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Implementation of the United for Smart Sustainable Cities Initiative

Smart sustainable cities profile: Grodno, Belarus

Note by the Secretariat of the Committee

Summary

This Note contains the Smart Sustainable Cities Profile for the city of Grodno, Belarus.

The Committee is invited to welcome the city profile and approve it as official publications in English and Russian, digital and print.

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Executive Summary

At just over 370,000 inhabitants, Grodno is the third largest city and key administrative, industrial, and cultural centre in the Republic of Belarus. The urban economy of Grodno is predominantly based on tourism, the production of nitrogen fertilizers, food and engineering products, furniture, tobacco and hosiery. Official statistics suggest that just 0.3 per cent of the working population is unemployed, which is significantly lower than the national average (4.9 per cent). There are 60 industrial enterprises located in Grodno and 78.5 per cent of employment is concentrated small and medium enterprises (SMEs).

The municipal budget prioritizes spending on social and cultural infrastructure and services, which make up 81.9 per cent of the total (BYN) 378 million¹ (around USD 151.7 million) budget. As such, Grodno is one of the major educational centers in the country, with over 147 facilities. Furthermore, the city has a well-established public transport system, with 91 routes stretching across 1,300 km. Grodno showcases a high number of integrated green spaces, which cover over 30 per cent of the urban footprint. In this context, the city is actively conducting urban rewilding activities and has committed to planting over 7,000 trees and bushes each year.

The economic base of Grodno was heavily impacted by the COVID-19 pandemic, mostly due to its high dependence on exports (e.g., international cargo shipments), as well as lower revenues from tourism. As a result, in 2020, the municipal budget shrunk by 2.6 per cent or BYN 9.5 million, which is around USD 3.8 million. Vulnerable groups and families with children have been among the most heavily impacted ones, together with low-income families and part-time employees. Official statistics suggest that over the course of 2020, a total of 300 legal entities and 3,000 individual entrepreneurs in Grodno received various types of Government support. The combined effect of these measures is estimated to have helped create 522 additional jobs in the city.

The outcomes of the evaluation, supported by the review of documentary data sources and feedback sessions with local experts, provided the basis for the recommendations to:

1. Significantly Improve urban governance for sustainable development through improved access to, availability and sharing of urban data.
2. Improve the water and sanitation infrastructure.
3. Improve solid waste management.
4. Improve public building sustainability and reduce energy consumption.

¹ (BYN) Belarusian Rubles.

General Overview

At just over 370,000 people and with an urban footprint of 142km², Grodno is the third largest city of the Republic of Belarus and major administrative, industrial, and cultural centre in the country. Grodno is located in the west of the country, on the banks of the river Neman. The border with Poland and Lithuania is respectively 15 km and 30 km away. Administratively, Grodno is divided into two districts: Oktyabrskiy and Leninskiy (see figure 1).

Grodno is a city with a rich history and cultural and architectural heritage. The city centre alone hosts 388 of 451 historical and cultural sites in Grodno. Furthermore, Grodno offers numerous tourist attractions, including the Grodno Regional Philharmonic, the Drama Theatre, the Puppet Theatre, and other cultural institutions, including 36 museums. To promote tourism, a visa-free policy² has been in force in the Grodno Region since October 2016. This policy allows tourists and entrepreneurs from 73 countries to visit the Region for up to 15 days without the need for a visa. Between 2016 and 2020, around 260,000 foreign tourists visited the city.

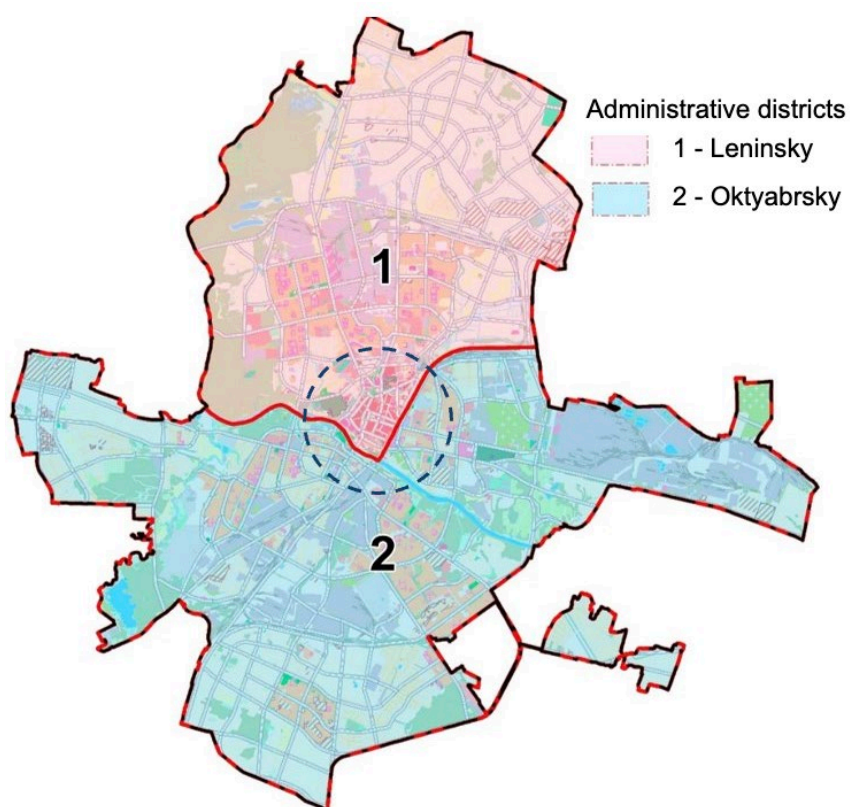


Figure 1: The administrative boundaries of Grodno: Source: Grodno City presentation at 69th UNECE Commission

In terms of urban economic outlook, the city specializes in the production of nitrogen fertilizers, food products, furniture, engineering products, tobacco, and hosiery products. The city is also an important educational hub within the Republic of Belarus. As such, Grodno hosts a total of 147 educational facilities, including 4 higher education institutions, 97 pre-school education establishments, 41 general secondary education establishments, 4 institutes for special education, 2 social education establishments, 2 institutions for additional education for children and youths, and 1 health-education institution.

² Grodno Visa-Free, *Visa-Free Regions*. Available at: <https://grodnovisafree.by/en/>.

Grodno is also an important regional health centre, with four hospitals, five specialized centres, two dispensaries and nine health clinics. Additionally, Grodno has one dental clinic, one beauty and health centre, and one emergency medical assistance station.

Grodno has a well-developed public transport network. The public transport network for urban passenger covers 1,300 km, and has 91 routes: 55 bus routes, 19 trolleybus routes, and 17 express routes (for shuttlebuses). Moreover, in 2017, the city completed the construction of a new six-lane highway and construction work is underway for a fourth automobile bridge across the river Neman. This bridge will connect residential and industrial areas in the city and help create a ring-road for Grodno.

At 44,5km², green areas are a key feature of the cityscape of Grodno and take up over 30 per cent of the urban footprint. The largest green urban area stretches across 4 parks – Kolozhsky, forest park Physhki, Rumlevo and Lososno. Furthermore, each year the city plants 7,000 new trees and bushes. Other infrastructure projects include the construction of a football stadium, a health clinic in the Vishnevets neighbourhood, a kindergarten, an outpatient clinic, and a school in the Olshanka neighbourhood.

