

RECOMMENDATIONS FOR CITIES by the World Urban Forum 11 Business Council



Global Compact
Network Poland



Know-How Hub
Centrum Transferu Wiedzy



Ministerstwo
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BFT TECHNOLOGIES
OF SUSTAINABLE
WORLD



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under the editorship of Jacek Woźnikowski
and Michał Chmurkowski



Network Poland





OUR MISSION:
**MOBILIZE A GLOBAL
MOVEMENT
OF SUSTAINABLE
COMPANIES
AND STAKEHOLDERS
TO CREATE
THE WORLD
WE WANT**

THE TEN PRINCIPLES OF THE UNITED NATIONS GLOBAL COMPACT



HUMAN RIGHTS

- 1 Businesses should support and respect the protection of internationally proclaimed human rights; and
- 2 make sure that they are not complicit in human rights abuses.



LABOUR

- 3 Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- 4 the elimination of all forms of forced and compulsory labour;
- 5 the effective abolition of child labour; and
- 6 the elimination of discrimination in respect of employment and occupation.



ENVIRONMENT

- 7 Businesses should support a precautionary approach to environmental challenges;
- 8 undertake initiatives to promote greater environmental responsibility; and
- 9 encourage the development and diffusion of environmentally friendly technologies.



ANTI-CORRUPTION

- 10 Businesses should work against corruption in all its forms, including extortion and bribery.



Cities have an enormous climate footprint, consuming more than two-thirds of the world's energy and accounting for more than 70 per cent of global CO₂ emissions. The choices that will be made on urban infrastructure in the coming decades – on construction, housing, energy efficiency, power generation and transport – will have tremendous influence on the emissions curve. (...) Cities Are Where the Climate Battle Will Largely Be Won or Lost

António Guterres

United Nations Secretary-General





Urban areas host the majority of humankind and urbanisation is only accelerating. The climate crisis is not only exacerbated by cities, but also will impact their population the hardest. Therefore, it is crucial to adapt cities to the consequences of climate change and implement mitigation mechanisms. The private sector will play a necessary role in ensuring a rapid implementation of such mechanisms.

Sanda Ojiambo

Assistant Secretary-General
and CEO United Nations Global Compact





With cities being responsible for 75 percent of global CO₂ emissions, predominantly from transport and buildings, they are obviously central to climate change mitigation. But efforts to reduce greenhouse gases must go hand in hand with measures to reduce inequalities and manage rapid urbanization. This will require bold and ambitious efforts and changes in the way we engage with young people as we plan, design, build and manage cities.

Maimunah Mohd Sharif

United Nations Under-Secretary General
and Executive Director, UN-Habitat



Foreword

The recommendations presented below are the result of four months of hard work of the World Urban Forum 11 Business Council. UN Global Compact Network Poland together with the Ministry of Funds and Regional Policy has established the Business Council to the Government Representative responsible for preparing World Urban Forum in Katowice, in February 2022. The idea behind the Business Council was that urban transformation based on inhabitants' wellbeing and environmental concerns, cannot proceed without the support from the private sector. Therefore, the Business Council, consisting of the highest representatives of companies, developed recommendations for cities to implement in their path of climate transformation and adaptation to the repercussions of the climate crisis.

The recommendations cover all the nuanced topics connected to cities' impact on the environment and the wellbeing of their residents. Specifically, the proposals pertain to energy production and consumption, construction, management, sustainable transport, noise and air pollution, industrial infrastructure, energy efficiency, transmission infrastructure and education based on good practices for the urban authorities. The proposals published in this brochure will be presented during the final Business Council meeting during World Urban Forum 11.

World Urban Forum is the flagship event of the United Nations Program for Human Settlements (UN-Habitat) and one of the most recognizable international meetings devoted to the exchange of views and experiences regarding the challenges of modern cities, urban policy and sustainable urbanization.

"Transforming our Cities for a Better Urban Future" is the motto of the 11th edition of the World Urban Forum, which will be held in Katowice between the 26th and 30th of June. The hosts of the event are the Republic of Poland (Ministry of Funds and Regional Policy), UN-Habitat and the City of Katowice. United Nations Global Compact Network Poland is a Strategic Partner for cooperation with business.

During the World Urban Forum, representatives of national, regional and municipal government, academics, business representatives, leaders of local communities and city planners will try to answer the most important questions and dilemmas related to supporting the future of cities, planning their dynamic sustainable development and the role of residents in this process.

The private sector, as a source of contemporary innovations and solutions enabling technological progress, has a special role to play in the recovery of the global economy after the pandemic. Transparent and ethical businesses are not only the driving force behind the necessary changes, but also many investment processes depend on their decisions. Sustainable finance and investment activities based on the Sustainable Development Goals are key to supporting genuinely green and socially and environmentally responsible changes.

The transformation of urban centers, placing the inhabitants and the environment in the center, cannot be achieved without the support and participation of the private sector. It is connected with a huge responsibility, which is at the same time an opportunity and a new direction of development.



Kamil Wyszowski

Przedstawiciel i Dyrektor Wykonawczy
UN Global Compact Network Poland



Spatial development of cities for climate and their green transformation towards climate neutrality and adaptation to the effects of the climate crisis

Contribution from the Climate Council at the UN Global Compact Network Poland for the World Urban Forum 11

Climate change is a scientifically recognised fact. It is largely caused by human activity and has a unique impact on it. This is particularly evident in urbanised areas, especially urban areas where activities of an increasing number of people are concentrated. Given that according to Smart Cities around 68% of the EU population live in urban areas and that its share of overall primary energy consumption is around 70%, which translates into nearly 75% of total anthropogenic greenhouse gas emissions, it is clear how important it is to reduce the negative environmental and climate impact of human activities. **Mitigation of the effects of climate change** is therefore one of the most important objectives of action at the urban level. On the other hand, the IPCC's latest Climate Change 2021 report highlights that "With global warming, urban areas and cities will be affected by more frequent occurrences of extreme climate events, such as heatwaves (...) as well as (...) rainfall intensity". Therefore, **the concept of adaptation to climate change** is becoming a key issue in both economic and urban terms. **The key to introducing sustainable solutions must therefore be holistic action based on interdisciplinary research covering issues dealt with by the climate science as well as social, technical and economic disciplines.**

The body created for such action is **the Climate Council**, which was established at the UN Global Compact Network Poland in October 2021. The Climate Council brings together experts representing various academic centres and various academic disciplines in Poland. Owing to the diversity of specialisations of members of the Council, climate change issues can be seen from different perspectives, thus supporting in-depth discussion of the issues under consideration. One of the topics addressed by the Climate Council during its 2022 proceedings was the spatial development of cities for climate and their green transition towards climate neutrality and adaptation to the effects of the climate crisis.

While pointing to the complexity and wide range of processes involving urban transition in the context of climate challenges, attention was brought to the need to create an increasingly wide-ranging **platform for the exchange of knowledge and information** involving scientific and educatio-

nal communities, policymakers, local governments, NGOs as well as target beneficiaries, i.e. urban residents. In these processes, the UNGC Climate Council may be a centre for reliable and comprehensive co-creation and verification of information at scientific and educational level, recommending materials improving knowledge in this area.

Spatial development of cities for climate and green transition of cities towards climate neutrality and adaptation to the effects of the climate crisis are crucial and fall in line with a number of the UN sustainable development goals (SDGs) including primarily: **"13 – Climate Action" and "11 – Sustainable Cities and Communities"**, **"9 – Industry, Innovation Infrastructure"**, as well as "3 – Good Health and Well-being", "6 – Clean Water and Sanitation", "7 – Affordable and Clean Energy", "12 – Responsible Consumption and Production" but also "4 – Quality Education". The use of these key directions of sustainable development means the need to integrate actions including urban planning, architectural, construction, transport, environmental, biodiversity, water resource management and air quality issues.

