

UNECE

Smart Sustainable Cities Profile

VOZNESENSK, UKRAINE



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Voznesensk, Ukraine



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PREFACE

This smart sustainable city profile for the city of Voznesensk, Ukraine, has been produced under the project framework “United Smart Cities”¹, coordinated by the United Nations Economic Commission for Europe (UNECE), together with the Organization for International Economic Relations (OIER).

The Ukrainian Ministry of Regional Development, Construction and Housing and Communal Services requested the profile for Voznesensk in 2016. The Housing and Land Management Unit of the UNECE Division of Forests, Land and Housing started with a fact-finding mission in December 2017 and completed the project in January 2019.

Project implementation was supported by financial and in-kind resources from the UNECE from funds of the UNDA 10th tranche project “Evidence-based policies for sustainable housing and urban development in selected countries with economies in transition”, the United Nations Development Programme’s office in Ukraine, the Ministry of Regional Development, Construction and Housing and Communal Services of Ukraine, and the city of Voznesensk. National and local experts also provided in-kind contributions. This generous support made the successful conclusion of the City Profile possible.

This is the second profile on smart sustainable cities in the UNECE region, after Goris, Armenia. However, in past years, the UNECE has undertaken and published similar city studies. These include reports on the Implementation of Human Settlements Policies on Urban Renewal and Housing Modernization for Vienna (1998), Bratislava (1999), Budapest (2000) and Ljubljana (2000). All these studies are available online at www.unece.org/housing/publications.html.

1 More information is available online at <http://www.unece.org/housing/smartcities.html>.

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CONTENTS

Preface	iii
Acknowledgements	iv
List of acronyms	vi
Executive summary	1
1. Background	9
The smart sustainable city profile process for Voznesek	9
Overview of the city of Voznesensk	10
2. Legal and institutional framework for urban development	13
Demographic and urbanization trends in Ukrainian cities	13
The institutional framework for urban development	13
Legal framework for urban development	15
The city structure of Voznesensk	16
3. Analysis of the Indicators	19
Introduction	19
Economy	19
Environment	23
Society and culture	27
4. The financial framework of Voznesensk	33
Existing financial mechanisms for sustainable urban development	33
Future opportunities for sustainable urban development and mechanisms to finance them	34
Availability of funds	34
Recommendations	36
Conclusion	36
Annex I – KPIs for smart sustainable cities	39
Annex II – Tables of recommendations	41

List of figures

Figure 1.	Administrative limits of the city of Voznesensk	10
Figure 2.	The stakeholders consultation	19
Figure 3.	Stakeholders consultation: discussion on the economy indicators	19
Figure 4.	Stakeholders consultation: discussion on the environment indicators	23
Figure 5.	Stakeholders consultation: discussion on society and culture indicators	27

List of boxes

Box 1.	Biofuel PPP in Malyn, Ukraine	35
Box 2.	UNDP launches support for ESCOs	35
Box 3.	Lending scheme for SMEs supported by the EU	36
Box 4.	EBRD local currency loans	36

LIST OF ACRONYMS

ACABs	Association of Co-owners of Apartment Blocks
AUC	Association of Ukrainian Cities
CO₂	carbon dioxide
DHCSCC	Department of Housing and Communal Services and Capital Construction
E5P	Eastern Europe Energy Efficiency and Environment Partnership
EBRD	European Bank for Reconstruction and Development
EE	energy efficiency
EIB	European Investment Bank
EIF	European Investment Fund
EMF	electromagnetic fields
ESCO	energy service company
EU	European Union
EUR	Euro
FAO	Food and Agriculture Organization
FX	foreign exchange
GEF	Global Environmental Facility
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
Gi/y	gigajoule per year
H₂S	hydrogen sulfide
Ha	hectare
IBRD	International Bank for Reconstruction and Development
KfW	Kreditanstalt für Wiederaufbau
Kg	kilogram
kWh	kilowatt hour
m²	square metre
MW	megawatt
NEFCO	Nordic Environment Finance Corporation
NO₂	nitrogen dioxide
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-operation and Development
P3DP	PPP Development Programme
PPP	private public partnership
SACI	State Architectural and Construction Inspection
SEAP	Sustainable Energy Action Plan
SIDA	Swedish International Development Cooperation Agency
SME	small and medium-sized enterprises
SO₂	Sulfur dioxide
UAH	Ukrainian hryvnia
UDHEEP	Ukraine District Heating and Energy Efficiency Project
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
USD	United States dollars
WB	World Bank
WHO	World Health Organization
µg/m³	micrograms per cubic metre

EXECUTIVE SUMMARY

The purpose of this study is to analyse the city of Voznesensk by using the Key Performance Indicators (KPIs) for Smart Sustainable Cities and support the municipality in setting priorities for action. The KPIs have been developed by the UNECE with the International Telecommunication Union (ITU) and 14 other UN bodies, as well as other partners in the global United for Smart Sustainable Cities (U4SSC) initiative.

In 2016, the Ukrainian Ministry of Regional Development, Construction and Housing and Communal Services appointed Voznesensk as their pilot city for the United Smart Cities programme and requested the UNECE to prepare a Smart Sustainable Cities Profile. The UNECE together with the United Nations Development Programme and a team of international and local experts developed this Profile for Voznesensk based on a research mission and stakeholders' consultation which took place in Kyiv and Voznesensk in December 2017.

This summary provides an overview of the city's situation and the analysis of its economic, environmental and socio-cultural indicators.

General situation

Voznesensk is a medium-sized city in Ukraine, located in the Mykolaiv Oblast and is the administrative centre of Voznesensk district. It is a city of *oblast* significance, meaning it is designated as a separate district within its region.

The city has an important part of the historical heritage of Ukraine and has a good climate which favours agriculture and tourism. Recently the city became popular for sports such as motorball. Furthermore, Voznesensk has invested in culture and recreation and owns several cultural institutions.

The economy of the city is mainly based on light industry and food processing. In the light industry sector, the most relevant areas are leather and leather goods, and manufacture of outerwear, footwear and furniture. In food processing, the most relevant areas are meat products, bakery and confectionery.

Urban development situation

Over the past two decades, Ukraine has experienced a steady population decline due to an aging population, a decline in fertility rates and emigration. As people leave rural areas, 80 per cent of Ukrainian towns and medium-sized-cities are also losing their population to larger cities. Further, the eastern and southern regions are highly

urbanized but have shown slower urbanization rates in the last two decades, while the historically rural Western region currently shows faster urbanization rates.

In 2014 Ukraine started a decentralization process which involved important modifications to its governance system. The most important modifications are:

- (a) A re-drawing of local administrative units (territorial-administrative reform) through the establishment of Amalgamated Territorial Communities (ATC) or 'hromada';
- (b) A redistribution of roles and responsibilities between levels of local government and a decentralized state administration, leaving the latter with a mostly regulatory and oversight role;
- (c) Broader fiscal and financial management powers given to local government.

This process of administrative restructuring has been accompanied by fiscal decentralization. This means that villages, towns and cities can unite communal properties and budget funds for joint projects or co-finance communal enterprises, organizations and institutions, creating appropriate bodies and services to do so.

To support the decentralization process, Art. 140 of the constitution gives local self-government the right to independently solve issues of local significance. This procedure is carried out by the local community directly, through local self-government bodies and their executive committees.

Analysis of the Key Performance Indicators (KPIs)

Economy

To conduct the assessment of the city of Voznesensk, this study used the Key Performance Indicators (KPIs) for Smart Sustainable Cities, developed under the initiative United for Smart Sustainable Cities (U4SSC). The data, dating to 2016-2017, was collected by the municipality and verified by a third-party auditor.

The economy section of the KPIs includes 43 indicators grouped into three sub-dimensions: ICT, productivity and infrastructure. The city of Voznesensk reported on 36 indicators under this category.

In terms of Information and Communication Technology (ICT), the city is performing well. Inhabitants generally have good internet connections and Wi-Fi hotspots are available. A citizens' transport card system has been implemented, and a Geospatial Information Systems (GIS) city map has been developed, which will need to be regularly updated.

Other services like drainage, electricity and water are not monitored by ICT and this currently does not represent a priority for the city. However, Voznesensk should continue to implement its services through digital platforms, and, due to the high cost of electricity, should consider using ICTs to monitor, manage and reduce electricity usage in the context of other energy efficiency initiatives.

Productivity needs improvement, as unemployment is fairly high and employment conditions can be unstable. Despite the current strategy of increasing tourism, tourism employment is still very low. In recent years, the city has seen the loss of larger companies because the primary sector was unable to provide raw materials. For example, a meat plant closed because the rural economy could not provide necessary cattle. Currently, small and medium-sized enterprises constitute the bulk of the local economy and need to be appropriately sustained and regulated.

Another economic issue for the city of Voznesensk is high public spending. In fact, while the decentralization process brought enormous advantages to local authorities in terms of budget autonomy and decision-making, local administrations like Voznesensk have to cover a wide range of expenses to provide adequate services to residents.

The city infrastructure also needs improvement. In particular, Voznesensk suffers from water losses, high electricity costs, poor solid waste treatment and sewage coverage, and an ageing building stock which requires retrofitting. Transport infrastructure works well in a compact city like Voznesensk. However, some road improvement is needed, especially if tourism is to become a primary source of income. Finally, introducing energy efficiency measures, especially in buildings, could offset heating, cooling and lighting costs and improve comfort.

Environment

The environment pillar of the KPIs includes 17 indicators grouped into two sub-dimensions: environment and energy. Voznesensk reported on 13 of these KPIs.

The city is very rich in good-quality water, however 25 per cent of the population is not connected to the public system and use their own, sometimes illegal, wells. When such a significant percentage of the population is not connected to the sewage system, hygiene issues may be more widespread, especially if cesspits are not properly maintained and cleaned. Furthermore, the wastewater treatment plant is situated outside the city and at a high elevation, thus having an impact on the cost of energy. Even though solid waste collection is properly done, there are issues with solid waste disposal as existing landfill is almost full and attempts to establish separate waste collection have failed. The municipality is not able to provide incentives, so it is implementing a recycling awareness and educational programme in schools.

Noise and electromagnetic field exposure do not seem to be significant issues for the city. However, the whole region suffers a lack of natural capital and biodiversity. Due to intensive agriculture, forests and other green areas are relatively scarce. Voznesensk has several parks.

As previously mentioned, energy costs remain a major issue for the city and its citizens, in particular the pumping of wastewater to the sewage plant and water pumping at the fresh water plant, as well as heating costs for schools, hospitals and households. The city is not performing well when it comes to energy. Currently, the city does not use renewable energy sources but only fossil fuels and nuclear power. Investment in the production of renewable energy need to be considered, especially considering the city's climate, agricultural landscape and current high energy costs.

Society and culture

In total, there are 29 indicators within the Society and Culture Dimension, grouped into two sub-dimensions: Education, Health and Culture; and Safety, Housing and Social Inclusion. Voznesensk has reported on 26 socio-cultural indicators.

The city is performing well in education, in particular, student internet access is 100 per cent, along with high student enrolment and literacy rates. The number of people with higher education qualifications is low, however, compared to the national average.

In the health category, the city has two important issues. The local hospital lacks equipment while having to serve the population of Voznesensk and surrounding districts (without receiving support from their budgets). The other issue is the cost of individual care. If a person needs special treatment, people are sent to the regional hospital or private clinic. If they cannot afford to pay, the city is responsible for its coverage. Furthermore, the city provides medication for disabled and chronically diseased people without reimbursement from the national budget. On the plus side, all citizens have electronic health records thanks to a "citizens card".

On culture, the city performs very well and great importance is given to cultural activities and institutions.

Housing is a major issue for Voznesensk - after energy costs; people reported high housing costs. Housing accounts for an average of 22 per cent of household income, and the quality of the housing stock is poor and hard to maintain. Despite no one living in informal settlements, poverty conditions or disaster-prone areas, citizens feel very discouraged by the city's economic situation and many migrate either to bigger cities, or abroad.

The city is reasonably safe in terms of violent crime and traffic accidents, but citizens are concerned about robbery, drug dealing, and wild dogs, which could become dangerous and carry disease.

Financial framework

Voznesensk's city budget for 2017 was 400 million hryvnias (UAH) (approximately USD 13 million), composed of general and special funds. Income tax accounted for 60 per cent of the total budget, while the remaining 40 per cent is derived from regional and state budgets. Overall, the local budget is very tight, and with decentralization laws the municipality is under increased pressure to spend its budget prudently. As far as maintenance is concerned, repair and modernization funds are very limited, meaning that only small improvements can be made annually. Additional taxes or borrowing funds (other than potentially for the solar plant) are not being considered. The city also receives international support from donors and national support from the nearby nuclear plant, but these funds are to support development projects. Infrastructure upgrades have begun, but funding is an issue.

Recommendations

Economy

1. **Promoting use of internet through an increase of the number of Wi-Fi hotspots in the city:** Citizens are already familiar with the importance of ICT to the city's operations, as shown by the citizens card. However, it would be beneficial to increase free public Wi-Fi spots to expand connectivity to the new digital economy. Young people, in particular, could then increase participation in the digital economy, developing employment opportunities that may lead to the city keeping its younger and more talented inhabitants.
2. **Strengthening the tourism industry:** The city's location as the main regional centre and historic crossroads has the potential for increased revenues from the tourism sector, taking advantage of the history and natural environment. To increase the number of visitors, the municipality could allocate resources to organize two social media campaigns:
 - a. On the city's natural environment;
 - b. On tourist activities such as motorball.
3. **Promoting energy efficiency:** Energy has a large impact on the city's budget. Therefore, projects whose aim is that of increasing energy efficiency, thereby reducing GHG emissions, should be a priority. Examples include:
 - **Increasing/upgrading insulation in the current building stock.** Building envelope insulation is the most practical and cost-effective way to make houses energy-efficient, increase indoor comfort and save up to 80 per cent in heating and cooling losses. It is therefore advisable to support insulation upgrades with fiscal incentives and awareness programmes.
 - **Installing higher efficiency heating systems.** Fuel price and environmental concerns drive the modernization of old heating systems. Modern, highly efficient, heating systems lead not only to cost savings but can also dramatically reduce the yearly total emission of pollutants.
 - **Installing higher efficiency lighting.** To improve lighting efficiency both in streets and households there are two possible solutions:
 - 1) New technologies with high luminous efficiency (high luminous flux per unit of electric power used);
 - 2) Smart lighting, such as sensors, reducing lighting at different times of day.
 Both solutions are advisable for Voznesensk.
 - **Developing energy efficiency rebate programmes.** Cash rebates for customers planning to install new, energy efficient information technology equipment or cooling systems could be provided.
 - **Developing mandatory city energy efficiency policies.** To create an enabling framework, a good system of regulations and policies are needed. With decentralization, many formerly national decisions are now taken by municipalities. Therefore, Voznesensk city council can adopt energy efficiency and renewable energy policies within its territory.
4. **Developing an industrial/business strategy based on the new rural economy, to develop new industries.** The closure of large employers in the city has had a negative impact on its economic base. Much of this was due to changes in the surrounding rural economy so that agricultural raw materials were no longer available. As a centre for the region, Voznesensk should review the surrounding rural economy and develop strategies that integrate with and support the surrounding economy. The city should also develop new industries based on available raw materials such as sand and granite.
5. **Upgrading the local transportation infrastructure.** Funds should be allocated to repair and maintain the road network, which will then support further economic growth.

