on commuting. People who do on-site work need to get from home to work and back. The offices and production plants where most Poles work are usually located far from residential districts. The distance to be covered is often

significant due to the vastness of urban areas. Half of the commuters use cars, thus causing traffic jams. Others travel by public transport, bicycle or personal transport.

URBAN PLANNING, SPACE DESIGN AND URBAN GREENERY

1. For nearly ten years now, gated estates for the wealthiest have been built en masse in EU countries. These estates boast an increased level of protection against severe weather conditions, an independent water circuit with its own sewage treatment plant, zero energy status and private greenhouses and hydroponic crops to secure the basic nutritional needs of the estate's residents.

2. In turn, immigrant ghettos and vast districts of poverty are forming in other areas of European cities.

3. The average floor space per European has decreased from approx. 40 m² in 2021 to 25 m² in 2050.

4. In 2050 individual car transport in European cities still covers a large percentage of travel of their inhabitants. The wealthiest

individuals own autonomous cars. Others travel using conventionally driven vehicles. These are usually electric cars which are several years old. It is no longer possible to buy a combustion-powered or hybrid car in the EU.

5. Significant suburbanisation has occurred in Wrocław in comparison to 2021. The most affluent Wrocław citizens, on the other hand, have moved to the countryside, where they build underground houses resistant to heat and adverse weather conditions.

6. Districts and buildings in Wrocław are mono-functional. Not all needs can be met close to home.

7. The diversity of the urban social fabric has increased and is reflected in the urban planning of Wrocław. Similarly to other EU cities, gated estates for the middle class are being

built in Wrocław. The average floor space in such estates is about 80 m². Fragmentation of public space is an important challenge for the local government. This is because it must, in the current conditions, ensure equal access to services and infrastructure for all city residents, regardless of the area they live in.

8. Given the high demand, housing prices in Wrocław and its close suburbs are extremely high in relation to earnings. Most of the inhabitants huddle in small cubicles. People living in one-person households usually live in so-called 'nano-apartments' with the minimum floor space permitted by the law or only slightly more (10–15 m²).

9. The average size of an apartment per Pole has decreased from approx. 28 m² in 2021 to 18 m² in 2050, and for the individuals born in the 21st century, it can even reach 15 m².

10. Many buildings constructed in the late 1990s and early 2000s are in ruin or are being demolished due to the risk of a structural disaster. They were built using the cheapest materials during the construction boom and proved to be vulnerable to extreme weather conditions. The stability and safety of concrete block housing is also increasingly being called into question. This situation and the associated threat of an even lower supply of housing pose a serious problem for the Wrocław authorities.

11. In 2050, cities are in dramatic need of green space due to the strongly felt climate change. However, planting new vegetation is proving difficult. The years of ‘concrete illness’ and sealing of urban soils have resulted in their degradation. At present, neither the weather conditions nor the condition of the urban soils are favourable for the development of vegetation. There are campaigns to fertilise land and plant alien or genetically modified species capable of growing in unfavourable conditions. Wrocław is not in the worst situation, as it shifted away from

the concrete trend relatively early and promoted new planting, e.g. along the city’s main arteries (the ‘green arteries of Wrocław’), which means that it was less affected by this problem than other cities.

12. The authorities of Wrocław are trying to introduce vegetation not only in designated places, such as parks and squares, but, most importantly, in housing estates and around service areas. This, however, is not possible everywhere due to the very dense housing developments constructed in the 2020s and 2030s.

IMAGE AND BRANDING OF CITIES

1. Shaping an image is a high ranking task in the hierarchy of city activities. It is dominated by topics related to the economy as well as the climate and migration crisis. Cities see their image advantage in the way they respond to these problems (especially as their competences and budgets have increased), so this is a major axis of communication.

2. The main audience for the image communication are the city dwellers, whose well-being, in the face of growing problems, is a real, fundamental goal, not just an entry in the strategy. Measures are also targeted at new groups of inhabitants (migrants) in order to reduce unrest and gain relative control over the structure of the population – cities position themselves as suitable for specific groups.

3. Poland’s largest cities compete for wealthy residents and entrepreneurs in 2050, to boost their tax revenues. Settlement competition in this segment begins to take the form of legal particularisms – some measures applied by local governments (such as drastically higher levels of local fees for people who do not pay PIT in the city) are accused of violating the principle of equality of citizens before the law.

4. Wrocław is perceived as a relatively wealthy city with a fairly mild climate, which is a great opportunity to shape its positive image.

5. Being a city with a heritage of multiculturalism, openness and tolerance (‘Wrocław, the meeting place’), it has a great advantage and image basis to use the problems of

migration in a positive way for the future. However, branding efforts must go far beyond marketing and focus on building shared value in the new and challenging reality where diverse needs and interests must be reconciled.

6. Action on climate change requires a separate, albeit coherent, approach. In this aspect, the city can build the image of a leader looking for the best solutions and effectively implementing them in cooperation with its residents and the local organisations. What is potentially important here is the role and recognition of grassroots initiatives that the city can support and encourage.

A DAY IN THE LIFE IN A CRISIS

Jurek seemed to be unenthusiastically poking at the stew with a fork, but he was eating nonetheless. If he doesn't eat it, well, he's in trouble because there is no dinner at home. On the whole, the stew is even tasty. It is for everyone. 'A bit like our school', he thought. – 'A democratic school, a democratic lunch and a democratic city. Too bad the factories are undemocratic', he thought and shifted his gaze from his plate to the home entry card case lying on his table in the open-air canteen. The case was very nice, made of shiny synthetic leather, embossed with his parents' factory mark. Or rather, a factory where his parents worked. With an emphasis on the past tense – did work. Since the state-owned production plant of batteries for electric cars closed six months ago, the family has had to make some crucial decisions. And they had to do it fast. They returned from Jawor to Wrocław to at the grandparents' house to cut costs. They reduced them in all aspects and probably had to reduce them further – Jurek was already a teenager, almost a grown-up man, so he could see that the family's resources had only been decreasing for several months.

'We're not the only ones', he thought, lifting his gaze from over his plate to the crowded school dining hall. 'For this school, it's every home'. But that was little consolation.

The lunchroom was divided – unofficially, of course, because that would certainly not have been allowed to pass, but it was – invisibly so. There were immigrant groups sitting further from the entrance. 'Our' groups were closer to the entrance. The passage was not sharp, there were mixed tables, but they were a minority.

The further away from the centre, the more homogeneous and the more demonstrative these divisions were. Above them one could see a 'democratic' glass photovoltaic canopy with dozens of tilted windows, and even higher – the sky, perhaps shared because it was quite indifferent. There were no walls in the summer either – they were dismantled. The lunchroom was open, just like the city. Jurek pecked the last vegetables from his plate with a fork. The buffet was on the axis of the canteen, seemingly for everyone, but somehow it happened that the desserts were on the 'Polish' side. Well, that was a pure coincidence.

Right then, one of the 'others', from the very centre of the immigrant hub in the lunchroom, moved towards those desserts, head high, looking above the people sitting around, gazes not meeting. 'He is coming out of the heart of darkness', Jurek thought. 'Or is he going into the heart of darkness? This is a horror', he whispered, pushing his plate away, knowing what was about to happen.

When the brave one was already reaching for a bowl of red fruit jelly topped with a creamy sauce, the things proceeded rather quickly and predictably. One of the girls sitting nearby, at 'our' tables, rose and squeakily shouted something insulting in a language that was neither 'ours' nor 'theirs', but sounded like an ugly caricature. The boy ignored her, but it didn't matter, the spring in the infernal machine was already released. Spontaneous secondaries were already jostling their chairs and standing up on both sides. The cameras above the buffet began to look around with a rustle. The crowd

in the middle of the room was getting thicker, the brave boy had already withdrawn – with the jelly – but his colleagues were queuing up and, looking defiantly at ‘ours’, very slowly, rather phlegmatically, took one each. ‘Others’ surrounded by ‘ours’. Raised voices. It was stuffy, like it would be before a storm. Jurek was watching the scene and drinking his compote. ‘I’m getting out of here, there’s going to be trouble’, he thought.

Before he had the chance to get up from his seat, he was stopped. The siren called, the light blinked. Dozens of motors of the photovoltaic roof activated, teachers were already rushing in from the main school building. A loud rumble of thunder could be heard from the north-west, immediately followed by the moaning of sirens in the area. Is it coming from Lublin or from Żmigród? Will there be hail? ‘Let justice spill out like water...’, Jurek muttered to himself as he was walking briskly towards the school building. The bell that announced the end of the break mingled with the alarm siren. ‘Well, we’re clearly not coming back to class’, laughed the girl who overtook him running. ‘Calm down! Please don’t run!’ – shouted one of the teachers hysterically. More than three hundred students were going down to the shelters. Of course the stairs were jammed. ‘What kind of moron designed this? Going into a basement during a flood is so stupid’, complained one of the final year students, a boy with long hair. ‘They have accepted the truth about climate change, but they have not yet adopted the laws of physics for grade 4 of primary school’.

Indeed, the evacuation project had its drawbacks, but since there were no windows in the basement, there was no risk of injury from broken window glass if the summer storm was accompanied by more hail. It was one of the schools built for the millennium, soon to be centenary itself, so there were lots of windows, big ones. Shutters were planned – but you can plan a lot, and in the times of crisis there are few resources. That’s why everyone went to the locker room, to the basement. But the elements did not allow themselves to be forgotten. Those who were closer to the massive drainage pipes built in the past few years could hear thousands

of litres of rainwater pouring down there with a bang throughout the entire period of alarm.

Jurek was sitting in one of the rooms, mingled with people from another class, from another year group, and unfortunately he was sitting with his back against the wall, behind which this nightmarish rain collector was – that’s how he had been led. There was a lot of noise and while there were lively conversations, laughter and jokes in the other changing rooms, in this room you would have to shout to carry on a conversation. The ones who sat closer to the wall chatted a bit, but most sat in silence, staring at the feeds of their dermo-visualisers or playing games on their micro-consoles.

She was sitting diagonally across and her eyes were closed. ‘Is she pretending to be asleep? No kidding’, Jurek thought. Rapid movements of her eyeballs suggested that there was a great deal going on in her head. ‘She got high on something? No, I don’t think so’ – he analysed, staring at her. ‘Let’s have a look in the virtual reality’. He started the application on the dermo-visualiser, shielding his forearm with his sweatshirt for minimal discretion. ‘Sofija2034, which means local-not local. Okay, that would be correct. And you have implants under your eyelids, who would have thought, not visible at all’. Sofia’s avatar on the screen of the dermo-visualiser raised her head towards Jurek and he almost jumped in place, hiding the screen under his sleeve and instinctively raising his head towards her. But no, her eyes were closed. He revealed the screen again – the black angel with huge violet eyes, her avatar, blushed and blinked.

By the time the storm was over, school was over too. The route they both took to their homes happened to be in the same direction. They were walking through the storm-torn city of Wrocław, on both sides of the street – the girl walked with one eye covered with her hand, the boy was staring at the dermo-visualiser. Meanwhile, in the virtual world, Sofija2034 and JURUS_WRO walked much more closely, overlapping with each other’s avatars. They walked past hail-crushed vehicles and spreading patches of tall weeds which, laid down by the force of the rain, revealed the underneath, lighter side of the leaves.



Slow life

SCENARIO 3

THE YEAR IS 2050. The ongoing climate change has been accompanied by an increase in the environmental awareness of people all over the world. The societies of developed countries began to care about stopping the climate crisis which threatened the future of younger generations. This has given rise to a willingness to implement far-reaching measures to reduce the ecological footprint. A gradual shift from the economic growth paradigm to sustainable development has begun. Gross domestic product is no longer an indicator of a country's economic success. What has gained in importance, however, is its composition and the economy's actual potential to meet the living needs of current and future generations in an efficient manner. Major social and economic changes have also occurred in Poland. Automation has shortened the standard working week, thus giving people more time to deal with everyday matters in peace. The negative externalities of corporate activity have been internalised with appropriate tax policies, which has led companies to show concern for their impact on the environment. Social capital and citizens' concern for the common good have increased significantly in Poland. Due to the abundance of greenery, Polish cities offer physical and psychological relief to their inhabitants. People enjoy sitting in green urban gardens organised on the roofs of buildings. Cities offer a high standard of living and encourage various forms of activity and leisure. Residents spend their leisure time taking care of their surroundings, meeting friends, experiencing culture, learning new things or getting involved in social life.