As part of the work of the UNGC Climate Council, it was indicated that meeting the objectives and requirements set means the need for **joint, harmonious cooperation**, based on knowledge and experience, around these key issues. Priority actions in this area include:

- Recognition of the primacy of sustainable development and climate policy in the design and implementation of actions and use of urban resources.
- Systematising climate policy by creating a coherent strategy covering both goals and actions and supporting instruments.
- Strengthening the role of spatial planning as a priority issue at central and local government level.
- The need to integrate climate issues into the urban spatial planning process, including the combination of planning with modelling and forecasting of development options for climate change (mitigation and adaptation).
- Introduction of consistent climate indicators in legal documentation, including the Study of Spatial Development Conditions and Directions (land use study), the Municipal Spatial Development Plan, the use of the list of activities from the Municipal Adaptation



Plan and combining the above with the Building Conditions and Technical Conditions.

- Creating a coherent set of tools and methods for climate and environmental risk analysis and adaptation to the effects of climate change.
- Increasing the importance of blue-green infrastructure, including the integration of spatial management with water management.
- Reducing low emission sources and strengthen the transition towards a low-carbon economy as a policy to improve air quality.
- Priority for the use of renewable energy and heat sources on an urban and local scale.
- Strengthen organisational, legislative and fiscal activities based on the circular economy.
- The use of new trends in architectural and urban design (diversity, flexibility, scale).
- Strengthening the importance of urban greenery and natural areas, including the use of new concepts of gardens, biophilia or biodiversity.
- Priority for sustainable transport, including public urban transport and pedestrian and cycling infrastructure.
- Involving residents in co-deciding on the direction of activities undertaken.
- Strengthen educational activities, including the availability of scientific research, education programmes and raising awareness among all stakeholders.

These priorities, by assuming the empowerment of people as the end-users of urban areas, indicate the need to improve their well-being while making reasonable use of natural resources. A strongly evolving change in the behaviour and attitudes of residents, growing participation and increasing broadly-defined accessibility seem to be a good background for changes that will make it possible to create and exploit urban tissue in a sustainable, climate-friendly and socially-friendly way.



WUF11

Recommendations for cities

Developed as a result of the work of the Business Council at WUF11 and in cooperation with the experts – Jacek Woźnikowski and Michał Chmurkowski and BFirst.Tech – Content Partner of the UN Global Compact Network Poland

Area: Energy



Background: In the context of energy challenges, cities play a key role – approximately 75% of the world's energy is consumed by urbanised areas.

The concept of the Energy Union, the overarching goal of which is to bring about the communitarisation of the European energy market, deserves attention. The purchase of energy produced outside the country should be motivated not only by the price but also by the source of its origin, so that the grid is supplied with clean energy to the greatest extent possible. The purchase of energy from the combustion of minerals should be limited to situations where the energy security of the country is at risk. In a report published in October 2020 on the state of the initiative, the European Commission revealed that the EU had recommended that 27 Member States allocate at least 37% of their budget expenditure on post-Covid-recovery to climate change investments. Referring to the 2021 Annual Sustainable Growth Strategy report, among the EU's typical multitude of other legislative documents, the Commission indicated in its 23-page energy review that renewable energy and hydrogen, energy and resource efficiency, as well as sustainable transport are its key policy areas. The inclusion of these areas in their budgets may mean that such expenditure can be viewed more favourably during the distribution of recovery funds. Among other things, this results in the selection of sectors of particular interest, which was made in this study by the authors.

According to the Paris Agreement, as part of a broader climate and energy policy to 2030, the EU contribution at national level assumes a reduction in greenhouse gas emissions of at least 40% by 2030 compared to 1990 levels. All key EU legislation to achieve this objective was adopted before the end of 2018. The European Union is leading the international efforts to combat climate change. It was instrumental in negotiating the Paris Agreement and is a world leader in combating climate change. To maintain its position as a global leader in the fight against climate change, the EU has set up its own strategy for 2021–2027. The European Green Deal is the first such comprehensive strategy of the European Union on environmental protection and combating climate change. Thus, Europe aspires to be the first climate-neutral continent by 2050. This is an ambitious plan, but it is feasible, provided that all

Member States are fully involved in its implementation. The main goal, apart from climate neutrality, is primarily to protect human life, animals and plants, while supporting the energy transition towards „clean technologies” – solutions that significantly reduce pressure on the natural environment. The main objectives of the European Green Deal:

- the adoption of a binding target for climate neutrality by 2050. This means that by mid-century, the EU economy is expected to emit only as much greenhouse gas as it can absorb (including through forests or CO₂ capture technology);
- revision of the EU's short-term targets – the 2030 emission reduction target is currently 40% compared to 25% in 1990, but is planned to be increased to 50% or 55%;
- continuation of the current structure of the EU's climate policy. What mainly needs correction is the EU Emissions Trading System (EU ETS), which is to cover new sectors (transport and construction, e.g. heating) and to limit free emission allowances for aviation;
- a proposal for a carbon import tax in order to protect the competitiveness of the EU economy (this proposal will be the most difficult to implement due to the technical challenges involved and international politics);
- the Just Transition Fund is to be part of the Green Deal for the regions most affected by the negative effects of decarbonisation (there is a dispute over its amount and sources of funding);
- The European Commission wants to acquire a trillion euros for climate goals within a decade. To this end, it will try to mobilise private capital and involve the European Investment Bank (however, it will be very difficult to obtain this amount);
- apart from climate policy, the Green Deal also includes proposals on agriculture, the circular economy, biodiversity and combating pollution.

Recommendations

Mission and goals

Setting goals (e.g. in the city/municipality development strategy) in the area of climate challenges. Kraków is preparing a Climate Strategy that aims to lead the city to climate neutrality. During the Kraków Climate Panel, a number of recommendations for the city were developed. The most important is the one regarding climate neutrality that Kraków is expected to achieve by 2030. Kraków was thus included in the list of 100 European cities which declared climate neutrality and set a date for achieving it. Apart from Kraków, also Łódź, Rzeszów, Wrocław and Warsaw¹ have set themselves such a goal. Neutrality will concern sectors such as buildings, transport, energy or waste management.

Incentive system

It is possible to introduce an incentive system that rewards the use of appropriate solutions with dedicated reliefs. Municipal authorities may impose energy efficiency requirements for newly constructed buildings. These requirements may relate to the technologies employed, the design of buildings, the materials used, etc. In addition, authorities can monitor the condition of buildings by requesting information on energy efficiency. Based on the data collected in the city, it is possible to create appropriate intervention tools.

Energy clusters²

The creation of energy clusters or cooperatives can be one of the tools to achieve the assumed goals of the city's energy policy. Decentralisation of large-scale energy, replacing it with green, distributed generation sources and building a civic dimension of energy are the directional goals of energy transition in the EU (Clean Energy Package, CEP).

Within the energy cluster, local administrations may facilitate energy transition by discounting local low-carbon generation potential and initiatives and the opportunities arising from smart management of multi-modal energy consumption, taking into account three important areas:

- heating of domestic water and residential premises, office space and industrial premises both by municipal heating utilities and as part of industrial waste heat management and electrification of heating/cooling combined with

widespread use of heat pumps, local storage of surplus electricity from RES in heat and smart management of an integrated multi-modal energy generation, distribution, local storage and consumption system;

- public transport and support for selected forms of low-/zero-emission individual transport through both electrification and the use of hydrogen, methane or other synthetic fuels produced locally with low-carbon methods;
- local supply of low-carbon electricity in combination with a consumption management system so as to compensate for shortages or excess of energy generated with the use of a smart consumption and storage management system, making an efficient use of the diversity of RES installations and opening up to new technological proposals such as joint supply of local industry and municipalities through nuclear microreactors.