Environment

- 6. Waste reduction.** The reduction of solid waste needs to be further explored as the municipal landfill has almost reached full capacity. Regional authorities have made several attempts to collect plastic, paper, glass and metal separately, but these have failed. Another attempt is expected to be implemented soon, however the city has no instruments for incentives or penalties. It is therefore advisable that the municipality continues to raise public awareness, especially in public schools where education programmes on waste recycling should be created.
- 7. Safety of wastewater pits.** About 25 per cent of households, usually in remote places, are not connected to the municipal wastewater system. Workshop participants reported that it is generally unknown whether cesspits are maintained correctly, or whether house owners' separate wastewater from the food system, for example failing to place the house garden next to a cesspit – which constitutes an obvious health risk. As the city cannot impose any legal measures to tackle these issues, two "soft measures" have been identified:
- 1) Raising awareness among households about the health risks of uncontrolled wastewater disposal;
 - 2) Establishing collective systems. If several households in the same neighborhood decide to access the public wastewater system, the costs can be shared and will be considerably lower.
- 8. Collection of tree leaves.** The burning of tree leaves in autumn creates a seasonal air pollution problem. One solution would be to create a central collection system for composting leaves, or controlled burning. The city has already started an information campaign and distribution of free collection sacks, and these measures need to be further enforced. Information about central collection should be channeled through the municipal website, schools, and posters.
- 9. Awareness and education about the local environment.** The best approach to raise awareness about environmental protection and ecosystem services is the school system. Here are some ideas:
- Making sure that school children know local species and discuss their roles and functions
 - Involving parents and the older generation (a useful knowledge archive) through joint excursions or interviews
 - Organizing prizewinning photo competitions about regional species
 - School discussions about lost species, their functions and why they disappeared
- Organizing a competition on how to improve the city's natural capital
 - Selecting an endangered species as a mascot for the city.
- 10. Implementation of agriculture-based solutions:** Compared with similar cities, Voznesensk lacks innovation, and there are very few SMEs offering new or alternative products. In addition, schools and training units seem to offer mainstream programmes and there is little groundbreaking research. First steps to increase innovation could include:
- Organizing study tours of regions with a similar setting that have implemented innovative solutions, for example regions in Poland or Baltic countries
 - Inviting successful SMEs from other countries with skills that are relevant for Voznesensk. In some cases, SMEs might even pay their own costs in order to make connections with the Ukrainian market
 - Proactively seeking financial support for international and regional knowledge exchange
 - Creating SMEs which are partly owned by the private sector and partly owned by the municipality
 - Inviting students from local and international universities for a summer competition on innovation.
- 11. Renewable energy use:** Since energy costs are a major issue for the city, energy cost reduction is a priority. Energy from biomass seems the obvious solution, since it offers many low-tech and low maintenance options. Alternative energy sources could include:
- **Plant biomass.** Due to the agricultural setting of Voznesensk, there are many options, such as burning plants in controlled vessels, processing oil seeds or starch-plants for ethanol or oil-based bio-fuels, and anaerobic fermentation to produce biogas. All options should be considered, taking into account which species can be produced at low cost and in co-operation with surrounding land owners, and which technology is most affordable and low-maintenance.
 - **Sewage sludge.** This can be used to produce biogas, as an energy source to run the water treatment plant pumps.
 - **Tree leaves.** Instead of burning, it would be advisable to collect these centrally. There are many options to further process the leaves

depending on the amount collected, including composting. This compost could be used in gardening or agriculture to increase humus content. The only requirement is space, and a caretaker to occasionally turn the compost. The compost should be free for those who provide the leaves, and available at a low price for others to incentivize its use.

Society and culture

12. Creating an “All students enrollment plan”:

Although drop-out rates stand at only 2 per cent, no school-aged child should be out of school. Therefore, an “all-students enrolled” plan should be implemented, identifying non-enrolled students and promoting awareness of causes, for example lack of economic resources, disability, transportation issues and problem families. Support, including psychological assistance, should be available to parents and children.

13. Designing a specialization programme in partnership with local industry and service sector stakeholders.

Poor on-site tertiary studies may be a cause for why the city lags behind the national average of adults holding university degrees. University studies should be promoted as the route to high quality and highly-paid jobs – this was a major issue in the workshop. This could be done by designing a specialization programme in partnership with local industry and service sector stakeholders. In addition, scholarships could be sponsored, and partners could offer on-site training to final-year students. This could lead to employment at the partner company once a degree is obtained.

14. Launching a “healthier lifestyle engagement programme”:

Life expectancy in Voznesensk is similar to the national average, but lower than the rural average. The city council could design a programme to promote healthier lifestyles. A similar quality of life issue arose during phase 1 of the workshop, where participants reported disabled people having difficulty living a normal life, as well as experiencing accessibility problems. The city council should address this issue directly by providing accessible transportation and removing barriers to access, especially to essential services such as health facilities.

15. Addressing the shortage of hospital personnel and equipment.

The number of hospital beds per capita is one third of the country’s average, and some workshop participants reported a lack of hospital medical equipment and personnel. This is

a structural issue that can only be addressed with central government investment and, eventually, with funds from donors. The city council should create an investment plan detailing the resources needed to reach Ukraine’s average standard as a minimum and present this plan to national authorities and international supporting bodies. Because financial resources are wasted in managing several hospitals, the closure of under-used local hospitals should be considered to provide investment to improve the central hospital. This would meet the high demand of patients for a better range of more modernized services.

16. Promoting local tourism. Voznesensk has many cultural and natural heritage sites which remain unexploited, calling for their promotion both at the national and international level. This would result in the creation of job opportunities for young and poor or informally paid people and also employ long-term and demotivated unemployed people. The most effective way to preserve culture and nature is to put it to use, and responsible tourism is the best tool for this as it provides the resources needed. For instance, by creating tourist attractions of mountain-bike routes and outdoor tours of the landscape² cultural heritage,³ visitor numbers would rise leading to increased hotel business. This would boost the job market and create a wide range of opportunities for people looking for employment, as well as for entrepreneurs. Therefore, the city council should take the lead in making Voznesensk a “tourist destination” and start by launching a stakeholder public consultation to create partnerships and alliances with the private sector.

17. Elaborating a “multi-purpose facility plan” to accommodate missing services and activities.

The UNECE’s Country Profile on Housing and Land Management on Ukraine⁴ (hereinafter, Country Profile Ukraine) states that one reason Ukrainian local authorities have not developed public facilities is

2 TripAdvisor, “Voznesensk”. Available at https://www.tripadvisor.es/LocationPhotos-g3569239-w8-Voznesensk_Mykolaiv_Oblast.html#129747432

3 Ukraine.com, “Guided tours of the history of Voznesensk”. Available at <http://www.ukraine.com/mykolayiv-oblast/voznensensk/>

4 The importance of residential regeneration has been recognized in Ukraine since at least 2000 and some cities have tried to promote city-wide regeneration programmes; however, these have not been successful for various political, economic and social reasons. For example, there have been cases where a multifamily dwelling, its utility connections and social infrastructure are finished by the builder, but the local authority refuses to place the utility and social infrastructure on its balance sheet, as such structures are often considered to be very expensive. Local authorities are very reluctant to take responsibility for structures which were not developed under their control. Source: Country Profile on Housing and Land Management – Ukraine (United Nations publication, 2013), p. 46. Available at https://www.unece.org/fileadmin/DAM/hlm/documents/Publications/CP_Ukraine_ECE_HPB.176.en.pdf

refusal to receive them from construction developers as they are difficult to maintain. This lack of public facilities was an issue discussed during the workshop. A simple usability analysis on existing public facilities in Voznesensk revealed that they are all single-purpose, and mostly underused. For instance, workshop participants said that the town has no movie theatre, but that one of the schools has an auditorium room that could serve this purpose. Therefore, the city council should identify and assess undiscovered needs to develop a “multi-purpose facility plan” to accommodate those missing services and activities within existing facilities by multi-tasking or rotating spaces. This could begin with place-mediating and place-making exercises with affected citizens as a first-hand method to discover currently unknown needs.

18. Providing affordable housing. One of the issues discussed in the workshop was the lack of affordable housing and low financial resources to access the housing market. The Country Profile Ukraine offers a possible way forward. Local authorities could partner with housing cooperatives (as well as other forms of non-commercial citizen associations) to create financial mechanisms to grant access to the housing market.⁵ However, the UNECE study warns that adequate legislation must be developed for this to be effective. With UNECE support, a 2018 new housing law is being developed which would devolve competence and powers on housing policy to cities. These legal changes would allow municipalities to facilitate the transfer of ownership rights from land owners of multi-apartment buildings to actual apartment owners. As a possible additional measure, central government and local authorities should make municipal debt securities more attractive to investors since these could be used to finance housing development programmes.

19. Increasing people’s participation in municipal elections by improving access to information. Participation in municipal elections could be improved by preparing public speeches before an election which clearly explain voting rules and procedures. In addition, physical accessibility should be improved, including increased provision of polling stations. Better information accessibility should make

it easier for elderly people to find their polling station. To attract young voters, a page of the Voznesensk web site could give information about candidates, with interviews about their political programmes. This way everyone would be better prepared and informed and have better access to polling stations and the candidates’ policies.

20. Creating kindergarten placements. Kindergarten placements should be created within the aforementioned “multi-purpose facilities plan”. This will create employment opportunities and improve the quality of life of working families, especially working women.

21. Relocating residents in high-risk areas. The city council reported 210 cases of residents living under threat of natural hazards. Although the specifics are not known, the municipality should draft vulnerability-zone plans to help prioritize relocation of affected residents. This could be a pilot implementation under the new municipal-cooperative housing programme. It is worth noting that the fire brigade reported staff shortages, disaffection and demotivation as well as poor equipment.

22. Improving emergency time response. One of the solutions given by the WHO to improve time response in emergency situations is to switch from traditional ambulance vehicles to motorbike-based assistance. For example, a traffic accident pilot scheme in Hanoi reduced response time from 5.18 ± 4.5 minutes with ambulance to 11.16 ± 6.2 minutes with motorbike.⁶ In Voznesensk, motorbikes cannot be used during the snowy season, but could be considered as first-response aid in non-extreme weather conditions.

23. Launching a “zero crime” campaign. Although there is no data on the number of police officers serving the city, participants manifested concern on high crime rates due to low police activity. It is however impossible to assess or recommend measures in this area as causes for low policing activity are not known. What can be advised is the launch of a “zero crime” campaign, emphasizing the importance of good behavior for a better quality of life for all. It is also expected that proposals for the areas of economy, education and culture will reduce crime rates as employment increases.

⁵ Current civil legislation treats housing cooperatives as transitory; as long as shares are paid, the member of a cooperative becomes the owner of the housing unit and the apartment building turns into a condominium. That was not the case under Soviet legislation, when Ukrainian society got the valuable experience of building and managing apartment blocks as housing cooperatives. Now, housing cooperatives (as well as other forms of non-commercial associations of citizens) could be effective partners of public authorities and targeted for both state and municipal housing assistance programmes. Fostering the non-commercial sector will require the development of adequate legislation. Source: Ibid., p. 69.

⁶ Post-crash response: Supporting those affected by road traffic crashes (Switzerland, World Health Organization, 2016), p. 10. Available at https://www.who.int/violence_injury_prevention/publications/road_traffic/Post-crash_response_booklet.pdf

24. Promoting bio-agriculture practices. All of the city's university programmes are agriculture-based, so it would be worth exploring a partnership between the municipality and the university to promote bio-agriculture by reducing the widely adopted use of fertilizers⁷. This would create a high-quality and specialized market of organic products that could boost the local economy through exports but would also increase local food consumption and reduce dependency. Moreover, since organic products are healthier, this would have a positive impact on quality of life, and probably increase Voznesensk life expectancy figures.

Finance

Despite public budget shortages, Ukrainian tax law does not allow the city to increase revenues by increasing taxes. Options for reducing expenditure are similarly limited as the cost of operation, maintenance and modernization of assets is substantial. As the municipality's capacity to pay interest and repay debt is also limited, other forms of funding need to be considered.

The discussion on available funding for future sustainable projects led to a set of key recommendations the city might focus on:

- Use "off-balance sheet" structures such as small-scale Public Private Partnerships (PPPs) and ESCOs to finance investments, subject to the provisions above;
- Consider debt only for investments which generate enough cash flow to repay it;
- Attract grants to the largest extent possible, particularly for energy efficiency investments. This strategy is already being pursued successfully, but could be broadened further;
- Encourage entrepreneurship and support SMEs. A prosperous SME sector which goes beyond micro-enterprises will generate more income tax;
- Strengthen the internal institutional capacity to successfully manage these off-balance sheet projects and attract and manage external grant funding.

It is recommended that the city continues this financial approach, only borrowing at subsidized rates for projects which generate cash flow for loan repayment. Furthermore, the city should continue to attract grant funding or subsidized funds to finance future projects. This has proven to be a successful approach, yet the city may need to increase its institutional capacity – for example employing qualified senior staff with relevant experience in attracting a broader range of funds.

⁷ Food and Agriculture Organization (FAO) of the United Nations, *Statistical Pocketbook: World Food and Agriculture*, p. 213. Available at <http://www.fao.org/3/a-i4691e.pdf>

1.

BACKGROUND



1. Background

The smart sustainable city profile process for Voznesensk

The United Nations Sustainable Development Goal (SDG) 11 calls for the progress of cities and human settlements toward being safe, resilient, inclusive and sustainable, from now until 2030.⁸ To achieve this, several factors impacting urban life and development need to be taken into account, such as urban planning, social issues, citizen awareness and participation, the environment, transport, resource efficiency, and the economy. In order to support the implementation of the SDGs at a local level, UNECE, together with other partners, launched the “United Smart Cities” project.⁹

In 2016, UNECE received an official communication from the Ukrainian First Deputy Minister of Regional Development, Construction and Housing and Communal Services, H.E. Mr. Vyacheslav Negoda, requesting the preparation of a Smart Sustainable City Profile for the city of Voznesensk.

In September 2017, UNECE conducted a preliminary mission in Kyiv and met the representatives of the United Nations Development Programme (UNDP) Ukraine as well as the Mayor of Voznesensk and the city focal point for the project to discuss the work, the process and the research mission.

The research mission was then conducted in December 2017 in Kyiv and Voznesensk.

Phase 1. Getting started: The expert workshop and the stakeholder consultation

The fact-finding mission to Kyiv, the capital of Ukraine, and to Voznesensk, was undertaken from 4 to 8 December 2017. It was organized by the UNECE’s secretariat in cooperation with UNDP Ukraine, the Ministry of Regional Development, Construction and Housing and Communal Services of Ukraine, and the city of Voznesensk. In Kyiv, the UNECE met the representatives of the State Statistic Service and the Department of Life-Support Systems and Housing Policy of the Ministry of Regional Development, Construction and Housing and Communal Services to gather information on urban development and data

collection and availability. The delegation then traveled to Voznesensk, where a workshop of experts as well as a consultation with relevant stakeholders took place.

During the stakeholder consultation, the methodology for the preparation of the smart sustainable city profile, based on the Key Performance Indicators (KPIs) for Smart Sustainable Cities,¹⁰ was discussed. Further, an interactive discussion with local experts was organized which allowed for the collection of information on the city’s current environment, urban planning, energy efficiency, and economic and social situation. The stakeholder consultation was organized using the “Pyramid 2030 Campaign” approach.¹¹

On the last day of the mission, the international experts and representatives of the city visited several sites of particular interest for the city’s development, after which the delegation departed from Voznesensk to Kyiv to meet project’s focal point at UNDP Ukraine, to debrief about the mission and discuss next steps.

Phase 2. Evaluating the city’s performance with the Key Performance Indicators for smart sustainable cities

The performance of Voznesensk was evaluated using the KPIs for Smart Sustainable Cities, which were developed by the International Telecommunication Union and the UNECE in consultation with other 14 UN bodies and other stakeholders in 2017. The list of KPIs includes 92 indicators which are grouped under the three pillars of sustainable development: economy, environment, and society and culture.

Using these indicators, this Smart Sustainable City Profile was prepared for Voznesensk. It provides an analysis on relevant factors for all urban development aspects, including business and economy, social issues, strategic urban planning and governance, with a particular focus on the use of energy and resources as well as the potential for increasing efficiency. The results and recommendations of this document will enable Voznesensk to better assess its status with respect to the impact of urban development on the economy, environment, and society and culture, as well as other aspects relevant to quality of life and city competitiveness of the city. It further allows to identify policy areas where action is required most urgently and to give recommendations on how to make improvements as well as the types of investments needed to finance them. The full list of the KPIs for Voznesensk is presented in Annex I.