INTERNATIONAL AND DOMESTIC ENVIRONMENT OF WROCLAW

POLITICS



- 1.** Over the past three decades, the need to act collectively to prevent and adapt to climate change has eased tensions between the world's largest economies. Climate action has become a priority of each country's domestic and foreign policy, and its effective implementation has required cooperation at the international level.
- 2.** There is no single, distinctive power on the international arena in 2050. Strengthening regional cooperation and the consolidation of regional political and economic communities have constituted an important trend over the past two decades. In addition to a strengthened and more strongly integrated European Union, the enlarged Association of Southeast Asian Nations and the Union of South American Nations, revived in the late 2020s, now play an important role in global politics. Due to internal crises and the consequences of climate change, the African Union is relatively weakest.
- 3.** The level of international cooperation on climate issues has increased to such an extent that today we can speak of collective decision-making by the developed countries of the world.
- 4.** The global number of armed conflicts has also decreased. The emerging clashes are of a local nature and mainly concern the countries of the South, affected by the humanitarian crisis.
- 5.** In the 2030s, a mechanism was established under the UN to distribute funds to help the countries bearing the highest costs of the economic and energy transition. International transformational aid is being implemented at the expense of the development aid to date. The sets of beneficiary countries for both types of aid do not fully overlap. While development aid was provided to the poorest countries of the world, transformational aid is reaching the countries affected by rapid industrialisation at the beginning of the 21st century. The poorest countries that have not yet reached this stage (such as Sierra Leone, Chad, Eritrea, Niger) have been deprived of support. This, in turn, is received by India and Brazil, which could not make the effort to shift towards reducing emissions on their own without international assistance.
- 6.** Depriving the poorest countries of development aid with their growing problems (relatively high rates of demographic growth, the tangible effects of climate

change and the decreasing availability of food) resulted in a humanitarian crisis, civil wars and a large wave of migration.

Developed countries are taking in refugees due to their sense of responsibility for this crisis.



1. The level of European integration has tightened relative to 2021. The cooperation between the Member States is now much better than three decades earlier. There is a high degree of compatibility in terms of objectives, solidarity and coherence in development concepts.

2. Since the early 2020s, the European Union has made it a priority to move towards a zero-carbon economy while minimising the associated social costs. The Community's policy was primarily subordinated to this objective over the following decades.



1. In Poland, compared to 2021 the importance of social participation in central and local government management has increased significantly. People are more willing to engage in civic activities on behalf of local communities, and modern digital technologies enable effective social dialogue.

needs of the residents of the city and its surroundings.

2. For Wrocław, the increase in participation was an opportunity to implement measures better tailored to the actual

3. Local governments in Polish cities are keen to cooperate with other local government units in Poland and other EU Member States. Close cooperation is carried out both between neighbouring units and units which face similar problems. Cooperation and exchange of experience fosters successful and effective management.

THE ECONOMY



1. The gradual shift from the paradigm of gross domestic product growth to the implementation of the concept of sustainable development has been a key change in the post-2021 global economy. This change was forced by the adoption of ecological priorities by the world's largest economies and the contradiction between the traditional understanding of economic development and the protection of the natural environment. It has been recognised that protecting biodiversity and containing climate change set limits to growth. GDP, as a simple measure of value

added in the economy, was not suitable for measuring sustainable development. Since GDP reveals nothing about the structure of an economy, it has grown both in innovative, green-transforming economies and in ones that have based their wealth on exploiting the environment or extracting and burning fossil fuels. In fact, the latter often performed better. GDP growth has also been supported by increased levels of consumption, which has had an adverse effect on climate and pollution levels. On the other hand, GDP did not include other components of

well-being, such as the health status of citizens (including mental health), their life expectancy or the average level of life satisfaction and its variation in the society.

2. Hence, in 2050, it is no longer the amount of GDP that determines the success of an economy, but its actual ability to meet the daily needs of the current and future generations in an efficient manner.

3. Due to the high carbon footprint associated with transporting goods, the global economy has been shifting away from international trade in goods towards the development of local production over the past decades.

4. In the last three decades, however, the globalization of services has accelerated. This was related to the greater acceptance of remote interactions, caused by limiting

travel only to the ones which are essential and maintain a low carbon footprint.

5. As a result, international trade in 2050 involves trade in goods to a marginal extent. The core traded assets include services performed remotely, intellectual property, industrial designs, rights to use specific technologies and *know-how*.

6. The gradual automation of work has also been an important change. More than 40 per cent of 2021 occupations are currently performed by machines.

7. In spite of the changes in the economy, the global demand for electricity increased by more than 40 percent compared to 2021. This is mostly due to the growth of the global population, the wealth of societies and the development of information networks (in particular, the Internet of Things).



1. The European Union uses the single currency, the euro, in all of its Member States.

2. In 2050 most of the commodity needs of the inhabitants of the European Union are satisfied by local production, i.e. production carried out within the given Member State. In the most extreme case, the local nature of production means production within your own apartment with the use of 3D printing technology.

3. However, the countries of the Community have not completely given up on intra-EU trade in goods. However, the transport of such goods is carried out using zero-emission measures – mainly via the tube railways which serve the main European trade routes.

4. The process of developing the tube railway network posed a threat to Wrocław. The infrastructure was often

built alongside, rather than instead of, existing railway lines. Wrocław was in danger of losing its advantage related to the specificity of the Wrocław Railway Junction in favour of a tube railway node located in a different, nearby center, e.g. in Wałbrzych, Opole or Legnica.

5. Social changes have made environmental issues an important factor in consumer choices. Europeans, including Poles, have stopped buying goods with a high carbon footprint. In 2050 such goods are practically no longer traded on the common market.

6. Over the last thirty years, cooperatives have gained in importance. They are currently one of the main forms of organising economic activity.

7. Landline shops remain a very important retail channel in 2050. This is due to three main factors. Firstly, the delivery of goods

to retailers in place of direct delivery to the customer consumes less energy and solves the so-called 'last mile' problem. Secondly, as regards grocery shops, a return to daily shopping at a nearby outlet has made it possible to reduce the scale of food waste. Thirdly, the 2050 Europeans appreciate the importance of everyday, face-to-face social interactions, even as fleeting as the ones that take place during everyday shopping.

8. The European Union has been functioning with an unconditional basic income regime, introduced 10 years ago in response to the rapid automation of work and growing structural unemployment in the Member States. Initially, the form of the income differed

from one Member State to another. The differences concerned mainly the amount of the benefit. It was not unconditional everywhere from the start either. In some countries, including Poland, the benefit was initially paid only to selected eligible persons. Over time, however, this tool was standardised.

9. With the basic income, every citizen is able to survive while unemployed. Most people, however, do work. They do not do so for financial reasons, but mostly because work gives their lives meaning and is a source of inner satisfaction.

10. In 2050 the European Union is a global leader in circular economy solutions.



1. The fourth industrial revolution has taken place in Poland. The vast majority of workstations in production plants have been automated. Most plants use autonomous production lines, which not only produce successive units of products automatically, but also have the ability to self-organise and optimise production processes. The role of man in these plants is limited to approving production targets and monitoring potential errors.

2. Simple office workstations have also been automated. Algorithms perform, among other things, simple analytical work, programming, lower-level managerial tasks and financial and accounting tasks. Many workplaces were supported by robots and so-called co-bots cooperating with humans. These are mainly jobs which combine the requirements of physical strength and precision, or tasks which require social interaction. Co-bots function in warehouses, in retail and in the area of nursing and care services.

3. The negative externalities of corporate activity are internalised through appropri-

ate tax policies, so that Polish companies take responsibility for their impact on the environment. The green technology sector plays a key role in the Polish economy.

4. Through automation and social and economic changes in Poland, the working week has been reduced to 32 hours – four days per week. In addition, nearly half of Poles work on a part-time basis, usually half-time.

5. It was a challenge for cities like Wrocław. More free time meant that it had to be managed in an attractive way. Expectations rose in terms of urban infrastructure and public spaces which would encourage walking, socialising and shared activities.

6. Poles in 2050 mostly work in semi-remote mode. Most companies do not need employees on site at their premises. People who do not like to combine work and personal life usually choose to work in co-working offices. From such offices, which provide adequate infrastructure,



they work remotely for their enterprises, which can be located even hundreds of kilometers away. For the employee, however, the office is just a few steps from home.

7. However, local service providers such as shop workers, caterers, care workers or beauticians work on site. This work, however, is light and fun in 2050, with the support of co-bots. The purpose of human presence is mainly to meet the social needs of the client at the place of providing the service.

8. The above changes have created a number of opportunities and threats for Wrocław. Above all, remote work options

have diminished the benefits of companies located in large cities. This poses a threat of an outflow of entrepreneurs registered in Wrocław and the Wrocław district and a drop in CIT revenue. Secondly, residents' demand for commuter transport – both public and individual – has decreased significantly. This provided new opportunities for the management of the recovered space and the capacity of urban routes. Finally, the expectations of the Wrocław residents have changed with regard to the environment in which they live. Mono-functional residential districts have lost their attractiveness. People began to look for locations with diverse infrastructure and functions, providing office, residential, service and leisure spaces.

THE SOCIETY



1. In 2050, the world is home to just over 9.5 billion people, while the global rate of demographic growth continues to slow down.

2. A clear generational shift has taken place in the world. The generations

brought up in the 21st century recognise the importance of climate change and the need to make hardships and sacrifices in the name of preserving the conditions which make life on Earth possible.



1. European society has started to care about stopping the climate crisis which threatens the future of younger generations. This has given rise to a full acceptance of the implemented reforms aimed at reducing the ecological footprint.

2. European countries accept migrants who leave their previous places of life due to the ongoing climate change or armed conflicts. They receive social support, start-up aid and job assistance. Europeans do not discriminate the

newcomers in any way. Due to this approach, there are no large differences in economic status between the immigrants and the old inhabitants of the continent. This has prevented social tensions.

3. The number of European Union single-person households has increased over the recent decades.

4. Local communities have gained a great importance in social life. Europeans are now less likely to form large families

(more than half of people over 25 live alone), but they are more likely to socialise with their neighbours and spend more time out and about.



1. Public trust in Poland has grown tremendously since 2021. This is partly attributable to the introduction of basic income and a growing sense of social security. The country's high social capital encourages civic and pro-social activity. The Poles also attach great importance to protecting the natural environment.

2. With the shorter working week, Poles have more time to take care of everyday matters. More time is devoted to friends, family and community than it used to be. People no longer live their lives in perpetual haste.

3. Over the last decades, the people of Poland have been very cautious in deciding to have children, although the reasons for these decisions have changed over time. In the 2020s, these were mainly livelihood concerns related to financial constraints and the limited ability to provide children with good living and development conditions. As time passed and the effects of climate change deepened, people also began to fear for the future of their offspring in a world threatened by disasters. An increasing number of people are now giving up the idea of having children due to the overpopulation of the planet and its impact on the environment and climate.

4. The ongoing social change has facilitated the choice not to have children. In Poland, the acceptance of various lifestyles has increased dramatically over the last 30 years. The path of personal life is not always followed according to the standard scheme, in which, after the period of adolescence and early youth, it is time to stabilize, start a family and have children.

5. The European Union residents live longer and stay fit longer than they did in 2021. They are also much less likely to suffer from mental disorders and illnesses.

Many people today live alone, but maintain strong social relationships with their neighbours and friends. There are also various types and forms of relationships. Although bi-sexual and same-sex marriages are still occurring, many people are opting for other relationship models: open, polygamous, temporary relationships. Marriages, on the other hand, are not necessarily contracted in people's youth. Everyone lives their lives the way they think is best for them at the moment, without facing the disapproval or misunderstanding of others.

5. For Wrocław and other Polish cities, the decline in fertility rates and lifestyles was a big challenge. It required adapting the organisation of preschool and educational institutions to the new conditions. Finding the right balance between the density of distribution of schools and kindergartens and the minimum number of children per school was a particularly difficult task.

6. Poland has taken in nearly two million climate refugees. The migrants have received support to adapt to their new circumstances from the Polish society and the country. Their current social and economic position does not differ from the average for indigenous Poles. The admission of refugees has temporarily prevented the demographic crisis associated with an ageing population.

7. The large number of migrants has brought about a challenge for Wrocław to make the urban space friendly to people of other cultural backgrounds. This required maintaining sensitivity to their specific needs.

8. The people of Poland are generally in better health than they were three decades earlier, and remain fit for much longer. The improvement was mainly due to the elimination of harmful civilisation factors: stress, fast pace of life, air pollution and poor diet. The progress in medicine and new, less invasive methods of treating cancer and cardiovascular diseases have also been of considerable importance. Mental health also improved significantly.

9. Public healthcare is one of the state's priorities. There remains a single central payer for health services. However, healthcare is subsidised and well organised. Access services provided at home are also efficient. However, there are still queues for selected medical services. Access to care is better in large urban centers than in smaller towns and rural areas.

TECHNOLOGY



1. Digital and autonomous technologies as well as robotics have developed over the last three decades. Great progress has also been made in the field of artificial intelligence, which has contributed to the automation of many professions. Artificial intelligence has not yet reached the level of singularity that many experts have predicted.

2. However, energy-efficient quantum computers with very high computing power are in widespread use.

3. In parallel, rapid developments in the field of genetic engineering have made it possible to treat many previously serious or fatal diseases.

4. Food production and processing technologies have also been improved. Among others, industrial laboratory food production technologies such as cell culture of meat and synthetic milk production have been developed.