High-temperature nuclear microreactors are an example of a technical solution replacing the use of natural gas at a time when energy

demand cannot be met by RES sources. The safety zone for these structures is just several dozen metres, which allows installation to be planned not only on energy-intensive sites that need their own energy sources, but even in urban areas, for example on the sites of former or existing heating plants. A different way of constructing fuel elements means that moderating the generation of energy so that generation from RES sources is compensated

does not lead to fuel degradation and thus the integration of RES into the system becomes simpler and more efficient. The local energy system created in such a setup within an energy cluster enables an energy community to develop in which the resources and needs of the participants are optimally harmonised, ensures a very high level of availability of energy supply, but also eliminates to a large extent the factors influencing price increases. The first industrial installations in Poland are already being designed for

USNC high-temperature microreactors and talks are being held on cooperation with energy clusters. At the same time, a similar technology (for reactors with higher power) is being developed in Poland at the National Centre for Nuclear Research in Świerk. Support is also provided by the Government of France for a similar design by Jimmy Energy, although it is still at a very early stage of development.

There are already several dozen energy cluster initiatives in Poland. An example is the Tychy Energy Cluster, which was established in 2020 and is located in two municipalities of the City of Tychy and the City of Bieruń. The Cluster Leader is Regionalne Centrum Gospodarki Wodno-Ściekowej S.A. (regional water and sewage utility), whereas the Cluster Coordinator is Control Process S.A. The Cluster has 23 members, including 21 enterprises. Due to its location, the Tychy Energy Cluster makes significant use of local potential resulting from the existence of the local economic zone and businesses operating within the zone. The energy cluster organised by the city and the Energy

¹ Commission announces 100 cities participating in EU Mission (europa.eu)

² More: The concept of Renewable Energy Sources (RES) development in the GZM municipalities as one of the tools for achieving the energy self-sufficient Metropolis goal: link



Clusters Network in Sokołów Podlaski has obtained funding from NCBiR for the project “Combined Heat and Power Plant in the Local Energy System”. As part of this reference solution, the biogas plant located in the vicinity of the city will provide the supply of biogas by pipeline to a district heating plant operating in cogeneration mode. The electricity produced here will be used, among other things, to power heat pumps at home locations where, due to the dispersion of buildings, it is not economically viable to construct a district heating network.

Each of the emerging energy clusters develops its own engineering solution best suited to local circumstances, guided by the desire to reliably satisfy the needs of residents and industry, eliminate emissions and inhibit price growth. New features are the creation of independent distribution infrastructures and the use of micro nuclear power already mentioned.

Tackling energy poverty

The UN’s seventh sustainable development goal addresses the issue of ensuring access to affordable, reliable, sustainable and modern energy for all.³ Access to such energy sources should not only be limited to the better off, but support mechanisms and tools should also be designed for financial vulnerable groups and individuals, which will allow them to switch from carbon-intensive but cheaper energy sources to low- or zero-emission ones. However, well-thought-out low-carbon solutions in the local system, using local potential and modern technologies do not have to be more expensive than conventional ones. Moreover, without the value of integrating the local community, individual

³ See link.

mechanisms of financial or even in-kind support are mostly wasted, which strengthens the case for a systemic approach to local energy.

For emission reasons, efforts should be made to eliminate from individual households any furnaces fired with solid fuels, because sooner or later waste is burnt in them. However, investment in photovoltaics, heat pumps and building insulation, due to the volume of the expenditure involved, remains beyond the reach of families at risk of energy poverty, even with the maximum level of subsidies allowed by law for individuals. Nevertheless, it may be effective to create a local system within the energy cluster, which will not only solve the emission problems but also provide such participants with the opportunity of long-term leasing of energy systems necessary to support their dedicated needs. It is also important to have a tailored mechanism with regard to needs but also the possible contribution to the local energy system (e.g. land for additional PV installations, manure, dishwater and food waste as an additive to substrate in biogas plants, etc.).

Aggregates – scaling of investments

The success of the transition of local economies depends not only on raising capital for large-scale infrastructure projects, but also on implementing less capital-intensive solutions, on a massive scale. In a situation where operating costs, due to the dispersed nature of the investment, negatively affect the profitability of individual projects and thus discourage private investors from engaging in their implementation, it is helpful for local authorities to set up structures enabling projects to be combined into larger types of investments (platforms) or joint management of funding by a number of entities (setting up joint project managing bodies).



A substantial part of energy used by the construction industry is used by buildings

35%

and transportation

28%

[IEA 2020d].

A vast part of emissions in the contraction sector can be attributed to buildings

38%

and transportation

23%

[IEA 2020d].

Area: Construction and renovations



Background: The building stock in the European Union is Union is characterised by great diversity, but what they have in common is that most of them are not energy efficient. As much as 40% of energy in the European Union is consumed by buildings, which at the same time are responsible for 36% of greenhouse gas emissions from the energy sector¹. In the context of the EU's climate objectives, the issue of the energy intensity of buildings is becoming one of the key areas of intervention. It is necessary to intensify efforts in the area of renovation of existing buildings. The creation of appropriate policies and tools will have a positive impact not only on reducing energy demand, but also on the creation of new jobs.

The urgency of action in this area is exacerbated by the current situation in the energy and fuel markets. The energy crisis related to the war in Ukraine will be particularly noticeable during the heating season.

¹ A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives: link

In the EU, it is estimated that construction is responsible for

43%

of greenhouse gas emissions.

Construction is responsible for around

38%

of global CO₂ emissions.



Recommendations

Existing buildings²

Existing buildings should be systematically subjected to measures to reduce their emissions. This applies to both buildings that are both public and private-owned. Cities should develop and implement programmes that will decarbonise buildings. These programmes should set clear goals and have mechanisms to monitor progress. It is also important to analyse the effectiveness of planned investments on an ongoing basis. In this context, it is worth noting that, for example, weaker insulation of a larger number of buildings will bring a greater effect on a city scale than the maximum technically available insulation but for a modest group.

At the same time, these programmes should take into account the affordability of housing to its users, as well as the accessibility of modernised buildings for people with special needs (including persons with disabilities and senior citizens). It is important to develop mechanisms to mitigate the effect of shifting renovation costs to users, especially those in a difficult financial situation.

Systematic renovation of existing buildings is important not only to reduce emissions, but they can also contribute to stimulating economic development, especially in the construction sector³.

New buildings

New buildings should be designed and constructed in such a way as to ensure that emissions are as low as possible at each stage and throughout their life cycle.⁴ At the same time, they should implement the principles of universal design as widely as possible, so as to guarantee equal accessibility for all users, including those with special needs (such as people with disabilities, senior citizens).

An assessment of the emission performance of a building throughout its life cycle from its construction to its operation should be introduced. This assessment (Life Cycle Analysis) should become a document required at the building permit issuance stage in order to know, so that the emission performance of the building is known already at the post-design stage.

² Better buildings for climate neutral cities The 'Fit for 55' revision of the Energy Performance of Buildings Directive, pp. 2–2. Access: link.

³ See, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives. Access: link.

⁴ Better buildings for climate neutral cities The 'Fit for 55' revision of the Energy Performance of Buildings Directive, p. 3. Access: link.

