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URBAN MOBILITY IN EASTERN POLAND

THE WAY FORWARD

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Korea Green Growth Partnership

TRANSPORT AND ICT GLOBAL PRACTICE
EUROPE AND CENTRAL ASIA REGION

Urban Mobility in Eastern Poland: The Way Forward

Transport and ICT Global Practice
Europe and Central Asia Region

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ABBREVIATIONS AND ACRONYMS

ABT	Account-Based Ticketing
ADCS	Automated Data Collection System
AFC	Automatic Fare Collection
AOM	Organizing Authority of Mobility
AOTU	Autorités Organisatrices des Transport Urbains, Urban Organizing Transport Authority
ATC	Area Traffic Control
AVL	Automatic Vehicle Location
BODS	Bus Passenger Origin and Destination Survey
BTP	British Transport Police
CATCH	Carbon Aware Travel Choices
CDM	Clean Development Mechanism
CF	Cohesion Fund
CO2	Carbon dioxide
COPERT	Computer Programme to Calculate Emissions from Road Transport
DLR	Docklands Light Railway
EC	European Commission
ECA	European Court of Auditors
EEV	Enhanced Environmentally friendly Vehicle
E-PRTR	European Pollutant Release and Transfer Register
ERDF	European Regional Development Fund
ESIF	European Structural and Investment Funds
EU	European Union
FUA	Functional Urban Area
GHG	Greenhouse Gas
GOM	Gdańsk Metropolitan Area

GPS	Global Positioning System
HEAT	Harmonized Emissions Analysis Tool
ITI	Integrated Territorial Investment
ITS	Intelligent Transport System
IVE	International Vehicle Emissions
KM	Kilometer
KPK	Komunalne Przedsiebiorstwo Komunikacyjne
KPKM	Komunalne Przedsiebiorstwo Komunikacji Miejskiej
KZK	Komunalny Zaklad Komunikacyjny
KZK GOP	Public Transport Municipal Association for the Upper Silesia Industrial Area
LU	London Underground
MAPAM	Modernization of Public Territorial Action
MPK	Miejskie Przedsiębiorstwo Komunikacyjne, Municipal Transport Operator
MOVES	Motor Vehicle Emissions Simulator
MZKP	Intercommunal Association for Public Transport
MZKZG	Metropolitan Association for Public Transport in the Gulf of Gdańsk
NMT	Non-Motorized Transport
NUP	National Urban Policy
NSRD	National Strategy of Regional Development
NSDC	National Spatial Development Concept
OECD	Organization of Economic Co-operation and Development
OP	Operational Programme
OPEP	Operational Programme for Eastern Poland
OPIE	Operational Programme Infrastructure and Environment
PKS	Przedsiębiorstwo Komunikacji Samochodowej, Intercity and Rural Bus Operator
PLK	Polskie Linie Kolejowe, Polish Railway Lines
PLN	Polish Zloty
PM	Particulate Matter
PR	Przewozy Regionalne, Regional Railway Company
PSO	Public Service Obligation
SEMITAN	Société d'Economie Mixte des Transports de l'Agglomération Nantaise
SKM	Szybka Kolej Miejska; Fast Urban Railway
ŚKUP	Silesian Public Services Card
SMS	Short Message Service
SUMP	Sustainable Urban Mobility Plan
SUMP	Sustainable Urban Mobility Plan
TfL	Transport for London
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
USD	US Dollar
ZDZiT	Zarząd Dróg Zieleni i Transportu w Olsztynie, Roads and Public Transport Authority
ZTM	Zarząd Transportu Miejskiego, Transport Authority

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

Introduction

In the second half of 2013, the World Bank secured grant funding from the Korea Green Growth Partnership for analytical support and technical assistance related to sustainable urban transport systems in select cities in Eastern Poland. Established in 2011, the Korea Green Growth Partnership strengthens cooperation between the Government of Korea and the World Bank Group to help countries achieve sustainable and inclusive development by developing and sharing practical knowledge around innovative green growth solutions. The objective of the first phase of this technical assistance involved assessing the urban transport sector in the selected cities—Białystok, Lublin, Olsztyn, and Rzeszów—with a primary focus on public transportation and the aim of identifying areas for improvement. The second phase of this technical assistance will focus on areas identified in the first phase, subject to agreement from the participating cities, as well as capacity building activities. This report provides a set of recommendations related to the legal and institutional framework for urban transport in Poland; summarizes the assessment of urban mobility for Białystok, Lublin, Olsztyn, and Rzeszów; and assesses the framework for inter-municipal coordination in Poland.