5. Rapid progress has been made in the area of green technology. Efficiency has increased and the cost of renewable energy has dropped drastically. New materials are created to increase the opportunities for economical energy management. The efficiency and scalability of CO₂ sequestration technology has also been increased.



1. The European Union is a global leader in the field of recycling technologies.

2. Emission-free transport has developed within the EU. In particular, the replacement of the most important intra-EU air links by a tube railway network has been achieved.



1. Poland is currently an exporter of many green technologies. These include,

in particular, technologies related to the production of energy from renewa-

ble sources, including advanced photovoltaic technologies. We also maintain a strong position in the area of gas filtration technology.

2. The country boasts state-of-the-art waste sorting and processing technologies.

3. Beginning in the early 2020s, when the first Perovskite cell factory was opened at the Wrocław Technology Park, the photovoltaic industry, of which the Lower Silesian province is now a major hub, developed in the region.

THE ENVIRONMENT



1. Despite sustained global climate action, the world has still not achieved climate neutrality. However, compared to 2021 global greenhouse gas emissions have decreased by more than a half.

2. In 2050 average global temperatures are 1,6°C above pre-industrial

temperatures. As a result of climate change, biodiversity has been declining and conditions for food production have deteriorated in many parts of the world.

3. Global environmental pollution increased in the 2020s. Since then, however, unfavourable changes in that regard have slowed down.



1. Over the recent decades, average temperatures on the European continent have been rising. However, in spite of the concerns, the Gulf Stream has not disappeared.

2. The European Union has succeeded in achieving almost all the objectives of the Green Deal over the last three decades. The Member States have achieved climate neutrality.

3. Currently, the Community is striving to preserve and restore biodiversity in the Member States. The countries are recreating their natural ecosystems. Protected areas and the extent of species protection have been increased. There are currently a number of reserves within the EU where access is prohibited.

4. Most of the EU's production meets the conditions for a circular economy.



1. Poland is affected by the effects of climate change. We face violent weather conditions, including heat waves, windstorms, torrential rain and flooding.

2. The problem of periodic floods has posed a particular threat to Wrocław due to its specific location on the Oder and its four tributaries.

3. Due to the prohibitively high costs of CO₂ emission allowances and the worldwide lack of social acceptance for fossil fuels, coal mining in Poland has become extremely unprofitable. The last Polish coal mine was closed in 2042.

4. Given the high social acceptance of the ongoing pro-environmental shift and the EU financial support for the trans-

formation, Poland has already managed to fully decarbonise and achieve climate neutrality.

5. Poland has been free of smog for more than a decade and has an efficient

resource and waste management system in place. We maintain an efficient system for the collection and recovery of raw materials from waste.

THE LAW



1. The European Union has introduced a range of regulations aimed at protecting the environment, mitigation and adapting to climate change.

2. There has been an absolute ban on raising animals for food purposes since 2045. It is not allowed to farm animals for meat, and egg and milk production are also banned. Natural meat and dairy have been replaced by plant-based products, meat from cell cultures and dairy from laboratories. These products have high nutritional value and, due to the reduced number of links in the food chain, their

production is much more efficient and has a much lower environmental impact.

3. EU countries have introduced restrictions on the packaging of goods. All disposable packaging must be recyclable with at least 10 recycling cycles. Returnable packaging is common, as is the sale of products to be filled or sold by weight from hygienic containers.

4. All non-industrial buildings built in the European Union after 2040 must meet the zero-energy target.



1. In 2050, there are regulations in Poland to ensure a high level of care for the climate and the quality of the environment. They cover many aspects of life and are strictly enforced.

2. In addition to the EU restrictions on packaging and food of animal origin, Poland also has introduced laws establishing high rates of greenhouse gas emission charges, high fines for emissions to air (for both individuals and businesses), high fines for activities which threaten biodiversity (for both individuals and businesses), and generous subsidies for activities which foster the protection and restoration of ecosystems. Wrocław and other cities in 2050

WROCLAW AND OTHER CITIES IN 2050

THE ROLE OF CITIES

1. Relative to 2021, the world has experienced significant urbanisation. Cities provide people with access to infrastructure and shelter from the effects of climate change. In densely populated areas, food and water distribution is easier and access to medical services is better.
2. The development of food production technology has also made cities a good place to grow crops and raise cellular meat. Nearly 40 percent of the world's food is produced in cities. There are centers in the world that are able to meet more than 80 percent of the nutritional needs of their inhabitants.
3. Urban food production has enabled elimination of the phantom of a food crisis linked to the growth of the global population on the one hand and the decline in the supply of arable land as a result of climate change on the other.
4. Food is also produced in European cities. It is, on the one hand, individual production by residents for their own use (on balconies, in home gardens, window sills and in special hydroponic systems). On the other hand, there have been many urban, usually communal food farms, located in abandoned buildings, former car parks and on the walls of high-rise buildings. There are plants producing cellular meat and synthetic milk in many cities as well.
5. Food is also grown in Wrocław. It is currently able to meet at least 30 percent of the nutritional needs of its inhabitants. Growing food was a development opportunity for Wrocław. In fact, it had many former office buildings (e.g. in the area of Strzegomska and Robotnicza streets) and multi-storey car parks (e.g. the car park at Domar) which could be repurchased and converted into food farms.
6. European cities serve as good places to live. They satisfy the need for social contact, cultural exposure and security in the face of the perceived effects of climate change.
7. The green nature of European cities in 2050 also allows to satisfy the need to connect with nature without human intrusion into the restored wild ecosystems.
8. Large cities in Poland are the best place to live. Due to the extensive climate change adaptation measures they have undertaken, they provide a high level of comfort even in adverse weather conditions.
9. Social life, which is a very important part of the life of the average Pole, flourishes in both small and large Polish cities.
10. Wrocław and other large cities have introduced a range of improvements for people with disabilities and for the elderly. They provide them with maximum independence and self-reliance. Removing architectural and urban barriers was a major financial and organisational challenge for Wrocław.
11. Wrocław is also a place to experience culture and spend your free time actively.
12. People are no longer attracted to Wrocław by the availability of jobs. As remote work from home or from co-working offices has

become commonplace, workplaces have become largely independent of where the given company is registered. For this reason, it has

become particularly important to offer residents a way of making life in the city attractive in order to

prevent the outflow of migrants who have come to Wrocław 'for work'.

CITY MANAGEMENT AND CITY FINANCES

- 1.** Urban authorities in Poland have, as they did in 2021, a high degree of autonomy relative to central authorities in shaping development strategies. Cities which form agglomerations set up joint agglomeration bodies to develop common policies.
- 2.** Polish cities, including Wrocław, use smart city systems. The systems of different cities are integrated with each other. This enables the exchange of information and increases operational efficiency.
- 3.** The Wrocław smart city system optimises such aspects as the management of the city's energy grid, water and sewage networks, public transport and public greenery. It also provides warnings of severe weather conditions and activates systems to prevent their effects.
- 4.** The inhabitants of Wrocław are largely involved in city management. Neighbourhood communities play a very important role here as they actively shape their surroundings and join the discourse on the future of the city.
- 5.** As such, the savings of residents who invest in local development cooperatives have become an important source of funding for urban projects.
- 6.** The city authorities create forums for cooperation and exchange of experiences with other cities in Poland and the European Union.
- 7.** In 2050, Wrocław and other Polish cities have reduced access to funding from the European Union's cohesion funds. The standard of living in Polish cities no longer differs significantly from the EU average and they are not entitled to any special support.
- 8.** Cities, on the other hand, do receive large amounts of funding from the EU budget for climate change adaptation and mitigation measures.
- 9.** In 2050, commercial entities contribute to the costs of managing and developing cities. Under the new economic conditions, the interests of private operators are not in conflict with the general interest of the society. Non-public entities are involved in urban development projects for their own benefit and for the benefit of the local community.
- 10.** The service and production activities of companies operating in the Wrocław area must fit in with its strategy and development plans for the area.
- 11.** Wrocław and many other cities in Poland use *social impact bonds* to manage their relationships with commercial entities. The bonds refinance part of the municipal investments made by private entities which fit in with the city's strategy. For instance, if a city wishes to create an intergenerational café in a particular street, it issues bonds for this purpose, the proceeds of which will be transferred to the entity which will undertake such an investment.
- 12.** A proportion of Wrocław's revenue in 2050 comes from selling food grown on communal urban farms to its residents.
- 13.** Wrocław also sells surplus electricity from the municipal grid.

CITY INHABITANTS AND CITY USERS

- 1.** Wrocław currently has a very diverse population. Due to the large number of migrants, the character of the metropolis is multinational and multicultural.
- 2.** In smaller cities and towns the degree of cultural diversity is relatively lower, but they also have a large immigrant population.
- 3.** The largest Polish cities, including Wrocław, have a balanced age structure. In smaller cities, due to the relatively smaller immigrant population, senior people prevail.
- 4.** Since the economic disparities between the inhabitants of Wrocław are low, there are no major social tensions in the city.
- 5.** Over the last decade, given the relatively high standard and safety of life in Wrocław, many individuals have emigrated from smaller towns and villages to the Wrocław agglomeration.
- 6.** The people of Wrocław are eager to buy locally sourced products from local stores. The proximity of the stores means that they avoid overstocking. This is particularly important for food, the waste of which is avoided.

BUSINESS AND ENTREPRENEURSHIP IN CITIES

- 1.** The residents of Wrocław are keen to use the services of local businesses, which encourages the development of the city's entrepreneurial spirit. Small businesses are – physically and metaphorically – close to their customers and their needs.
- 2.** Wrocław's neighbourhood grocery shops sell mostly locally sourced products.
- 3.** Social forms of economic activity such as cooperatives and neighbourhood support groups are experiencing a boom.
- 4.** Wrocław supports pro-environmental and pro-social businesses with its policy.

LIFE IN THE CITY

1. Similarly to other Polish cities, life in Wrocław runs unhurriedly. The short working day encourages non-professional activities. The residents spend their free time caring for their family and friends, and more distant surroundings. They cultivate their gardens, prepare meals and meet their acquaintances.

Many people experience culture, learn new things or become involved in social life. The life of a Wrocław resident in 2050 is much more colourful and varied than 30 years earlier.

2. Wrocław residents rarely move between districts. They are able to

satisfy most of their needs in their immediate vicinity.

3. With its overwhelming greenery, Wrocław offers physical and mental relief. People enjoy sitting in green urban gardens organised on the roofs of buildings.

URBAN PLANNING, SPACE DESIGN AND URBAN GREENERY

1. Residential housing in a modified form of co-living has gained popularity in Europe, including Poland. Residential buildings are rebuilt in a new layout, in which relatively small apartments are accompanied by large common spaces where neighbours can spend time together. It is impossible to feel lonely living in a European city today.

2. Cities in Europe focus on sustainability and the comfort of their inhabitants. Mono-functional neighbourhoods are virtually no longer found. The urban fabric is intertwined with mixed-use developments: residential, office, food growing, recreational, educational and other uses. Europeans do not have to travel long distances to get to work, go shopping or visit sports facilities.

3. Wrocław began the process of adapting to the new requirements well in advance. This is because single-family housing estates (Zalesie, Sępolno, Bartoszowice, Krzyki, Borek) account for a large part of its development, which could potentially make it difficult to fit into the trend of multifunctional neighbourhoods. However, the city had already been pursuing a 'complete estates' project since the early 2020s, with the aim of making such estates multifunctional. As a result, Wrocław gained an advantage over other cities which did not undertake such actions in advance.

4. Many buildings and urban structures across Europe perform the nature conservation function. Their façades are covered with adapted vegetation or photovoltaic

cells. The latter are typically sourced from Poland.

5. Similarly to other European cities, Wrocław has convenient and efficient zero-emission public transport. The last-mile problem in residents' transport is solved by public personal transport facilities such as bicycles, scooters and the like. Individual private cars are used almost exclusively by people with disabilities. In 2050, the low convenience and high cost of using private cars discourages Wrocław residents from owning them.

6. Most of the EU's urban buildings have zero or positive energy status (producing surplus energy).

7. Around 30 percent of buildings in the EU use water recycling

systems and an additional grey water circuit.

8. European cities are oases of vegetation. Urban greenery serves a recreational and functional purpose. It provides protection against the negative effects of climate change. It prevents drought and heat islands, provides shade by protecting against overexposure to UV radiation, purifies the air and provides food.

9. Since the early 2030s, both Wrocław and other Polish cities have massively implemented urban planning solutions to adapt

to climate change. It has been a particularly difficult challenge for Wrocław to modernise buildings and introduce urban greenery in the Old Town area.

10. Wrocław has managed to overcome the suburbanization trend. It has become such a comfortable living space that moving to the suburbs is no longer an attractive alternative. With higher environmental awareness and concern for the environment, people do not want to contribute to the conversion of even more land.