However, it is important to keep in mind not only the emission performance of the building during its use, but also the carbon footprint of the materials from which it was made, which is important at the stage of production of these materials, as well as their future disposal.⁵

In the case of the construction of new public buildings, it seems important to address the issue of future emission performance of the building as an important element in the assessment of the public procurement process.

The condition and capacity of the power grid, as well as the procedures for new connections, are also important for construction. The local government can engage in the process of putting pressure on the central government regarding transmission grid refurbishment.

Spatial planning

Planning should always take place on the basis of a dialogue which, under certain conditions, involves all future space stakeholders and experts who assist the local government in the planning process and in assessing the possible impact of decisions taken. Spatial planning is a key tool for the sustainable development of the municipality to improve the standard of dwelling, eliminate or significantly reduce possible conflicts and rationally manage resources⁶.

When preparing spatial development plans, the built-up areas should be kept as low as possible relative to neutral and green areas.⁷ At the same time, green areas should be restored in cities due to their positive impact, particularly in the area of combating climate change and urban resilience.⁸ It is also important to keep in mind the accessibility of public spaces for all citizens, including those with special needs (such as people with disabilities, senior citizens).

Revitalisation

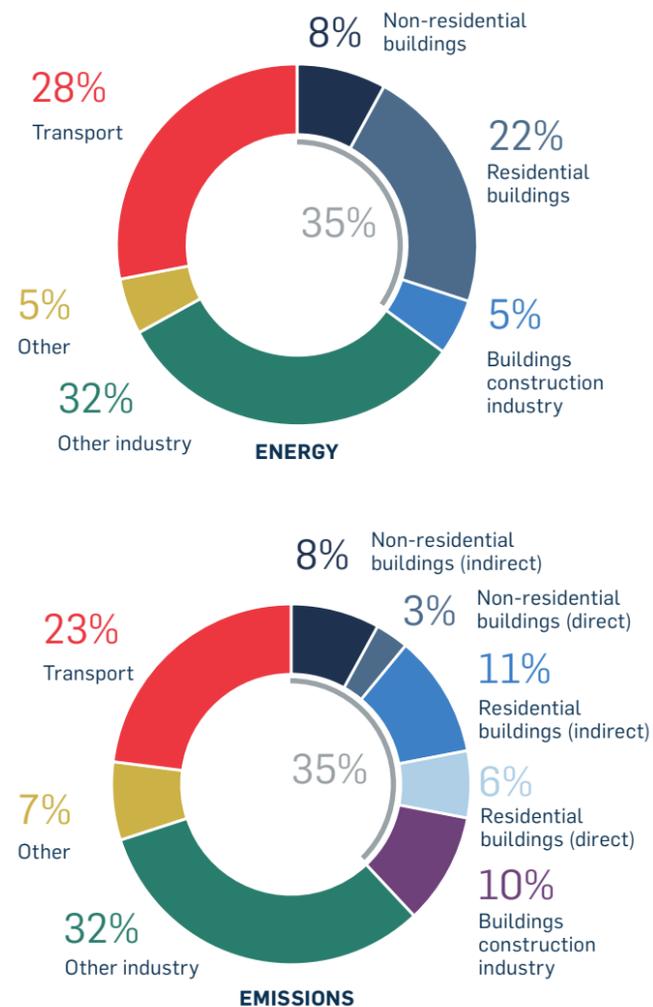
The aim of revitalisation (urban renewal) should be to support the effective and functional inclusion of existing built-up areas into city structures. The implementation of revitalisation programmes should contribute to the organisation of urban structures, the preservation of multifunctional spaces, allowing for different forms of use depending on the changing needs of

local communities. The regeneration process should take into account, among other things, the renewal/functional re-use of existing buildings, adding new and arranging the existing space. The process should also take into account the release of the water retention potential in cities, in particular in squares, parking areas and small architectural features, allowing rainwater to effectively infiltrate the soil from the surface.⁹

Comprehensive revitalisation of post-industrial areas must also aim to change them towards zero emissions, good connection by public transport and cycling.

⁹ See: Krajowa Polityka Miejska 2030 (Projekt), p. 23. Access: link.

Global share of buildings and construction final energy and emissions, 2019



[2020 Global Status Report For Buildings and Construction]

⁵ See: The New Urban Agenda, pp. 127–128. Access: link.

⁶ Prowadzenie polityki przestrzennej w gminie. Miniporadnik (2021), p. 6. Access: link.

⁷ Principles for Better Cities. Towards Sustainable Development in Metropolitan Regions, Precincts and Places, p. 9. Access: link.

⁸ Metropolis (2021). Nature in and across cities: metropolitan approaches for biodiversity conservation, Metropolitan comparative studies, pp. 16–19. Access: link.



Area: Governance



“Our struggle for global sustainability will be won or lost in cities”¹

these words spoken by Ban Ki Moon in 2012 set the role of cities in the 21st century according to the UN.

Background: *Managing urban areas comes with a huge responsibility. It is in cities that changes related to climate change, conflicts or other phenomena that violently upsetting the status quo resonate. The growing importance of cities is evidenced by the fact that more and more international organisations address their activities directly to cities. Urban development is of interest to the UN, OECD, EU.*

Prof. Jerzy Hausner's team identified 8 deadly sins of the Republic of Poland. These are: the inability to use different governance modes, but also civic passivity and a demanding attitude². Hausner stresses the deficit in understanding the functioning of network governance mechanisms, including co-management. On the social side, however, civic passivity and a demanding attitude are indicated. In this context, the role of local leaders in creating conditions conducive to cooperation for the common good is growing. This role fits in with the principles of development policy in Poland, which are included in the National Urban Policy. The authors emphasise the importance of participation, as well as cooperation and partnership (inter-level within administration and between administration and private, business or social partners).

In the area of modern city governance, it is also worth mentioning the concept of smart city, which has been dominated by technological issues in public discussion, and which is a much broader concept. Smart city is an urban centre intelligently co-managed with residents, the aim of which is economic development and the increasing quality of life achieved through investment in human capital, sustainable mobility and ICT infrastructure³. The role of the administration is to ensure that technologies in the service of residents are implemented transparently, involving users, in a sustainable manner and always leading to an improvement in the efficiency of urban governance and, thereby to enhancing the quality of life. Researchers from the Technical University of Vienna and the University of Vienna, for the purposes of creating the smart cities ranking, listed six smart areas: environment, quality of life, mobility, economy, people, governance⁴. Smart governance focuses on the inclusion of residents, transparency or a high level of public services and governance⁵.

1 Zemka, A., Silne dzielnice czyli miejski układ odpornościowy, in: Miasto wobec wyzwań, UrbanLab Gdynia, 2021

2 Hausner, J. et al., Państwo i my, Fundacja Gospodarki i Administracji Publicznej, Kraków 2020, p. 24

3 Caragliu, A., Del Bo, C., Nijkamp, P., 2009, Smart cities in Europe, Proceedings of the 3rd Central European Conference in Regional Science – CERS 2009, Kosice, p. 50.

4 Giffinger, R., Gudrun, H., Smart cities ranking: an effective instrument for the positioning of cities?, Architecture, City and Environment = Arquitectura, Ciudad y Entorno, 2010, pp.14-15

5 Bień, M., Jarczewski, W., Piziak, B. Urban lab – narzędzie poprawy jakości życia mieszkańców zgodnie z ideą smart city, IRMIR 2020, p. 16.