Poland's population has been declining gradually in recent years due to emigration to other European Union (EU) countries and reduced family size. Within Poland, there has been migration from provincial areas to larger cities such as Warsaw and Kraków, and from city centers to suburban areas. Despite this stable or declining overall population, there has been a significant movement of people within metropolitan areas as families move from small apartments in the heart of cities to apartment blocks or single-family homes in the suburbs. The demographic and settlement patterns in Białystok, Lublin, Olsztyn, and Rzeszów fit this general pattern.

This shift towards the suburbs in Polish cities has significant implications for urban transport as well as for other urban services, particularly in the long-term. Importantly, expansion into peri-urban areas has been occurring at significant distances from the city center with new developments along main arteries driven by low land prices and improved road access. Residents in these suburban areas typically depend on private vehicles to commute into the city. As a result, the hard urban cores that defined Polish cities before 1990 have given way to scattered suburban developments that make public transport networks in those areas impractical and expensive, and create challenges for the provision of water, sewage, electricity, and solid waste management services. All of these aspects also contribute to rising greenhouse gas (GHG) emissions. While Polish municipal and regional authorities recognize that suburbanization has adverse consequences for provision of transport and other services, there has been little coordination in spatial planning among the jurisdictions that make up Polish functional urban areas to guide new developments in a sustainable way. From a long-term perspective, the demographic and suburbanization trends have important implications on the financial cost and sustainability of delivering urban services. The costs do not appear pressing due to significant EU funds pouring into many Polish cities.

Given the large investments in Polish cities of more extensive, high-quality public transport services and infrastructure financed through the EU, an important objective going forward should be to ensure that these investments translate into increased ridership—or at a minimum ridership that is not declining. It is equally important to ensure that the cities can afford to finance the operation and maintenance of enhanced public transport services. An important factor to keep in mind is that the cost of operating and maintaining the municipal, public transport fleet of Białystok, Lublin, Olsztyn, and Rzeszów could increase over time. The scale of this cost increase will depend on a number of factors, including the level of service that would be provided to suburban municipalities, ridership trends, and neighboring municipalities' willingness to contribute to the cost of service. Cities will need to plan for life cycle and other capital renewal of infrastructure to ensure that public transport continues to provide a service that is competitive with private cars. At these levels of expenditure, the financial sustainability of the planned level of service in the functional urban area (FUA) could become a challenge for the cities.

Polish Context

The World Bank has reviewed the policy and legislative environment in which decentralized government in Poland carries out land-use planning. There is a clear gap between the principles of sustainable development that inform national policies on regional and spatial planning, development of a low-carbon economy, and public transport on the one hand and the practice of land-use planning on the other. As a consequence of residential development in metropolitan areas being developer-led rather than guided and constrained by effective regional planning many Polish cities are experiencing significant suburbanization.

Analysis by Government of Poland agencies and the Organisation for Economic Co-operation and Development (OECD) has recognized that suburbanization conflicts with policies to promote sustainable development, but policy instruments have not yet been developed to bring local practice into line with national policies. Many OECD countries have developed regulation and practice in land-use planning that achieve consistency between plans in national, regional, and urban areas,

and encourage compact urban development. These practices have often developed in institutional environments where responsibility for local planning and decision-making is delegated to local authorities, as is the case in Poland.

The absence of effective regulation of land-use development and the trend towards suburbanization in major cities inevitably leads to a modal shift towards private transport. The wide distribution of population within suburban areas makes it expensive, and in some cases impractical, for public transport operators to provide a frequent service that would be attractive to car owners. Polish cities, which had been characterized by very high modal share for public transport, are now upgrading their infrastructure in an environment that has become more challenging for public transport. While the emergence of urban sprawl represents the greatest challenge for the provision of public transport, other institutional and legislative developments may also limit cities' flexibility in making public transport competitive with private cars.