8 United Nations, Division for Sustainable Goals, “Transforming our world: the 2030 Agenda for Sustainable Development”. Available at <https://sustainabledevelopment.un.org/post2015/transformingourworld>

9 UNECE, Housing and Land Management, “United Smart Cities”. Available at <http://www.unece.org/housing/smartcities.html>

10 UNECE, Housing and Land Management, “Publications”. Available at <https://www.unece.org/index.php?id=47031>

11 The Pyramid 2030 Archive website <https://pyramid2030.wordpress.com/>

Overview of the city of Voznesensk

Background information

The historical city of Voznesensk, is located in the Mykolaiv Oblast (region) in Ukraine and is the administrative centre of Voznesensk Rayon (district). Voznesensk is a city of *oblast* significance, meaning that the city is designated as a separate district within its region. The city's territory is divided into districts: 1, 2, 3, Natiagalivka, Bolgarka, Crimea-Caucasus, Lageria, ZelenyiGai, Pionerskyi, Plemstantzia and Priame. Currently, Voznesensk has a population of around 35,900, which has recently been shrinking by around 200-300 inhabitants per year due to low birth rates and emigration of population in working age to larger cities.¹²

Historical and cultural heritage

The history of the city dates back to 1415-1418, when Prince Vitovt started expanding his kingdom into the Black Sea Region. A fortress and Cossack settlement were built on the territory later.

In October 1789, at the initiative of the governor of Novorossia, G.O. Potemkin, Queen Catherine II commissioned the building of Voznesensk on the banks of the river Bug, and construction of the city began in 1795. After the death of Catherine II, Emperor Paul's decree of 12 December 1796 suspended the city's construction and abolished the Voznesensk province.

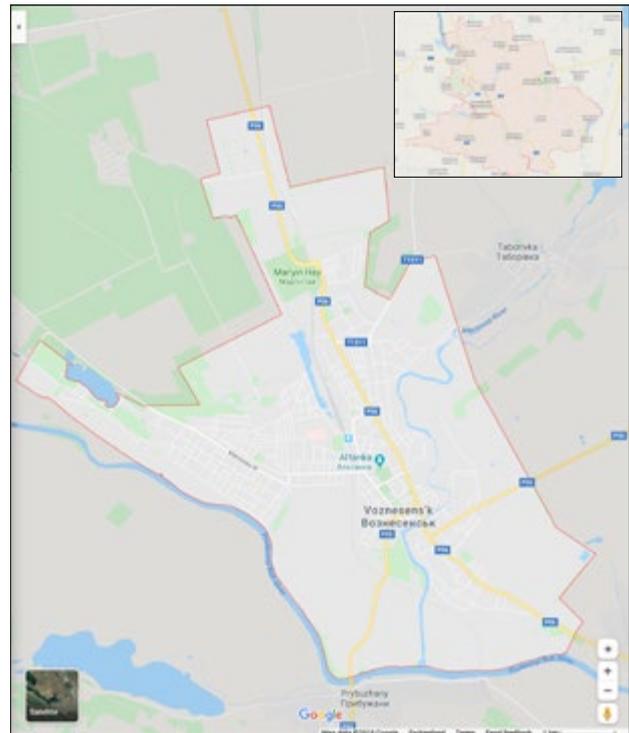
In 1803, Voznesensk became the headquarters of the Bug Cossack Army, and in 1817, when this army was liquidated, a cavalry settlement was created instead. By 1823, Voznesensk was the centre of this settlement.

In 1837, near Voznesensk, "the highest watch of troops" brought around 100,000 troops to the city. In preparation for the arrival of emperor Nicholas I and other officials, the city was transformed. Two palaces, dozens of stone buildings, a theatre, greenhouses, arbours and fountains were built, and the streets were planted with trees. The second half of the 19th century saw industry arrive in Voznesensk and before long a railway connection was established with Odessa.

Voznesensk suffered significant damage in the Second World War, but gradually recovered. Industry thrived, and various food processing plants and factories manufacturing goods from furniture to leather were founded.

In recent years, Voznesensk has seen the rise of a market economy and an increase of private businesses, especially in trade and services. City authorities are actively implementing new programmes and public initiatives, and networking and

Figure 1. Administrative limits of the city of Voznesensk



Note: Top picture inset is the city within Voznesensk rayon.

exchanging best practices with other cities from different countries. Leisure facilities, a skate park and a major sports and recreation complex have been built, along with many temples and churches.

Environmental conditions

This territory was originally steppe land, with a narrow prevalence of drought-resistant herbs. The arid climate and steppe vegetation were perfect conditions for formation of fertile black soil across the region, capable of producing substantial agricultural yields.

The climate of Voznesensk is moderately arid and continental. Summer is mostly warm, lasting around 5 months; winter is mostly short, mild, and slightly snowy, with unstable snow cover. Spring tends to last up to 60 days, whilst autumn is short, mild and often dry, lasting about 45 days. The average annual air temperature is +9.4 degrees Celsius, ranging from average temperatures of 3.9 in January to 22.4 in July.

Annually, the city averages 420-440 mm of precipitation, the largest amount of it, 70 mm, falling in June - the driest month is February with 26 mm. Only a small amount falls as snow. The average freezing depth is 54 cm, the maximum 140 cm. In warm winters, the soil freezes to a depth of 10-20 cm.

¹² Ukraine, State Statistics Service, Demographic Passport of Territory. Available at http://database.ukrcensus.gov.ua/MultiDialog/statfile1_c_files/pasport_en.htm

The Southern Bug River, and its tributary the Mertvovod, flow through the city territory. The Southern Bug originates far beyond the borders of the Mykolaiv region in the marshes of the Khmelnytsky region, and is 792 kilometre (km) long. The river is navigable, and its water is used for irrigation, water supply and fish breeding. Land use in Voznesensk, which comprises a total of 2,256 hectares (ha), is as follows:

Land type	Surface, in number of hectares
Agriculture	9.7838
Owned by private citizens	1 150.3677
Institutions and organizations	193.9459
Industry and enterprise	204.2943
Defense	80.8542
Recreation	0.0164
Not owned/unused	616.7377
Total	2 256.0000

Socioeconomic conditions

Industry

With 10 enterprises, light industry lies at the heart of the city's economic activity. The city hosts companies producing leather and leather goods, tailoring, footwear, furniture manufacture, as well as baked goods and confectionery.

Public Utilities

- The municipal water supply company of Voznesensk provides water and waste-water services.
- The communal enterprise "Teplo-Service" of Voznesensk City Council provides heating services. However, this company serves only 259 subscribers because most inhabitants use individual heating.
- The "Communal Enterprise City Sanitary Cleaning" provides solid waste disposal services and has 264 sites on which there are 886 containers for garbage collection.
- Education and culture

Voznesensk school system institutions include pre-school, general education, out-of-school education, vocational and technical education and Voznesensky College of the Mykolaiv National Agrarian University. All of these are controlled by the Education Department of the City Council.

The area is served by twelve nursery/pre-schools, enrolling 1,600 pupils from 0 to 6 years old. These institutions are municipally owned and employ qualified teachers. The use of information and communication technologies (ICTs) is of crucial importance and all pre-school educators have some ICT knowledge.

The city hosts twelve secondary education institutions, two professional colleges, the Voznesensky College of the Mykolaiv National Agrarian University, a special boarding school for children with learning disabilities, and the comprehensive boarding school "Giftedness". These institutions also provide evening or remote courses and enrol about 4,400 students. In order to meet the educational needs of national minorities, there is also a secondary school with classes in Ukrainian and Russian. Furthermore, there are two after-school institutions and more than 70 hobby clubs attached to general secondary education institutions, enrolling 1,160 students.

Finally, in Voznesensk there are several publicly owned cultural institutions: The City House of Culture, two art schools, the museum of art and local folklore, five libraries, and a city park of culture. The city regularly hosts cultural and artistic activities, such as the festival "Classic Melody of the Steppe".

Healthcare

The population of Voznesensk and the surrounding district is served by a district hospital which treats around 10,000 patients per year, as well as three outpatient clinics. A large number of patients from Voznesensk (252,677) and from the district (100,837) visited the hospital in 2017, whereas 153,153 people visited family doctors and ambulatory clinics.

Since 2004, a pilot project for providing medical assistance to the population has been operating, with the aim of managing cost-effective healthcare provision according to individual needs. As part of this scheme, citizens have been issued electronic medical cards to help the pooling of medical data.

Social inclusion

Local self-government bodies¹³ provide social support to citizens in need, especially vulnerable groups such as elderly people and single disabled citizens in need of constant third-party assistance through specialized public institutions. Furthermore, other community organizations support and assist the city's inhabitants.

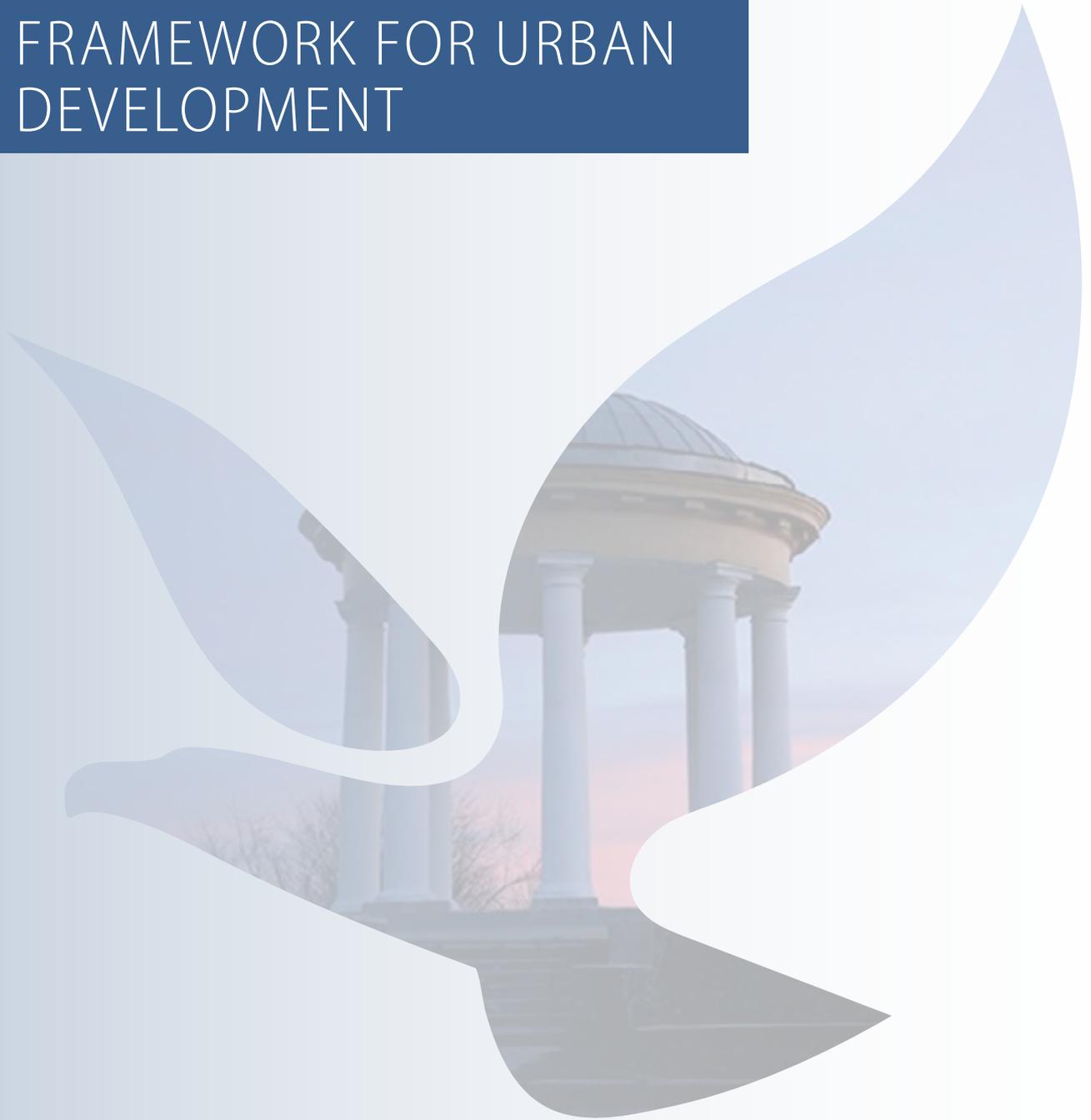
Recreation and Sport

The city hosts a city stadium and a motorcycle ring as well as the physical culture and recreation complex "Vodograj", which includes a water pool, rooms for Greco-Roman wrestling and gyms. Voznesensk is famous in Ukraine for sports such as motorcycling, speedway and motocross. Recreational sites include the Pivdennii Bug and Mertvovod rivers and their surrounding areas, as well as many Voznesensk Forestry Enterprise sites, situated in the west of the city. There are also a number of public parks.

¹³ Please see "Local self-government" in chapter 2.

2.

LEGAL AND INSTITUTIONAL
FRAMEWORK FOR URBAN
DEVELOPMENT



2. Legal and institutional framework for urban development

Demographic and urbanization trends in Ukrainian cities

Over the past two decades, Ukraine has experienced a declining and aging population, with notable consequences at the city level. The national population declined by 13 per cent (in 1993 Ukraine had 52.2 million inhabitants, in 2017, 42.4 million);¹⁴ and urban population declined by 9 per cent. This sharp decline is linked to emigration, the overall aging trend and a significant decline in birthrates.¹⁵ Technically, the country could be said to be continuing to urbanize, because the rural population is declining faster than the urban population. However, more than 80 per cent of Ukrainian cities are losing population, but not homogeneously. The eastern and southern regions are highly urbanized but have shown slower urbanization rates in the last two decades, while the historically rural Western region currently shows faster urbanization rates.

The institutional framework for urban development

The decentralization process

Currently, Ukraine is going through an ambitious decentralization process which presents both challenges and opportunities. On 1 April 2014, the Cabinet of Ministers adopted the Concept of the Reform of Local Governance and Territorial Organization of Power,¹⁶ which laid down core principles and a broad two-phase timeline for the reform agenda. The main modifications are:

- (a) Redesigning local administrative units (territorial-administrative reform) through the establishment of Integrated Territorial Communities (ITC or Hromada);
- (b) Redistributing roles and responsibilities between the local government and the decentralized state administration, leaving the latter with a mostly regulatory role;
- (c) Passage of broader fiscal and financial management powers to local government.

Alongside this process of administrative-territorial integration, fiscal decentralization is a priority within the broad reform agenda. Central control of finances means local government is heavily dependent on inter-governmental transfers from central government.

The Voluntary Association of Territorial Communities Law of 5 February 2015A,¹⁷ is another step towards decentralization, allowing villages, towns and cities to contractually unite communal properties. It also allows them to budget funds for joint projects or to co-finance maintenance of communal enterprises, organizations and institutions, as well as create appropriate bodies and services for them. This law, which came into effect in March 2017, has led to the voluntary amalgamation of 3,443 communities into 743 ITCs, with over 6.4 million people living in these new units (data as of June 2018).¹⁸

National institutions

Legislative

The Parliament (*Verkhovna Rada*)¹⁹ has the authority to create and approve laws. It decides when local elections are held, the status and responsibilities of the different tiers of public administration including local governments²⁰, and changes in administrative unit borders, including cities, budgetary allocation and so on. In the Verkhovna Rada, the Committee for Construction, Urban Planning and Housing and Communal Services and the Committee for State Construction, Regional Policy and Local Self-Government are responsible for developing and submitting laws on urban planning, spatial development, and housing.

14 Ukraine, State Statistics Service, Population census database. Available at http://database.ukrcensus.gov.ua/MULT/Database/Census/databasetree_en.asp (accessed on 24 October 2019).