Legal and Institutional Framework for Urban Development

The executive and administrative power of the city lies with the Grodno City Executive Committee (hereafter, City Council). Equivalent to a Mayor Office, the City Council is further subdivided into 15 departments³. Furthermore, Grodno has dedicated departments for matters related to urban development, such as the Department for Architecture and Urban Planning and the Department for Housing. Overall, departments, ranging from Economics, Financial Management, Trade and Services, Education, Culture, oversee the day-to-day management of the city. The legislative power in Grodno lies with the Grodno City Council of Deputies.

Administratively, Grodno is divided into two districts, Oktyabrskiy and Leninskiy. Each district has its own powers and responsibilities. The territorial development policy of Grodno is guided by the Master Plan, which is currently valid up until 2030. The Master Plan is based on socio-economic analyses and forecasts and establishes the strategic direction for a wide range of urban development programs and projects. Currently, the Master Plan focuses on the preservation of the environment and historical and cultural values.

Through the Presidential Decree on the Development of Entrepreneurship⁴, which came into force in 2017, the mechanisms of cooperation between businesses and State bodies underwent reform. The key provision of this Decree is to reduce to the lowest possible level the control of the State over businesses. Furthermore, the “One Window” service⁵, introduced by the Government of Belarus in 2018⁶, guides administrative processes in the city, insofar as it facilitates direct interaction between citizens and city officials. The service provides inhabitants with advice on filling in administrative documents and is a convenient one-stop office for instigating administrative processes.

Grodno cooperates with regional authorities on the implementation of the Grodno Region Investment Programme, facilitating the implementation of its most important development initiatives.

³ Grodno City, *Structural Subdivisions*. Available at: <http://grodno.gov.by/en/main.aspx?guid=1841>

⁴ Pravo.by, *Development of Entrepreneurship, 2017*. Available at: <https://pravo.by/document/?guid=12551&p0=Pd1700007&p1=1>.

⁵ Grodno City, *One Window Service, 2018*. Available at: <http://grodno.gov.by/ru/main.aspx?guid=1051>.

⁶ President of the Republic of Belarus, *Decree on the One Window Service, 2018*. Available at: http://president.gov.by/ru/official_documents_ru/view/ukaz-202-ot-24-maja-2018-g-18791/.

Funding and Financing Framework for Urban Development

In 2020, the municipal budget of Grodno amounted to BYN 378 million (around USD 151.7 million⁷). Spending from the budget is guided by an expenditure strategy. Under the current budget, Grodno prioritizes spending on social and cultural infrastructure and services, which make up 81.9 per cent of the total budget. Key budget lines include spending on school maintenance (46.5 per cent) and healthcare infrastructure and services (29.3 per cent). Moreover, the city budget allocates BYN 2.7 million for social institutions and Br 0.9 million for the purchase of equipment and other fixed assets.

For 2020, BYN 44.2 million, or 11.6 per cent of the total budget, was dedicated to spending on housing and communal services and housing construction. BYN 0.5 million out of the total BYN 44.2 million was allocated for major repairs, reconstruction, and modernization of the thermal energy infrastructure, BYN 4.8 million (on purchasing and replacing elevators in communal buildings, Br 6.9 million) on major repairs and modernization of the housing stock, and BYN 2.1 million on standard repairs. BYN 9 million, or 2.4 per cent of the total went into subsidizing the extensive public transport system of Grodno.

Furthermore, Grodno allocated around BYN 168,000 to co-finance energy-efficient retrofits in educational institutions, such as the replacement of old windows with energy-saving polyvinyl chloride windows. Over the past years, Grodno worked on the implementation of the State Housing Construction programme 2016-2020⁸ and provided BYN 0.8 million to implement the Infrastructure for Housing subprogramme.⁹ Moreover, the Grodno Region Innovation Fund¹⁰ allocates funds on a competitive basis for implementing innovative projects, completing scientific research, and developing industry laboratories.

In recent years, Grodno implemented major urban infrastructure projects in, inter alia, waste treatment, energy efficient housing, sustainable public transport, and landscaping. In 2017, Grodno inaugurated a solid waste facility which can treat and separate 162,000 tons of waste per year. In 2020, the waste treatment facility generated and sold 6,000 tons of recycled materials, which accounted for over 25 per cent of the total revenue of the waste complex. In 2021, the city is planning to install additional equipment and upscale recycled material recovery to up to close to 94,000 tons per year (58 per cent of the total). In 2017, the city finished work on an energy-efficient residential building with 120 housing units. The building utilizes innovative technologies for heat recuperation from the ground, smart ventilation, as well as engineering solutions geared towards reducing energy consumption. Thanks to these approaches, the average heat consumption in the building is a 15kWh per cubic meter, which is much lower compared to first generation energy-efficient homes in Grodno (39kWh).

Furthermore, in 2019, the World Bank, the European Investment Bank (EIB) and the Global Environment Facility (GEF) selected Grodno as a pilot for the implementation of a project on the modernization of the thermal energy infrastructure in residential buildings¹¹. The project aims at improving energy efficiency in 250 multi-apartment

⁷ Calculated with the exchange rate of June 11, 2021. USD 1 = Br 0.40 (applies to all other amounts in USD in this document).

⁸ Pravo.by, *Decision of the Council of Ministers of the Republic of Belarus on the State Programme "Housing Construction 2016-2020"*. Available at: <https://pravo.by/document/?guid=3871&p0=C21600325>.

⁹ Pravo.by, *Decision of the Council of Ministers of the Republic of Belarus on the State Programme "Housing Construction 2016-2020"*. Available at: <https://pravo.by/document/?guid=3871&p0=C21600325>. Information on subprogramme 2 – "Infrastructure for Housing".

¹⁰ Grodno City Executive Committee. Available at: <http://grodno.gov.by/main.aspx?guid=4861>. Based on Presidential Decree on the Procedure for the Formation and Use of Funds of Innovation Funds. Available at: http://president.gov.by/ru/official_documents_ru/view/ukaz-357-ot-7-avgusta-2012-g-1414/.

¹¹ The World Bank, *Belarus to Enhance Energy Efficiency with Support from the World Bank, 2019*. Available at: <https://www.worldbank.org/en/news/press-release/2019/10/30/belarus-to-enhance-energy-efficiency-with-support-from-the-world-bank>

residential buildings in Grodno and Mogilev oblasts and is expected to deliver key outcomes such as reduced natural gas consumption, increased biomass fuel storage capacity, district heating networks upgrades, lower heat consumption and ultimately more comfortable living conditions. The total project cost was estimated at just over USD 202.2 million and received USD 99.3 million respectively from the World Bank and European Investment Bank, in addition to USD 3.65 million from the Global Environment Facility.

Evaluation of Grodno against the Key Performance Indicators for Smart Sustainable Cities

To support the commitment of Grodno to becoming smarter and more sustainable, the city was evaluated using the KPIs for Smart Sustainable Cities (SSC) between 2019 and 2021. This is a United Nations standard on SSCs, which was developed by UNECE and ITU in 2015¹².