11. Polish cities have developed infrastructure for personal transport. The wide arteries formerly used by cars are being replaced by green lanes and multi-speed paths. For Wrocław, investment in the new infrastructure has been a major challenge. They required narrowing and reconstruction of arterial roads leading to the city centre (including Żmigrodzka, Krakowska and Opolska Streets, Powstańców Śląskich, Karkonoska, Legnicka and Jana III Sobieskiego avenues).

IMAGE AND BRANDING OF CITIES

1. The image-related activities of Polish cities in 2050 are aimed at maintaining their position as 'responsible caretakers', treating the well-being of not only their current inhabitants, but also future generations and society as a whole as their most important concern.

2. The society's needs revolve around culture, spirituality, self-fulfilment, as well as empathy and a sense of community. Consequently, cities focus on their distinctive characteristics through the lens of the values that their citizens identify with and represent. This is the main topic of marketing communication aimed at building the image of cities.

3. Furthermore, cities highlight their role and achievements in shap-

ing and distributing the common good, and communicate the effects of their actions in this regard and their consequences for the public.

4. The recipients of such city image activities include the general public, and in particular groups for which it is important to build a community and implement solutions aimed at fostering the common good. Active players in the city, committed to its development and the multiplication of shared value, are the key group.

5. Wrocław had the opportunity to use its achievements to communicate not only the values which are important to its community and which guide them in their daily lives (in line with the brand strategy), but also to present the effects of

acting in accordance with them – as an effective, active city that contributes to the common good for mankind – and the contribution of which matters beyond the city's borders.

A DAY OF PEACEFUL LIFE

'It may be hard to believe today, but while Paweł Włodkowic was advocating the right of nations to self-determination and the prohibition of extermination on the basis of religion at the Wretslaw Diet, the town was also a centre of implacable hostility towards the Hussites and Catholic ultraloyalism under the sign of the Luxemburgers. Probably also in this church, the church of St. Stanislaus, St. Dorothea and St. Wenceslaus, which was built as a symbol of concord between the three kingdoms, and at that time belonged to the hermits, the faithful listened to sermons denouncing the Hussite heresy, and perhaps even inciting to violence...' – a friendly elderly gentleman with glasses and a pronounced English accent suspended his voice, as if with embarrassment, and headed down the street. Yetunde looked around again, watching the handcarts and horse-drawn carts rolling towards the stone bridge over the moat and the town square. Men and women in funny medieval costumes walked crowded in both directions, snapping their shoes and bare feet on the stone pavement. Step by step, Yetunde, accompanied by the rest of the group, moved on, following in the guide's footsteps. Her neighbour, Anna, came closer and, smiling with a flash of serene blue eyes from under the woollen hood of her robes, said: 'It is not the worst of times we live in, though'.

The alarm on Yetunda's AR glasses began to flash discreetly at the edge of the field of vision. She stopped the historical application with a small gesture of her hand, and Świdnicka Street before her eyes returned to its everyday state of 2050. The medieval costumes, vehicles

and buildings have disappeared, and so has the friendly guide. The church was still there. Her neighbour was there too, still smiling, though no longer in a medieval dress, but in a rainbow neon jacket. 'I guess it is time for me to go', she said, grinning cheerfully from between Yetunda's beautiful black lips. 'Sure enough, it can't be done without you' – laughed Anna along with the whole group of neighbours who had escorted her away. These Wrocław people were different, so different that when she looked at the group, she found it difficult to find any common denominator. They lived in Wrocław, in the apartments of a single staircase. That was probably the only thing they had in common.

Yetunde moved ahead cheerfully. As she walked through the Kazimierz Wielki perimeter park, she mingled with a crowd of people, as usual in the middle of a weekday playing games, chatting and dancing in the shade of the trees. Above them drones glided, moved by the power of silent electric motors, inspecting plants, pollinating flowers and performing a series of not entirely comprehensible tasks – as if the creators of their algorithms always wanted to keep them busy. It was a day like any other – but different for her – for although surrounded by a group of her friends, she felt the stares of almost everyone around her – strangers after all! Heads turned towards her and outstretched hands pointed at her. And yet it was not because she was black. Or was it?

She continued walking towards the market square, passing the houses of the Old Town. Most people have become accustomed to seeing six-foot-tall robots rustling among the

shade-giving vines between buildings and on facades, carrying out their small-scale urban waste disposal tasks. For Yetunda, however, they were always puzzling, especially when squirrels or birds tried to chase them out of their territories and the city robots meekly gave way to them. They were necessary – without them, it would be very labour-intensive to maintain lush urban greenery, which compensated for CO₂ emissions, provided shade, collected rainwater and performed many other functions. ‘I should know them!’ she thought. Today, the less work there was to do and the slower the city life went on, the harder it was to find people willing to do the hard work of being familiar with the hundreds of new varieties and urban species adapted to climate change.

In the market itself, it was hard not to be euphoric. Dense trees and feathered birds, strollers and people snoozing peacefully on deckchairs near the Pręgierz made up the picture of an urban idyll. The noise of footsteps and conversations was not so audible here, as it was muffled by the omnipresent lush plants. Yetunde walked on, towards the city hall, aware that time was already pressing – the AR glasses were doing their job, showing her the way.

However, the idyllic scene was unexpectedly disturbed by the crying and screams of a baby. She looked in that direction. A three-year-old toddler ran as fast as he could from the bushes under one of the large canopy trees, followed by two tangled four-winged mini-robots the size of sparrows, which alternately followed and stopped each other, in a conflict of preset functions. The terrified grandmother was left behind, unable to keep up with the scurrying little boy, as she must have taken a nap while the toddler was frolicking in the bushes. The boy, sprinkled with pollen, ran straight towards Yetunda, blinded by the fear of the pollinator drones chasing him. But a few steps in front of her, one of the robots made an emergency resolution, ripping the wings off its twin – then flew off further away. The boy, unaware that the threat was over, kept running.

Yetunde picked up the electronic insect with a broken wing from the ground. She brought her face close to the ridiculous eyes of the damaged

robotic dragonfly. ‘Poor pollinator, you cannot chase children, even if they smell pollen’, she said with a smile and mock reproach. ‘Do you know that you are from Wrocław? You know how nice we are to each other here?’ – she asked the robot in a whisper, and a few of her neighbours in the group laughed heartily, surrounding her in an even tighter circle.

Two figures in dark uniforms moved from the open door of the town hall. Police officers, perhaps having taken notice of the unusual situation, rushed to intervene, approaching the black woman who was holding a damaged urban robotic vehicle. It was difficult to read their intentions behind the translucent AR glasses, and the whole situation was... very unusual. They slowed their step a few metres away from the group. The neighbours parted and now Yetunde stood face to face with them. ‘Now you will come with us’, she heard. She put the robot gently on the bench and walked away.

In the depths of the building, under the cross-ribbed vaults of the Great Hall of the Wrocław Town Hall, one could see a crowd of people, and on the podium, near the iron gates, dignitaries in suits. The mayor slid his hands under the heavy gold chain on his chest, signalling that he would immediately, happily, willingly and proudly hand it over to his successor. Yetunde felt her heart beating hard, something rose in her throat and her eyes grew warm. Their glances met – and so did their smiles. She entered the hall.

Techno- logical expansion

SCENARIO 4

THE YEAR IS 2050. Rapid technological progress has allowed people to maintain a relatively high quality of life despite climate change. New technologies have enabled a reduction in greenhouse gas emissions while maintaining high levels of consumption. Yet major social inequalities persist, which means that not everyone has an equal share in the benefits of progress. The economy and administration in the Member States of the European Union have become highly automated. Automation has also spread to the sphere of management, both in the private and public sector. Citizen participation has been increased through the widespread use of a key decision-making model which combines direct democracy with a peculiar form of technocracy. Citizens submit their needs and priorities in public polls, while advanced artificial intelligence algorithms propose effective action programmes to reconcile and meet these needs. This model is commonly implemented at both national and local government levels.

With technologies such as holographic images, augmented and virtual reality, most professional and private meetings are held remotely. As a result, people have a limited need to travel. If they do, they tend to use autonomous public transport, which is convenient and efficient. It is no longer cost-effective to maintain one's own means of transport. Where you live is slowly losing its importance.

INTERNATIONAL AND DOMESTIC ENVIRONMENT OF WROCLAW

POLITICS



- 1.** During the 2020s and the first half of the 2030s a trade war was fought between the us and China, with brief interruptions. During this time, both countries have made significant progress as regards automation, robotics and efficient generation of energy from renewable sources.
- 2.** Ultimately, China turned out to be the stronger. In 2050, it is the world's economically largest and politically strongest power, which alone dictates

the world order. The country's political system has not changed fundamentally since 2021.

- 3.** China's dominant position both as a global economic actor, political leader and exporter of a particular model of 'civilisation' was further cemented in 2048 once artificial intelligence (the Superintelligent Neural Network – NSN) in the possession of the Chinese government achieved technical singularity.



- 1.** In 2050, the European Union retains its internal cohesion, even though small ruptures have periodically appeared within the Community. Their background was based on different visions for the development of the Union presented by the Member States. In particular, opinions differed on the topic of further strengthening cooperation with China.
- 2.** The ongoing technological progress has brought about systemic changes. Citizen participation has been enhanced by the widespread implementation of a new governance model which combines representative

democracy, direct democracy and a peculiar technocracy.

- 3.** Local, national and EU authorities are, as before, elected by popular vote, but the policies they implement respond to specific, reported needs of the citizens. The general public polls their needs and prioritises them, while advanced artificial intelligence algorithms propose effective agendas to reconcile and satisfy these needs. These algorithms also track various types of irregularities. Awareness of their effectiveness acts as a preventive measure against nepotism, corruption and other misuse of power. This model

is universally implemented in Europe at both national and local government level.

4. The elected authorities outline the boundary conditions of the operational programmes and take decisions of strategic importance for the region.

5. The new systemic model is met with increasingly frequent opposition and protests. Accusations are being made that we are giving power over

Europe not to the citizens, but to China, where most of the optimisation algorithms come from. Currently, we are still able to reproduce and explain the recommendation formulation process of artificial intelligence algorithms step by step. We are able to check its correctness and validity, which is done periodically. However, the public is concerned that the governance of Europe will soon be handed over to a super-intelligent network, thus eliminating any possibility of control.



1. Public governance in Poland is exercised under the same principles as throughout the entire European Union.

Poland is regarded as a fully democratic country, but the definition of a model democracy has changed.

THE ECONOMY



1. The last thirty years have seen the globalisation of services, thanks to digitalisation proceeding on an unprecedented scale.

2. In 2050, China is the unquestioned leader of the global economy, mainly due to high innovation in the field of information, autonomous and energy technologies. Most of the global corporations operating in 2050 are based in this country. China is a major global supplier of automated and robotic technologies.

3. The us is still in a strong position, although significantly weaker than China. However, its technologies are more expensive and less efficient than the dominant Chinese ones. This gap will certainly become even greater as China begins to apply the products of its NSN on a wider scale.

4. The global position of the us economy is also undermined by internal crises resulting from the country's record-breaking social inequalities.

5. Global electricity demand has increased by more than 40 per cent compared to 2021. The global population growth was the main factor behind the increase.

6. From 2021 onwards, most of the professions that existed at the time have been automated. New areas of specialisation have developed in this place, mainly related to the everyday operation of autonomous systems. People continue to perform tasks which require direct interaction with a live person, mainly related to psychological support.



1. In 2050, the share of the twenty-seven countries of the European Union of 2021 in the global economy is less than 10 per cent. The European Union is an exporter of specialist waste recycling technologies.

2. For the most part, EU Member States have abandoned offshoring by shifting their production to the continent. With Chinese automated and robotic technologies in 2050, production is efficient and effortless.

3. With the rapid advance of automation, Europe has introduced an unconditional basic income. This has prevented a wave of poverty associated with mass redundancies and structural unemployment.

4. The existence of the basic income and the group of people living solely on it has led to increased economic inequalities. Working individuals are significantly richer than non-working persons since they can add this benefit to their salary.



1. Similarly to companies in other European countries, Polish companies rely mainly on Chinese robotic and automation technologies.

2. Most of those who work in 2050 do their jobs remotely from home. For large cities such as Wrocław this posed a certain threat, as the cities ceased to attract residents with their labour market. On the other hand, not having to commute every day, relieving the public transport system and reducing traffic congestion, facilitates a balanced spatial layout of any city and improves the quality of life within its boundaries.

3. Traditional shops are virtually non-existent anymore. Initially, they were replaced by self-service autonomous stores. Later, demonstration centres, where consumers could see the items they were buying before deciding to make a purchase, and enjoy free entertainment and culture, became popular. In 2050, due to rapid advances in holography and virtual reality technology, show centres are also becoming a thing of the past.

4. These changes posed a major challenge for Wrocław. First of all,

the possibilities of renting service space have decreased. Secondly, it was necessary to find new urban functions for the city's existing main shopping streets, including Świdnicka, Oławska, Rynek, Kuźnicza and Piłsudskiego.