With the above in mind, the following recommendations are made to the Government of Poland for its consideration:

- *Introduce minimum requirements for land-use plans to be prepared at all levels of government.* Planning authorities could be encouraged to demonstrate how their plans are consistent with the National Plan for Regional Development, the National Spatial Development Concept, and other national policies such as those that seek to control GHG emissions. Land-use plans at each level of government could also demonstrate consistency with the spatial planning objectives of the plans for the next higher level of government. In this way, municipalities and other planning authorities would retain their delegated planning authority, but would make decisions within a clear policy context and with the knowledge that the same rules apply to neighboring planning authorities.
- *Establish a specialist policy unit within the Ministry of Infrastructure and Development* that would initiate necessary legislation and financing changes to influence policy in areas such as spatial planning and climate change, support integration across administrative borders, and disseminate best practice in public transport. This unit could establish common technical standards for smart-card ticketing schemes, which would facilitate integration across modes and jurisdictions.
- *Develop policies that would ensure the financial sustainability of commuter transport* from outside municipal areas and within rural communities after institutional changes planned for 2017. Existing services are unprofitable and public transport operators often cannot afford to replace life-expired vehicles, so the withdrawal of financial support for concessional fares is likely to result in withdrawal of services. Many suburban and rural services merit consideration for public service obligation (PSO) contracts. Those commuter bus services could be integrated with municipal bus and rail services in relation to scheduling, information, and ticketing. In addition, initiatives to integrate school transport services with contracts to bus services for the wider community would improve service and achieve value for money for both commuter and school services.
- *Rationalize concessional fare structures and remove obstacles to fare integration.* The arrangements for concessional fares in Poland appear to have emerged piecemeal and the very specific statutory provisions on discounts prevent urban transport operators from offering discounted fares across different modes. To address this, the statutory provisions for concessional travel could be consolidated allowing greater flexibility for transport authorities and public transport operators in setting fares, including integrated fares.
- Assign responsibility for integrated ticketing to a named authority for each region of Poland and develop national standards that would facilitate integration across jurisdictions and transport modes**.** There is consensus among municipal and regional transport authorities, as well as transport operators in Eastern Poland, that greater integration of ticketing across operators and modes would benefit passengers and transport providers. However, no authority believes that it has a mandate to lead projects that would integrate ticketing. The Ministry of Infrastructure and Development could initiate legislative changes that would mandate a single authority to develop integrated ticketing schemes for their respective regions. The ministry could also develop standards that would facilitate integration, within and across such schemes, including unification of statutory discounts and their compensation.
- *Encourage greater balance between investing in infrastructure improvement and promoting complementary measures.* The recent investment programs, including projects funded by EU Operational Programmes for Eastern Poland, have addressed deficiencies in fixed infrastructure and rolling stock resulting from years of underinvestment in public transport. While further investment will be required to upgrade infrastructure, the Government of Poland could promote complementary initiatives that would make public transport more competitive with private cars. The four cities that were part of the World Bank study are tentative in their commitment to demand management measures that would impose a greater share of the cost of infrastructure on private car users. So there is a role for the Government of Poland to promote best practice and pilot schemes. For example, charges for on-street parking are controlled by the Government of Poland and apply in restricted geographical areas. The maximum charges should be relaxed and cities encouraged to extend their scope. The Government of Poland could support pilot schemes for commuter car-sharing, introduce lower speed restrictions on national roads to improve safety and environmental performance, and promote "walking buses" for school children to encourage them and their parents to walk to school in safety rather than drop children off by car.