The KPIs for SSCs have been tested and implemented in over 150 cities worldwide¹³. In the period from 2019 to 2023, UNECE is also undertaking the evaluation of 17 Norwegian cities, Bishkek (Kyrgyzstan), Tbilisi (Georgia), Tirana (Albania), Podgorica (Montenegro), Almaty (Kazakhstan), and Nur-Sultan (Kazakhstan). The KPIs for SSC consist of 91 indicators at the intersection of the three dimensions of sustainability (economy, environment, and society and culture) and ICTs. The KPIs are outlined in the Collection Methodology for Key Performance Indicators for Smart Sustainable Cities. The evaluation of the city performance against the KPIs for SSC was supported by the Protocol on the Evaluation of City Performance against the Key Performance Indicators for Smart Sustainable Cities.

This study dedicates a section for each of the three dimensions, which are further sub-divided into: i) Overview and ii) KPI Evaluation. The overview sub-section aims at providing an evidence-based context and is based on documentary data sources. The KPI Evaluation highlights the key findings of the data collected through the KPIs for SSC methodology.

The graph on page 11 visualizes the performance of the city against the KPIs for SSC. Follow-up discussions in this section outline the performance of Grodno in relation to the three dimensions of the KPIs and relevant city actions, with a view to identifying the challenges to, and opportunities for, making the city smarter and more sustainable.

The study suffers from major limitations due to lack of data in all domains of the KPIs for SSC methodology. Grodno reported 59 out of 108 data entries (the KPI indicators are 91 but some have sub-indicators, thus the higher number); data was missing or not available for 49 indicators, mostly in the economy and society and culture domain. Specifically, 27 out of 50 economy indicators were reported, 20 out of 28 environment indicators were reported, and 12 out of 29 society and culture indicators were reported. The indicators are also divided into "core" and "advanced" indicators. 45 out of 67 core indicators were reported, and 17 out of 41 advanced indicators were reported. Improving sustainable development depends on the access to, availability of and ability to share urban data.

Grodno is, therefore, strongly encouraged to supply and put in place mechanisms to be able to share urban data on the following areas of the **economy dimension**:

¹² The KPIs for SSC standard was endorsed by the UNECE Committee on Urban Development, Housing and Land Management in 2016 (ECE/HBP/2016/4) and was brought under the U4SSC initiative. The U4SSC associates 16 UN agencies, and supports the evaluation of cities' performance using the KPIs and the implementation of SSC solutions through the development of guidelines, studies, city action plans, and capacity-building events.

¹³ These include Nur-Sultan (Kazakhstan) Voznesensk (Ukraine), Goris (Armenia), Pully (Switzerland), Dubai (United Arab Emirates), Singapore (Singapore), Shanghai (China), Buenos Aires (Argentina), and Moscow (Russian), among others.

- **Transport:** share of journeys taken by private vehicles, public transport, walking, cycling, or paratransit; public transport network access; dynamic public transport information; amount of shared vehicles; and amount of shared bicycles;
- **ICT infrastructure:** public WiFi spots; 3G and 4G wireless broadband coverage; wireless broadband subscriptions; and household internet access;
- **Employment:** tourism industry employment; and youth unemployment rate; and
- **Buildings:** integrated building management systems; and public building sustainability.

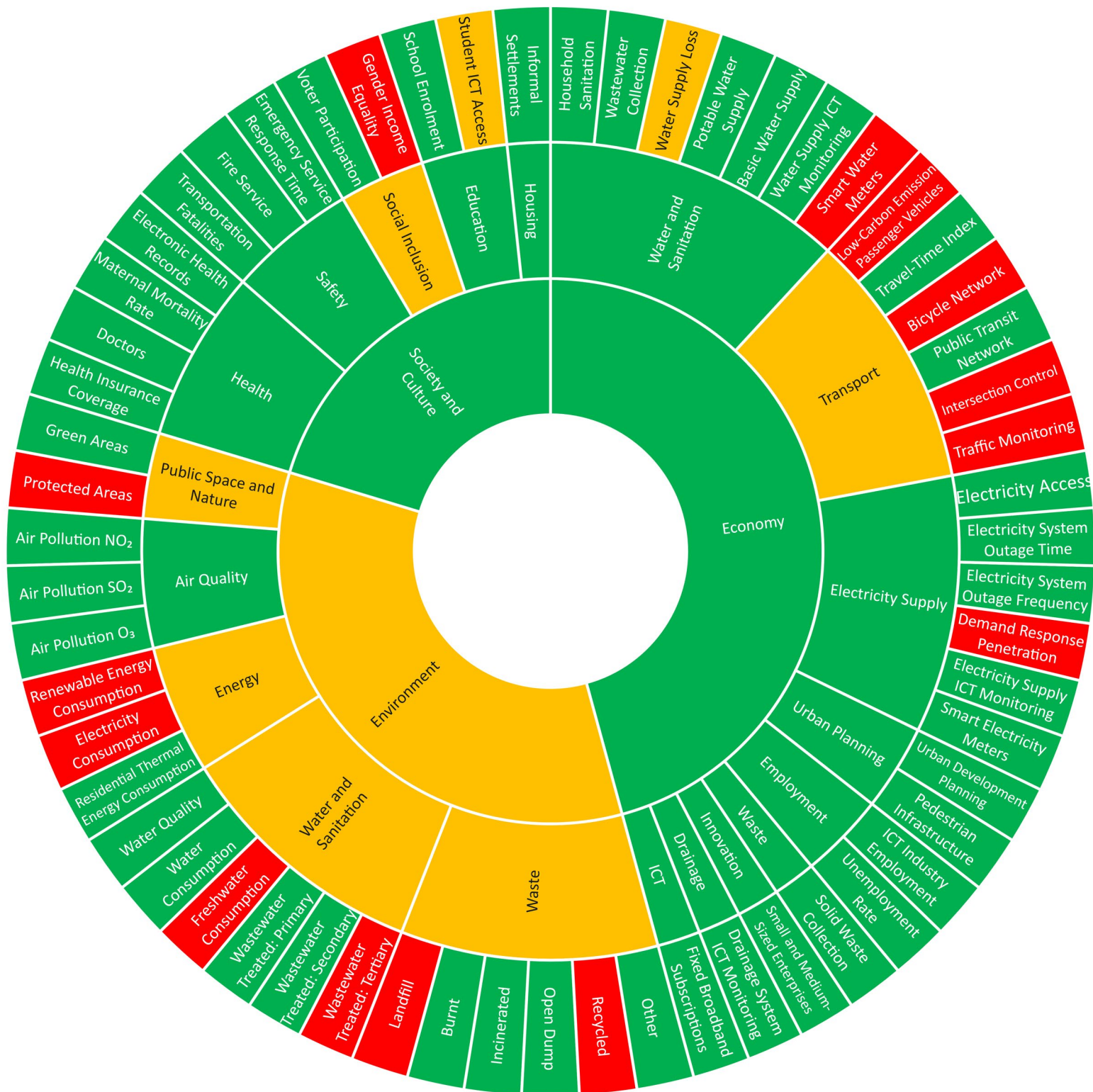
Grodno is also encouraged to supply and put in place mechanisms to be able to share urban data on the following areas of the **environment dimension**:

- **Air quality,** especially through the online monitoring of PM10, and PM2.5 emissions, and greenhouse gas emissions;
- **Energy:** public building energy consumption;
- **Public space and nature:** recreational facilities; and green area accessibility; and
- **Environmental quality:** exposure to noise and to electromagnetic fields.