Recommendations

Urban development laboratories⁶

Opening up of the administration to extensive cooperation with all the city's stakeholders. The tool can be formulas based on the idea of urban/living labs. The example of Rzeszów and Gdynia shows how many benefits the city derives from involving residents, non-governmental organisations or business in addressing urban challenges. The city can be treated as a platform for cooperation where the administration acts as host, animator and stimulator of development. The city understood this way, with a specific role of the public sphere, has a chance for better use of local resources and partnerships. Such an approach may prove particularly important in the current situation, when, on the one hand, actions are needed that will dramatically reduce greenhouse gas emissions in a very short period of time and on the other hand, for the fossil fuel market, the most accurate response to the entirety of developments seems to be the maximum abandonment of their use. Long-term action plans and the experience of the municipal administration staff in this situation do not guarantee finding solutions that satisfy citizens. This is the moment when opening up to an „agile” approach that deviates from the routine can bring useful solutions and can certainly result in an increase in the level of involvement of residents and as a result a more cohesive community.

Agile city management

Introduction of management mechanisms supporting quick response in crisis situations. Procedures that, in exceptional situations, will make it possible to make better use of the potential of the municipality potential but also of local businesses and non-governmental organisations and individuals.

Opening up data

Opening up data generated by cities and municipal units. Data is not only information about the state of the city, but also fuel for local businesses and science. Examples of data banks include:

- Gdańsk
<https://www.gdansk.pl/otwarte-dane>
- Metropolia GZM
<https://otwartedane.metropoliagzm.pl/>
- Wrocław
<https://www.wroclaw.pl/open-data/>

Widely available data can generate new business models, strengthen local entrepreneurship and stimulate the creative class.

6 <https://urbanlab.net/pobierz-podrecznik-o-urban-labach/>

Participation

Using all forms of involving city stakeholders in the management process. Examples include civic panels organised in Wrocław⁷ or Gdańsk⁸.

It is also necessary to engage in dialogue with local business. Its direct impact on the environment and people is of great importance for the comfort of life of city residents, but also for the success of the whole project of low-carbon transition.

Continuous increase in human resources competence. Introduction of mechanisms to enhance the competence of local government staff in the field of sustainable transition. Local governments should cooperate with academic units to make the necessary changes to the curricula for future local government staff, so that they take into account the ESG aspects in each field of education. Cooperation and dialogue between local governments and business are also important and will provide knowledge of available technological solutions, the rules for their use or the possibility of financing with the use of repayable instruments.

7 <https://www.wroclaw.pl/rozmawia/panel-obywatelski-wroclaw>

8 <https://www.gdansk.pl/panel-obywatelski>



Area: Sustainable transport



Background: Transport is one of the main sources of air pollution and noise in the city. Moving around the city also entails huge energy consumption. Ensuring clean, non-energy-intensive, affordable and accessible transport is crucial for the sustainable development of the city.

Transport is the bloodstream of the city. If well organised, it enables people to travel efficiently to meet their daily needs. Many years of investment in the development of road and parking infrastructure, as well as much negligence in the area of organising public transport have contributed to the popularisation of the private car as a means of first choice in everyday travel.

In its Sustainable and Smart Mobility Strategy, the Europeanⁱⁱ Commission sets the target of reducing transport emissions by 90% by 2050. The EC's 2030 targets include:

- at least 30 million zero-emission vehicles will be in operation on European roads;
- 100 European cities will be climate-neutral;
- high-speed rail traffic will double;
- scheduled collective travel of under 500 km should be carbon neutral within the EU;
- automated mobility will be deployed at large scale.

Reaching climate neutrality in Europe by 2050 requires greenhouse gas emission reduction by at least

55%

by 2030 (in comparison to the year 1990).



Recommendations

Sustainable Urban Mobility Plan (SUMP):

In orderⁱⁱⁱ to ensure sustainable transport, it is reasonable to develop and implement in urban areas functional Sustainable Urban Mobility Plans (SUMP). This document covers the entire urban area and provides for cooperation in different policy areas, at different levels of administration and with the local community and other key stakeholders. It takes into account a number of sustainable transport options for the safe, healthy and smooth movement of people and goods, with due regard for co-residents and the urban environment. SUMP's advantage is a developed and tested methodology for their creation and implementation. Having a SUMP in place may also be prerequisite for the allocation of EU funds for a particular investment.

Collective transport

Collective transport should be the backbone of sustainable mobility, in particular in areas with high built-up density and population density^{iv}. It reduces the number of vehicles, which not only reduces emissions of harmful substances, dust and noise to the environment, but also allows cities to reclaim a valuable resource, that is space.

Reclaimed space may be a resource on which public facilities (parks, playgrounds), infrastructure necessary for the development of collective transport (bus lanes, stops or transfer centres), pedestrian and cycling paths can be built, or it can also be commercialised in some cases.^v

The issue of fuels

Given the need to move away from fossil fuels (oil, gas, coal) and at the same time the rapid development of RES technologies^{vi}, small and micro nuclear reactors and hydrogen systems^{vii} and the noticeable increase in their share in the energy mix, it should be pointed out that collective transport should be electrified as much as possible, which will reduce its environmental impact in the medium term. In this context, it is recommended to systematically replace rolling stock with electric units. However, it is important to ensure the possibility of charging from RES sources, SMRs (small nuclear reactors may be installed on the outskirts of agglomerations) or MMRs (micro-reactors may be installed in almost any places where 100x200 m sites can be dedicated).

Collective transport based on energy from hydrogen locally produced using zero-emission methods is also an interesting option. The high-temperature electrolysis technology, which allows carbon-free hydrogen to be produced at a price not exceeding the conventional method of steam reforming of natural gas, is very promising here. In this case, high-temperature nuclear microreactors are the source of process heat.

Hydrogen solutions are currently being developed and tested worldwide, but it is clear that they require a comprehensive approach adequate to plan the entire hydrogen-based transport system. An intermediate solution, particularly of interest to smaller agglomerations, is the construction of biogas plants and the adaptation of rolling stock to this energy carrier. Biogas can consume a fermentable fraction of municipal and sewage waste and waste from the cultivation of green areas (e.g. mown grass, leaves, etc.). It is also much cheaper to adapt the vehicle fleet and allows previously operated vehicles to be used.

Other means of transport^{viii}

Collective transport is complemented by infrastructure enabling safe and convenient travel by bicycles, scooters and other personal transport devices. This infrastructure should not only cover recreational or sporting routes, but above all enable its users to reach the most frequently attended places, i.e. schools, workplaces, shops, gyms, public institutions, etc., in line with the 15-minute city concept.

In the same spirit, when designing urban transport infrastructure, the provision of adequate infrastructure for pedestrian traffic should not be forgotten.

The mobility services introduced into the city (based mainly on shared means of transport – cars, bicycles, scooters) have a positive impact on local entrepreneurship, but they can also help the city to manage its transport policy properly. User-generated data help to understand users' patterns of daily demand for urban transport, and thus for better investment planning and better development of urban policies.

Accessibility of the transport network^{ix}

The sustainable urban transport network should be designed in an inclusive manner and ensure a sense of safety for all potential users regardless of gender, age or fitness level, and taking into account social considerations, i.e. transport exclusion of certain population groups.

Clean transport zones

Unfortunately, no clean transport zone has been successfully implemented in Poland. The current legislation allows cities to do so, but this requires a clear vision of urban development and political courage. Restriction of traffic for vehicles has a positive impact on local business (contrary to the general opinion that the lack of availability of parking spaces kills trade, it is pedestrians who make the largest purchases in small stores), and contributes to improving the living conditions of residents (reduction of emissions and noise).