- Request national railway companies—PKP, PLK, and PR—to prepare joint strategies for development of commuter rail services in designated urban agglomerations. Railways are an underutilized resource in Polish cities and there is no evidence that national investment planning takes into account the spatial plans of urban agglomerations. There is also concern that operating decisions systematically give priority to intercity and freight services ahead of commuter services. The railway companies could be obliged to consult with city and voivodeship authorities on investment decisions that affect the quality of railway services in the respective areas. These decisions would include addition or removal of stops, passing and turn-back facilities, and electrification of lines.
- *Review the provisions for vehicle taxation* to ensure that they are aligned with Government of Poland's policies for control of GHG emissions and reduce the incentive for other EU countries to dispose of used cars with high emissions in Poland. A car scrappage scheme that would incentivize purchase of new cars would not be appropriate for Poland as there is no need to stimulate the car market any further and much of the benefits would transfer to car manufacturers outside Poland.

Assessing Urban Mobility in Eastern Poland

The four selected cities in Eastern Poland have transformed their supply of city transport with EU funding and have made public transport a credible alternative to private cars for residents of all ages and social backgrounds. These EU funded projects have generally included an appropriate balance between investment in replacing life-expired vehicles, improving accessibility of infrastructure at stops, upgrading ticketing and passenger information, and investing in traffic control systems. The scope of the projects is integrated with other urban planning objectives such as restoring the historic heart of the city and reducing air and noise pollution. While the projects are not fully implemented, it is clear that they are being well managed and the reported outturn costs for sub-components completed are reasonable. The management teams in the cities are to be congratulated for delivering public transport of high international standards within a short period of time.

Less progress has been made in upgrading the supply of public transport in the areas surrounding cities' administrative borders and for suburban commuters accessing the cities. Poland's current institutional arrangements and resourcing for regional bus services are not conducive to reversing the decline in patronage. Based on the assessment carried out by the World Bank, the following recommendations are made for the consideration of the cities of Białystok, Lublin, Olsztyn, and Rzeszów:

- *Refocus urban transport policy across city borders.* Residents of the four cities and of their neighboring municipalities will clearly benefit if investment in transport development and management of operations were to be carried out in a more integrated way across modes and geographical boundaries. While the mandate of urban transport authorities does not extend to railways or to regional bus services, there should be no institutional obstacle to initiatives such as coordination of schedules, passenger information provision, and an agreement on integration of tickets and fares.
- *Integrate spatial land-use planning with transport*. Effective integration of spatial land-use planning with transport would bring benefits in the medium- to long-term by encouraging compact development and limiting suburbanization in keeping with the Integrated Territorial Investment (ITI). This is more difficult in the absence of national standards for sustainable planning and the devolved responsibility for planning decisions to municipal governments. However, marshals of voivodeships have discretion over the allocation of investment funds for a range of infrastructural development and when exercising that discretion they could give priority to investment in municipal infrastructure, such as water and electricity, in areas that are consistent with sustainable development. Future urban development and transport strategies for the cities and their FUAs should make specific commitments to promote development within walking distance of public transport and discourage dispersed development.
- *Implement complementary measures.* In the next phase of investment, Białystok, Lublin, Rzeszów, and Olsztyn may wish to consider a more ambitious program of complementary measures that would impose a greater share of the cost of congestion on private cars. Examples of measures that would increase the attractiveness of traveling by public transport in congested areas of the city include extending the paid-parking zones within the city—in the case of Rzeszów the first step would be to introduce paid-parking zones; provision of Park & Ride facilities in the suburbs to be served by high-frequency public transport; and the creation of bus lanes in the busy access routes to the proposed Intermodal Transport Centers. The level of congestion does not call for penal measures that would be unpopular with the wider population, but interventions should focus on providing higher quality and more reliable public transport services for users. It is important that the rationale for changes, such as extending the paid-parking zones, be explained to the public as encouraging more efficient use of valuable on-street parking spaces and greater use of high-quality public transport services.
- *Upgrade content and timeliness of communication with passengers.* Urban transport authorities are encouraged to provide information on their websites on public transport service performance, including information on passenger journeys, modal share, customer satisfaction, improvement in customers' top concerns, journey time, and fleet and stations in service. They should also provide an own-branded, user-friendly Journey Planner with information about different modes of public transport and pedestrian and cycling links. Some of the cities' websites have more accessible informa-

tion about public transport services, but in all cases the transport authorities should use the websites as marketing tools for customers with Internet and smart-phone access rather than as a platform for public-service notices.