Lastly, Grodno is strongly encouraged to supply and put in place mechanisms to be able to share urban data on the following areas of the **society and culture dimension**:

- **Safety:** violent crime rate; police service staff count; population at risk of disasters; resilience plan implementation; disaster-related economic losses; and natural disaster-related deaths;
- **Health:** life expectancy;
- **Social inclusion:** childcare availability; poverty rate; and Gini coefficient;
- **Education:** adult literacy rate; and number of higher education degrees;
- **Housing:** housing expenditure;
- **Culture:** number of cultural institutions; and cultural expenditure; and
- **The prevalence of local food production.**

Graph 1: The performance of Grodno against the KPIs for SSC.



Economy – an overview

The GrodnoInvest Free Economic Zone (FEZ)¹⁴, established in 2002, supports the economic development of the city. Residents of GrodnoInvest are subject to a special legal regime, including tax and customs benefits which reduce the cost of conducting business activities. The GDP production of the FEZ currently amounts to USD 1.6 billion.¹⁵

Currently, one-third of the budget of Grodno is generated through tax revenue from around 3,500 private businesses. Annually, 250 new private companies register in the city and at the end of 2020, despite the impacts of the COVID-19 pandemic, the city registered an increase of 539 companies city-wide. In 2019, Grodno was named the “Best regional centre for business in Belarus”¹⁶ as part of a country-wide competition. Official statistics suggest that the unemployment rate in Grodno is extremely low. The number of unemployed citizens dropped by 36.7 per cent between 2015 and 2019 (from 7,677 people to 4,858), and the unemployment rate fell from 1.3 to 0.3 per cent of the economically active population. This resulted from the implementation of a State programme focusing on social protection and the reduction of unemployment.

Grodno specializes in producing nitrogen fertilizers, food products, furniture, engineering and tobacco products and hosiery. The entirety of the cord fabric production of Belarus is concentrated in the Grodno region, as well as the production of polyamides in their primary form and gloves. Roughly 90 per cent of the country’s nitrogen fertilizers and 80 per cent of its hosiery production takes place in Grodno. Manufacturing is concentrated in the industrial complex of Grodno and is made up of 60 major enterprises. Furthermore, the city is home to Grodno Azot, Neman tobacco factory, Grodno Meat Processing Plant, Milk World, and Conte Spa.

The most developed sector in the city is the services sector, which includes 5,450 establishments. The IT sector has also been rapidly developing thanks to export-oriented business models. In 2016, the first subsidiary branch of Minsk’s Hi-Tech Park was established in the city.¹⁷ This Park includes an education centre delivering training for IT companies countrywide. In this context, Grodno is a regional leader in terms of computer services exports per capita.

In order to increase access to ICTs in Grodno, all multi-apartment residential buildings are connected to the internet through fibreoptic connection. Furthermore, the city offers free access to real-time public transport information through numerous third-party applications. Electronic information boards, developed via a public-private partnership, are currently being installed at transport stops. Since 2020, it has been possible to pay for public transport using QR-codes and a mobile application. Since 2019, Grodno has been extending the bicycle network. Currently, the length of the network is 20 km; by 2030, it will be 130 km.

To support further economic development, the city will implement the Informatization Development Strategy of Belarus for 2016-2022 e-government strategy. The strategy aims to improve the provision of services electronically, including providing 75 per cent of administrative procedures and public services electronically. Grodno will also focus on maintaining high levels of employment from 2020 to 2024.

¹⁴ GrodnoInvest, *Developing Businesses in Grodno Region*. Available at: <https://grodnoinvest.by/en>.

¹⁵ GrodnoInvest, *About Free Economic Zone*. Available at: <https://grodnoinvest.by/en/grodnoinvest/about/>.

¹⁶ Republican Conference of Entrepreneurship, *Results of the Competition "Best City (District) and Region for Business in Belarus", 2019*. Available at: <https://rce.by/news/news26-0919.php>.

¹⁷ HTP Belarus, *Hi-Tech Park* Available at: <https://www.park.by/en/>.

Economy – KPI evaluation

The evaluation of Grodno against the KPIs revealed a strong performance in the Economy sphere. Based on data reported on 27 of the 51 indicators, the evaluation revealed high levels of employment, a large number of small and medium-sized enterprises, and strong performance in the area of ICT infrastructure. The evaluation showed that only 0.3 per cent of the population is unemployed, which is significantly below the national average of 4.9 per cent.¹⁸ 78.5 per cent of all enterprises in the city are small and medium-sized (SMEs). With reference to the ICT infrastructure, the city reported that 75.2 per cent of households have a fixed broadband subscription. The city did not provide information about public Wi-Fi spots, 3G and 4G wireless broadband coverage, wireless broadband subscriptions, or household internet access. At the time of the evaluation (2020), 2.2 per cent of the city labour force worked in the ICT sector, which is relatively high in comparison with OECD countries, at 3 per cent.¹⁹

The entirety of the drainage and storm water infrastructure network is monitored by ICTs, and all households are served by solid waste collection. Furthermore, Grodno has all five urban development and spatial planning documents that promote: compact development; connectivity; integration of mixed land use; social inclusion; and resilience to climate change. A high 3.3 per cent of the city is designated as car-free pedestrian zones. Regarding electricity supply, all households in the city have reliable access to electricity. In fact, customers experience an average of only 0.1 interruptions to supply per year. Similarly, 72.4 per cent of the electricity supply system is monitored by ICTs, and 65.6 per cent of installed electricity meters are “smart” electricity meters. However, almost none of the population (0.1 per cent) has demand response capabilities for their electricity supply.

The water and sanitation indicators also scored well as 95.6 per cent of all city households have a basic water supply and access to potable water. Moreover, 96 per cent have access to basic sanitation facilities, and 94.4 per cent are served by wastewater collection. While 100 per cent of the water distribution system is monitored by ICTs, only 1.1 per cent of water meters installed are “smart” water meters. Also, 13.2 per cent of water is lost in the water distribution system, which should be minimized.

Grodno has an extensive public transport system, at 289.3 km per 100,000 inhabitants, higher than Minsk, at 159 km per 100,000 inhabitants²⁰, and a good flow of traffic. However, none of the major streets in Grodno are monitored using ICTs, and none of the road intersections have adaptive traffic-control measures. Furthermore, the bicycle path network is not extensive, measuring 4.95 km per 100,000 inhabitants, and only a very small number of passenger vehicles (0.08 per cent) are registered low-emission vehicles.

Grodno did not report any data on the following indicators: shared vehicles; shared bicycles; use of bicycles for commuting; walking to work; use of public transport for commuting; use of private vehicles for commuting; public transport network access; dynamic public transport information; public Wi-Fi spots; 3G and 4G wireless broadband coverage; wireless broadband subscriptions; household internet access; tourism industry employment; the youth unemployment rate; public sector e-procurement; e-government; publicly available data sets; number of patents; research and development expenditure; integrated building management systems; and public building sustainability.

¹⁸ World Bank, *Unemployment, total (% of total labour force) – Belarus, 2020*. Available at: <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?locations=BY>.

¹⁹ OECD, *OECD Digital Economy Outlook, 2017*. Available at: <https://www.oecd-ilibrary.org/docserver/9789264276284-en.pdf?expires=1596108721&id=id&accname=guest&checksum=B0600CD875F431BBBD4652E5FB9354AE>.