15 Ukraine Urbanization Review, World Bank, 2015.

16 Ukraine, Ministry of Foreign Affairs, "Concept of the Reform of Local Self-Government and Territorial Organization of Government in Ukraine". Available at <https://mfa.gov.ua/en/news-feeds/foreign-offices-news/21459-koncepcija-reformuvannyamiscevogo-samovnyaduvannya-ta-teritorialnoji-organizaciji-vladi-v-ukrajini> (accessed on 10 August 2018).

17 "Decentralization" initiative website, "The Law on Voluntary Accession of Communities has Become Effective", 20 March 2017. Available at <https://decentralization.gov.ua/en/news/5066?page=166> (accessed on 10 August 2018).

18 Results available at https://decentralization.gov.ua/uploads/library/file/277/Monitoring_11.06.2018_EN.pdf and <https://decentralization.gov.ua/en/gromada> (accessed on 10 August 2018).

19 It is the parliament of Ukraine, composed of one chamber with 450 members.

20 According to Art. 140 of the Constitution, local communities are allowed to independently solve issues of local significance within the Constitution and laws of Ukraine.

Executive – central level

The country's executive power is held by the Cabinet of Ministers.

The *Ministry of Regional Development, Construction, Housing and Communal Services* (hereinafter, MRDCHCS) is responsible for developing and implementing policies and regulations in territorial-administrative organization and local self-government, construction, spatial planning, housing, and communal services. The Minister is also Vice Prime Minister of the Cabinet.

This Ministry manages several state agencies/services under its jurisdiction, among which are the State Architectural and Construction Inspection (SACI), and the State Service of Geodesy, Cartography and Cadastre. SACI implements policies on state architecture, and construction control and oversight, issuing permits for various types of planning and construction works and licenses for professional market operators. The State Service of Geodesy, Cartography and Cadastre was created by merging the State Agency of Land Resources with the Cartography Agency in 2015. The latter agency is responsible for land management works and operations, evaluating land values, technical characteristics, and environmental protection. It is also responsible for managing the State Land Cadastre and for maintaining a database of expert organizations and individuals with technical skills in land survey and management. It has regional departments all over Ukraine.

The *Ministry of Economic Development and Trade* is responsible for drafting state and regional policies and overall economic policy. It monitors the economic development of Ukrainian regions, as well as regulating investments and consumer rights. It also provides administrative support and expertise for preparing socio-economic strategies for regions and large cities, as well as collecting national statistics.

The *Ministry of Culture's* responsibilities include developing and implementing policy which protects cultural heritage. It includes the Department for Protection of the Cultural Architectural Heritage, which agrees, and issues permits for construction and activities for areas with special cultural and historical status (e.g., UNESCO sites and architectural national reserves).

The *Ministry of Ecology and Natural Resources'* responsibilities include developing and implementing policies on environmental protection, air, water, and land resources, including land use.

The *Ministry of Infrastructure's* responsibilities include developing and implementing policies on infrastructure and telecommunications.

Besides the Ministries mentioned above, key urban stakeholders include two associations - the *Association of Ukrainian Cities (AUC)* and the *Association of Small Towns of Ukraine*. AUC is one of the most influential lobbying

platforms in Ukraine, bringing together mayors of all large cities in Ukraine. AUC has traditionally been playing an important role for functional and fiscal decentralization, and for giving strong roles and capacities to city councils in developing and implementing effective policies.

The *Association of Small Cities of Ukraine* is a lobbying platform which evolved from an association of villages and settlements. It unites the mayors of small cities and towns and the headquarters which are in the city of Ukrainka (Kyivska region).

Regional institutions

Executive power in regions, districts, and the city of Kyiv is exercised by local state administrations. These are responsible for implementing national laws and regulations at regional and district level and for monitoring their execution. They provide a range of administrative services for urban development, architecture, planning and land management. The heads of local state administrations are appointed and dismissed by the President of Ukraine, upon submission to the Cabinet of Ministers. The heads of local state administrations report to the President of Ukraine and the Cabinet of Ministers.

Regional and district councils are elected, and function as local self-government. They are responsible for developing policies at regional and district level, according to the authority granted to them by the Constitution and the Law on Local Self-Government (1997). They approve budgets, special development programmes and projects, and manage assets belonging to the region and district community. They do not have their own executive committees, and delegate all executive functions to state administrations at regional and district levels. In turn, local councils (regional and district) may delegate part of their powers to regional and district state administrations, retaining control over how these are exercised.

Local councils are supervised by the *Verkhovna Rada*, which can call extraordinary elections and replace the local council in the event of illegal actions or decisions.

Local self-government

According to Art. 140 of the Constitution, local communities are allowed to independently solve issues of local significance within the Constitution and laws of Ukraine. Local self-government is carried out by the local community, both directly and through local self-government bodies - village, town and city councils and their executive committees.

Executive committees are legal entities which stay in office for four years. They are composed of the chair of the relevant council and deputy/ies of the village and city

mayor. The secretary of an executive committee and other executive bodies of the council are also members. The Executive Committee supervises local social, economic and cultural projects as well as the local budget. It also drafts decisions to be submitted to the relevant council and coordinates the activities of local enterprises, institutions and organizations. It also has special powers in planning and accounting, budget and finance, communal property management, local economy development, environmental protection, construction, housing, transport, communication and social services.

Self-government territorial organization is based on a combination of national and local benefits, including legal, organizational, material and financial autonomy. Democratic expression is allowed for by elections, local referendums, open citizen meetings, and public hearings, as well as voluntary associations.

The main units of administrative territorial organization are the *hromada*. A *hromada* is the territorial community of villages, settlements and cities established as an independent administrative territorial unit, or a voluntary union of citizens from several villages with one administrative centre. These territorial communities manage their own property, local budget revenue and other funds, as well as land and natural resources. They approve and implement socio-economic and cultural development programmes as well as the budgets of corresponding administrative-territorial units. In addition, they establish local taxes and fees and supervise local referendums and their implementation. They form, reorganize and liquidate communal enterprises, organizations and institutions, as well as control their activities. Finally, they decide on other issues of local importance.

The Mayors of villages, towns and cities are elected by their territorial community for a four-year term and manage the council and its executive committee. They ensure the legal exercise of powers. In addition, they organize the work of the council and executive committee, appoint and dismiss heads of departments, council subdivisions, enterprises, institutions owned by the municipality and relevant territorial communities. They convene general citizen meetings, and represent the territorial community, the council and its executive committee in relations with other state and non-state bodies. Finally, they sign all contracts and submit them for approval, receive citizens personally, and appeal to the court in the event of illegal acts committed by territorial bodies.

Legal framework for urban development

National level

In the 27 years since independence, many national laws have been passed concerning urban legal, regulatory, and institutional processes. The Law of Urban Development

(1992) was the first post-independence law, maintaining the centralized Soviet system and giving primary planning, monitoring and execution powers to SACI. Under this law, regional and district councils had a secondary role in planning, while the function of local government was simply to monitor the implementation of government programmes. The law did, however, give local governments the power to approve planning documentation on territories within their jurisdiction. The subsequent Reform Law of Urban Planning (2011) simplified urban planning procedures. A series of centralization laws, approved between 2012 and 2014, further shifted urban planning powers from regional and local governments back to the executive branch of the central government. These laws increased central government powers in urban planning. Currently, the main administrative body responsible for decentralization, construction, urban development, housing and communal services is the MRDCHCS.

Regional level

Under Articles 118 and 119 of the Constitution of Ukraine, local state administrations exercise executive power in regions and districts, as well as in the cities of Kyiv and Sevastopol. Under Article 5, para.3 of the Law on Elections of Members of Local Councils, Village, Settlement and City Mayors, a council determines its composition based on its population size. For example, the council of a community which has a population of less than 3,000 residents may have at least 15 members, but no more than 25.

The division of powers and responsibilities between local councils and their executive bodies is defined by the Law on Local Self-Government (Art. 26-44). This law also regulates the relationship between state administrations and local self-government bodies. In fact, state control over local self-government can only be exercised in conformity with the Constitution and laws of Ukraine. Therefore, the state has no right to interfere with the powers of local self-government authorities (Law on Local Self-Government, Art. 20) unless abuse is reported.

In 2006, Ukraine introduced a system of administrative courts, established to resolve disputes between state and local government bodies. Local authorities have the right to court appeal against state actions which obstruct the rights of territorial communities and local self-government bodies and officials (Law of Ukraine on Local Self-Government, Art. 71).

Local level

The city, settlement or village council takes decisions on administrative and territorial structures (Law on Local Self-Government, Art. 26). Elections are direct and based on majority rule.

In cities, villages and settlements, representatives are directly elected by the citizens of the *hromada* (by simple majority of votes). In regions and districts, heads are elected by the members of the council (Law on Local Self-Government, Art. 55).

The mayor of a city, village or settlement executes the responsibilities delegated by the executive committees, upholds the Constitution and the Laws of Ukraine, and implements the Decrees of the President as well as other relevant executive bodies (Law on Local Self-Government, Art. 42, point 3).

The city structure of Voznesensk

Voznesensk City Council has 34 deputies, and the executive bodies of the council employ 155 people. Separate independent legal entities include the:

- Department of Social Protection of the Population
 - Office of Education
 - Financial Department
 - Department of Housing and Communal Services and Capital Building
 - Department of Community and Municipal Property
 - Department of Culture and Sports
 - Department of Urban Development and Architecture
 - Archive Division
 - Service for Children,
 - Executive Committee.
 - The city council has an international quality certificate (ISO 9001). In the executive administration, documents are managed electronically – a process which is currently underway in other city council departments.
-

3.

ANALYSIS OF THE INDICATORS



3. Analysis of the Indicators

Introduction

The indicators used in this Profile are the KPIs for Smart Sustainable Cities developed under U4SSC initiative.

This analysis evaluates the current performance of Voznesensk, and highlights areas for improvement. This process is crucial to identify improvement measures, and to support the city in achieving the sustainable development goals.

The data reported by the city on the KPIs is from 2016 and 2017.

Figure 2. The stakeholders consultation



Economy

The KPIs' Economic Dimension provides information on city performance on defined key economic indicators. This section also includes the KPIs on basic infrastructure which enables a city to become more sustainable, as well as better prepared for a transition to a digital economy.

Voznesensk has reported on 36 indicators of the 43 of the Economic Dimension. What follows is an analysis of this and guidance on improving the city's performance in these areas.

The KPIs of the ICT sub-dimension (16 indicators) show the importance of providing access to the digital world for city inhabitants and the use of ICTs in the delivery of city services and infrastructure. The KPIs of the Productivity sub-dimension (10 indicators) show the employment landscape of the city, and the impact and integration of innovation within the economy. The KPIs of the Infrastructure sub-dimension (9 indicators) show the infrastructure supporting economic activity, sustainability, and quality of life for inhabitants.

Figure 3. Stakeholders consultation: discussion on the economy indicators



Reported data

ICT

ICT infrastructure

The KPIs of the ICT Infrastructure category provides an overview of the infrastructure in place to support a digital economy.

1C Percentage of households with Internet access:
72.9 per cent

2C Percentage of households with fixed (wired) broadband: **54 per cent**

3C Wireless broadband subscriptions per 100 000 inhabitants: **44,430**

4C Percentage of the city served by wireless broadband – 3G: **100 per cent**

Percentage of the city served by wireless broadband – 4G:
0 per cent

The City of Voznesensk has a good ICT infrastructure and the majority of the inhabitants are digitally connected. Fixed line communications are provided through CES No.3 Ukrtelecom OJSC.²¹ Mobile communications in Voznesensk are provided by Kyivstar, Vodafone, Life and Beeline. These local and internet providers provided the information used for the above indicators.

It can be assumed that through the combination of wireless and wired connections, almost all inhabitants are digitally connected. There is 3G wireless coverage across the entire city, which could support future smart city applications.

²¹ Ukrainian National Telecommunications Operator

5C Number of (public) Wi-Fi hotspots in the city: **1**

According to data provided by the Information Department of Economy of the City Council Executive Committee, there is only one public Wi-Fi hotspot in Voznesensk. Most public institutions and public buildings have publicly accessible Wi-Fi; however, it would be advisable to increase the availability of free public Wi-Fi spots.

Water and sanitation

The KPIs of the Water and Sanitation category provide a view on ICT use to monitor and control the water supply.

1C Percentage implementation of smart water meters: **0 per cent**

2A Percentage of the water distribution system monitored by ICT: **0 per cent**

The Water Supply Company of Voznesensk treats and supplies water from artesian wells. Voznesensk has not currently implemented ICTs to monitor the water delivery system. With the need for basic infrastructural upgrades to control leakage and other issues, the implementation of ICTs in this component should not be considered a priority.

Drainage

The KPI of the Drainage category shows the use of ICT to monitor and control the drainage and storm water system. No data on this indicator is available as the municipality currently does not carry this out.

1A Percentage of drainage/storm water system monitored by ICT: **No data**

Electricity supply

1C Percentage implementation of smart electricity meters: **0 per cent**

2A Percentage of electricity supply system monitored by ICT: **No data**

Currently, Voznesensk has not implemented ICTs to monitor and manage the city's electricity delivery system. With electricity being a significant budgetary expense for both the city and its residents, there may be value in exploring the use of ICTs to monitor, manage and reduce its usage in the context of other energy efficiency initiatives. Such energy management information systems have been introduced in some Ukrainian cities with the support of UNDP. The most successful of these is Dubno, in the Rivne oblast.

Transport

The KPIs of the Transport category provide information on ICT use to monitor and provide feedback for the city's public transport system and road infrastructure.

1C Percentage of urban public transport stops for which dynamic traveller information is publicly available: **0 per cent**

2C Percentage of major streets monitored by ICT: **77 per cent**

3A Percentage of road intersections using adaptive traffic control or prioritization measures: **0 per cent**

As a small city with essentially no traffic issues, the cost of further implementation of ICTs is considered not relevant and most likely not cost effective. Voznesensk has, however, rolled out a smart card system for its public transport which is very advanced for a city of its size and economy.

Repair and maintenance of the existing network should be considered before investing in ICT implementation on transport.

Public sector

The KPIs of the Public Sector category provide an overview of the implementation of digital platforms to support city services.

1A Percentage and number of inventoried datasets that are published: **46 per cent**

2A Number of public services delivered through electronic means: **0 per cent**

3A Percentage of public sector procurement activities that are conducted electronically: **69 per cent**

According to information from the Financial Department of the City Council, Voznesensk is advanced in terms of implementing digitally-based systems for procurement and opening of data sets, particularly for a city of its size and economy. In addition to the above, the Chief Planner and Architect has developed a complete GIS map of the city and its infrastructure.

Voznesensk should continue to review the implementation of services through digital platforms where benefits are clearly defined. The GIS map should be maintained and updated on a regular basis and could be adapted to include information on city infrastructure maintenance and repair activities.

Productivity

Innovation

The KPIs of the Innovation category show input into the innovation economy.

1C Research and development expenditure as a percentage of city GDP: **No data**

2C Number of new patents granted per 100,000 inhabitants per year: **0**

3A Percentage of small and medium-sized enterprises (SMEs): **100 per cent**

Voznesensk has lost all its large employers, mainly due to the changing local rural economy.²² For example, a meat packing plant closed down because the rural economy could not provide the necessary cattle. As a result, small and medium size enterprises are now the backbone of the local economy. The city should support the growth of these enterprises. This could be in the form of direct subsidies, subsidies for staff training, tax relief for firms that commit to expansion, or city policies allowing firms to minimize their regulatory burden.

Employment

The KPIs of the Employment category provide an overview on the city employment situation and the success of specific industries.