5. Nearly 100 percent of purchases made by individuals in Poland are ordered online and delivered to the customer's door with an autonomous means of transport that suits their needs. Depending on the place of residence, it is most often a drone or a delivery robot. Due to the proximity of distribution centers, in large cities such as Wrocław, delivery is usually made on the same business day, usually within an hour of placing the order.

6. The increasing volume of drone and robot traffic posed a major challenge for Wrocław. Indeed, intensive delivery vehicle traffic without adequate regulation or infrastructure poses a risk to pedestrians, urban animals, including birds, and other means of transport.

7. Unconditional basic income is the only social benefit and social policy

instrument in the field of subsistence in Poland. It currently amounts to $\frac{2}{3}$ of the average salary in the country. The benefit is mainly financed by corporate taxes and concession fees.

8. Since the unconditional basic income provides for all basic

needs (including medical and health expenses), separate pension insurance was discontinued. Thus, the concept of retirement age no longer exists. Currently, slightly over 40 percent of citizens aged 18 and over work in Poland. This compares with 50.3 per cent in 2020.

THE SOCIETY



1. In 2050 the world is already inhabited by more than 9.9 billion people. However, the global demographic growth rate is steadily slowing down.

2. The last three decades have not seen a recurrence of a pandemic comparable to COVID-19 in scale and impact.

3. The global society is benefiting from the fruits of technological progress to an unequal extent. The level of automation in the poorer countries of the South is relatively lower than in the highly developed countries, which translates into differences in the quality of life.



1. There has been a marked increase in the average quality of life in Europe. Technological progress has enabled preserving a high level of prosperity in spite of climate change. However, major social inequalities persist, which mean that not everyone benefits from the advantages of progress to the same extent. The less affluent have limited access to consumer goods: the latest VR devices, tourism, deli foods. They are much less likely to live on the outskirts of the city. They have smaller apartments, usually somewhat less well adapted to changing climatic conditions.

2. There are more single-person households than in 2021.

3. European Union member states welcome migrants from the South who

abandon their homes due to climate change. The migration rate, however, is not as high as was expected back in the 2020s. With new energy and climate change adaptation technologies transferred to the most vulnerable regions of the world, it is now possible to inhabit areas that would not have been able to support human life 30 years ago.

4. Consequently, the European society is a society of the elderly. Due to the advances in medicine, prosthetics and robotics, these people remain fit well into old age.



1. With the exception of some representatives of the oldest generation, Poles are keen to use holographic, virtual and augmented reality technologies.

2. The 2050 Polish society is a society of individualists. People spend most of their time in a digital or hybrid world. It is where they freely form their identity and express it in an uninhibited way. It matters increasingly less what region you live in in everyday life. Therefore, the authorities of Wrocław had to answer the question as to what the city could offer to its citizens so that they would choose to live within its borders. Indeed, the virtual world and staying at home appear to be the same everywhere. It was therefore necessary to develop an approach to ensure that Wrocław citizens did not move to

other, cheaper cities in the country or abroad.

3. There have been advances in medical diagnostics, prosthetics and supportive devices for people with disabilities. Care robots are widely available in Poland. Public healthcare is well organised and optimised on an ongoing basis based on artificial intelligence algorithms. The remote medical services sector is highly developed, which has made access to medical care largely independent of the place of residence.

4. Although the Polish society is more culturally diverse in 2050 than it was in 2021, due to some influx of migrants – it is hardly felt in practice. Almost everyone lives in their virtual bubble, without seeing their neighbours for weeks at a time.

TECHNOLOGY



1. A tremendous progress has been made in the last three decades in the field of information technology, automation and robotisation. The development of artificial intelligence and automation technology was made possible by super-powerful quantum computers.

2. In 2048 artificial intelligence reached the level of technological singularity. The Superintelligent Neural Network (snn) remains in the hands of the Chinese government. It currently operates independently of the Internet and is used – with caution – for research and development projects. The world is divided in its assessments and forecasts. Some suggest that the

snn is purely a propaganda product of China and that the level of singularity has not really been reached yet. They are calling for open access to the snn to outside parties. Others express concerns about the future and the impact of large-scale deployment of superintelligent networks.

3. The last three decades have also seen significant developments in technologies promoting climate change mitigation and adaptation. Climate change continues to progress, but with modern technology it is possible to live in a world affected by it. Most people who live in developed countries have become used to these conditions and treat them as normal. Unlike

autonomous technologies, which are an important source of income for their owners, China and other manufacturers have freely donated many adaptation solutions to the countries most affected by climate change. This action was aimed at preventing massive climate migrations and their negative effects on the economy.

4. Green technologies have also developed significantly. In 2050, low-cost photovoltaic cells with efficiency close to 95 per cent are being produced, and active CO₂ recovery plants absorb half of its emissions. These and other technologies in the energy sector have made it possible to reduce global greenhouse gas emissions despite the large increase in electricity demand. It is estimated that the world will reach climate neutrality in as little as 10 years, and we will be heading towards reversing most anthropogenic environmental change in the coming decades.

5. Medicine has made clear progress in the area of prosthetics. Bionic prostheses in 2050 are no longer just simple arm or leg prostheses, but also eye, ear and even spinal prostheses – they allow people who were considered severely and permanently disabled in their early 2020s to reclaim their mobility.

6. Lightweight, bionic exoskeletons which restore mobility and physical strength needed for independent living to the elderly are a real saviour for the ageing population of the developed world. This has significantly reduced the costs of caring for the elderly and the emphasis on the elimination of architectural barriers in cities.

7. Virtual and augmented reality technologies have also developed significantly. Virtual reality is nothing at all like what it was called in the first decades of the 21st century. It is a combination of advanced sensory techniques: sound, smell, projection and holography. Suffice it to say that in 2050 a hologram can be touched. A conference call no longer means talking to people projected on a screen. This experience is very close to a real encounter today. You can shake your interlocutor's hand and sit at the table with them.

8. Due to the popularization of new technologies, the great location of Wrocław has partially lost its importance. The ease of traveling to nearby centers in Germany for professional and business purposes is no longer an advantage, as all such meetings are held online.



1. The EU countries, including Poland, make widespread use of automation technologies. Automation has also spread to the sphere of management, both in the private and public sector.

2. The European Union mainly buys Chinese technologies, although this has been the subject of many internal conflicts within the Community.

3. The European agriculture uses artificial intelligence to optimise its production processes. This has enabled increasing food production despite the perceived consequences of climate warming.

4. Autonomous vehicles are in widespread use.

5. For Wrocław, this meant a challenge for the development of infrastructure to ensure the safe movement of such vehicles on the city's transport routes.

6. Europe has succeeded in adapting most of its urban buildings to climate change. They provide a safe shelter

against heat, storms, wind and flooding. This posed a challenge for Wrocław. This is because it required developing adaptation standards and overseeing their implementation. It has also proved necessary to contribute to part of the costs in municipal buildings and those with a large number of communal premises.

THE ENVIRONMENT



1. Global average temperatures now exceed pre-industrial era temperatures by more than 1,50°C. Global biodiversity has declined and the rate of its decline is still at the level of the 2020s.

2. Environmental pollution has increased on a global scale.

3. However, it is possible to achieve global climate neutrality within the next ten years.



1. The European Union member states managed to implement almost all of the assumptions contained in the Green Deal. With the advanced robotic and digital technologies, it has been possible to meet the Green Deal targets for a circular economy. Thanks to effective renewable energy technologies and CO₂ reverse recovery, the EU achieved climate neutrality in 2049

2. Europe has seen a significant increase in average annual temperatures from the levels of the early 21st century. In the wake of climate change, the member countries are plagued by violent weather conditions. Due to adaptive measures, they do not cause great losses.



1. In 2050, only 10 per cent of Poland's energy comes from burning fossil fuels – most of the heat is generated by gas turbines. However, all of the CO₂ produced with their use is re-absorbed by the sequestration systems.

months of a year. This condition was a development opportunity for Wrocław. Reducing the phenomenon of heat islands was its significant advantage over other cities.

2. The surface of green areas has clearly decreased in Poland since 2021. For this reason, heat waves of the summer season are difficult to withstand outdoors. Some people may not even leave their homes for several

THE LAW



1. The use of advanced autonomous systems has compelled the EU's legislative bodies to abolish most data protection laws. Europeans are paying for the convenience of living in a high-tech world with their privacy.

2. In 2050, the countries of the European Union, including Poland, have regulations which ensure a high level of care for climate and environmental quality.

WROCLAW AND OTHER CITIES IN 2050

THE ROLE OF CITIES

1. In 2050, cities provide shelter from the effects of climate change. This is where climate change adaptation solutions are most widely implemented.
2. Cities around the world also provide better access to digital and autonomous infrastructure than suburbs. They also distribute goods and services much faster and more efficiently.
3. Residents of European cities are free to use autonomous assistance technologies in their daily lives. Robots prepare meals, plan and order purchases, and manage the home.
4. European city dwellers have access to cheaper energy as well.
5. It is more expensive to live outside the city due to less dense and poorer infrastructure and higher costs of delivering goods to the place of residence. Its advantages include greater tranquillity and distance from the hectic pace of life.

URBAN MANAGEMENT AND CITY FINANCES

1. European and Polish cities, including Wrocław, commonly operate in the smart city model, using information technologies, including the Internet of Things and advanced artificial intelligence algorithms in the day-to-day governance of the city.
2. The management process in Wrocław has been largely automated. The autonomous city management system is responsible for all decisions and makes choices based on the preferences expressed by the residents. The municipal authorities only supervise the operation of the system. In justified cases, they may suspend the enforcement of some of its decisions, after consulting a national advisory body.
3. In 2050, Wrocław has a reduced access to European Union funding. These funds are mainly used to support the budgets of less industrialised countries to help them meet their obligations regarding the unconditional basic income.
4. Wrocław is financed from local taxes, participation in

income taxes and funds from the central budget distributed according to demand by the automated public finance system of the Republic of Poland.

5. In addition, Wrocław is competing with other cities for investment funds outside of the automated distribution to be able

to implement more ambitious strategic projects.

CITY INHABITANTS AND CITY USERS

1. Given demographic trends, Polish cities in 2050 will have slightly fewer inhabitants than they did in 2021. There are many more elderly people living in Polish cities, including Wrocław, than there were thirty years ago.

2. The declining population was a major challenge for Wrocław. Maintaining as many residents as

possible was essential to maintaining high budget revenues.

3. The proportion of representatives of other nationalities and cultures has increased among the inhabitants of Wrocław. Many of these people work abroad, although they live in Wrocław.

4. Due to increasing multiculturalism, Wrocław was faced with the need to ensure social cohesion and adapt public services to the specific needs of its new inhabitants. It was a major problem, in particular at the beginning of the migration processes. In 2050 most of these tasks are already performed by artificial intelligence.