When planning zones, the issue of growing volumes in e-commerce should be borne in mind. Courier companies invest in low-carbon

fleets, but also use completely neutral means of transport such as cargo bicycles.

Last mile transport^x

Apart from the transport of people, the transport of goods should also be kept in mind, especially last-mile transport. Transport of this type, as well as traffic generated by non-food trade, is a source of pollution in cities. When designing transport infrastructure, it is therefore necessary to take into account the transport of goods, which in some cases could involve, for example, the use of cargo bicycles or other solutions, e.g. drones or pneumatic network. At the same time, it should be possible to develop infrastructure for the use of zero-emission vehicles (rapid charging stations). In this case, the challenge is to provide power connections with sufficient capacity and clean energy sources to ensure the periodic generation of large quantities of energy. This issue becomes a problem when there is a large number of electric vehicles.

It may be interesting to combine P&R facilities with shopping centres. Such a combination may lead to a reduction in the daily journeys of residents for commercial purposes.

Recommendations from BFirst.Tech – Content Partner of UN Global Compact Network Poland for the following areas: Environmental Acoustics and Smart Industrial Infrastructure Monitoring and Diagnostics Systems

Environmental acoustics – zero noise in industry and the environment

- Adaptation and updating of EU directives on industrial noise from large plants in urban agglomerations
- Modification of requirements for environment protection against noise to increase its effectiveness, taking

into account the sound landscape and air pollution through modelling and monitoring techniques

- Changing the current method of managing the acoustic climate of cities with a particular focus on industrial areas – strategic acoustic maps
- Creating scenarios for changes in the acoustic environment based on strategic acoustic maps, taking into account the plant planning or expansion stage
- Data lake technology as support for local governments in the management of multi-dimensional information on the state of air quality

Smart industrial infrastructure monitoring and diagnosis systems

- Updating the provisions on testing and monitoring the condition of all types of transmission networks in urban agglomerations
- Improving the energy efficiency of households, housing estates and cities to optimise costs
- Management of energy in communities in the face of rising prices
- Handbook of good practices on quality of life dedicated to offices, concerning the minimum energy performance standards (manual with a set of recommendations)

Environmental acoustics – zero noise in industry and the environment

Noise is still one of the biggest problems of modern cities. In addition, just next to air pollution, it is an indicator for measuring quality of life. Both of these factors have a real impact on human health. Noise is generated by traffic, industrial plants, airports or railway lines and, which is mentioned less frequently, there is also the so-called municipal noise in cities, i.e. that generated by food service outlets, shopping facilities and mass events. It is important that noise can be closely associated with air pollution. If we analyse factors that generate noise and have an impact on air quality, their common determinants include, e.g., traffic intensity. In addition, traffic is an example of continuous noise, which is therefore the most onerous. According to the WHO, noise above 55 dBA has harmful effects on human health.

In large cities, a significant number of inhabitants are exposed to this type of noise: for Warsaw the average noise level is 68.1 dBA, for Wrocław it is 72.1 dBA. The same may apply to heavily industrialised places.

It is possible to create a robust framework for improving the comfort of life, but these actions should be linked to measures to improve air quality. Of course, air quality has been a hot topic in recent years, and the burden of work is likely to follow this trend, but with these activities comes an excellent opportunity to update the existing regulatory provisions, including Directive 2002/49/EC.

It is necessary to review EU legislation and to confront it with the latest scientific studies. This will strengthen public information and support citizens' initiatives, convince the public and, above all, engage it in changes that may often be very difficult to bring about.

Adaptation and updating of EU directives on industrial noise from large plants in urban agglomerations

Noise protection consists in ensuring the best possible condition of the acoustic environment in the plant environment. The main measure is to maintain the noise level below or at least at the permissible level. Many establishments fall into the trap of legislative changes, where regulations on permissible levels change, or a plant which was on the outskirts of a city becomes part of it as a result of the current pace of development.

Recommendation: *It would be a good practice to introduce mandatory long-term monitoring in these areas, so as to provide knowledge on the rhythm of the plant's life along with its impact on the environment, and then to model the impact, predict and take corrective actions.*

This would allow entrepreneurs to properly map all areas that must be covered by mandatory measurements of the working environment and environmental impact. Such a mechanism would protect the plant from the risk of penalties from control bodies, but it would also provide those authorities with a tool to impose penalties or differentiate them (in the case the plant has been part of the city for years or is part of the strategic infrastructure). For plants in areas with a low permissible level or when the plant has existed in the same location for many years, it will be possible to plan logistics so that it is least burdensome, based on maps of the sound level distribution, having surveyed noise sources. As descriptive data can also be collected during monitoring, this offers the opportunity to use them in other aspects. The energy crisis forces us to invent new solutions or adapt existing ones so as to make it possible, for example, to plan loads in the context of RES use. On sunny days, when there is an overproduction of energy from renewable sources, if possible, the plant should switch to increased production. This solution is nothing new, as not so long ago company announcements about the level of power supply were given; this time, the use of this type of information would fall within the "smart" trend.

Modification of requirements for environment protection against noise to increase its effectiveness, taking into account the sound landscape and air pollution through modelling and monitoring techniques.



Compulsory modelling of air or noise pollution by an industrial plant should be a mandatory layer of spatial information in GIS systems.

Recommendation: *It is necessary to amend EU legislation in order to unify the way in which the data is stored, processed and distributed.*

In the coming years, further strategic acoustic maps will be implemented, which provide much interesting data, not only in the field of noise. The common feature is the volume of traffic, which is also responsible for air pollution. Adequate processing would allow a better understanding of the problem. Random measurements of noise and traffic volumes will not give us a complete picture. Continuous monitoring – understood as a year-round process – will provide us with information necessary to take the following measures:

- modelling of traffic in the city,
- introduction of dynamically variable restricted entry zones, depending on air quality and noise,
- designing the acoustic landscape.

The existing legal arrangements allow for too much freedom of interpretation. Published data – maps are in raster or vector format, sometimes in the form of a PDF file; the same applies to descriptive and measurement data. This information does not allow easy interpretation and it may even discourage urban planners from taking it into account in planning. Not to mention the possibility of using new inference tools, i.e. Machine Learning or ordinary statistical mechanisms. In addition, measurement data without an imposed storage method are deprived of redundancy or completeness control, which also limits the possibility of its further interpretation. With a complete set of EU-wide data, inference and prediction would ideally be possible on the basis of observation, leading to the reduction of the cost of future environmental noise research, but such data has unfortunately been collected incompetently for years. Legislative changes should take into account easier access to data by scientific units.

Changing the current method of managing the acoustic climate of cities with a particular focus on industrial areas – strategic acoustic maps

Urban planners play a key role in shaping the quality of life in the city. Enabling them to easily access information in the field of acoustics will facilitate better decision-making in the field of noise and air pollution protection.

Recommendation: *Establish or strengthen cooperation in urban planning, acoustics and environmental protection.*

Consolidating information on the land use plan with information on air quality and the level of noise pollution will make it possible

to have a real positive impact on the comfort of life in the city and in industrialised areas. Enhancing this cooperation would allow noise levels to be eliminated or reduced by appropriate solutions, but this time in urban planning terms:

- correct location of buildings
- relevant projects
- use of the building – in the first line from the noise source – as a screen
- appropriate functional layout
- use of appropriate materials for the design of the façade

This approach will allow solutions to be used with are both functional and acceptable for the public. This will also limit the installation of noise barriers in places where their effectiveness is strongly overestimated. Cooperation between the urban planner and the acoustics engineer backed by public acceptance will allow a sense of spatial comfort and a sense of belonging and territoriality to be recovered and will enable the planning of city division into reduced noise zone both for places already built up and when planning expansion.