²⁰ UNECE, *Sustainable Urban Mobility and Public Transport in UNECE Capitals, 2016*. Available at: <https://www.unece.org/fileadmin/DAM/trans/doc/2016/itc/ECE-TRANS-245.pdf>.

Environment – an overview

One of the major goals of Grodno is to reduce its energy consumption. As part of the “Energy Saving 2016-2020” programme²¹, the city developed annual energy-saving plans to reduce energy consumption in the manufacturing sector and to increase the use of renewable sources of energy. In 2019, the realization of this programme led to a reduction in energy consumption of 67,500 tonnes of standard fuel. Furthermore, Grodno is implementing a programme to extend the public electric vehicle charging network, which comprised 14 charging stations in 2019. The programme is funded by the public and private sectors. In 2020, the Government of the Republic of Belarus approved the proposal of tax refunds for purchasing electric vehicles. The city is also developing an environmentally friendly transport infrastructure, which is based on an extensive public transport network. 88 trolleybuses serve city inhabitants daily and 15 of these are self-driving. Grodno annually develops a plan for planting trees and shrubs.

The city promotes the segregation and recycling of solid waste. In 2017, it opened a facility for recycling and mechanically sorting waste. In 2019, the facility processed around 140,000 tonnes of garbage, 17.5 per cent of which was recycled. As a result of the decision by the city administration to construct garbage chutes in apartment buildings and to install garbage container areas for separated garbage collection in all courtyards, 843 garbage containers were installed. In the period 2020-24, Grodno will apply a waste-to-energy approach to waste sorting. It will produce fuel pellets out of solid waste from the waste-sorting facility. The city will also further promote waste segregation among the population.

In 2020-2024, the city authorities plan to increase the number of green spaces in the city by creating new parks in both old and new neighbourhoods. The city also plans to further implement the State Energy Conservation Programme, and to introduce new measures to increase the use of electricity as a source of energy (as opposed to, for instance, gas). Furthermore, through the programme “Comfortable housing and a favourable environment”²², the Government aims at improving urban quality of life through communal facilities upgrading and the reduction in the cost of rents and communal services. The latter programme also comprises the “Drinking Water” project, which goal is to ensure that all households in Grodno have a potable water supply by the end of 2020.

Environment - KPI Evaluation

Grodno reported on 20 out of 28 KPI indicators. The city performed well in relation to air quality, though key indicators such as PM2.5 and PM10 were not reported. Environmental performance could be improved in the areas of public space and nature, energy, water and sanitation, and waste management.

The evaluation showed strong performance in air quality. Grodno reported 0.4 µg of nitrogen dioxide per m³ of air, 0.7 µg of sulphur dioxide, and 25.7 µg of ozone, all of which are well below the limits recommended by the World Health Organization (WHO). Regarding the water and sanitation infrastructure indicators, the evaluation revealed that 99.9 per cent of water samples complied with the drinking water standards of the WHO, and the water consumption levels are relatively low, at 156.6 litres per day per capita. 100 per cent of wastewater undergoes primary and secondary treatment; however, none undergoes tertiary treatment²³.

²¹ Energy Efficiency Department of the State Committee for Standardization of the Republic of Belarus, *Energy Saving 2016-2020*. Available at: <http://energoeffekt.gov.by/programs/govporgram20162020>.

²² Resolution of the Council of Ministers of the Republic of Belarus 21.04.2016 № 326, *State Programme on Comfortable Housing and a Favourable Environment, 2016*. Available at: <http://www.government.by/upload/docs/file8c3586a94739667b.PDF>.

²³ Primary treatment screens sewage sediment to remove larger debris. Secondary treatment reduces Biological Oxygen Demand (BOD10) to acceptable levels by microbial oxidation using activated sludge or a trickle filter. Tertiary treatment reduces BOD still further through micro straining or filtering, the microbial removal of phosphates and nitrates, and disinfection using chlorine or ozone.

The public space and nature indicators revealed that Grodno has large green areas, which amount to 756 hectares per 100,000 inhabitants. However, only 0.7 per cent of the city area is made up of protected natural areas.²⁴ Regarding waste measures and how solid waste is processed, the evaluation highlighted that no waste is burned in open areas, incinerated, or disposed of in open dumps. 95.7 per cent of waste is disposed of into landfills, and only 4.3 per cent of solid waste is recycled. In comparison, 46 per cent of waste in the European Union, Iceland, Norway, and Switzerland was recycled in 2017.²⁵ In relation to energy production and consumption, electricity consumption is very high, at 5,319 kWh per year per inhabitant, and only 5.4 per cent of electricity comes from renewable sources of energy. Grodno has a low level of residential thermal energy consumption, at 13.8 gigajoules per year per inhabitant.

Grodno did not report on the following indicators: greenhouse gas emissions; air pollution – PM 2.5; air pollution – PM 10; public building energy consumption; recreational facilities; green area accessibility; exposure to noise; and exposure to electromagnetic fields.

Society and culture – an overview

Grodno is working towards improving access to adequate and affordable housing for large families. In 2020, the city planned the construction of 600 new apartments, which complements Government efforts to support large families using debt-relief measures and subsidies. In addition, the Government provides preferential access to public housing, meaning that large families are usually able to access such housing within one year of joining the waiting list. Additionally, the Government introduced a measure whereby developers constructing housing for those in need are limited to earning only 5 per cent in profit. Regarding healthcare, in 2019, the city began construction on a modern cancer centre, which will serve not only the city but also the entire region of Grodno.

As part of the national Comfortable Housing and a Favourable Environment programme²⁶, Grodno will work to improve housing maintenance, and the thermal energy infrastructure, and will renovate and refurbish old housing stock and facilities, such as elevators. It will also improve urban waste management, electricity, and the clean water supply infrastructure, and provide access to gas in villages around Grodno.

Grodno offers good access to cultural events and facilities. Every two years, it hosts the Republic's Festival of National Cultures²⁷ – a festival which celebrates peace and appreciation for national art. In 2018, the Festival was attended by more than 270,000 people, and the participants represented 36 nationalities. Other cultural events in Grodno include the Big Mini festival of street art, and the Kazyuki artisans' festival in honour of St. Casimir.

Grodno is also investing in the digitization of public services. In the period 2020-2024, the city plans to improve access to ICTs in schools, and to increase access to open electronic educational resources. Additionally, the city plans to improve connectivity between healthcare organizations. Building on the visa-free regime for foreign tourists, Grodno plans to further strengthen its tourism sector by restoring the Old Castle, and redeveloping Grodno Zoo.

²⁴ A protected area is a clearly defined geographical space, recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

²⁵ European Environment Agency, *Waste recycling*. Available at: <https://www.eea.europa.eu/data-and-maps/indicators/waste-recycling-1/assessment-1>.

²⁶ Resolution of the Council of Ministers of the Republic of Belarus 21.04.2016 № 326, *State Programme on Comfortable Housing and a Favourable Environment, 2016*. Available at: <http://www.government.by/upload/docs/file8c3586a94739667b.PDF>.

²⁷ Republic Centre of National Cultures. *Festival of National Cultures*. Available at: <https://nationalcultures.by/national-cultural-associations-festival/>.