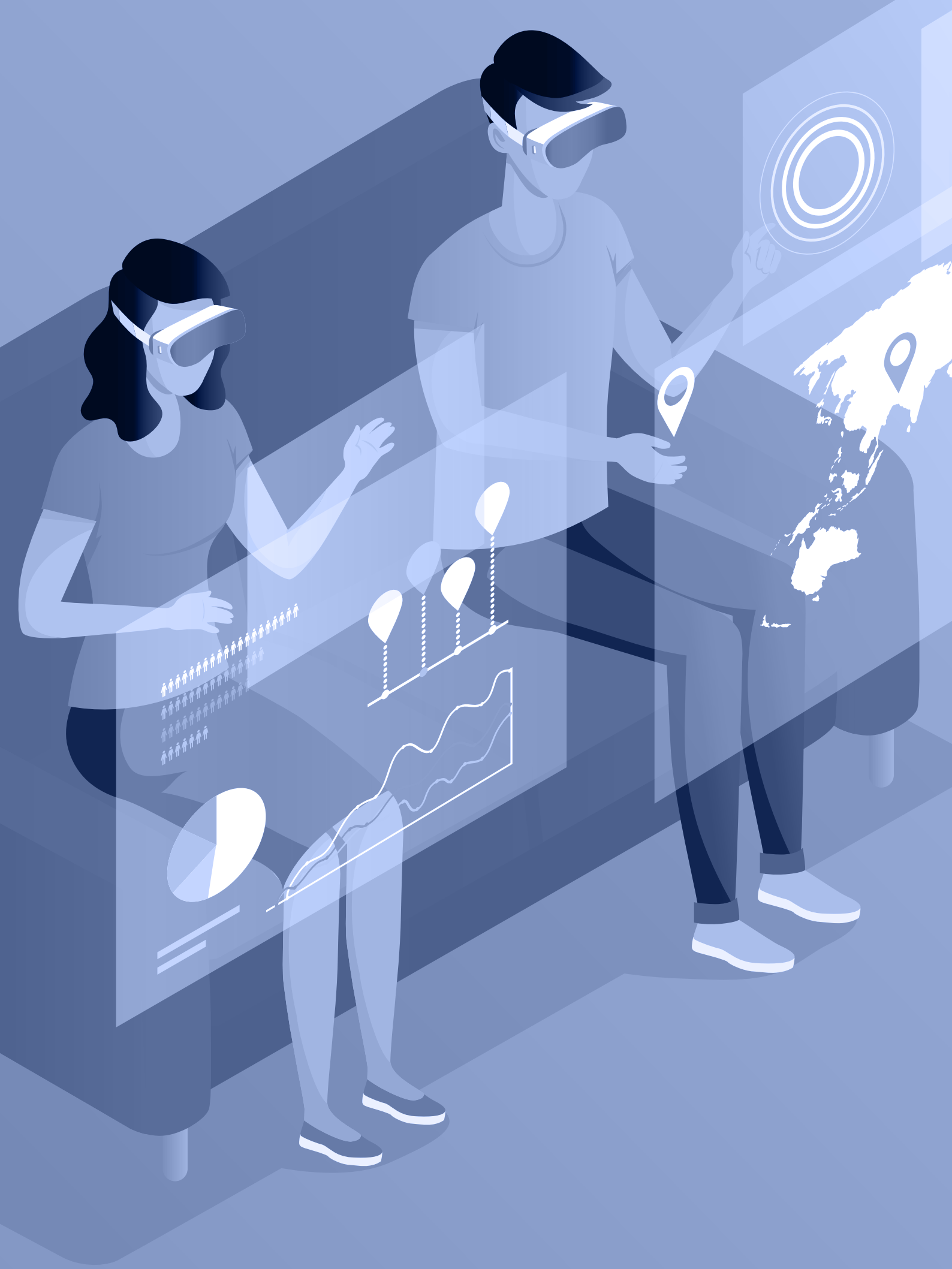
BUSINESS AND ENTREPRENEURSHIP IN CITIES

1. It was important for Polish cities to have modern production facilities located in their area. This is because it provides them with high tax revenues. Wrocław's attractive location has been the

city's advantage in the race for investment.

2. The place of business does not matter for small entrepreneurs, as most services can be provided

remotely. For Wrocław, this poses a major threat of outflow of registered activities outside the city borders.



LIFE IN THE CITY

1. Thanks to virtual reality solutions, most meetings – professional and private – are held remotely. Consequently, people have a limited need for movement. If they do, they tend to use autonomous public transport, which is convenient and efficient. It is no longer

cost-effective to maintain one's own means of transport.

2. The inhabitants of Wrocław spend most of their time in their apartments. They rarely need to go outside, and in summer it can be even unpleasant due to the heat and violent weather phenomena.

3. Occasionally, Wrocław residents go out to undertake activities that they are unable to do in the virtual world. They do outdoor sports or go for a walk outside the city.

4. With the basic income, the phenomenon of homelessness has been eliminated.

URBAN PLANNING, SPACE DESIGN AND URBAN GREENERY

1. Most European urban buildings have been adapted to climate change. They provide a safe shelter against heat, storms, wind and flooding. In Poland, however, nearly 30 percent of city buildings have still not been fully adapted.

2. A number of cities in southern Europe are experimenting with the construction of underground skyscrapers. The structures, which are over a dozen storeys deep, provide shelter from the heat and remove the need for air conditioning, which consumes a lot of energy in the cooling process. The modern design of the underground skyscrapers ensures good ventilation and air exchange. Unfortunately, due to geological and hydrological conditions, they cannot be built in arbitrary locations. Wrocław is currently consulting the possibility

of creating such structures in its area with experts.

3. Most means of transport in European cities operate in autonomous mode. All buses, trains, trams and the metro are autonomous. Selected cities are experimenting with urban modular transport, which combines the advantages of individual and mass transport.

4. The sub-urbanisation and peri-urbanisation trend slowed down in Wrocław in the second half of the 2020s. Stopping sub-urbanisation has enabled maintaining low population density in the vicinity of Wrocław, which is environmentally beneficial and reduces the negative effects of climate change on the city.

5. By 2050, many spaces and buildings in Polish cities are

multifunctional. Mono-functional districts, i.e. mainly or exclusively residential, office or retail, are practically no longer found. The inhabitants can have all their needs met in their immediate neighbourhood. This trend also extended to Wrocław, for which the revitalisation of former office districts (e.g. the area of Strzegomska and Robotnicza Streets) was a particular challenge.

6. As the demand for retail outlets, service units or office space is decreasing, the available residential space in Wrocław has increased. As of 2050, housing is relatively cheap, accessible and convenient. What determines the real estate price is mainly the degree of its adaptation to climate change, including energy efficiency.

7. Most of the apartments in Wrocław have at least one dedicated virtual reality room.

8. Polish cities are diversified in terms of available green areas.

This is because in 2050 its quantity and functionality depends largely on the preferences of the residents. Poorer cities, with a lower percentage of buildings fully adapted to climate change,

tend to have larger green areas surrounded by residential buildings. This allows them to mitigate the impact of adverse climate change on their inhabitants.

IMAGE AND BRANDING OF CITIES

1. The images of Polish cities are becoming similar to each other. Cities build their image advantage based on similar attributes (mainly modern technologies), while focusing on innovative communication tools, rather than on the content of the message itself.

2. The emphasis in image shaping has shifted towards the creation and communication of amenities, and the aim is to become a leader and innovator in this domain.

3. Besides residents, the main beneficiaries of technology in cities are tourists. However, these not only include people who visit the city physically, but also those who are hosted there indirectly, at a distance, mainly through virtual reality. They also benefit from paid services offered by the city and its local entrepreneurs.

4. Cities also focus on attracting talent. Due to remote work, such individuals are more accessible, so cities are trying to build their prestige and reputation in this group.

5. However, widespread automation is causing some audiences to seek more traditional experiences and face-to-face interactions. This was an opportunity for Wrocław. When it comes to image building, the emphasis could be placed on balancing modern solutions with the authentic experience that the city provides.

A DAY IN THE LIFE IN A HIGH-TECHNOLOGY WORLD

As far as safety was concerned, Professor Obornicki's biotechnology laboratory was verging on Prussian rigour and ruthless discipline. The modified fungal spores his team was working on were ultimately intended to revolutionize wastewater treatment and waste treatment plants, permanently reducing the city's negative chemical environmental impacts by 50 percent, which by 2050 are already less than 1 percent of the 2021 level. The by-product would be new materials suitable for road construction. All of this would operate on a model of self-replication, autonomy and secure communication via telecommunications networks. Given how high Wrocław's waste, water and transport efficiency has already been, owing to the staggering advances in technology and human collaboration with artificial intelligence, this task can be classified as non-trivial. Or even more – as devilishly ambitious. But what was at stake here was not just improving the environmental technology of the home town. The market was the entire world – hundreds of thousands of cities around the world which could benefit from the technology. Obornicki's fungi were a potential export success.

Unfortunately, in the 30th hour of work, when the fourth shift of Obornicki's human team members had already entered the custom-filtered mycology laboratory and the accompanying robots were being charged and serviced at the internal autonomous service station – an accident occurred. In the course of reproduction, one of the analysed fungi increased its volume to such an extent that it

floated out of the Petri dish on which it was grown.

In a situation like this, the laboratory was cut off from the outside world, and quite radically at that. The fungi that Obornicki was working on were classified as a level five hazardous substance – which meant that contamination with the research material could potentially have horrific effects, effects far more serious than any of the pandemics of the 21st century. Releasing fungi – which can connect to telecommunications networks and have as a function the task of searching for specific pathogens or chemical molecules and inactivating them by metabolism before they have been thoroughly tested – and certified – into the atmosphere could cause a real hecatomb. A fungus programmed in this way would simultaneously destroy still unspecified chemicals, including in the human body, cooperate with other identical fungi over the internet, and, on top of everything else, replicate itself. It comes as no surprise then that the preventive measures were radical. The information displays were reflected in Obornicki's glasses – and with the lab's isolation process complete, his hand turned the key in the security lock. The annihilation program has been started. Obornicki saw only the bewildered faces of his PhD students through the glass, and then the ravenous flame devoured everything on the other side, in the laboratory. The professor lowered his head silently.

The light went out.

‘This, ladies and gentlemen, is how the twentieth iteration of the ethics experiment in the current sequence came to an end’, said the moderator in a serious but friendly tone. ‘You have seen that the delta algorithm, responsible for the behaviour of ‘Professor Obornicki’, coordinated and implemented the biotechnology experiments correctly, but also, each time, with different sets of specially modified variables, made the same decision, consistent with the purpose of the experiment – he has saved the city and perhaps the entire world, without a trace of hesitation, destroying his life’s work, and without sparing the innocent lives of his PhD students and precious laboratory robots’. He continued, shifting his dignified gaze between the thousands of faces of citizens staring intently at him. ‘I would like to remind you that your task, as the city’s ethics panel, is now to assess whether it is sufficiently convincing and credible to declare the delta algorithm ready for use in real laboratories. This assessment must be based on consensus. We will keep talking until we agree whether the artificial intelligence delta algorithm that animated the actions of ‘Professor Obornicki’ in the experiment can be allowed to operate at the Wrocław University of Technology. Who would like to speak first in the discussion?’. The moderator fell silent and diligently followed the changes of emotional expression on the faces of the citizens. ‘Well, why don’t I start’, spoke up an amiable man with glasses. ‘I’ll be honest, it made me... terribly tired. I no longer know what I’m thinking. I understand this is my job and I am grateful to be able to do it. First of all, I applied for it myself as a representative of the Przedmieście Oławskie housing estate and was approved in the poll... plus, I am a trained ethicist. And secondly... as we all know, I get paid for that. But if I had to watch those twenty laboratory fires again, I’d rather really give up. Can I abstain from voting?’ – he mouthed. The moderator nodded understandingly. ‘I think many of us feel that way at the moment. Let’s take a short break and let’s discuss this in a few minutes, how about that?’

Many days passed before representatives of Wrocław’s housing estates came to a consensus on the delta algorithm. But when it was done,

there was no resignation in the final decision – there was the enthusiasm typical of people who, although they differ, come to a common decision and know that it is the right one – a decision that is not only rational, not only good, but it is one with which they can fully identify. In a world where they have virtually everything, where advanced technology has made life simple, where there is no need to make difficult decisions on a daily basis – making such a decision gives you great satisfaction. The role of the moderator, a truly outstanding figure, was no small part of this.

The light went out.

The assistant professor in a white lab coat took off his VR helmet and, with a deep sigh, turned in the chair towards the grey-haired scientist sitting next to him. ‘Well, Mary, let me tell you that in today’s experiment the deconfliction of public opinion went quite well and the inhabitants simulated well too, the moderator is great in general, but decisions that save lives, at least my own life... I would not yet entrust them to this delta algorithm. Let’s take another two months for it.

The grey-haired computer scientist replied: ‘Here I fully agree, but note that there will be a few more iterations of Professor Obornicki and – at least in my opinion – that fungus of him can be patented’.

WILD CARDS 2050

Since the scenarios for Wrocław's environment were intended to cover the widest possible spectrum of potential futures, highly unlikely events were removed in the process of scenario development, even though they would have a large impact on the future of Wrocław. This is because including such an event in the given scenario would make that scenario very unlikely, and thus of little use from the perspective of strategy development. This does not mean, however, that factors of this type should be completely forgotten. Events that are very unlikely but have a high impact on the study area have been termed 'wild cards'. Their consequences are usually considered in isolation from the scenarios. The process of building scenarios for Wrocław has led to identifying nine 'wild cards', which are described below.



1 Degradation of the natural environment and climate change have been halted.

Global warming and environmental degradation are changes that are almost 100% likely to occur over the coming decades. Even if humanity were to stop all greenhouse gas emissions today, overnight, the rise in global temperatures would still continue to some extent. Due to the complexity of climatic processes, the changes caused by human activity occur with a certain delay.

Since climate change and environmental degradation are among the major factors that shape the future, their sudden halt would have a gigantic impact not only on the future of Wrocław, but also on the entire world. In each of the previously described scenarios, climate pressures sooner or later required actions to mitigate and adapt to climate change. It forced the energy transformation and the creation of costly, although not necessarily effective, protection against the effects of violent weather phenomena. The climate catastrophe is a specific sword of Damocles hanging over the modern civilisation – its removal would have far-reaching consequences. We would see development prospects for countries, where economies are based on fossil fuels. Theoretically, Poland could benefit from this. Completely different technologies would gain in importance – including ones that are currently being abandoned due to their

high carbon footprint. Adaptation funds would be released for investment. Cities such as Wrocław could follow the usual paths of development without worrying about their ability to provide for the basic living needs of their inhabitants in the times of climate crisis. zapewnienia podstawowych potrzeb bytowych mieszkańców w czasach klimatycznego kryzysu.