- *Control the net cost for the cities of operating larger transport networks.* The cost of operating and maintaining public transport infrastructure in all of the cities will increase corresponding to the number of buses serving a wider FUA with lower average residential density. The increase in cost in Olsztyn will be greater when tram services begin. Urban transport authorities should identify ways to control the net cost of operating public transport services, including new services to less densely populated communities in the suburbs. The best approach to control the financial exposure for gross-cost contracts is to increase passenger numbers. This should receive highest priority, but it would also be timely to consider modified gross-cost contracts that allocate some proportion of payments to improve customer satisfaction and other features that attract additional passengers. Cities should plan for a program of preventative and life-cycle maintenance to optimize the whole-life cost of the new vehicles and fixed infrastructure.
- *Examine scope for broadening the tax base to ensure financial sustainability through a review of the local finance system.* Given the long-term demographics in cities—declining and aging populations—and the large investments in more expensive, high-quality public transport services, and infrastructure financed through the EU, there may be merit in carrying out a comprehensive assessment of the tax base to finance public transport services. Options for consideration could be employment taxes to finance inter-municipal transport services or changes to the way in which property taxes are calculated. Such a study would need to take into account the existing tax burden, assess whether there is scope for additional taxation, and could potentially be financed by technical assistance funds under the EU 2014-2020 financial framework.
- *Involve relevant agencies in planning Intermodal Transport Centers.* If it is confirmed that Intermodal Transport Centers are to be built near the cities' railway stations under the 2014-2020 financial framework for EU co-financed projects, the public transport authorities should ensure that the other public transport providers are active participants in planning for this initiative. Construction of Intermodal Transport Centers would be unlikely to alone generate additional patronage. At the very least, the cities should take a lead in ensuring better service integration across modes and encourage the marshals of the voivodeships and the railway companies to improve rail services. These initiatives would be worthwhile, even in advance of building Intermodal Transport Centers.
- *Control growth in GHG emissions from the transport sector.* Poland's car ownership has grown rapidly since EU accession in May of 2004. The average age of the car fleet is high relative to other EU countries. The cities should monitor and publish energy usage and GHG emissions from the transport sector, particularly to assess impact of energy efficient or alternative-fuel vehicles, both for the city itself and for the functional urban area. Participation in efforts like the Covenant of Mayors could help signal the cities' commitment to increasing energy efficiency and use of renewable energy sources on its territory.

Intermunicipal Coordination

Some metropolitan areas in Poland have agreed to share responsibility and financing for transport provision and operations on a voluntary basis. Polish legislation facilitates these structures and helps to set standards for governance. The Government of Poland has not provided direct financial support for inter-municipal associations, but it welcomes applications for funding under EU programs from the associations on behalf of the constituent municipalities. The associations are also consistent with the ITI policies promoted by the EU and the Government of Poland.

However, the organization of rail transport in Poland and the financial support provided by the Government of Poland through statutory discounts tend to undermine efforts to coordinate transport across municipal boundaries. For example, while compensation is available from the national government for railway tickets for certain categories of passengers, this compensation is lost if rail tickets are integrated with bus or tram tickets in urban areas. The local authorities would then need to compensate for this discount from their own budgets. While this is likely to be an unintended consequence of the statutory discount scheme for rail travel, it is an example of how national regulations and funding do not give sufficient attention to the need to encourage metropolitan structures for public transport.

The best examples of intermunicipal coordination of transport provision in Poland are from metropolitan areas where there are a number of constituent cities of approximately comparable size. These metropolitan authorities also incorporate small municipalities, but there is little risk of decision-making and funding being dominated by a single municipality. While there is complexity in bringing together a large number of autonomous authorities, and the governance arrangements have evolved over time, it may be easier to establish structures in areas with a number of large cities than in Eastern Poland where the regional capital dominates in terms of size and resources.