1C Percentage unemployed: **4 per cent**

2C Percentage youth unemployed: **2 per cent**

3C Percentage of the labour force working in the tourism industry: **0 per cent**

4C Percentage of the labour force working in the ICT industry: **1 per cent**

Data from the Department of Social Protection of the City Council shows low unemployment rates but this includes around 4,000 self-employed people. These are not in stable employment, so the actual rate of unemployment and underemployment is probably significantly higher than reported. Tourism employment is currently very low, but Voznesensk has determined that there is potential growth for the tourism industry, taking advantage of its central regional location region, and its location by the Southern Bug river with an abundance of natural areas. Should this become a priority, then the infrastructure to support a tourism industry would need to be upgraded.

²² See Summary for more information.

Infrastructure

Water and sanitation

The KPIs of the Water and Sanitation category show the extent to which water and waste systems serve the city, and their delivery efficiency.

1C Percentage of households with access to a basic water supply: **98 per cent**

2C Percentage of households with potable water supply: **No data**

According to the Department of Housing and Communal Services and Capital Construction (DHSCC), Voznesensk's water quality is a matter of pride. The city is blessed with a local water supply system that uses the sand beds around the city as natural filtration leading to potable water for those connected to the system.

4C Percentage of households served by wastewater collection: **48 per cent**

5C Percentage of households with access to basic sanitation facilities: **77 per cent**

The wastewater/sewage system coverage is quite low, and many households use informal methods for wastewater disposal.

3C Percentage of water loss in the water distribution system: **38 per cent**

These high losses are caused by the system's age. The cost of more maintenance, and a system upgrade, may be offset by reducing the amount of water lost and its subsequent cost.

Waste

1C Percentage of households with regular solid waste collection: **100 per cent**

DHSCC states that a functional waste collection covers the entire city. However, solid waste treatment is a city issue, and more information on this is provided in the environmental indicator analysis.

Electricity supply

The KPIs of the Electricity Supply category show the reliability and extent of the authorized electrical grid.

1C Average number of electrical interruptions per customer per year: **No data**

2C Average length of electrical interruptions: **No data**

3C Percentage of households with authorized access to electricity: **100 per cent**

The data reported by DHSCC show that all citizens are connected to the electricity supply system. However, the cost of electricity is a significant budget item for private consumers, industries and the public sector. No data was reported on the reliability of the network, but no significant issues were mentioned during the stakeholders' consultation and the fact-finding mission.

In particular, the wastewater/sewage system is a major consumer of electricity due to the system design and the requirement to pump significant quantities of liquid uphill for further treatment.

Continued improvement in energy efficiency and energy reduction would provide private and public budgetary relief to the city administration. This has the potential for significant return on investment as new technologies (such as LED lighting) significantly reduce electrical consumption and are now economically viable for almost all applications.

Transport

The KPIs of the Transport category show the extent of the public transport network, travel patterns of inhabitants and alternative shared modes of transport.

1C Length of public transport network per 100 000 inhabitants: **126.6 km**

2A Percentage of the population that has convenient access (within 0.5 km) to public transit: **100 per cent**

3C Length of bicycle paths and lanes per 100 000 population: **3.2 km**

4A Percentage of people using various forms of transportation to travel to work:

Private vehicles – **15 per cent**

Public transport – **52 per cent**

Walking – **25 per cent**

Cycling – **8 per cent**

5A Ratio of the travel time during the peak periods to travel time at free flow periods: **1.14**

6A Number of shared bicycles / 100,000 inhabitants: **0**

7A Number of shared vehicles / 100,000 inhabitants: **0**

Voznesensk is relatively small and compact, with 37 bus routes covering most of the city. Public transport is provided by the public OJSC Voznesenskavtotrans, plus three private carriers. Overall coverage is reasonably good for a city this size, the network is extensive, and there is little need for other shared transportation systems. In addition, the transport system has implemented a smart card system for payment that is very advanced for a small city.

Buildings

The KPIs of the Buildings category showcase the sustainability and environmental impact of public buildings.

1A Percentage of public buildings with recognized sustainability certifications: **No data**

2A Integrated Building Management Systems in Public Buildings: **No data**

The city would not greatly benefit from implementing formal sustainability certifications - instead it should focus on reducing energy costs, which are a significant burden on the city's households. The implementation of building ICT controls (for example, building automation systems and occupancy sensors) may help control energy costs, though it would be better value for the city and its residents to upgrade current building stock with standard energy efficiency initiatives such as increased insulation, high efficiency heating and lighting. The costs of these initiatives can usually be offset through lower heating, cooling and lighting costs.

Urban planning

1A Percentage of the city designated as a pedestrian/ car free zone: **23 per cent**

2A Existence of strategic city planning documents promoting compact development, mixed urban land use, and avoiding urban sprawl: **Yes**

Many planning tools that larger cities need which prevent urban sprawl are not as critical in Voznesensk due to its size. However, despite this, as reported by the Department of Urban Development and Architecture of the City Council, the Chief Planner and Architect of the city has implemented and updated a GIS map of the city and has developed plans for compact and mixed land use.

Results from the stakeholders consultation

The results from the stakeholders' consultation based on the Economy KPIs provide the following outcomes:

First phase:

Main challenges faced by the city of Voznesensk

- (1) City budget had higher expense due to decentralization;
- (2) Loss of large employers in the city;
- (3) Many small enterprises focus on trading and not high value activities;
- (4) Tax evasion;
- (5) Central planning registry (GIS) not a priority;

- (6) Inefficient water and sewage infrastructure - significant budget expense related to loss of revenue from leaks and energy cost of pumping;
- (7) Energy use in old buildings – significant budget expense;
- (8) Energy efficiency upgrades for private properties not affordable.

Second phase:

Causes

- (1) Large companies not competitive;
- (2) Loss of raw materials for large companies;
- (3) Collection of taxes;
- (4) No financing for infrastructure and energy efficiency;
- (5) Lack of awareness of energy efficiency.

Third phase:

Measures to reduce or eliminate the challenges

- (1) Energy efficiency projects in public building to reduce impact of energy costs;
- (2) City polices to encourage energy efficiency projects;
- (3) Alternative financing for infrastructure upgrades with demonstrated cost benefits;
- (4) Updating and maintaining the central planning registry (GIS);
- (5) Orienting the economy to new resources (sand, gravel, tourism);
- (6) Using the city's central location to transform it into a regional crossroads and transport hub;
- (7) Reorganizing city agricultural economic activities with the rural agricultural economy to form a more symbiotic relationship.

Fourth phase:

Strategies and concrete plans to solve the challenges

- (1) Focussing on reducing the energy component of public and private budgets;
- (2) Reorienting the economy to take into account regional strengths;
- (3) Developing more stable budget financing for the city.

Environment

The Environment Dimension of the KPIs shows city performance on defined key environmental indicators. There are 17 indicators within the Environment Dimension, which are grouped into two categories: Environment and Energy.

Voznesensk has reported on 13 indicators, and this is an analysis of the values reported, with guidance on ways to improve city performance.

Figure 4. Stakeholders consultation: discussion on the environment indicators



As Voznesensk does not have heavy industry, environmental impact on air, water and soil are not very significant. Furthermore, impact from the traffic sector is also moderate.

Working with local experts has shown that some of the indicators are very advanced and not particularly relevant for such a small city, whereas for some indicators the city simply does not have the resources (human resources, equipment, and expertise) to measure them.

Reported data

Environment

Regarding the environment, the following categories were evaluated: air quality, water quality, noise, environmental quality, biodiversity and energy.

Air quality

There are no heavy industries, highways or airports in the area, so air pollution is a minor problem in Voznesensk.

In the stakeholder consultation it was mentioned that hydrogen sulphide (H₂S) emissions sometimes occur close to a leather processing factory. Also, leaf-burning seems to be an issue in autumn, when enormous amounts are burnt by citizens in their private premises.

1C Air quality index based on reported value for:

Particulate matter (PM₁₀ and PM_{2.5}): **No data**

NO₂ (nitrogen dioxide): **0.504 µg/m³**

SO₂ (sulphur dioxide): **10.07 µg/m³**

O₃ (ozone): **No data**

Regarding air quality monitoring only two out of four indicators, namely NO₂ and SO₂, were provided by the Department of Laboratory Research of the Ministry of Health. Monitoring of particulate matter (PM_{2.5} and PM₁₀) and ozone are missing due to lack of monitoring equipment.

Currently, costly air monitoring equipment seems unnecessary, but should be reconsidered if the number of polluting sources increases.

2C Greenhouse Gas (GHG) emissions per capita:
5.4 tons

According to the Department of Energy Management of Municipal Initiatives and Investments, GHG emissions amount to 5.4 tons CO₂ per capita.

The value reported is very low compared to the EU average of 10 tons per capita but is plausible in view of the general lack of industry and other energy intensive equipment; for example, low car ownership. It is recommended that GHG emissions are monitored annually to observe trends.

Water and sanitation

Voznesensk is supplied with river water which has been filtered through sand reservoirs. Drinking water quality is reported to meet WHO standards. These households consume groundwater from their own wells, mostly illegally. According to workshop participants, groundwater in the region has, in general elevated levels of ammonia and nitrate, both of which represent a health issue, in particular for small children.

1C Percentage of households covered by an audited Water Safety Plan: **100 per cent**²³

The value reported for this indicator was 100 per cent, meaning that all households are connected to a safe water system (data provided by D H CS CC).

According to feedback received at the workshop, the reported value of 100 per cent of households covered by safe water should be revised.

2C Total water consumption per capita: **96 liters**

The value reported for this indicator was 96 liters per capita per day (data provided by DHCSCC). The reported value seems to be plausible in view of approximately 200 liters per capita per day in highly industrialized countries.

3C Percentage of water consumed from freshwater sources: **100 per cent**

The total need of water is fully met by city sources. Therefore, water does not seem to be an issue for the city. Voznesensk has no issue with the overexploitation of water, and water scarcity was also not raised as an issue during the workshop.

3C Percentage of wastewater receiving treatment:

Primary: **100 per cent**

Secondary: **100 per cent**

Tertiary: **100 per cent**

Voznesensk is equipped with a waste water plant, situated outside the city at a higher elevation. One of the problems of the drainage system is the large distance of biological treatment facilities from the city - the length of the main collectors (one line) to the treatment facilities is 17 km. Also, when pumping out sewage from KNS-2 to KNS-3, the height is about 90 meters, which requires the use of KNS-2 powerful pumps. This process is very energy intensive although the plant itself was reported to run properly.

At the treatment plant, there is currently no biogas capture or conversion of gas into energy. Another issue mentioned at the workshop was the fact that those households who are not connected to the drinking water network are also not connected to the waste water system. For very remote households it is thus more affordable to install a cesspit than to connect to the sewage water system. However, cesspits must be managed properly and have to be regularly emptied and undergo tightness checks. During the workshop, it was stressed that the management of cesspits in remote households is unclear, and that the city has no instruments to control or oblige cesspit owners to do proper maintenance and cleaning.

The value reported for this indicator was 100 per cent according to D H CS CC. While the reported value is technically correct, it does not capture the real situation, since only 75 per cent of households are connected to the sewage water system. In fact, the remaining 25 per cent have cesspits, which may be unsafe.

Waste

Solid waste is dumped at a waste disposal site. The current landfill is reaching capacity, and a new site is planned. Regarding recycling and separate waste collection, several attempts have been made to separate plastic, paper, glass and metal in special containers. Unfortunately, these schemes failed, and the city has no instruments to provide incentives or increase pressure on citizens. However, the municipality is currently engaged in raising public awareness of waste recycling and public schools have education programmes on this topic.

²³ The reported value apparently only refers to households connected to the public drinking water network, neglecting those with illegal drinking water wells.

1C Percentage of solid waste dealt with in the following ways should be reported on:

- disposed to sanitary landfills: **3,455 per cent**
- burnt in an open area: **0**
- incinerated: **0**
- disposed to an open dump: **3,455 per cent**
- recycled: **0**
- other, with regard to total amount of solid waste produced: **0**

DHCSCC reports that total annual waste generation is 16,900 thousand tons, or 479.53 kg per capita annually. A study from the International Finance Corporation²⁴ in Ukraine stated that solid waste generation in Ukraine ranges between 270 to 300 kg per capita annually. However, from the data reported, solid waste in Voznesensk is disposed in landfills and open dumps and recycling is not carried out. As mentioned during the stakeholders' consultation, waste is also burnt in the open air, as in the case of leaves. There are therefore inconsistencies in the values reported for this indicator.

Environmental quality

In this chapter exposure to electromagnetic fields (EMF) and noise are addressed. EMF exposure was not discussed at the workshop neither was data reported.

1C Percentage of mobile network antenna sites in compliance with WHO endorsed EMF exposure guidelines: **No data**

It seems that the exposure to electromagnetic fields is not monitored in the city. In fact, no information on the indicator was reported by local authorities and it was not raised as a relevant issue during the stakeholders' consultation.

2A Percentage of city inhabitants exposed to excessive noise levels: **0**

The Department of Laboratory Research of the Ministry of Health reports that the city population is not affected by excessive noise levels, probably due to lack of monitoring systems. However, during the stakeholders' consultation, it was mentioned that about 7 per cent of citizens were exposed to noise and vibration. Their dwellings are located along the railway tracks and the only road with heavy transport.

Hence, despite the lack of official data on noise exposure, a small share of the population is exposed to elevated levels of noise and vibrations.

Public spaces and nature

In general, it should be noted that the entire region suffers from a lack of natural capital and biodiversity, due to intensive agriculture being the prevailing land use. Forests, natural food plains, natural pastures, or grasslands are very scarce. The city is also lacking green areas, especially in the periphery and its surroundings. Various efforts have been undertaken to maintain green urban spaces and introduce new ones. The city has a few parks including the central park which hosts the garden chapel monument to Catherine II the Great, as well as several concerts and recreational activities.

1C Green areas per 100,000 inhabitants: **145 ha**

Natural green spaces provide a wide range of benefits to people and the environment. Where trees are present, they also act as filters for air pollution. Nearby nature is good for people, for wildlife and for the environment.

According to the data reported by the Department of Communal Property of the city council, the city has 52 ha of green area and 35,900 inhabitants. This means there are 145 ha per 100,000 capita or 14.5 square metre (m²) per capita.

The international average (OECD),²⁵ statistics are much higher, as very few cities have less green area than 50 m² per capita. It therefore important that this indicator is monitored in the city and that this monitoring should increase.

2A Percentage of inhabitants with accessibility to green areas: **25 per cent**

The DHCSCC reports that only 25 per cent of citizens have green areas within 300 meters of their house. According to SDG 11 all citizens should have access to green areas by 2030.²⁶ Voznesensk should work on improving access, as this leads to better quality of life for the city's inhabitants. It is worth noting that the surroundings of Voznesensk are mostly agricultural areas without any recreational function.

3A Percentage of city area protected as natural sites: **1 per cent**

24 International Finance Corporation, "Municipal Solid Waste Management in Ukraine: Development Potential", 2015. Available at <https://www.ifc.org/wps/wcm/connect/24f11a48-d7a0-4970-9bd1-37ff9244f60e/21.+Municipal+Solid+Waste+in+Ukraine+DEVELOPMENT+POTENTIAL+Scenarios+for+developing+the+municipal+solid+waste+management+sector+.pdf?MOD=AJPERES&CVID=INpD-tQ>

25 OCHA, "Green area per capita", The Humanitarian Data Exchange. Available at <https://data.humdata.org/dataset/green-area-per-capita-square-meters-per-capita>

26 Target of SDG11 "By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities".

The communal property department of the city council states that about 14 ha, corresponding to about 1 per cent of the city area, are protected as natural areas.

Biodiversity in the city is low. In this context, protected natural areas in a city allow to maintain biodiversity and preserve habitats. While it is difficult to increase the number of protected areas, due to the lack of natural capital, the city should consider small steps to increase their natural capital and space for biodiversity.