Grodno is investing in improving road safety. The Grodno City Executive Committee, for instance, created a commission on road safety, which approves road safety plans in urban areas, especially near schools. To improve neighbourhood safety and the quality of the environment, the city introduced the “Courtyards without cars” policy in 2018. The policy puts forward a requirement to place car parks outside of residential areas. Regarding education, the city of Grodno introduced weekly meetings between heads of schools and pre-schools in the city, at which city authorities support the resolution of any emerging problems.

Society and Culture – KPI Evaluation

The final section of the evaluation pertains to society and culture. This section of the evaluation suffers from major data limitations, since only 12 out of 29 indicators were reported. Regarding healthcare, 100 per cent of inhabitants are covered by basic health insurance, and all have electronic health records. There are 676 doctors per 100,000 inhabitants in the city – in comparison, the national average for Belarus is 519 doctors per 100,000 inhabitants, Germany, 425, and France, 327.²⁸

Regarding safety, the time taken for emergency services to respond to calls is extremely fast, at 6.26 minutes (below the European average of 8.96 minutes²⁹). The fire service is well-staffed, at 114 firefighters per 100,000 inhabitants, and there are very few traffic fatalities, at 0.8 per 100,000 inhabitants. The evaluation also revealed that a relatively high proportion, 65 per cent, of students have classroom access to ICT facilities, and 100 per cent of the school-aged population is enrolled in schools. The evaluation also indicated that none of the city population lives in informal settlements.³⁰

Lastly, regarding the indicators pertaining to social inclusion, the evaluation revealed that voter participation is very high (70.3 per cent of eligible voters voted in the most recent local elections). However, performance in relation to the gender income equality indicator was not good; female hourly earnings are only 71.9 per cent of male earnings, compared to 85.2 per cent on average in the European Union.³¹

Grodno did not report on the following indicators: violent crime rate; police service staff; the at-risk population; resilience plans; disaster-related economic losses; natural disaster-related deaths; in-patient hospital beds; life expectancy; childcare availability; poverty; the Gini coefficient; adult literacy; higher education degrees; housing expenditure; cultural infrastructure; cultural expenditure; and local food production.

²⁸ World Health Organization, *Medical doctors (per 10,000 population), 2021*. Available at:

[https://www.who.int/data/gho/data/indicators/indicator-details/GHO/medical-doctors-\(per-10-000-population\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/medical-doctors-(per-10-000-population)).

²⁹ Statista, *Average answer time of calls made to emergency services in selected European countries in 2019*. Available at:

<https://www.statista.com/statistics/794483/average-answer-time-of-calls-made-to-emergency-services/>.

³⁰ The proportion of the population living in informal settlements was reported by Grodno and measured using the national definition of informal settlements.

³¹ Eurostat, *Gender Pay Gap Statistics, 2019*. Available at: [https://ec.europa.eu/eurostat/statistics-](https://ec.europa.eu/eurostat/statistics-explained/index.php/Gender_pay_gap_statistics#:~:text=For%20the%20economy%20as%20a,in%20Estonia%20(Figure%201))

[explained/index.php/Gender_pay_gap_statistics#:~:text=For%20the%20economy%20as%20a,in%20Estonia%20\(Figure%201\)](https://ec.europa.eu/eurostat/statistics-explained/index.php/Gender_pay_gap_statistics#:~:text=For%20the%20economy%20as%20a,in%20Estonia%20(Figure%201)).

Socio-economic impacts of the COVID-19 pandemic in Grodno

Overview

Following the detection of the first case of the COVID-19 outbreak on 28 February 2020, Belarus did not apply stringent measures to contain the spread of the pandemic³². Movement within the country did not suffer significant restrictions and schools and universities continued to hold in-person teaching. Mask-wearing in closed spaces such as public transport did not become mandatory until mid-November 2020³³.

According to a report published by the United Nations Country Team (UNCT) in March 2021, Belarus' lax approach towards COVID-19 management has been guided by pre-existing macroeconomic challenges.³⁴ Official statistics suggest that the Belarusian economy did not suffer as much compared to other countries due to COVID-19. In 2020, where other economies in the region registered GDP losses close to the double digits, Belarus' national GDP shrunk by only 1 per cent compared to 2019³⁵.

However, the outbreak of the COVID-19 pandemic imposed a significant challenge on the Belarusian economy and society, especially on vulnerable groups. Over the next years, Belarus' path to economic recovery may also be hampered by structural macroeconomic challenges, EU sanctions and continued economic slowdowns faced by the country's key trade partners³⁶. Exports account for over half of the country's GDP³⁷ and as COVID-19 continues to impose challenges to trade and tourism, economic growth from these sectors is not expected to go back to pre-pandemic levels in the near future. To boost the domestic economy and prevent the mass liquidation of enterprises, the Government earmarked BYN 110 million (around 43.5 million³⁸) with measures geared towards the support of the real economy and the protection of the consumer market³⁹.

Economy and unemployment

The economic base of Grodno was heavily impacted by the pandemic, majorly due to the city's high dependence on exports (e.g., international cargo shipments), as well as lower revenues from tourism. In 2020, the municipal budget, which totaled just over BYN 378 million (around USD 151.7 million), was reduced by 2.6 per cent, or around BYN 9.5 million (around USD 3.8 million). Budget losses from own-source revenues accounted for slightly over BYN 1 million (around USD 400,000) compared to 2019. These reductions stemmed from revenue losses from land tax on organizations (8 per cent of the year-on-year loss), lower corporate real estate tax revenue (10 per cent) and lower revenues from taxes on individual entrepreneurs and individuals (82 per cent).

³² United Nations Country Team Belarus, *COVID-19 Socio-economic Response Plan (SERP): Achievements and Plans, March 2021*. Available at: <https://belarus.un.org/en/123448-unct-belarus-covid-19-socioeconomic-response-plan-serp-achievements-and-plans>

³³ KPMG Belarus, *Government and institution measures in response to COVID-19, April 2020*. Available at: <https://home.kpmg/xx/en/home/insights/2020/04/belarus-government-and-institution-measures-in-response-to-covid.html>

³⁴ United Nations Country Team Belarus, *COVID-19 Socio-economic Response Plan (SERP): Achievements and Plans, March 2021*. Available at: <https://belarus.un.org/en/123448-unct-belarus-covid-19-socioeconomic-response-plan-serp-achievements-and-plans>

³⁵ National Statistical Committee of the Republic of Belarus, *Dynamics of Gross Domestic Product 2020-2021*. Available at: <https://www.belstat.gov.by/en/ofitsialnaya-statistika/realny-sector-of-the-economy/national-accounts/current-data/gdp-and-grp/dynamics-of-gross-domestic-product-in/>

³⁶ Data provided by UNECE focal points within Grodno municipality in June 2021.

³⁷ National Statistical Committee of the Republic of Belarus, *International Trade*. Available at:

<https://www.belstat.gov.by/ofitsialnaya-statistika/realny-sector-ekonomiki/vneshnyaya-torgovlya/>

³⁸ Calculated with the exchange rate of June 11, 2021. USD 1 = Br 0.40 (applies to all other amounts in USD in this document).