Creating scenarios for changes in the acoustic environment based on strategic acoustic maps, taking into account the plant planning or expansion stage

Acoustic maps of urbanised areas (towns, districts, housing estates) or maps of noise emissions from industrial areas today form the basis for the assessment of acoustic climate, but are most often carried out, in the case of an industrial plant, to determine the impact of the plant on the surrounding environment. This information may, but does not have to, be published.

Recommendation: *Introduce the obligation to create a map of the environmental impact of the plant in terms of noise. Applicable to each stage:*

- *plant construction plan,*
- *current status,*
- *expansion plan,*
- *a plan to prevent emissions above the normative sound level.*

This will allow entrepreneurs to properly map all areas that must be covered by mandatory measurements of the working environment as well as environmental impact. It will make it possible to clearly identify possible risks and develop possible prevention plans already at the investment planning stage. The preparation of

such a plan does not need to be costly because much information in a prepared plan will be reused:

- survey of sound sources
- digital base map
- complementary measurements

The benefit for the investor is the visualisation of the possibility of applying solutions to reduce excessive noise; in addition, it can be a starting point for assessing the reliable implementation of security measures.

Publication of information on the environmental impact of the plant in the public space restores confidence and testifies to the transparency of the plant.

Data lake technology as support for local governments in the management of multi-dimensional information on the state of air quality

At every stage of work on improving the comfort of life, a better understanding of the problem is essential. It is worth using not only new technological solutions and basing inference on the collection of new data, but it is also worth reaching for existing solutions. Unfortunately, this is not possible without an efficient flow of information. Already today, the amount of information obtained from the implementation of previous studies of acoustic maps, or from air quality monitoring, would allow efficient preventive actions to be taken.

An additional advantage is the fact that many cities aspire to being SMART and, to a greater or lesser extent, implement various

interesting solutions. So let us try to make smart real and show how important the years of work and investment were, and let us draw conclusions. It is necessary to propose recommendations for the use of existing data but also prepare recommendations on what this should look like in the future. Let us look at a wider spectrum.

Recommendation: *Develop a standard for information exchange*

Consolidation of different information systems, better data flow, recommendation of proven solutions, all these options will help to better address risks and, above all, reduce costs, as local authorities may be able to reach for solutions that have already been tested and discuss new ones on the European forum.

Smart industrial infrastructure monitoring and diagnosis systems

The comfort of life in the city depends to a large extent on efficient public institutions providing strategic resources such as water, gas and electricity. Due to its age, the efficiency of the infrastructure operated by these institutions is deteriorating year on year.

Municipal authorities and management bodies of companies providing strategic resources must make every effort to give a second life to existing infrastructure, the limitations of which are costly not only in terms of maintenance but often in terms of human health or life.

Long-term monitoring of water or gas pipelines is an element of strategic importance, thanks to which continuity of supply of utilities is ensured for institutions and for the local community.

Addressing also the comfort of the local community, it is worth paying attention to the issue of electricity use and the collection of

Currently

55%

of global population lives in cities, it is estimated that by 2030 it will be

60%

of humankind

[IPCC AR6 WGI, 2022]

In the EU

68%

of people live in cities, by 2050 it is estimated that it will increase to

80%

[Urban Innovative Actions 2022]

information on consumption and the directions for distribution of energy consumed. The development of smart city technologies is a direction which residents should be encouraged to follow, while providing highly developed network infrastructure and access to the highest class of security features.

Updating the provisions on testing and monitoring the condition of all types of transmission networks in urban agglomerations

Unrestricted access to utilities is one of the fundamental rights of every citizen of the European Union. First of all, this means access to water, gas and electricity. Focusing on the first two, the key aspect of this issue is not only their acquisition (sources), but also their distribution to end-users. Distribution of both water and gas is based on pipelines. Nowadays, urban agglomerations have huge pipeline systems, whose condition is very diverse and, as is well known, this is an element of critical infrastructure.

If we look at the history of the development of the pipeline network, it is very much related to the development of urban agglomerations, especially in the post-World War II period. Therefore, the age of some of its elements may be over 70 years. Given that steel pipelines are used for both gas and water, corrosion is the most immediate problem.

As far as water is concerned, the following can be mentioned as problematic issues:

- hydrological status
- number of pipe failures in urban agglomerations
- price increases

According to the Polish Geological Institute, the risk of a regional hydrological low is projected to develop in June 2022. Taking into account observation point II/743/1 located in Leszno (Wielkopolskie voivodeship), the forecasted water table level will change from approx. 2.55 m to approx. 2.85 m, i.e. by nearly 12% in June 2022¹.

The result of such hydrological situation is the warning from the National Hydrological Service No. 1/2022 of 31 May 2022 concerning the introduction of a state of hydrological emergency for the Wielkopolskie and Pomorskie voivodeships as well as parts of the Zachodniopomorskie and Dolnośląskie voivodeships².

According to the report of the Supreme Audit Office (NIK) on the maintenance and operation of water supply networks in cities, over 50% of the length of the water mains consists of

pipes operating longer than 50 years and 45% of the pipes are aged 25–50 years. In addition, the number of failures in Poland is up to 100,000 annually. Some of the water utility companies have introduced automatic monitoring of the water supply network, which enabled them to show a one-year profit on the reduction of mains water losses, which was three times higher than the costs incurred for the purchase and implementation of the monitoring system. In addition, 2/3 of the cities had no information on monitoring, which shows their lack of interest in the possibility of reducing the costs of operation of the water supply networks.

Besides, the report notes that the average national water losses over the period under study were 15.2 %, which translates into more than 10 million m³.³

One of the conclusions of NIK's audit was the finding of an unjustified increase in water prices in certain companies, which could thus compensate for water losses in the water supply network, as well as costs resulting from network failures.

The key conclusion of NIK's audit is the possibility of reducing the costs of operation of water supply networks through the application of monitoring.

An equally important argument is the increasingly emerging problem of access to water resulting from climate change, which the "Poland on the Way to SDGs. Report 2020" draws attention to⁴.

As far as gas is concerned, this is a strategic, geopolitical and environmental issue. Gas is the main substitute for other fossil fuels. Its main advantage is that during combustion there is a much smaller proportion of the solid phase, mainly due to the sub-optimal combustion phasing. Its disadvantage is a high methane (CH₄) content. Although there is more than 200 times less methane in the atmosphere than carbon dioxide (CO₂), its impact on the climate is very strong. Within 20 years of emission, one tonne of methane heats our planet like 86 tonnes of CO₂ and within 100 years of emission like 34 tonnes of CO₂ released into the atmosphere. Monitoring of transmission infrastructure is therefore also important in this respect.

The Energy Regulatory Authority approved the tariffs of the Gas Transmission Operator GAZ-SYSTEM S.A. for 2023, which means an increase in the rates at entry points by 30.3% for high-methane gas (Group E) and an increase by 30.9% for nitrogen-rich gas (Subgroup L) compared to the rates in force in 2022. The rates at exit points will increase by 19.2% for gas E and by 8.1% for gas L⁵.

1 <https://www.pgi.gov.pl/psh/psh-2/aktualna-sytuacja-hydrogeologiczna/9165-prognoza-sytuacji-hydrogeologicznej-w-strefach-zasilania-i-poboru-wod-podziemnych-1-06-2022-30-06-2022/file.html> (checked 14 June 2022).