4A Area of total public recreational facilities per 100,000 inhabitants: **107,922 m²**

Recreational facilities are important for the health of city inhabitants and provide opportunities for its population to publicly assemble and socialize. Indoor recreational facilities include gyms, community centres, swimming pools and arenas. Outdoor recreational facilities include sports fields, parks and wooded areas. The city is situated along the Southern Bug river and provides outdoor recreational activities like swimming, fishing and relaxing on the riverbanks. The canyon of the Southern Bug is located to the north of Voznesensk and is famous for rafting and mountain climbing.

The city has a stadium with a football pitch, tennis court, athletics track, and playground. The sports club "VOSCO" has an indoor basketball/tennis court as well as a weight training room. Finally, the recently opened sports complex "Waterfall" has a swimming pool, training room and saunas.

It is reported that the city has in total 38,744 m² recreational facilities and 35,900 inhabitants. This results in 107,922 m² per 100,000 capita or about 1 m² per capita. Therefore, in comparison to the availability of green spaces, the amount of recreational or sports facilities is very good.

Energy

During the stakeholders' consultation, participants mentioned several times that energy costs represented a major issue for the maintenance of municipal infrastructure and also for private households. It was reported that fossil energy sources are largely used for heating, and that electricity is mainly derived from the nearby nuclear power plant. Regarding municipal infrastructure, several energy issues were mentioned during the workshop, such as (a) the pumping of waste water to the sewage plant, (b) energy costs for water pumping at the fresh water plant, and (c) heating costs for schools and hospitals.

1C Percentage of renewable energy consumed in the city: **0 per cent**

From information reported by local authorities, the share of renewable energy sources is zero. It means that the city does not use any renewables to cover its energy consumption, using only fossil fuel and nuclear power.

Renewable energy could have a great potential for Voznesensk especially given its climatic conditions which could support solar and wind energy, as well as agricultural residuals for biomass. The municipality has several opportunities to use small-scale renewable energies with low-tech equipment, as mentioned in the summary.

2C Electricity consumption per capita: **2,396 kW/h**

A value of 2,396 kW hours annually per citizen was reported with data from the Department of Energy Management, Municipal Initiatives and Investments Reports.

This seems very low but plausible compared to the national average of 3,419 kWh/cap or countries with similar economic conditions such as Georgia with 2,688 kWh/cap and the Republic of North Macedonia with 3,497 kWh/cap.

3C Residential thermal energy consumption per capita: **0.69 Gj/y**

Consumption of thermal energy together with electricity and water are the key indicators of resource consumption for a city. The Department of Energy Management, Municipal Initiatives and Investments gives a figure of 0.69 Gigajoule annually (Gj/y) per capita. This seems very low compared to the national average of 98 Gj according to the World Bank (WB) database of global indicators (2014 as reference year)²⁷. This indicator was not discussed in the workshop so further feedback from the stakeholders cannot be reported.

4A Annual energy consumption of public buildings: **No data**

The Department of Energy Management, Municipal Initiatives and Investments of the city does not have data for this indicator. However, from the discussion with the stakeholders, it is clear that the municipality has a major issue regarding energy costs, especially from public buildings.

Results of the stakeholders' consultation

The results are reported below. For the environmental indicators, all the items on the pyramid were discussed, however due to lack of time, the group was not able to document the full exercise.

²⁷ World Bank, "Energy use", World Development Indicators. Available at <http://databank.worldbank.org/data/reports.aspx?source=2&series=EG.USE.PCAP.KG.OE>

Phase 1.

Main challenges faced by the city of Voznesensk:

- (1) Waste disposal and waste separation trials;
- (2) High energy costs and no renewables;
- (3) Some unsafe water, and drilling of illegal wells;
- (4) Air pollution and burning of leaves;
- (5) Lack of biodiversity;
- (6) Lack of smart agriculture;
- (7) Wastewater issues;
- (8) Some of the population affected by excessive noise.

Phase 2.

Measures to reduce or eliminate the challenges:

- (1) Reducing waste quantity;
- (2) Exploring renewables;
- (3) Creating safer wastewater pits;
- (4) Collecting tree leaves;
- (5) Nature awareness and education;
- (6) Exploring agriculture-based solutions.

Phase 3.

Strategies and plans to solve the challenges:

- (1) Finding financing for new disposal sites, and exploring waste-to-energy options;
- (2) Producing biogas from sewage sludge or composting leaves, or otherwise use biofuels;
- (3) Creating public awareness and incentive schemes;
- (4) Developing public incentives and awareness, for example through competitions, municipal events and school programmes;
- (5) Developing campaigns and adding information to the city's website;
- (6) Exploring the feasibility of biofuel-innovative products and creating innovative SMEs in this field.

Society and culture

The Society and Culture component of the KPIs shows the city's performance on defined key socio-cultural indicators. There are 29 indicators within the Society and Culture Dimension, grouped into two areas: Education, Health and Culture; and Safety, Housing and Social Inclusion.

Figure 5. Stakeholders consultation: discussion on society and culture indicators



Voznesensk has reported on 26 indicators and this section is an analysis of this, with guidance on how to improve performance where the comparison exercise indicates. Lastly, at the end of this document, the recommended measures are organized in a summary table and prioritized based on different factors.

To that end, different statistical sources from UN agencies have been consulted, including: [1] WB²⁸, [2] WHO²⁹, [3] FAO³⁰, and [4] UNECE³¹, among others.

Data reported

The 29 indicators of the Society and Culture set are distributed in seven topic areas: **Education (E), Health (H), Culture (C), Housing (H), Social Inclusion (S), Safety (Sa), and Food Security (F).**

Education, Health and Culture

Education

1C Percentage of students/pupils with classroom access to ICT facilities: **100 per cent**

The Education Department of Voznesensk's city council reported that 4,824 students enrolled in primary and secondary schools, all who had access to ICT facilities. No data has been found at the national level for comparability though this is certainly a good result.

28 Website: <http://databank.worldbank.org/data/home.aspx> and http://databank.worldbank.org/data/Views/Reports/ReportWidgetCustom.aspx?Report_Name=CountryProfile&id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=UKR

29 Website: <http://www.euro.who.int/en/countries/ukraine/data-and-statistics>

30 Website: <http://www.fao.org/3/a-i4691e.pdf>

31 Website: http://w3.unece.org/PXWeb2015/pxweb/en/STAT/STAT_30-GE_03-WorkAndeconomy/017_en_GE_GPG2_r.px?rxid=faa1ee32-aa15-4240-a3d9-8923a06d27bc

2C Percentage of school-aged population enrolled in schools: **98 per cent**

The Education Department reported that the school-aged population stands at 4,841. As the number of enrolled in primary or secondary studies is the 4,824, 0.35 per cent of school-aged children are not in the education system due to health reasons, such as disability. At national level, the most recent data is from 2014 (WB) and indicates that dropout rates are at 0.4 per cent, which was much improved from previous years: in 2013 it was 2.27 per cent, and in 2012 it was 4.76 per cent.

3C Higher level education degrees per 100 000 inhabitants: **18,950**

6,803 inhabitants hold a university degree in the city. This result is low compared to national statistics. Although a comparable cumulative figure has not been found, Ukraine's enrollment ratio in higher studies in 2014 was 82.3 per cent (WB). Currently, 4,760 students are currently enrolled in primary and secondary studies in Voznesensk while 3,917 students are enrolled in tertiary studies. Considering that primary and secondary levels take 11 years to complete, if Voznesensk was to follow the national trend, the city would add 3,917 to its current 6,803 university degree holders

4C Adult literacy rate: **100 per cent**

The Department of Education reports no illiteracy within the adult population, and the same results are given at national level (WB), reporting a 99.97 per cent literacy rate for adults (people aged 15 and above) and 99.96 per cent in young adults (aged between 15 and 24).

Health

5A Percentage of city inhabitants with electronic health records: **100 per cent**

Voznesensk's multidisciplinary hospital has health records from all insured people in the city. All residents, therefore, enjoy public health coverage. No comparable information has been found at country level. It is particularly interesting that the city is experimenting with a so-called "citizens card". This is a registered digital card associated with a number, which is in turn associated with a person. Showing this card at the hospital, gives the nurse or doctor access to all the patient's information and allows them to book their own appointment. This is a multipurpose card and will soon provide the citizen with access to different services by scanning it.

1C Average life expectancy: **70.4**

When asked about the average life expectancy of a group of people born in the same year, the hospital source reports 70.4. This is in line with the national average, established at 71.18 for 2015 (WB), which has been slowly progressing for the last decade in 2010 it was 70.3.

2C Maternal Mortality Rate: **0**³²

3C Number of doctors per 100,000 inhabitants: **124**

This figure is twice as low as the national average level of 315 per 100,000 inhabitants. According to the information collected during the stakeholders' consultation, there are two functioning hospitals in the city. One is specialized on general medicine and the other is specialized in different areas. The stakeholders involved reported that the hospital is very efficient though personnel and equipment are lacking. In particular, equipment for mammography, tomography, modern diagnosis, endoscopy and sterilization are urgently needed. Stakeholders further reported that there is one doctor and one nurse for every 2,000 people.

4A Number of in-patient public hospital beds per 100,000 inhabitants: **766**

This is a worrying result, confirmed by the hospital source. At country level, the figure is 9 hospital beds per 1,000 inhabitants (WB; latest data available is from 2012); in Voznesensk this ratio drops to 2.75. This is less than a third of the national average, which, combined with the low number of practitioners, is a cause for concern. The public hospital serve not just the city (about 35,900 people) but also the surrounding areas (an additional 30,000 people) but operates only with a budget from the city of Voznesensk. While there are other hospitals in the surrounding districts, patients prefer to be treated in Voznesensk. Unfortunately, the municipality does not get support from the surrounding areas to cover hospital expenses because their money goes to their own hospitals. This also happens with government funds, causing a loss of money which could be invested more efficiently.

5A Percentage of city inhabitants covered by private health insurance: **5 per cent**

A total of 1,620 inhabitants were reported by the hospital as private insurance holders: 5 per cent of the city's population. Although equivalent information has not been found for Ukraine, the World Bank reports that the proportion of Ukraine's population spending more than 25 per cent of household consumption or income on out-of-pocket private health care expenditure is 1 per cent (2014), whereas the proportion of population spending more than 10 per

³² This figure shows lack of information on the indicator.

cent of household consumption or income on out-of-pocket private health care expenditure is 7.2 per cent (2014). These figures seem to be roughly in line with the situation in Voznesensk. According to information provided during the stakeholder's consultation, the country has a good public health system, however, private hospitals in the region are better equipped. Therefore, if a patient needs equipment which is not present in a public hospital, they are sent to the regional hospital or a private clinic. If the patient cannot afford to pay for the care, the municipality covers the expense. Furthermore, the local budget provides medicines for disabled people and people with chronic diseases without receiving any funds from the national budget. Local authorities report that in 2017, about UAH 12 million of the city budget has been spent on medicines.

Culture

1C Percentage expenditure on cultural heritage:
2 per cent

The city council Department of Culture and Sports reported a 2016 expenditure of UAH 8,029,250.53, which includes UAH 6,187,062.99 for cultural activities and UAD 1,842,187.54 for sports. This is 2 per cent of the overall municipal budget of UAH 400 million. A national comparison is not applicable since the country and city administration have different levels of responsibility concerning cultural heritage. Expenditure in other Ukrainian cities has been researched, but no results are available. On the plus side, there are no negative web reviews from cultural tourists in Voznesensk.³³ According to information collected during the research mission, Voznesensk has around 50 public historical sites, all maintained by the city budget.

2A Number of cultural institutions per 100,000 inhabitants: **30.64**

According to the Department of Culture and Sports, there are eleven cultural institutions in the city, including the City House of Culture, the Ascension Art Museum (named after I.A. Kibrica), a local history museum, five libraries, a children's music school, and a children's art school.

The communal organization Voznesenskyy City Centre for Physical Health of the Population "Sport for All" includes a sport and health complex "Vodogray" (with two swimming pools for adults and children, a gym, two saunas and training rooms for different types of sports), and the City Stadium (with a mini football field, a tennis court, a sauna, and an outdoor playground with simulators). Voznesensk also hosts a motorball stadium and team. In 2011, the European motorball championship was held here.

33 Tripadvisor, "Things to do in Voznesensk". Available at https://www.tripadvisor.ca/Attractions-g3569239-Activities-Voznesensk_Mykolaiv_Oblast.html

Again, no cultural institution comparison can be established at country level, and there is no fair comparison with other municipalities either as cultural institutions are related to heritage, which varies from one city to another. During the research mission, the involved stakeholders pointed out the lack of after-school activities and the lack of a cinema.

Safety, Housing and Social Inclusion

Housing

1C Percentage of city inhabitants living in slums, informal settlements or inadequate housing: **0**

The city council Department of Social Protection reported zero occurrences of inadequate housing. No data is available at country level. This data is confirmed by information collected during consultation; no slums or illegal settlements exist within the city's boundary.

2A Percentage expenditure of income for the provision of housing: **22 per cent**

The same city department informed that the total household monthly income average is USD 155, of which USD 34.74 – 22 per cent - is used to pay rent or mortgages. According to the Country Profile Ukraine, this proportion is quite high compared to 13.6 per cent, the 2013 index reported for Kyiv³⁴. The same source reports an optimal ratio between 3 to 5 per cent, recognized as a range indicating housing affordability.

Social inclusion

1C Ratio of average hourly earnings of female to male workers: **0.85**

This rate was given by city council's Department of Social Protection and it is much better than the country level. UNECE³⁵ reports a national gender pay gap (difference in hourly wage rates) of 0.23. In the same terms, the figure for Voznesensk is 0.15.

2C Income distribution in accordance with Gini coefficient: **unknown**

34 Country Profile on Housing and Land Management – Ukraine (United Nations publication, 2013). Available at https://www.unece.org/fileadmin/DAM/hlm/documents/Publications/CP_Ukraine_ECE.HPB.176.en.pdf

(p2) Housing affordability is also of concern to Ukrainians. The current average household income does not match current housing prices. For example, **the affordability index of the housing market, calculated by dividing the average house price by the average household annual income, in Kyiv is 13.6**. An index of 3 to 5 is usually recognized as providing an affordable housing market.

35 UNECE, "Gender pay gap", UNECE Statistical Database. Available at http://w3.unece.org/PXWeb2015/pxweb/en/STAT/STAT_30-GE_03-WorkAndeconomy/017_en_GE_GPG2_r.px/?rxid=faa1ee32-aa15-4240-a3d9-8923a06d27bc

The same department states that municipal statistics on this indicator are not available. The national value for 2015 is 25.5.³⁶

3C Percentage of city inhabitants living in poverty: **0**

The Department of Social Protection reports 0 cases of poverty. The World Bank reports 2.5 per cent of the Ukrainian population is undernourished, with 0 per cent of population living with less than USD 1.90 per day, 0.1 per cent living with less than USD 3.20 per day and 1.4 per cent living with less than USD 5.50 per day.

4C Percentage of the eligible population that voted during the last municipal election: **32 per cent**

The Central Electoral Commission reported 31,771 eligible voters, of which 10,096 voted in the last municipal election. This 32 per cent participation rate is a very low figure for a democratic country. Similar figures for other cities are not available. In the last national elections only 59.9 per cent of the population voted.³⁷

5A Percentage of pre-school age children (0-3) covered by public or private day-care centres: **0**

The city council Department of Education reported only 12 day-care facilities available for 2,523 pre-school children. This information was not found at country level or in other cities for comparison purposes, but the figure reported by the city council is certainly very low.

Safety

1C Number of natural disaster-related deaths per 100,000 inhabitants: **0**

The city council's Executive Committee of the Emergency Department reported 0 cases. This information was not found at country level or for other cities.

2C Natural disaster-related economic losses as a percentage of the city's gross domestic product (GDP): **N/A**

The same Department reports no economic losses, as there have been no natural catastrophes. This information was not found at country level or in other cities.

3A Resilience plans: **N/A**

This indicator involves implementation of risk and vulnerability assessments, financial (capital and operating) plans, and technical systems for disaster mitigation which address natural and human-induced disasters and hazards. The city could not provide any information related to this indicator.