The cities of Eastern Poland need to develop structures that would promote and support public transport services for metropolitan areas rather than be based on the needs of city residents. The following recommendations are made to the Government of Poland, marshals of voivodeships, and to the cities to encourage intermunicipal structures for public transport planning and operation:

- *Remove existing barriers to intermunicipal cooperation for transport*. The statutory concession schemes that compensate local transport operators for granting free or discounted fares to certain categories of passenger prevent integration of fares and ticketing. This is most obviously the case for railway services, but is also relevant for bus services outside PSO contracts for the time being. The Government of Poland could consider reviewing its compensation schemes for statutory discounts and introduce structures and payment mechanisms that support integration across municipal boundaries and modes of transport. This could be done at the earliest opportunity to avoid suburban and regional bus services being withdrawn in anticipation of further market liberalization after 2017. The marshals of the relevant voivodeships could consider tendering for PSO contracts for bus services between the major cities and their neighboring municipalities.
- *Give explicit preference to applications for funding under EU and other programs that are based on intermunicipal structures.* Applicants for funding under the 2014-2020 financial perspective are required to demonstrate a commitment to ITI policies. However, there is a high level of cooperation implicit in the ITI memoranda of understanding entered into by cities and their neighboring municipalities in Eastern Poland. It would be appropriate for the Government of Poland to consider giving greater strength to ITI policies by allocating more funds to initiatives that demonstrate improvement in transport that cross municipal boundaries.
- Formal agreements between cities and neighboring municipalities can mitigate the risk of weaker parties being dominated by stronger partners. The size and resources of the regional capitals in Eastern Poland, relative to their neighboring municipalities, inevitably give rise to concerns that the interests of the stronger partners would dominate those of the smaller ones in any agreements. For their part, the city administrations may have concerns that neighboring municipalities with limited resources would not contribute proportionately to improved public transport. The Ministry for Infrastructure and Development could consider developing a draft agreement suited to the needs of a metropolitan area that is dominated by a city, but with population sprawl to neighboring communes. This draft agreement would set out mutual commitments to transparency, shared decision-making, and equitable financial contributions to be negotiated at a local level. To further support such agreements, the Government of Poland could commit to providing additional financial support to initiatives developed by the inter-municipal associations that will make measurable contributions to national policies such as the National Plan for Regional Development and National Plan for Spatial Development.

The high-level recommendations made in this diagnostic report are supportive of, and complementary to, the investments in urban transport being made by the cities of Poland. These recommendations would require further analytical work. As with the infrastructure investments, the EU 2014-2020 financial framework provides a unique window of funds for commissioning technical assistance that would ensure that the policy framework for urban mobility in cities and their functional urban areas is optimal and financially sustainable in the long-term.