2 The size of the global population is less than 9.5 billion people.

Although the rate of global demographic growth is steadily slowing down, it is extremely unlikely that the size of the global world population will remain less than 9.5 billion people by 2050. Such a high number of humans living on Earth will put very high pressure on the available resources, including water and food, and on the environment.

Compared to the scenarios described earlier, a significantly smaller population would reduce the pressure on natural resources, food, water and climate. The risk of food crises would be reduced and the need to shift towards a plant-based diet would somewhat decrease. The general prospects for the ability of future generations to maintain a high quality of life would be improved. There would probably not be migratory flows on such a large scale either. On the other hand, in the scenarios which do not involve a shift in the economic paradigm, a smaller population, would mean a smaller global demand and size of the world economy. Depending on the reason for the reduction in the global population relative to the expectations, there could also be a problem of ageing population – not only in developed countries but on a global scale.

3 The global demographic growth rate has not decelerated past 2021.

The 'wild card' which is the complete opposite of the situation described above is the continuation of the current rate of demographic growth and a linear growth of the global population. A world population approaching 11 billion in 2050 would put enormous pressure on the environment, resources and climate. Shortages of water,

food or living space would be far greater under these conditions than under any of the scenarios described. Such a high increase would probably mean humanitarian crises of unprecedented magnitude, massive migratory movements and the risk of widespread armed conflicts in the struggle for scarce goods. If it is mainly the developed countries that are responsible for maintaining the current rate of population growth, this would mean reducing the problem of an ageing population. However, this phenomenon could be considered unfavourable in the context of increasing automation, due to the risk of a large-scale unemployment problem.

4 The technological advances and development of automation have slowed down after 2021.

The rapid development of autonomous technologies and artificial intelligence algorithms indicates that by 2050 at least 40 per cent of today's jobs will be automated. The technologies that will replace these professions are already available or are in the final stages of development. It is highly unlikely that jobs such as translation, simple data analysis, simple programming work or operating a cash register in 2050 will still be performed by humans. For the four 2050 scenarios, far-reaching automation and noticeable technological progress were crucial. In the 'strong state' scenario, they enabled an effective operation of a highly centralised economy, and in the 'technological expansion' scenario, like a knight on a white horse, they helped avoid most of the problems associated with global warming. In all of the scenarios, advanced automation reduced the risk of a collapse in the pension system in the EU countries and Poland. This is because it ensured that in the real sphere of the economy it was possible to produce enough goods to meet the society's needs despite the reduced labour supply. This was particularly true in scenarios where the number of migrants was limited.

If the technological progress slowed down, Poland in the 'strong state' scenario would either resemble the 20th century People's Republic of Poland more – or it would be a democratic country that failed to install a system with authoritarian features. In the scenarios with low migrant influx, the economy would face severe labour shortages and a collapse of the pension system. The 'technological expansion' scenario would have no chance of materialising at all.

5 No migrants have arrived to Europe from outside the continent.



The Delphi study experts concluded that an influx of climate migrants into European Union countries is almost certain. This is why the topic of climate migration has been included in all four scenarios for the environment of Wrocław. While migration has bypassed Poland by itself in the ‘strong state’ scenario, it has had an indirect impact on the situation in the country and in Wrocław. If there were no migratory flows, the world described in the scenarios would look different. The entire European Union would then be faced with the problem of an ageing population. This problem would be relatively least severe in the ‘technological expansion’ scenario due to the furthest-reaching processes of work automation and high prevalence of technologies restoring physical fitness to the elderly. On the other hand, lack of migratory movements towards Europe would entail less investment in integration programmes and a lower risk of outbreaks of civil unrest.

6 Poland finds itself outside of the European Union.

Poland finding itself outside the European Union was regarded as a very unlikely event during the survey period (June-August 2021). Therefore, although the level of European integration varies, Poland is a member of the European Union in all scenarios for Wrocław. The consequences of the contrary, however, would be powerful – and would differ depending on whether Poland’s place outside the Community would be a consequence of a post-Brexit situation or of the break-up of the Union itself. In either case, Poland would lose access to powerful markets (including in particular the German market), funding from the common budget and it would lose political power in its relations with third countries. In the case of a break-up of the EU, however, there would be a greater chance of building beneficial bilateral relations with other former members, as opposed to a situation where Poland would be the only one to leave the Community. Poland falling outside the European Union would mean an economic crisis, no financial support in the process of energy transformation and climate change adaptation (and probably their abandonment), and finding itself in the Russian sphere of influence with all of its consequences. Local governments could be affected by a permanent lack of funds, corruption and clientelism.

7 Fossil fuels retain a high share in Poland's energy mix.

Although the process of Poland's decarbonisation has progressed relatively slowly so far, in view of existing international commitments and corporate plans, it is considered highly unlikely that fossil fuels will still account for more than 20 per cent of Poland's energy mix in 2050. If this were to happen, however, it would come at a high cost to the economy. The EU plans to achieve climate neutrality by 2050. According to the Intergovernmental Panel on Climate Change (IPCC), this target should also be met globally if we want global warming to not exceed 20°C by the end of the century. Countries that do not implement the energy transition, or at least come close to it, may face high costs due to exceeding carbon dioxide emission limits and prohibitive prices on the Community (and perhaps global) market for emission allowances.

8 Poland has not introduced regulations to ensure care for the climate and natural environment.

The existence of regulations to ensure care for the climate and the environment, although a much broader issue, is closely linked to the energy transition described above. The absence of such regulations in 2050 in Poland is highly unlikely. The increasingly tangible effects of climate change will force global leaders to introduce environmental and climate protection policies. The lack of pro-environmental regulations in Poland would mean that the European Union has abandoned the assumptions of the Green Deal and has departed from the transformation processes. Since the EU is a global transformation leader, such changes could signal an abandonment of efforts to protect the climate and the environment at the global level. It is hard to imagine anything other than large-scale international conflicts that could lead to this. Lack of transformation and a shift away from conservation efforts would result in dramatic increases in global temperatures, environmental degradation and a collapse of ecosystems. It is even hard to assess how bad the state of the planet and the environment would be in such a situation in 2050. However, the world picture would be even worse than in the scenario of 'Hostages of the economy'. Poland and Wrocław could suffer the worst effects of climate change, including shortages of drinking water and food.

9 Polish cities do not follow the smart city model.

The experts in the Delphi study concluded that it is highly unlikely that large Polish cities are not 'smart' in 2050. Technological solutions to enable advanced city management systems using the Internet of Things are available now, and it seems only a matter of time before they are deployed into widespread use. However, if this were not to happen, Polish cities, including Wrocław, would face additional difficulties and tasks to be implemented compared to the situation described in the scenarios. Organisation and planning of urban transport would be less flexible and efficient – much like today's transport. It would be more difficult to maintain public safety (especially in the scenario 'Hostages of the economy'), to manage energy and to handle severe weather conditions. The day-to-day city management costs would also be higher. On the other hand, however, the cities would avoid the difficulties associated with having to implement new systems and adapt urban infrastructure to their needs.

10 High levels of European funding are still available.

The Delphi study concluded that the decline in the availability of European funds in the 2050 perspective is essentially sealed. These funds, which currently make it possible to implement a number of ambitious urban investments, will either no longer be available to Polish cities in 2050 – or they will be significantly lower than today. Any different situation is extremely unlikely. However, if this were to happen, it would be an extremely beneficial factor for local authorities, including municipalities. Additional sources of funding would allow implementation of bigger and bolder investments.

WHAT NEXT?

The future scenarios described in the report serve as an auxiliary tool for the development of the city's strategy. They make up a specific map of Wrocław's future, which illustrates possible changes in the city's environment until 2050. These changes lie outside Wrocław's direct control, but will have a strong impact on the city and its residents.

However, the scenarios should not be regarded as forecasts for the future. Although they do group together the most convergent elements of possible states of the future, they do not represent the only possible paths of development for Poland and the world in the perspective of the coming three decades. The realisation of some of the events in one scenario will not mean that the story will continue along the same path and that the events described in the other scenarios will never come into being. The scenarios only outline a spectrum of possible changes in the city's environment to which special attention should be paid at the stage of planning its development. They are not a glass ball to determine the future of the world.

Also, the scenarios do not in any way impose strategic solutions that the city should adopt in the face of possible changes. The references to the position of Wrocław should not be understood as a guideline as to how best to proceed, but as an illustration of the changes occurring in large cities across the country and Europe. Wrocław can, of course, follow the paths taken by others, but it can also choose to follow its own different course if it believes that doing so would benefit the city and its inhabitants. We therefore encourage you to take a critical look at what is possible, what is desirable, what you need to be particularly careful about, and what you can do now to be better prepared.

BIBLIOGRAPHY

1. A. Białas, 'Five trends to transform the housing market in Poland', Pillars of Business, 21 February 2021. <https://filarybiznesu.pl/piec-trendow-ktore-odmienia-rynek-mieszkaniowy-w-polsce/a8786>
2. A. Wolska, 'Demographic trends in the Polish rural areas. What does the future of rural areas look like?', Euractiv, 22 February 2021. <https://www.euractiv.pl/section/rolnictwowpr/news/polska-wies-unia-europejska-depopulacja-urbanizacja-gus-komisja-europejska-miasto-obszary-wiejskie/>
3. 'Global Electricity Demand to Increase 57% by 2050', Bloomberg, 4 September 2018. <https://about.bnef.com/blog/global-electricity-demand-increase-57-2050/>
4. T. D. Fishman, S. Hamilton, 'Using public-private partnerships to advance smart cities', Deloitte, 2019. <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Public-Sector/gx-ps-using-public-private-partnerships1.pdf>
5. 'What will we be living like in 20 years? Highlights of the trends which will conquer the property market', Dziennik.pl, 6 June 2019. <https://nieruchomosci.dziennik.pl/news/artykuly/599571,jak-bedziemy-mieszkac-20-lat-nieruchomosci-trendy-design-mieszkanie.html>
6. '10 Trends Shaping the Future of Work', European Political Strategy Centre [European Commission], November 2019. <https://op.europa.eu/en/publication-detail/-/publication/e77a1580-ocf5-11ea-8c1f-01aa75ed71a1/language-en/format-PDF/source-121729338>
7. E. Nosarzewska, 'Urbanisation (Megatrends 2050)', Polish Society for Future Studies, 30 April 2021. <https://ptsp.pl/urbanizacja/>
8. 'The Future of Food and Agriculture. Alternative Pathways to 2050', FAO UN, 2018. <http://www.fao.org/3/CA1553EN/ca1553en.pdf>
9. 'Common Challenges', Future of Cities, March 2017. [https://www.futureofcities.city/pdf/pages/Future of Cities Common Challenges.pdf](https://www.futureofcities.city/pdf/pages/Future%20of%20Cities%20Common%20Challenges.pdf)
10. 'The condition of households in 2017', CSO, May 2018. <https://stat.gov.pl/obszary-tematyczne/warunki-zycia/dochody-wydatki-i-warunki-zycia-ludnosci/sytuacja-gospodarstw-domowych-w-2017-r-w-swietle-wynikow-badania-budzetow-gospodarstw-domowych,3,17.html>
11. H. Kharas, K. Hamel, 'A global tipping point: Half the world is now middle class or wealthier', Brookings, 27 September 2018. <https://www.brookings.edu/blog/future-development/2018/09/27/a-global-tipping-point-half-the-world-is-now-middle-class-or-wealthier/>
12. 'Impactful trends in Europe towards 2040', INHERIT Project, June 2017. https://inherit.eu/wp-content/uploads/2017/09/Future_Trend_Poster.pdf