4A Percentage of inhabitants living in a zone subject to natural hazards: **1 per cent**

The Emergency Department of city council's Executive Committee reported 210 inhabitants living in areas subject to natural hazards. This seems to be quite high compared to the national figure of 126 cases people displaced due to natural disasters (WB).

5C Average response time for Emergency Services: **12.59 minutes**

The same Emergency Department reported a total of 220,853 minutes between the call and the arrival on site to attend the 17,535 emergency calls received. This results in an average emergency response time of 12.59 minutes. There are no international standards for this but, taking as a reference the use case of Hanoi, where WHO³⁸ designed a plan to improve city's initial emergency response of 11.16 minutes, Voznesensk's performance needs improvement.

6C Number of police officers per 100 000 inhabitants: **Unknown**

The city of Voznesensk did not report information on this indicator. Ukraine's national average is 458 enforcement agents per 100,000 inhabitants.³⁹ For information, Ukraine does not have municipal police.

7C Number of firefighters per 100 000 inhabitants: **50**

The Emergency Department reported a total of 18 full-time firefighters serving a population of 35,900. According to information provided during the research mission, the fire brigade is not well equipped, in particular with ladders. This information was not found at country level or in other cities for comparison.

36 World Bank databank. Available at <http://databank.worldbank.org/data/home.aspx>

37 <http://www.osce.org/odihr/elections/ukraine/119271>

38 Post-crash response: Supporting those affected by road traffic crashes (Switzerland, World Health Organization, 2016), p. 10. Available at https://www.who.int/violence_injury_prevention/publications/road_traffic/post-crash_response_booklet.pdf

39 In 2013, law enforcement agencies of Ukraine had a headcount of 261,000 people, including internal troops personnel, cadets and non-uniformed staff. This is 1.5 times as much as the European average level (300 police officers per 100,000 inhabitants), and almost twice as much as recommended by the UN (222 police officers per 100,000 inhabitants) With 21,840,000 economically active inhabitants in the country, it would mean that every 83rd employed citizen would draw his or her salary from Ukraine's MIA. Source: Ukraine, National Police <https://www.npu.gov.ua/en/publish/article/1240270>

8C Violent crime rate per 100,000 inhabitants:
Unknown

The city did not report information on this indicator. At country level, the number of intentional homicides in 2016 was 77.68 per 100,000 people.⁴⁰ During the research mission the involved stakeholders were concerned at what they perceived as a high level of criminality in the city, in particular robberies, murders, and drug dealing. They also felt that wild dogs were a concern, as they could become dangerous and carry infectious diseases.

9C Traffic fatalities/100 000 inhabitants: **0**

The Emergency Department reported only 2 traffic fatalities within the city area during 2016. Although at country level interstate roads and highways (which by definition have higher mortality rates) mean there is no fair comparison, it is worth reporting that fatalities caused by road traffic injury in Ukraine in 2016 was 9.7 per 100,000 people.⁴¹

Food security (FS)

1C Percentage of local food supplied from within 100 km of the urban area: **50 per cent**

The city council's Executive Committee of Economy Information Department reported a total of 13,792.5 tons of local food supplied within 100 km, out of 27,762.8 tons produced within the Voznesensk district. Although the values are in dollars and for the overall country, Voznesensk's figure of 50 per cent of production being consumed locally could be improved if compared to Ukraine's exports and import balances (USD 16,140 million worth of exports vs USD 4,577 million worth of imports).⁴²

Results of the stakeholders' consultation

During the field visit to Voznesensk and the stakeholders' consultation, the issues identified as most relevant are reported below.

Phase 1.

Main challenges faced by the city of Voznesensk:

- (1) lack of skilled and experienced staff;
- (2) lack of medical equipment, computer and lab equipment;
- (3) no opportunities for disabled people;
- (4) lack of disabled-friendly infrastructure;
- (5) perceived high levels of crime and low police activity;
- (6) employment black market.

Phase 2.

Causes of the challenges:

- (1) low salaries result in lack of motivation, no opportunities for young people;
- (2) absence of affordable housing and lack of financial resources, no employment opportunities with a reasonable salary, high taxes for business.

Phase 3.

Measures to reduce or eliminate the challenges:

- (1) To take part in competitive international projects to get funds;
- (2) investment from central government and from country donors.

Phase 4.

Strategies and concrete plans to solve the challenges:

- (1) Taking part in competitive international projects to get funds grants
- (2) investment from central government and from country donors

Most of the challenges identified have an economic cause which is outside the scope of the indicators on society and culture. Therefore, the workshop feedback, even in economically-related issues, has been considered in developing measures to improve city performance in areas where socio-cultural indicators indicate a need to do so. Recommendations are presented in the same format as the analysis of indicators conducted in this section, however only indicators requiring improvement are discussed.

40 World Bank databank. Available at <http://databank.worldbank.org/data/home.aspx>

41 Ibid.

42 FAO, FAO Statistical Pocketbook 2015. Available at <http://www.fao.org/3/a-i4691e.pdf>

4.

THE FINANCIAL FRAMEWORK OF VOZNESENSK



4. The financial framework of Voznesensk

This section deals with the financial framework for urban development in Voznesensk, with the aim of making recommendations for funding of future projects. It is a review of the main income and expenditure budget items to determine robustness and future scope for borrowing. It also reviews future sustainable projects and considers a range of finance options, providing case studies to illustrate these. Finally, there are key recommendations for future action.

Existing financial mechanisms for sustainable urban development

According to the Finance Director of the Municipality of Voznesensk, interviewed during the research mission, the budget for 2017 was about UAH 400 million (USD 13 million). The city budget is composed of general and special funds. The main source for the general fund is personal income tax. The city budget accounted for 60 per cent of this tax, another 40 per cent was distributed between regional and state budget levels. In addition, the city budget includes local taxes and fees (for example property tax, single tax, and vehicle tax), as well as excise taxes on the sale of alcohol, fuel and tobacco.

The city budget includes 56 budgetary areas, for example, education, health care, culture, sports, and social protection. The money for housing and communal services is mainly spent on the maintenance of city infrastructure and related activities.

The development budget is for development expenditure, in particular for new projects as well as construction and repair of city infrastructure and is separately allocated in the city budget. The sources of the development budget are budget revenues such as land sales, privatization of communal property, and developer contributions to city infrastructure. As defined by fiscal legislation, transfers from other budgetary areas are only permitted for development expenditures. The mayor of Voznesensk explained that the development budget is about 10 per cent of the city's budget.

Voznesensk is allowed to borrow but has not done so yet since according to city officials, commercial interest rates are prohibitively high (23-25 per cent). Loans are only being considered for a planned solar plant.

The issues linked to the budget relate to both income and the expenditure. Given the size of the municipality, the

share of citizen income tax is modest. The income level for an average citizen of UAH 5,300 per month is low and does therefore not generate high income tax revenue to be shared between state and municipality.

On the expenditure side, the effects of decentralization add substantial pressure. For example, Voznesensk owns two hospitals and has to provide financial resources for them to be operated, maintained and modernized. Only staff salaries are paid by the state. The hospitals also provide services for patients outside the city boundary but receive no remuneration for operation and maintenance of these. Schools and kindergartens are also owned by the region but, as with hospitals, they are operated and maintained with the municipality's financial resources, and only the salaries of the teachers and personnel are paid by the state.

Concerning energy and water infrastructure, Voznesensk has water pipes, wastewater pipes, gas pipes as well as an electricity grid, all regularly used. The water pipes are maintained by the municipality which generally repairs around 3km of pipes annually. From local authority data, UAH 400,000 was spent on pipe repair in 2017. Of this amount, UAH 230,000 was paid from the city budget, UAH 100,000 by users and the remaining UAH 70,000 by the public water company. Furthermore, 40 per cent of water is lost because the pipes are too old. Clearly, this structure is not sustainable since the water users are only able to pay a fraction of the cost of operating and maintaining the water system. A further expense is incurred by the wastewater pipe system because wastewater treatment facilities are located more than 100 metres higher than the pipes, resulting in high electricity cost from pumping the water.

Gas is offered by a private gas monopoly. This company uses state-owned pipes, but does not pay for their use, although it is responsible for repairs and investment. Electricity is also offered by a monopoly supplier with similar arrangements.

The transport system in Voznesensk does not appear to be a burden on the municipal budget. Every five years a tender is offered for operation of the urban bus network. It is the responsibility of the successful company to provide and operate buses in accordance with the tender requirements. However, there is a lack of information about how many citizens use the service, which is considered to be expensive by city officials. In March 2018, the operator installed electronic readers in all buses which allow the use of smart cards.

Overall, the budget situation is very tight. Funds for maintenance, repairs and modernizations are very limited so only small improvements can be made annually. Additional taxes or borrowing funds (other than potentially for the solar plant) are not being considered. The size of the development budget is limited but the municipality strives to use it wisely. It is also in touch with potential donors and international finance institutions for possible support.

The city also receives government grants for the socio-economic development of territories in the 30-kilometer 'surveillance zone' around the nuclear power plant, in particular for the development of city infrastructure, as well as purchase of medicines such as pills for radiation protection. The municipality also receives funds from the nuclear plant for safety measures in case of a nuclear accident, but it appears that these funds are being used for a broader range of projects.

Since 2006, the UNDP has been working with Voznesensk within the framework of the "Municipal Governance and Sustainable Development Programme", with the financial support of the Swiss Confederation. The majority of projects have focused on solving the most urgent problems in housing and communal services, such as repairing public premises (in particular schools and kindergartens), improving water supply and sewage systems, as well as improving administrative services.

In 2010, the City Council approved a Sustainable Energy Action Plan (SEAP) which was developed with the Covenant of Mayors. It foresees an absolute reduction of CO₂ emissions of 33.7 per cent by 2020 and has an estimated budget of EUR 17.2 million. Projects include building insulation, increased use of bicycles and electric vehicles, as well as investments in renewable energy, combined heat and power. Planned funding was from a combination of government aid, taxes for connection to the local heat distribution network, and bank loans. Many of the projects in the plan have not yet been implemented, partly because some are very ambitious, and partly due to lack of funding.

One of the projects listed under the SEAP, a retrofitting project in the two healthcare institutions of Voznesensk, is ongoing and was completed in August 2018. For this project, the European Union (EU) provided EUR 635,458.

Future opportunities for sustainable urban development and mechanisms to finance them

Voznesensk is considering building a solar plant (2.2 MW) in accordance with the SEAP. A private company will build and fund the project. At completion, the plant would be bought by a municipal company for around UAH 70 million. The project will be funded through a combination of city funds, state funds and a loan from the European Bank for Reconstruction and Development (EBRD), funneled through Ukrgasbank, a local commercial bank. The feed-in tariffs are attractive, making this a potentially profitable investment. Profits would be used to create a local Energy Efficiency (EE) Fund which would support EE investments in SMEs, provide EE training, and so on.

In addition to the solar plant, the SEAP plans a range of other investments. Some of them are clearly not priority

investments, or are unaffordable, for example an electric car fleet and a road bypass. Others, such as a 2.8 million investment in public building insulation, or energy from biogas, are clearly relevant. Repairs of water pipes need to continue, ideally at a greater speed. In addition, meters should be installed outside apartments.

The sewage system represents a challenge. Due to the elevation of the purification facilities, expensive pumping stations are required. The resulting costs are the highest in the country. Many ideas are being considered but no specific project concept has yet emerged. A cost-benefit analysis is needed to justify this project.

Regarding heating of public buildings such as schools and kindergartens, individual heating systems need to be replaced but funding is a difficulty.

Availability of funds

Since the municipality's capacity to pay interest and repay debt is limited, other forms of funding need to be considered. Some of the principal options are discussed below.

PPPs: Often, when public financing for large infrastructure is an issue, PPPs are discussed. In a typical PPP, a private body designs, builds and finances an asset, operating it for an agreed period before handing it back to the public body. Funding is either based on "user fees", where users of pay for the asset's use, or "availability fees" where the public body pays a fee for making the asset available. In the past twenty or so years there has been a noticeable shift towards availability-fee-based PPPs. Typically, PPPs are only used for large infrastructure projects in countries with an amenable legal and environmental framework. Generally, a minimum project cost of EUR 50 million is requested from the partners to finance such projects.

However, provided the following conditions are met, small PPPs can be considered for Voznesensk:

- Availability of comprehensive technical assistance for project preparation and implementation;
- Competition among private bidders during the tender stage - it is important to see more than one serious bidder being interested in a project;
- Possible replication of experience gained through the first PPP;
- Adequate institutional capacity to manage the work of the consultants involved in the tender preparation, negotiations and implementation. These include lawyers, engineers, environmental and finance experts.

The box on the following page provides an example of a small PPP implemented in Ukraine.

Box 1. Biofuel PPP in Malyń, Ukraine⁴³

In Malyń, a town of nearly 30,000 inhabitants, a biofuel PPP helped the city administration to heat three schools by refitting a municipal boiler house. It substituted expensive, unreliable imported natural gas with locally produced biofuel made from wood or straw pellets. Under the PPP Development Programme (P3DP), the United States Agency for International Development (USAID) assisted the city in preparing the project, and a private local entrepreneur successfully tendered to build and operate the new boiler house for 15 years, selling heat at a pre-agreed price.

Box 2. UNDP launches support for ESCOs

In June 2017, UNDP launched a project on improving EE of public buildings in small and medium sized Ukrainian cities. The initiative, funded by the Global Environmental Facility (GEF), provided support to local engineering firms for equipment construction, installation, operation, maintenance and repair. Over a five-year period, a minimum of 10 pilot projects will be implemented in ten small and medium-size Ukrainian cities. The project builds on the experience of the UNDP ESCO-Rivne project, and will be developed in partnership with MRDCHCS. The overall budget for this initiative is USD 5.48 million.

ESCOs:⁴⁴ ESCOs are private companies which finance and implement energy efficiency investments and operate the asset over a longer period – a maximum of 15 years in Ukraine. The repayment of their loans is funded by energy savings. For the owner of the asset (the municipality or a municipal company), no additional cost arises. However, different project structures are available for different circumstances.

The ESCO market in Ukraine is limited but has potential. ESCOs have existed for at least two decades but have only been legally available for Ukrainian municipalities since April 2017.

Prior to the financial crisis some 70 ESCOs operated in Ukraine but the number shrank to five at one point.

In order for ESCOs to operate, they need to borrow to finance their investment. Borrowing is expensive and can lead to excessive cost for an ESCO project. Often, the required loan terms are not available. Commercial banks are also not experienced in lending to ESCOs, making it difficult to analyze the risks to an energy supply company. Audits of the state of assets prior to the EE investment need to be performed to establish a benchmark. Initiatives such as the one from UNDP (see below) are needed to stimulate the market.

ESCOs for Voznesensk can be considered if the conditions listed in the section on PPPs can be met.

Funding for energy efficiency investment in general:

In March 2017, UNDP published a document summarizing all relevant Ukrainian mechanisms for financing energy efficiency investments. It stated that some 80 per cent of support by international financial institutions and donor funds led to modernization of thermal energy supply systems, and only a few programmes dealt with EE investments for buildings.

Energy efficiency investments for public buildings:

Voznesensk should access grants for these investments. One of the initiatives is the Nordic Environment Finance Corporation (NEFCO) energy efficiency programme that provides loans at an interest rate of 3 per cent. MRDCHCS is working on an EE fund which will include a grant element of up to 50 per cent, and further schemes may be available.

Energy efficiency investments for private flats and buildings: In addition to schemes for public buildings, mechanisms also exist for private owners of flats, and for Associations of Co-owners of Apartment Blocks (ACABs) such as:

- a) "Warm Loans";
- b) The "IQ Energy" programme managed by the EBRD;
- c) Preferential loans from the State Fund for supporting youth housing institutions;
- d) Bank loans from institutions such as Metabank, Kredobank and Bank Lviv;
- e) Municipal schemes (see schemes in Kyiv, Rivne, Vinnitsa);
- f) Energy Efficiency Fund (see above).