³⁹ KPMG Belarus, *Government and institution measures in response to COVID-19, April 2020*. Available at: <https://home.kpmg/xx/en/home/insights/2020/04/belarus-government-and-institution-measures-in-response-to-covid.html>

Most policy responses were coordinated at the national level. In this context, Government support targeted the preservation of jobs to avoid mass liquidation of enterprises and ensuing economic fallout⁴⁰. Through Decree No. 143 and Decree No. 178, a total of 300 legal entities and 3,000 individual entrepreneurs in Grodno received various types of Government support in 2020. The combined effect of these measures is estimated to have helped create 522 additional jobs in the city⁴¹. Furthermore, Decree No. 131⁴² provided major financial incentives to health workers during the pandemic. Moreover, health workers in Grodno received Br 6.4 million (around USD 2.5 million) directly from the city's budget as a compensation for the extra hours needed to treat patients during the pandemic.

Through Grodno City's Executive Committee Decision No. 219 of March 27, 2020 "On the Amount of Rent", legal entities engaged in activities most exposed to the adverse effects of the epidemiological situation, such as the tourism industry for example, were granted deferrals on rents on municipal property. Official statistics for the first quarter of 2021 suggest that the unemployment rate in Grodno was in the range of 0.3 - 0.4 per cent of the economically active population⁴³. At the end of 2020, the balance between newly registered and liquidated legal entities in the city was +539.

In the first quarter of 2021 (January to April), almost all sectors of the urban economy showed signs of economic recovery compared to 2020⁴⁴. The Grodno City Executive Committee reported that small and medium-sized enterprises (SMEs) produced about 30 per cent of the city's economic activity and that the number of registered individual entrepreneurs was increasing. Only in the light industry and the production of building materials were economic volumes lower than in the first quarter of 2020. The current key priorities of city officials, as reported by the Department of Economy, are the economic restructuring of unprofitable organizations⁴⁵ and the provision of wage increases for workers.

Vulnerable groups

The socio-economic impacts of the COVID-19 pandemic have been felt particularly hard by the most vulnerable groups, which are mostly concentrated in small cities⁴⁶ such as Grodno. According to the Federation of Trade Unions, by April 2020 15,000 employees were on leave of absence nationwide, 11,000 worked part-time and 20,000 were on unpaid or partially paid leave. Furthermore, the pandemic put at least 78,000 people employed in micro- and small enterprises⁴⁷ at risk of losing their job. Over 36,000 self-employed individuals were bound to lose at least half of their income and informal workers, which constitute over 8 per cent of the country's workforce, are likely to have suffered most from travel restrictions and a recession. Other vulnerable groups mostly affected by the COVID-19 pandemic are stateless persons, refugees, asylum seekers and migrant workers⁴⁸.

⁴⁰ State Committee on Property of the Republic of Belarus, *On Support of the Economy (decree 143)*, April 2020. Available at: <http://gki.gov.by/en/about-press-news-en/view/implementation-of-the-decree-of-the-president-of-the-republic-of-belarus-dated-24-april-2020-143-on-support-7799/>

⁴¹ Data provided by UNECE focal point in Grodno.

⁴² Presidential Decree No 131 of April 16, 2020, *On Material Incentives for Health Workers*. Available at: https://www.tvr.by/eng/news/obshchestvo/beloruskie_mediki_stali_poluchat_nadbavki/

⁴³ Data provided by UNECE focal point in Grodno.

⁴⁴ Grodno City, *City News Archive*. Available at: <http://grodno.gov.by/ru/main.aspx?guid=1011>

⁴⁵ As of 1 May 2021, there were 53 unprofitable organizations in Grodno, down from 53 on April 1.

⁴⁶ United Nations Country Team Belarus, *COVID-19 Socio-economic Response Plan (SERP): Achievements and Plans, March 2021*. Available at: <https://belarus.un.org/en/123448-unct-belarus-covid-19-socioeconomic-response-plan-serp-achievements-and-plans>

⁴⁷ In Belarus, micro-enterprise is intended to be between 1-4 employees up to 15 employees. Small enterprises 16-100 employees. Medium-sized enterprises 101-250 employees.

⁴⁸ United Nations Country Team Belarus, *COVID-19 Socio-economic Response Plan (SERP): Achievements and Plans, March 2021*. Available at: <https://belarus.un.org/en/123448-unct-belarus-covid-19-socioeconomic-response-plan-serp-achievements-and-plans>

The crisis also significantly affected families with children. A survey conducted by UNICEF revealed that more than half of Belarusian parents suffered an income decrease, with major impacts concentrated on those on low-incomes or working part-time. Less than one-third of Belarusian parents had a similar economic behavior compared to before the pandemic. In this context, every second parent had to postpone buying clothes for their children and one in four did so to save up for food supplies⁴⁹. Single-parent households suffered major impacts as these are mostly headed by women, who are employed in crisis-hit sectors such as services and textiles⁵⁰.

Education

In Grodno, all educational institutions operated in-person teaching throughout the pandemic. Grodno City's Executive Committee mandated the use of Sanitary and anti-epidemiological measures to prevent the spread of COVID-19 were implemented. Furthermore, the Department of Education of the City Executive Committee and educational institutions of the city ensured availability of modern information technologies for teaching. Excerpts of video lessons and supplementary education materials from teachers' classes were offered for those interested on the Internet portal "Education in Grodno" (obr.grodno.by) and the thematic YouTube channel "Education in Grodno".

Overall, there are widespread concerns regarding increased inequalities in education due to the digital divide. As outlined in the previous section, household spending on non-essential items went down during the pandemic, meaning not all Belarusian families are able to equally afford internet access or relevant technological equipment⁵¹.

Basic medical supplies and food

Throughout the pandemic, Belarus received several international financial aid packages for medical supplies. In May 2020, the World Bank approved a USD 109 million package to help address immediate needs such as the purchasing of modern ventilators, pain medication and personal protective equipment for health workers⁵². In the beginning of 2021, the Government signed agreements with UNICEF and UNDP respectively for the purchasing of similar products, for a total of almost USD 17 million⁵³.

Since the beginning of the pandemic, the Grodno City Organization of the Belarusian Red Cross Society has been aiding vulnerable categories citizens affected by the socio-economic consequences of COVID-19. Such support has been handed to residents in the form of vouchers worth Br 150 for the purchase of food and basic necessities in Grodno retail chains. Over the period from 01.12.2020 to 01.05.2021 Grodno City Organization of the Belarusian Red Cross issued 201 vouchers to the most vulnerable categories of citizens.

Since March 2020, the "Social Service Centre of Kastrychnitsky District of Grodno" and "Social Service Centre of Leninsky District of Grodno" (hereinafter the Centres) established a telephone hotline to respond to urgent food and basic medical supplies requests. This service was targeted to disabled people and the elderly. Between

⁴⁹ UNICEF Belarus, *First Wave Results: Well-being of Families with Children, 2021*. Available at: https://www.unicef.by/well-being_en/

⁵⁰ United Nations Country Team Belarus, *COVID-19 Socio-economic Response Plan (SERP): Achievements and Plans, March 2021*. Available at: <https://belarus.un.org/en/123448-unct-belarus-covid-19-socioeconomic-response-plan-serp-achievements-and-plans>

⁵¹ Ibid.