13. 'Global warming of 1.5 . Summary for policymakers', IPCC, 2018. <https://www.ipcc.ch/sr15/>
14. J. Wakefield, 'How will our future cities look?', BBC News, 17 February 2013. <https://www.bbc.co.uk/news/technology-20770518>
15. J. Gadziński, E. Goras, 'Transport and urban mobility. Report on the state of Polish cities', Institute for Urban and Regional Development, Warsaw 2019.
16. J. D. Macomber, 'The future of cities depends on innovative financing', Harvard Business Review, 11 January 2016. <https://hbr.org/2016/01/the-future-of-cities-depends-on-innovative-financing>
17. J. Pierre, 'Multilevel governance as a strategy to build capacity in cities: Evidence from Sweden', Journal of Urban Affairs, 41/1 (2019), 103–116. <https://doi.org/10.1080/07352166.2017.1310532>
18. 'New trends in urban governance: Examples from across EU', Kneeshaw Consulting, 26 June 2021. <https://www.kneeshawconsulting.com/new-trends-in-urban-governance/>
19. 'Cities of the future – challenges, visions, prospects', European Commission, Directorate General for Regional Policy, 2011. https://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/citiesoftomorrow/citiesoftomorrow_final_pl.pdf
20. K. Gluc, 'What will the cities of the future be like?', SWPS, 27 September 2017. <https://www.swps.pl/centrum-prasowe/informacje-prasowe/16470-jakie-beda-miasta-przyszlosci?dt=1624017036202>
21. M. Keegan, 'The city of sustainable skyscrapers', BBC Future Planet, 10 February 2021. <https://www.bbc.com/future/article/20210209-hong-kong-the-worlds-greenest-skyscrapers>
22. N. Harrison, F. Thomas-Dupuis, 'The Future of Retail', Oliver Wyman, January 2019. https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2019/January/Boardroom-Vol4/The_Future_of_Retail_web.pdf
23. 'The Future of Families to 2030', OECD, December 2011. https://www.oecd-ilibrary.org/social-issues-migration-health/the-future-of-families-to-2030_9789264168367-en
24. 'Mobility 2040: The quest for smart mobility', Oliver Wyman, 2018. https://www.oliverwyman.com/content/dam/oliver-wyman/v2-de/publications/2018/Aug/Mobility2040_OliverWyman.pdf
25. 'To recovery and beyond: The future of travel & tourism in the wake of COVID-19', Oliver Wyman / World Travel & Tourism Council, September 2020. <https://wtcc.org/Portals/0/Documents/Reports/2020/To Recovery and Beyond-The Future of Travel Tourism in the Wake of COVID-19.pdf?ver=2021-02-25-183120-543>
26. 'Foresight Poland 2035: Experts on the future', Polish Economic Institute, December 2019. https://pie.net.pl/wp-content/uploads/2020/04/PIE-Raport_foresight.pdf
27. 'The Future of Cities', Publications Office of the European Union, 2019. <https://urban.jrc.ec.europa.eu/thefutureofcities/>
28. A. Ghiran, A. Hakami, L. Bontoux F. Scapolo, 'The Future of Customs in the EU 2040', Publications Office of the European Union, 2020. <https://publications.jrc.ec.europa.eu/repository/handle/JRC121859#:~:text=The Future of Customs in the EU 2040 report is,effectiveness in the long%2Dterm>
29. 'The Long View: How will the global economic order change by 2050?', PwC, February 2017. <https://www.pwc.com/gx/en/world-2050/assets/pwc-the-world-in-2050-full-report-feb-2017.pdf>

- 30.** R. Muggah, O. Geray, K. A. Eik, 'Innovative urban financing can make our cities stronger', World Economic Forum, 29 March 2019. <https://www.weforum.org/agenda/2019/03/innovative-urban-financing-can-unlock-stronger-cities/>
- 31.** S. Uren, 'What's the future of travel and tourism?', Futures Centre, 15 February 2020. <https://www.thefuturescentre.org/whats-the-future-of-travel-and-tourism/>
- 32.** S. Jones, 'With car ownership on the decline, what does the future hold for personal mobility?', Smart Transport, 11 November 2020. <https://www.smarttransport.org.uk/opinion/with-car-ownership-on-the-decline-what-does-the-future-hold-for-personal-mobility>
- 33.** 'Democracy Index 2020', The Economist Intelligence Unit, January 2021. <https://www.eiu.com/n/campaigns/democracy-index-2020/>
- 34.** 'Financing Cities of the Future: Tools to scale up clean urban development', The Gold Standard, 2018. <https://www.goldstandard.org/sites/default/files/documents/financingcitiesofthefuture.pdf>
- 35.** 'Global Trends 2040', The National Intelligence Council, March 2021. https://www.dni.gov/files/ODNI/documents/assessments/GlobalTrends_2040.pdf
- 36.** 'The future of cities. Cities of the Future', Think Tank / RWE, 2019. <http://www.ekip.kujawsko-pomorskie.pl/pliki/raport.pdf>
- 37.** 'Global trends in renewable energy investment 2020', UNEP's Economy Division / Frankfurt School-UNEP Collaborating Centre for Climate & Sustainable Energy Finance, BloombergNEF, June 2020. https://www.fs-unep-centre.org/wp-content/uploads/2020/06/GTR_2020.pdf
- 38.** 'Plan for adaptation of the City of Wrocław to climate change until 2030', Municipal Office of the City of Wrocław, November 2018. <https://bip.um.wroc.pl/artykul/528/36151/plan-adaptacji-miasta-wroclaw-do-zmian-klimatu-do-roku-2030>
- 39.** 'Climate Change, Global Food Security, and the U. S. Food System', USDA, December 2015. <https://www.usda.gov/sites/default/files/documents/FullAssessment.pdf>
- 40.** 'Taking on Inequality', World Bank, 2016. <https://www.worldbank.org/en/publication/poverty-and-shared-prosperity-2016>
- 41.** 'Population estimates and projections', World Bank [access: June 2021]. <https://databank.worldbank.org/source/population-estimates-and-projections>
- 42.** 'Living Planet Report 2020 – Bending the curve of biodiversity loss', WWF 2020. <https://f.hubspotusercontent20.net/hubfs/4783129/LPR/PDFS/ENGLISH-FULL.pdf>

ABOUT THE REPORT

The report has been drawn up by 4CF and commissioned by the City Strategy Office of Wrocław Municipal Office.

4CF has a clear mission that it has consistently delivered for over a decade – to explore the future to help clients make sound strategic decisions. In other words, it provides support to public authorities, businesses and institutions around the world to successfully achieve their goals by shaping the future and seizing opportunities. With its deep expertise in strategic foresight, a branch of strategic consulting crucial for the implementation of plans in a dynamically changing market environment, 4CF guarantees the highest level of performance, as confirmed by clients from Poland, Europe and other continents. 4CF makes sure that its customers are always one step ahead of their competitors.

4CF is a member organisation of the Association of Professional Futurists and the Polish representative of an international think-tank, The Millennium Project.

In the preparation of the report we were assisted by experts, to whom we would like to thank for their involvement and valuable input.

EXPERT BIOGRAPHIES



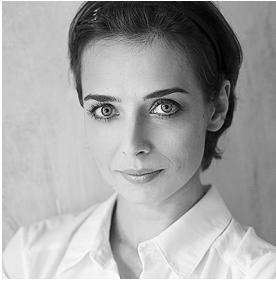
Adam Czerniak, PhD economics

Adam Czerniak is a PhD in economics, research director and chief economist at the analytical centre Polityka Insight, and head of the Department of Institutional and Political Economics at the Warsaw School of Economics. Until 2012, he worked as a bank economist, before which he collaborated with the World Bank and the FOR Foundation and was a grantee of the Ronald Coase Institute. He is author of scientific publications on economic sociology, institutional economics and the functioning of the real estate market. He is a Polish representative on the board of the European Master in Official Statistics operating under Eurostat for the term 2021–2023.



Joanna Erbel housing

sociologist, municipal activist, housing expert. She is the founder of the Blisko Foundation dedicated to supporting local activism and generating knowledge on housing innovation. She has coordinated works on the preparation of housing policy and the Housing2030 programme for the capital city of Warsaw. From 2017 to 2020, she was in charge of the housing innovation subject at PFR Real Estate. She is a member of the expert group of the Rental Market Laboratory and the CoopTech Hub, the first cooperative technology centre in Poland. She is the author of a book entitled *Beyond Property. Towards a successful housing policy*. She is an associate of the A/typowi Foundation for Neurodiversity.



Magdalena Florek, PhD, prof. at UEP territorial marketing

A scientific and didactic employee of the Poznań University of Economics, she specialises in territorial marketing and brand management. She was awarded a Polish-American Fulbright Foundation Scholarship at Northwestern University and the Kellogg School of Management in the USA. She is co-founder and board member of the International Place Branding Association, based in the Netherlands. She is also co-founder and board member of the Best Place Foundation – European Place Marketing Institute. She is a Senior Fellow at the Institute of Place Management, based in the UK. She co-authored strategies of brands and promotion of Polish cities and regions. She is a consultant in the field of branding of places and destinations. She is a jury member of the following competitions: 'Golden Formats', 'Plus Camerimage – European Funds in Camera', 'Active City', 'Brand Local Government', the Polish Advertising Competition and Effie Awards.



Kamila Kamińska-Sztark, PhD sociology, social psychology

Kamila Kamińska-Sztark, PhD, has been involved in urban pedagogy, regeneration and streetworking for over 15 years as an assistant professor at the University of Wrocław. Since 2005, she has worked as an assistant professor at the Institute of Pedagogy of the University of Wrocław. She is a member of domestic and international scientific organisations such as the Critical Discourse Analysis and Discourse Power Resistance. Since 2015, she has also been sitting on the Board of the Network of Universities of the European Capitals of Culture (UNECC). In 2017, she was awarded the medal of the Mayor of Wrocław for her contribution to the ECC programme and received an award in the science category in the plebiscite of 30 Creative People of Wrocław 2017. Since 2017, she has been the Attorney to the Rector of the University of Wrocław in charge of social responsibility.



Wojciech Kazanecki, PhD geopolitics

Member of the Prognosis Committee Poland 2000 Plus at the Presidium of the Polish Academy of Sciences (term 2019–2022), academic lecturer (e.g. the University of Wrocław, ICN Business School Nancy-Metz). He is the founder and president of the Lower Silesian Centre for Strategic Studies (2004–2014). Home page: kazanecki.wordpress.com



Kornelia Kwiecińska, PhD environment

she graduated from M.Sc. studies at the Faculty of Chemistry, Wrocław University (with a specialization in Environmental Chemistry) and Ph.D. studies at the Faculty of Environmental Engineering, Wrocław University of Technology. She is author of green infrastructure projects and nature-based solutions as well as studies for industry, environmental reports and expert opinions in the field of environmental engineering. She has authored and co-authored domestic and international articles and publications on environmental engineering and climate change adaptation. She cooperates with the Wrocław Municipal Office on environmental education for city dwellers in the field of environmental protection and city adaptation to climate change (e.g. by introducing nature-based solutions).



Jarosław Tworóg, Ph.D., Eng. new technologies

Vice-President of the National Chamber of Commerce for Electronics and Telecommunications, member of the Council for Digitalisation and member of the Council of the Polish Committee for Standardisation. He is responsible for innovation and industry development strategy at KIGeIT. He has technical expertise in 5G networks, electronic manufacturing, telecommunications, information society services, next generation networks and ICT systems for the energy sector. In the past, he worked for ENERGA SA and for electronics and telecommunications production companies. He has graduated from the Faculty of Electronics at the Warsaw University of Technology.



M.Sc. arch. Marek Wiland urban planning

He has graduated from the Faculty of Architecture at the Wrocław University of Technology. He has been running Ecoland Urban Planning Office in Wrocław for 30 years. Above all, he is concerned with the practical practice of the urban planning profession; he has managed the preparation of, among others, several hundred local plans and a number of other planning documents. He is also the author of more than 50 publications on urban planning and spatial planning. He chaired the Western Regional Chamber of Town Planners based in Wrocław for 8 years to date. Since 2014, he has chaired the ZOIU Association of Town Planners. Within the framework of these two organisations, since 2003 he has, among others, been preparing and conducting nationwide Seminars in the 'Planning Problems' series. Recently, he has also been appointed President of the Polish Urban Planning Federation.



Prof. dr hab. Janusz Zaleski, PhD regional policy and water management

Professor Emeritus of Wrocław University of Technology and IMGW in Warsaw. He is an expert in water management and regional policy. He is author of more than 150 articles on water management, environmental engineering, application of mathematics, public finance and regional policy. From 1990 to 1992 he was Chairman of Długołęka Municipality Council, 1992–1998 Governor of Wrocław, 1993–1997 Chairman of the Convention of Governors, 1998–2001 Advisor To the Prime Minister, author of 'Programme for the Oder 2006'. He was Chairman of the International Commission for the Protection of the Oder River against Pollution in 2000–2001 and 2008–2010. In the years 2000–2004 he was a member of the Regional Policy Council, in 2004–2005 – a member of the Government Interdepartmental Team preparing the National Development Plan for Poland for years 2007–2013; he is a co-author of the Expert Project of the Concept of the National Spatial Management until 2033. In the years 2004–2006 he was Chairman of the National Health Fund Council. He was President of the Wrocław Regional Development Agency between 1998 and 2016 and co-author of national and regional implementations of the HERMIN macroeconomic model. From 2001 to 2006 he held the position of Director of the World Bank Flood Control Project Coordination Office in Wrocław. From 2008 to 2016 he was Director of the Flood Protection Project in the Oder River Basin and then in the Oder and Vistula River Basins, co-financed by the World Bank and CEB, from 2016 to 2020 he was an expert on new projects. He is a member of the presidium of the Committee on National Spatial Planning of the Polish Academy of Sciences.

The report has been drawn up by the team of 4CF sp. z o.o. under a contract awarded by the Wrocław Municipality.

Authors of the report:

Zofia Bednarczyk, Joanna Jaworska, Kacper Nosarzewski

Authors of the stories:

SCENARIO 1: Kacper Nosarzewski, Maciej Jagaciak

SCENARIO 2, 3 and 4: Kacper Nosarzewski

Edited by:

Kacper Nosarzewski, Dariusz Kozdra

Proofreading:

edycja360.pl

Desktop publishing and typesetting:

Marcin Kiedio