Voznesensk should continue conducting awareness-raising campaigns, especially on EE in buildings.

Investments for energy supply systems:

Overall, some 700 million EUR in loans is available from international financial institutions and donors, but these are currently only partially utilized. Funders include the World Bank (UDHEEP IBRD), European Investment Bank, KfW, and Ukreximbank, supported by the World Bank and the EBRD. Some loans offered are very long term (some beyond 20 years) and have interest rates of between 1-4 per cent making them more suitable for national, rather than municipal, investment. Furthermore, many of the schemes are not suitable for Voznesensk because they require larger investments than the city can make. However, smaller loans for investment in energy supply projects are available

43 Detailed information on this project and others is available at <http://ppp-ukraine.org/en>

44 For a list of ESCOs, see <http://ukraine.green-energy-portals.com/cms/en/content/energy-service-companies-escos>

under the DemoUkrainaDH Programme (supported by NEFCO and SIDA) and the Chyste vyrobnytstvo Programme (supported by NEFCO).

Technical assistance and grants for energy efficiency projects: Technical support is needed to get EE projects started. Fortunately, several countries provide technical assistance to municipalities with energy efficiency investment. Examples include USAID Municipal Energy Reform in Ukraine, IFC Residential Energy Efficiency Project, and GIZ Energy Efficiency in Municipalities. Some schemes also provide grants such as E5P, a multi-donor fund managed by the main international financial institutions.

Funding for SMEs: Whatever its long-term economic strategy may be (see section on economic indicators), Voznesensk should find ways to encourage the productive sector, in particular SMEs. Currently, many of the companies in Voznesensk are micro-companies focusing on trading activities with little possibility for growth and productivity gains. It is clear the municipality itself cannot provide much support, but there are various country-wide schemes which support SMEs - predominantly through cheap loans. Two of these are described below.

Box 3. Lending scheme for SMEs supported by the EU

The European Investment Bank (EIB) and the European Investment Fund (EIF) – jointly the EIB Group – have signed a guarantee agreement with Oschadbank to support EUR 50 million of lending to small and medium-sized enterprises (SMEs) in Ukraine. This is made possible with European Union support through the EU4Business initiative. This agreement enables Oschadbank to facilitate access to finance for local SMEs by providing a 70 per cent guarantee on each loan, and subsequently extend financing on favorable terms with reduced collateral requirements.

Box 4. EBRD local currency loans

The EBRD is providing fresh funds to develop local currency lending and SME support mechanisms in Ukraine. The use of local currency gives greater security to potential borrowers, who will not be exposed to foreign exchange risks. The EBRD is providing a four-year local currency loan in UAH worth USD 25 million equivalent to the PJSC ProCredit Bank Ukraine (PCBU). Grant funding provided through the EU Neighborhood Investment Facility will help reduce the interest rate cost of foreign exchange (FX) risk hedge, to achieve better cost of funding in the local currency (UAH).

Institutional capacity: A municipal strategy should focus on off-balance sheet financing structures, obtaining grants and subsidies for municipal projects and obtaining support for SMEs. However, this can only be successful if it develops

and maintains the capacity to pursue these options and manage preparation and implementation of the resulting projects. Institutional capacity can be an issue even in the most advanced municipalities but nevertheless, ideas must be developed to recruit and retain qualified staff.

Recommendations

Having analyzed the municipal budget, it becomes clear that increasing budget revenues by introducing an additional tax burden is not possible under Ukrainian tax laws. On the expenditure side, the options for cost savings are limited as the budgetary demands for operation, maintenance and modernization of assets are substantial. The obvious alternative is for the municipality to borrow for accelerated investments, however its capacity to pay interest and repay debt is limited. Therefore, other forms of funding, such as those already outlined, need to be considered.

For access to funding for future sustainable projects the city of Voznesensk would need to focus on:

- a) Using “off-balance sheet” structures such as small-scale PPPs and ESCOs to finance investments, subject to the provisos above;
- b) Considering debt only for investments which generate enough cash flow to repay it;
- c) Attracting as many grants as possible, particularly for energy efficiency investments. This strategy is already being successfully pursued but needs to be broadened further;
- d) Finding ways to encourage entrepreneurship and support SMEs. A prosperous SME sector which goes beyond micro-enterprises will generate more tax income;
- e) Strengthening the internal institutional capacity to successfully manage all the above.

Conclusion

A thorough review of the budgetary situation led to the conclusion that the budget was so far managed conservatively, without much borrowing - a strategy which relies on long-term funds to acquire assets. It is recommended that the city keeps this financial approach and only borrows at subsidized rates for projects generating cash flow for loan repayment. It is also recommended that the city continues to attract grant funding or subsidized funds to finance future projects. The city has been quite successful at this, but may need to increase its institutional capacity, for example, employing qualified senior staff with relevant experience, to attract an even broader range of funds. In addition, it should consider some of the innovative options to fund projects, such as ESCOs and PPPs, but be aware of their limitations and pitfalls.

A

ANNEXES



ANNEX I

KPIs for smart sustainable cities

AREA	SUB-DIMENSION	CATEGORY	INDICATOR	TYPOLGY	
Economy	ICT	ICT infrastructure	Household Internet Access	core	
			Fixed Broadband Subscriptions	core	
			Wireless Broadband Subscriptions	core	
			Wireless Broadband Coverage	core	
			Public Wi-Fi	advanced	
		Water and sanitation	Smart Water Meters	core	
			Water Supply ICT Monitoring	advanced	
		Drainage	Drainage / Storm Water System ICT Monitoring	advanced	
		Electricity supply	Smart Electricity Meters	core	
			Electricity Supply ICT Monitoring	advanced	
			Demand Response Penetration	advanced	
		Transport	Dynamic Public Transport Information	core	
			Traffic Monitoring	core	
			Intersection Control	advanced	
		Public sector	Open Data	advanced	
			e- Government	advanced	
			Public Sector e-Procurement	advanced	
		Productivity	Innovation	R&D Expenditure	core
				Patents	core
				Small and Medium-Sized Enterprises	advanced
			Employment	Unemployment Rate	core
	Youth Unemployment Rate			core	
	Tourism Industry Employment			advanced	
	ICT Sector Employment			advanced	
	Infrastructure	Water and sanitation	Basic Water Supply	core	
			Potable Water Supply	core	
			Water Supply Loss	core	
			Wastewater Collection	core	
			Household Sanitation	core	
		Waste	Solid Waste Collection	core	
		Electricity supply	Electricity System Outage Frequency	core	
			Electricity System Outage Time	core	
			Access to Electricity	core	
		Transport	Public Transport Network	core	
			Public Transport Network Convenience	advanced	
			Bicycle Network	core	
			Transportation Mode Share	advanced	
			Travel Time Index	advanced	
			Shared Bicycles	advanced	
			Shared Vehicles	advanced	
			Low-Carbon Emission Passenger Vehicles	advanced	
		Buildings	Public Building Sustainability	advanced	
			Integrated Building Management Systems in Public Buildings	advanced	
		Urban planning	Urban Development and Spatial Planning	advanced	
			Pedestrian infrastructure	advanced	

AREA	SUB-DIMENSION	CATEGORY	INDICATOR	TYPOLGY	
Environment	Environment	Air quality	Air Pollution	core	
			GHG Emissions	core	
		Water and sanitation	Drinking Water Quality	core	
			Water Consumption	core	
			Freshwater Consumption	core	
			Wastewater Treatment	core	
		Waste	Solid Waste Treatment	core	
		Environmental quality	EMF Exposure	core	
			Noise Exposure	advanced	
		Public spaces and nature	Green Areas	core	
			Green Areas Accessibility	advanced	
			Protected Natural Areas	advanced	
	Recreational Facilities		advanced		
	Energy	Energy	Renewable Energy Consumption	core	
			Electricity Consumption	core	
			Residential Thermal Energy Consumption	core	
Public Building Energy Consumption			core		
Society and culture	Education, health and culture	Education	Student ICT Access	core	
			School Enrolment	core	
			Higher Education Degrees	core	
			Adult Literacy	core	
		Health	Electronic Health Records	advanced	
			Life Expectancy	core	
			Maternal Mortality Rate	core	
			Physicians	core	
			In-Patient Hospital Beds	advanced	
			Health Insurance / Public Health Coverage	advanced	
		Culture	Cultural Expenditure	core	
			Cultural Infrastructure	advanced	
	Safety, housing and social inclusion		Housing	Informal Settlements	core
				Expenditure on Housing	advanced
		Social inclusion	Gender Income Equality	core	
			Gini Coefficient	core	
			Poverty Share	core	
			Voter Participation	core	
	Safety	Safety	Child Care Availability	advanced	
			Natural Disaster Related Deaths	core	
			Disaster Related Economic Losses	core	
			Resilience Plans	advanced	
Population Living in Disaster Prone Areas			advanced		
Emergency Service Response Time			advanced		
Police Service			core		
Fire Service			core		
Violent Crime Rate			core		
Traffic Fatalities			advanced		
Food security	Local Food Production	advanced			

ANNEX II

Tables of recommendations

ECONOMY							
Measures and implementation		Objectives		Resources and efforts (technical, human, financial)		Recommended Activities	Priority
Wi-Fi hotspots	Short Term: < 2 years	H	To increase connection to the opportunities of the new digital economy To develop employment opportunities	M	Public resources and financing to improve digital infrastructure	To increase the number of Wi-Fi hotspots in the city	L
Development of the tourism industry	Medium Term: 2-5 years	M	To increase the number of visitors and the overall tourist economy	M	Public resources to develop a plan promoting tourism in the area	Social media campaign promoting the natural environment in Voznesensk Social media campaign based on current tourist activities such as motorball	M
Energy Usage and Cost	Short Term: < 2 years	H	To reduce the impact of energy costs on the city budget To reduce the impact of energy costs on citizen expenditure	H	Technical expertise in energy upgrades (private or public Sector) Financing for installations	To increase / upgrade insulation in current building stock To install higher efficiency heating systems To install higher efficiency lighting Energy efficiency rebate programs Communal bulk buying programs for energy efficient products Mandatory city energy efficiency policies	H
Reorientation of the city economy	Medium Term: 2-5 years	H	To orient the city's economy to support and integrate with the changing rural economy To take advantage of specific natural resources (sand and granite) to build new industries To take advantage of the 'crossroads' location of the city to build transportation and transportation-support industries	H	Public resources and financing to improve transportation infrastructure. Review and study of the rural economy	To develop an industrial/ business strategy to develop new industries based on the new rural economy To develop an industrial / business strategy based on the development of potential industries based on sand and granite deposits To upgrade local transportation infrastructure	H
Better transport infrastructure	Long term: > 5 years	H	To support economic growth	H	Public-private resources and financing to improve transportation infrastructure	To upgrade local transportation infrastructure	H

ENVIRONMENT							
Measures and implementation		Objectives		Resources and efforts (technical, human, financial)		Recommended Activities	Priority
Reduction of waste quantities	Medium Term: 2-5 years	H	To reduce solid waste quantities	L	Public resources to implement educational programmes and material	To raise awareness To create educational programmes and material	H
Safety of wastewater pits	Medium Term: 2-5 years	H	To increase the safety of wastewater pits which are poorly maintained To reduce the health risk to the local population	H	Public resources and financing to develop awareness material or campaigns Public-private financing to build collective systems	To raise awareness among households about the health risks of uncontrolled wastewater disposal To establish collective systems	H
Collection of tree leaves	Short Term: < 2 years	M	To decrease seasonal air pollution caused by tree leaf burning	L	Limited public resources to develop awareness material about central collection through the social media	To enforce central collection of leaves to then be composted or burnt, then made available. To be done through social media and the city's website	H
Awareness and education of local biodiversity	Medium Term: 2-5 years	M	To raise awareness with regard to environmental protection and ecosystem services	L	Public resources and financing to develop awareness material or campaigns	To make sure that school children know local species, like mammals, plants, trees and insects, and discuss their roles and functions To involve parents and, ideally, the older generation (probably an undiscovered archive of knowledge), through joint excursions or interviews To organize a photo competition about regional species with a prize To talk at school about lost species, their functions and why they disappeared To organize a competition of ideas on how to improve the natural capital of the city To select an endangered species as a mascot for the city	M

ENVIRONMENT (continued)							
Measures and implementation		Objectives		Resources and efforts (technical, human, financial)		Recommended Activities	Priority
Implementation of agriculture-based solutions	Medium Term: 2-5 years	H	To increase innovation, employment and deployment of local materials	M	Financial support for international and regional knowledge exchange Public funding to initiate the pilot SME	To organise study tours to regions with similar settings with interesting solutions (i.e. regions in Poland or the Baltics) To invite successful SMEs from other countries with skills that are relevant for Voznesensk To start a SME, which is partly private owned and partly owned by the municipality to develop these solutions To invite students from top universities, local and international for a summer competition on innovation	H
	Medium to long term: Up to 5 years or more		To reduce high energy costs To introduce biomass energy	H	Public-private investment in technologies to implement and maintain solutions Cooperation with land owners to collect agricultural residuals	To use sewage sludge as biogas To compost tree leaves To experiment in use of bio-fuels from agriculture residuals	H

SOCIETY AND CULTURE							
Measures and implementation		Objectives		Resources and efforts (technical, human, financial)		Recommended Activities	Priority
Create more opportunities	Medium Term: 2-5 years	H	To create more employment opportunities To enhance university education To enhance university collaboration with the private sector To boost economic growth	M	Public resources to design educational programmes Cooperation with private companies to offer in-company apprenticeships/ jobs, or funding possibilities, or cooperation for economic growth	To design a "specialisation programme" with local industry and the service sector To promote local tourism and explore responsible tourism To promote bio-agriculture by establishing a university programme and training	H
	Medium to long term: Up to 5 years or more	H	To increase the safety of wastewater pits which are poorly maintained To reduce the health risk to the local population	H	Public resources and financing for staff and equipment Technical skills for doctors and personnel	To equip and staff health services To improve emergency time response, exploring the potential of motorbike assistance in emergency	H

SOCIETY AND CULTURE (continued)							
Measures and implementation		Objectives		Resources and efforts (technical, human, financial)		Recommended Activities	Priority
Implement accessible housing	Long Term: > 5 years	H1	To increase access to affordable housing	H	Public resources for drafting maps	To relocate residents from high-risk areas	M
			To prevent human losses from disasters				
			To enhance early warning systems		Policy-making and financial mechanisms	To create affordable housing by partnering with housing cooperatives and creating financial mechanisms that would grant access to the housing market	
Develop services for all	Medium Term: 2-5 years	M	To support women rights and gender equality	M	Public resources and financing to develop the plan, and create more kindergarten places	To identify and assess unknown city needs to develop a “multi-purpose facility plan” to accommodate missing services and activities	M
			To assess city's needs and address them				
			To support working families				
			To create employment opportunities				
Boost a safer society	Short Term: < 2 years	H	To improve transparency	L	Public financial support for the development of plans/campaigns	To launch a “zero crime” campaign	L
			To reduce the crime rate				
			To identify and reduce education drop-out causes			To launch the “healthier lifestyle engagement programme”	
			To improve personal health and well-being			To increase voter participation by improving information and accessibility	
			To improve both physical accessibility (e.g. by eliminating architectural barriers) but also improve voter access by making it easier for people to find their polling station				

Smart Sustainable Cities Profile

Voznesensk, Ukraine

The UNECE Committee on Urban Development, Housing and Land Management is an intergovernmental body representing all 56 UNECE member States. We provide countries with a forum for compiling, disseminating and exchanging information on housing, urban development and land administration.

The Smart Sustainable Cities Profile provides an analysis of the city performance on urban development activities, including business and economy, social issues, urban planning, governance, energy, infrastructure, and so forth. The Smart Sustainable Cities Profile identifies areas where action is required, and makes relevant practical and financial recommendations to enhance the quality of life by creating livable, green, more connected and inclusive cities.

For further information on our work, please visit our website:

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