2 <https://www.pgi.gov.pl/psh/psh-2/aktualna-sytuacja-hydrogeologiczna/9166-ostrzezenie-psh-nr-1-2022-dotyczace-sytuacji-hydrogeologicznej-w-kraju/file.html>

3 <https://www.nik.gov.pl/aktualnosci/nik-o-utrzymaniu-i-eksploatacji-sieci-wodociagowych-w-miastach.html>

4 <https://raportsdg.stat.gov.pl/2020/en/cell.html>

5 <https://www.ure.gov.pl/pl/urząd/informacje-ogolne/aktualnosci/10353,Rynek-gazu-Prezes-URE-zatwierdzil-taryfe-przesylowa-dla-GAZ-SYSTEM.html>

As at 31 December 2021, the length of the gas transmission network in Poland was 11,394 km, while the amount of gas fuel sent is 19.3 billion m³ (data from GAZ-System operator). In addition, according to the December 2018 Decision, was designated by ERO as transmission system operator until 6 December 2068.

According to the Statistics Poland (GUS) report of December 2020, in 2019 the total length of the gas network was 157,900 kilometres and increased by 2.3% from 2018.

The present geopolitical situation is strongly linked to the war in Ukraine. As of 27 April 2022, the Russian company Gazprom stopped supplying gas via the Jamal pipeline. According to the Energy Market Information Centre, the Russians limited gas supplies to Poland as early as 2014.

In order to minimize the risk of access to gas, the Gas Terminal in Świnoujście was commissioned in 2016, and PGNiG's flagship project, i.e. the Baltic Pipe, is scheduled to be put in operation on 1 October 2022⁶.

Taking into account the above information, it is crucial to update the provisions on monitoring the condition of water and gas pipelines and to enforce them accordingly.

Recommendations: Develop a new system, as well as expand the existing systems for monitoring the condition of pipelines and ensure openness of data on infrastructure for the water network.

The benefits resulting from the implementation of the recommendation are listed below:

- Wide access to reliable data. At this point, it is suggested to use modern solutions for big data collection, storage and visualisation;
- Continuous condition monitoring Thanks to the use of Internet of Things (IoT) tools, it is possible to create a system of continuous monitoring of critical infrastructure of both water and gas pipelines for the entities dealing with its maintenance;
- Reduction of infrastructure maintenance costs. The monitoring system is a key tool for extending the lifetime of pipelines while reducing the risk of large-scale failures;
- Optimisation of repair logistics. Thanks to the use of modern artificial intelligence solutions, it is possible to predict critical depreciation of pipelines over time, so that the algorithm will support decision-making in the infrastructure maintenance schedule.
- Improved security. Continuous monitoring of the infrastructure makes it possible to see potential failure locations before a disaster (e.g. pipeline leakage).

6 <https://www.baltic-pipe.eu/pl/o-baltic-pipe/>

Improving the energy efficiency of households, housing estates and cities to optimise costs

Smart City and Smart Home solutions generate, acquire, and process big data. Development monitoring, planning and development for each city should be based on sound analyses. It is therefore crucial to be able to use the data and interpret it easily. Without cooperation on many levels, a real "SMART" effect will not be achieved. Cooperation at administrative, business and civic levels is necessary. Consolidation of data on e.g. thermal upgrading of buildings (administration) with energy consumption data (energy sector) and data from home automation sensors (citizens) will allow better energy management, but also a more precise use of EU funds in transition plans.

Recommendation: Amend legislation on access to information (or information flow) key to decisions in the field of energy and development of the area of cooperation between business, municipal administration and society.

The implemented platforms for cooperation between local authorities and city community are a good example. Such solutions allow citizens to better understand the idea of smart city. But this data is worth complementing. Information on energy consumption will allow better planning of upgrades to existing infrastructure, enable a broader urban planning perspective and allow better targeting of financial resources. Subsidising photovoltaics in places with high solar exposure, and solutions such as heat pumps in places with high air pollution or in places where there is a problem with transmission infrastructure.

Management of energy in communities in the face of rising prices

Energy management should be understood as a complex process consisting of at least three sub-tasks: the management of energy production, transmission and consumption.

The technological development witnessed today makes it increasingly possible to generate energy near the place of its consumption. Energy production always involves certain risks or uncertainties. A small distance between the energy source and the consumer reduces the costs associated with transmission energy losses, transmission infrastructure costs and investment costs of industrial energy.

A significant disadvantage of the currently existing alternative energy sources is their seasonal nature due to natural atmospheric processes. This feature of most of renewable energy sources requires investment in some kind of energy storage.

Depending on the type of energy obtained (heat, electric current, mechanical energy), different types of storage can be used. The most popular are heat storage facilities (e.g. underground, water) and

electricity storage facilities (batteries). Energy can also be stored as potential energy of compressed gas, kinetic energy of rotating masses, potential gravity energy in the form of mass elevated to a height e.g. pumped storage plants).

As energy storage is still problematic, especially in economic terms, consumption management becomes a necessity. In the case of cities, this may be particularly easy to obtain. For example, energy produced by solar panels can be used to supply air conditioning systems – there is a correlation between energy demand and production.

Recommendations: *Where possible, use geothermal energy and energy storage in underground storage facilities, use photovoltaic solutions for roof coverings, blinds/shades incorporating photovoltaic panels. Cover the walls of buildings with photovoltaic panels. Work is underway on the implementation of transparent photovoltaic panels, which will reduce the amount of energy reflected from large glazed surfaces of modern buildings.*

It is worth addressing the issue comprehensively, e.g. a wall covered with photovoltaic panels contains ventilation ducts in which the flowing air is heated while cooling the wall and thus the panels, which improves their efficiency.

Handbook of good practices on quality of life dedicated to offices, concerning the minimum energy performance standards (manual with a set of recommendations)

A good practice is an action that produces concrete, positive results, has a certain potential for innovation, is sustainable and reproducible, can be applied under similar conditions elsewhere, or by others.

This description should include:

- best practice identification procedure
- why this is important for the future user
- a broader context, description of the problem and the objectives to be achieved, which will allow the usefulness of a practice in a particular country to be assessed
- main activities of the project which is to become a practice
- outcomes of the application of the practice
- information on value added
- implementation time
- whether it will contribute to beneficial social changes

- best solution selection criteria

Guidance on good practices should be addressed to the institution supporting sustainable urban development, for example in a European brochure, proposing a step-by-step approach to align existing solutions with new standards.

- I Caragliu, A., Del Bo, C., Nijkamp, P., 2009, Smart cities in Europe, Proceedings of the 3rd Central European Conference in Regional Science – CERS 2009, Kosice, p. 50.
- II See: Sustainable and Smart Mobility Strategy – putting European transport on track for the future: link
- III See Krajowa Polityka Miejska do 2030 r. (Projekt), pp. 51–59. Access: link.
- IV See Principles for Better Cities Towards Sustainable Development in Metropolitan Regions, Precincts and Places. Access: link.
- V See Metropolis (2022). Rethinking public space for a sustainable metropolitan future, Metropolitan comparative studies, p. 11. Access: link.
- VI See Energy Policy of Poland until 2040. Access: link.
- VII See Polish Hydrogen Strategy until 2030 with an Outlook until 2040. Access: link.
- VIII See Metropolis (2022) Public space strategies for a sustainable metropolitan future: A collection of best practices, p. 6. Access: link.
- IX See Think local, act European. Contribution to the development of the new EU Urban Mobility Framework (2021), pp. 16–17. Access: link.
- X See Full stop: fossil-fuelled mobility in cities Eurocities position on the revision of CO₂ emissions standards for cars and vans (2021), pp. 4–5. Access: link.

Companies and organisations listed below are members of the World Urban Forum 11 Business Council

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