⁵² The World Bank, *World Bank Supports Belarus' COVID-19 Response with €90 million Financing, May 2020*. Available at: <https://www.worldbank.org/en/news/press-release/2020/05/22/world-bank-supports-belarus-covid19-response-with-eur90-million-financing>

⁵³ United Nations Country Team Belarus, *COVID-19 Socio-economic Response Plan (SERP): Achievements and Plans, March 2021*. Available at: <https://belarus.un.org/en/123448-unct-belarus-covid-19-socioeconomic-response-plan-serp-achievements-and-plans>

March 2020 and mid-May 2021, the hotline received 347 requests for the delivery of food and necessities such as medical products. Besides this program, social workers of the Centres deliver food and other supplies on a permanent basis to citizens who benefit from home care services of the Centres (1,382 people as of 01.05.2021). In 2020, 443,354 buy-and-deliver services regarding food and other necessities were delivered to home care beneficiaries (151,928 services provided in the first five months of 2021).

Transport

Border closures and isolation related to quarantine measures have contributed to the slowdown in cargo and passenger transportation services and logistics. In January-December 2020, the growth rate of transport services exports stood at 91.0 per cent. In Grodno in 2020 the urban transport passenger turnover⁵⁴ decreased by almost 25 per cent compared to 2019, majorly due to COVID-19 induced restrictions on international tourism. Through the mobile app Oplati (Pay), the city now operates a contactless fare payment system.

Recommendations

Based on the evaluation report and the review of documentary data, including information provided by the city, it is recommended that Grodno:

- 1. Significantly Improve urban governance for sustainable development through improved access to, availability and sharing of urban data.**

Improving access to high-quality urban data cannot be achieved without improving methodologies and standards for collecting and making urban data available to the public. In this context, policymakers in Grodno are strongly encouraged to improve governance processes and enhance the availability and ability to share these data. In this study, for instance, the lack of data was a major limitation. Efforts should thus be made to improve the capacities of urban data producers, especially the national statistical offices and other organizations that make up the national statistical systems, including local and national governments, to produce, collect, manage, analyse, and disseminate data.

Data plays a key role in designing efficient and effective urban interventions, and in improving quality of life and ensuring that no one is left behind. For instance, measuring and addressing the high level of noise in the city is important, as prolonged exposure to excessive noise can lead to hearing loss. Low air quality is associated with health issues, such as respiratory illnesses. It also has particularly negative effects on the physical and cognitive development of children. Addressing these issues is a prerequisite for sustainable development so that “no one will be left behind”.

- 2. Improve the water and sanitation infrastructure.**

Water quality and the efficiency of the water and wastewater infrastructures and facilities have a considerable impact on residents’ quality of life and on the environment. The evaluation of Grodno against the KPIs indicated a need to significantly decrease the loss of water from the supply system (13.2 per cent of the overall volume). Therefore, the city is encouraged to invest in the renovation of the existing water and sanitation infrastructure. Water supply loss could be reduced through investment in better ICT monitoring of urban water networks, including introducing “smart” water meters and setting up a drainage and storm water ICT monitoring system.

Addressing the unsustainable consumption of natural resources such as water is a prerequisite for the successful implementation of the 2030 Agenda in the UNECE region. It requires cities to take decisive action to develop

⁵⁴ Passenger turnover is calculated by multiplying the number of passengers transported to transportation distance.

and implement policies, programmes, projects and technologies that promote sharing, recycling, refurbishing, re-using, replacing, and digitizing of natural resources⁵⁵.

3. Improve solid waste management.

Solid waste treatment and waste collection have a considerable influence on quality of life and the environment. The production of waste not only consumes resources (e.g. land) and energy but also has a negative impact on air quality. Landfills emit a significant amount of methane and, when burned, waste contributes to CO₂ emissions. Both methane and CO₂ are greenhouse gases (GHGs), the emission of which should be decreased, in line with international standards such as the United Nations Framework Convention on Climate Change (2016). Inefficient waste management can have a negative impact on the local climate by blocking drainage and causing flooding.

The city should increase the volume of waste recycled, while simultaneously decreasing the amount of waste put into open-air dumps, incinerated, burned, or disposed of into landfills. In this context, there is a need to: (i) develop infrastructure and technologies that enable the use of waste for energy generation; (ii) promote sustainable material cycles via design control; and (iii) encourage residents and businesses to sort and recycle their solid waste⁵⁶.

Local waste management policies should also be climate-neutral, based on the principles of circular economy, and reflect the capacities of organizations directly managing the solid waste collection and processing. Solid waste management should be included in sustainable housing strategies and policies, as this waste is generated during housing construction and demolition, and from household usage⁵⁷; this suggests that particular attention should be paid to the waste production of the construction sector.

There is a need to promote solutions that allow for the integration of waste management into water and energy management. Initiatives aiming to optimize water consumption, reduce GHGs and energy consumption, and decrease waste-processing costs should be promoted and scaled-up.

4. Improve public building sustainability and reduce energy consumption.

Improving public building sustainability leads to improved environmental quality and quality of life. Buildings account for a significant proportion of GHG emissions and resource use in cities. Constructing, operating, refurbishing and maintaining public buildings consumes significant amounts of energy.

High use of energy for buildings is associated with adverse effects on the environment, especially when the production of energy is based on fossil fuels. However, it is estimated that existing technologies can reduce energy consumption by 30 to 50 per cent in buildings without significantly increasing investment costs. Improving the energy performance of housing contributes to increased comfort of living, reduced energy bills, the alleviation of fuel poverty, the mitigation of GHG emissions, and job creation⁵⁸.

⁵⁵ ITU, *U4SSC: A Guide to Circular Cities*, 2020. Available at: <https://www.itu.int/pub/T-TUT-SMARTCITY-2020-1>.

⁵⁶ UNECE, *Climate Neutral Cities: How to make cities less energy and carbon intensive and more resilient to climatic challenges*, 2011. Available at: https://unece.org/fileadmin/DAM/hlm/documents/Publications/climate.neutral.cities_e.pdf

⁵⁷ UNECE, *Geneva UN Charter on Sustainable Housing*, 2015. Available at: https://unece.org/DAM/hlm/charter/Language_versions/ENG_Geneva_UN_Charter.pdf

⁵⁸ UNECE, *UNECE studies and networks will help reduce buildings' energy consumption*, 2018. Available at: <http://www.unece.org/info/media/presscurrent-press-h/sustainable-energy/2018/unece-studies-and-networks-will-help-reduce-buildings-energy-consumption/doc.html>.

In line with the KPI evaluation, the city is encouraged to take steps towards decreasing levels of energy consumption and improving the overall sustainability of public buildings. This concerns especially the energy efficiency of the old building stock and office buildings, whose life-cycle energy (primary) requirement⁵⁹ is in a range of 250–550 kWh/m² per year (compared to conventional residential buildings, which have a requirement of 150–400 kWh/m² per year).

Furthermore, the city is encouraged to further work with the business community and academia to develop innovative policy solutions that stimulate a demand for energy savings and energy efficiency. This mainly concerns the development of new technologies and designs that allow sharing, recycling, refurbishing, re-using, replacing, and digitizing of the use of energy, on the one hand, and passive and active technologies that allow the reduction of energy demand during the building's life cycle, on the other hand.

The city should also promote initiatives that aim to decrease electricity waste and loss, and work with the national Government, the business community and academia to this end. This could include incentivizing the production and use of energy-efficient and “smart” appliances (whose functioning can be linked to consumer behaviour) by households.

⁵⁹ The life-cycle energy (primary) requirement is the assessment of the energy needs of a building throughout its life cycle.