INTRODUCTION

1. In the second half of 2013, the World Bank secured grant funding from the Korean Green Growth Trust Fund for analytical support and technical assistance related to sustainable urban transport systems for select cities in Eastern Poland. Established in 2011, the Korea Green Growth Partnership strengthens the cooperation between the Government of Korea and the World Bank Group to help countries achieve sustainable and inclusive development by developing and sharing practical knowledge around innovative green growth solutions. In the first phase of this technical assistance, an assessment of the urban transport sector in the selected cities was conducted with a primary focus on public transportation and a goal of identifying areas for improvement. The second phase will focus on areas identified in the first phase subject to agreement from the participating cities and capacity building activities. This report provides a set of recommendations related to the legal and institutional framework for urban transport in Poland; summarizes the assessment of urban mobility for Białystok, Lublin, Olsztyn, and Rzeszów; and assesses the framework for inter-municipal coordination in Poland.
2. Białystok is the largest city in northeastern Poland and the capital of Podlaskie Voivodeship. It's population is almost 300,000. The city functions as the administrative, economic, scientific, and cultural center of the Podlaskie Region. The city's location within 50 km of the border with Belarus and close to Lithuania makes it an important transit location for transporting people and goods between the EU and its eastern neighbors. Białystok's history of being at a crossroads for nations contributes to the city's cultural and religious diversity. The shape and development of Białystok have also been defined by the forests and lakes within the city boundaries and in neighboring areas.
3. The city adopted the Białystok City Development Strategy for 2011-2020 that lays out ambitious goals for the city in the context of development opportunities offered by the EU's new financial perspective. One of the key objectives of the strategy is building regional and metropolitan bonds with integration of planning in the metropolitan area and shaping transportation systems in order to foster development in the metropolitan area. In this regard, a key priority is the institutionalization of local cooperation in the Białystok metropolitan areas. This renewed focus of thinking of development beyond the city's border is a move in the right direction.
4. Lublin, administrative center of the Lublin Voivodeship, the capital of the Lublin Region, and home to nearly 350,000 inhabitants, is the largest city in Eastern Poland. The City of Lublin—the per capita GDP of the region is below the average for Poland as a whole, although that of the city itself is above the national average[1]—is endeavoring to attract new investment based on the availability of well-qualified graduates, local agriculture, and tax incentives. The city is well recognized in Poland and internationally as an academic center and is home to a number of large universities. It has a student population estimated to be around 75,000. The large number of students in Lublin, who typically live at home in the region or in private rented accommodation in the city, contributes to high usage of public transport in peak and off-peak periods. However, these students generally have concessional fares, which reduces the average financial yield per trip. The dominant areas of Lublin's modern economy include trade, various services and industry, engineering, automotive engineering, power, and furniture production. Lublin is an important center of food production.
5. The city adopted the Lublin Development Strategy for 2013-2020.[2] One of the key objectives of this strategy is to build regional and metropolitan bonds with a renewed focus on regional integration and the establishment of the Lublin Metropolitan Area. Action plans include the creation of a common transportation system for the Lublin Metropolitan Area, cooperation between the city and region for purposes of spatial development, and developing a strategic program for city-region coordination. As in Białystok, this renewed focus of thinking of development across the city's border is a move in the right direction**.** This report focuses heavily on assessing the current lacunae in the transportation system. The World Bank believes this report and its findings are in line with and supportive of the city's strategic objectives for 2013-2020.
6. Olsztyn is located in northeastern Poland in a region known as the Thousand Lakes in recognition of the extensive lakes and protected woodland within the city's boundaries and in the wider region. It is the capital of the Warmian-Masurian Voivodeship. Forests constitute 21 percent of the city area and lakes 8 percent. Both have limited the development of urban sprawl when compared to other similarly sized cities in Eastern Poland. Olsztyn, with a surface area of 88 km^2, has a population of 174,675, but the average density of 2,000 inhabitants/km^2 disguises a wide range of densities within the city's boundaries. The city's extensive woodland areas are sparsely populated while some residential districts have average densities of 5,000-15,000 inhabitants/km^2. The Michelin tire company is the largest employer in the region of Warmian-Masurian. Other important industries are food processing and furniture manufacturing.
7. In 2013, the City of Olsztyn adopted a new City Development Strategy—Olsztyn 2020. The strategy's overarching objective is that by 2020 Olsztyn should become a modern agglomeration with well-developed metropolitan functions.

1 The per capita GDP of Lublin Voivodeship in 2011 (PLN 34,425) was 86 percent of Poland's per capita income. However, a 2008 PWC study found that the City of Lublin's income was 111 percent of the national average. This study is available at (http://www.pwc.pl/pl/wielkie-miasta-polski/raport_Lublin_2011.pdf

2 Lublin Development Strategy 2013-2020 (2013). Available at: http://www.lublin.eu/images/File/Lublin%20Development%20Strategy%202013-2020.pdf

Strategic goals include improving human capital, attracting investments, increasing innovation and development of metropolitan functions. The strategy stresses the importance of cooperation between the city and surrounding communes. It also outlines priority business areas, such as "the economy of water" (breweries, leisure, hydro-power generation, and fisheries), high-quality food production, as well as timber and furniture. With regard to transport, the strategy aims mostly to improve external accessibility of the city, stating air connections as "very important, if not the most important" part of the transport system. Road accessibility to Warsaw, Elblag, and Elk (two other cities in the region) is the only indicator regarding transport in the strategy. In the area of urban transport, the strategy states "proposed investments will aim to calm down car traffic in the city center, improve quality of public transport, bike and pedestrian traffic as well as development of parking system."

8. Rzeszów is the largest city in southeastern Poland and is the capital of the Podkarpackie Voivodeship. Rzeszów's political and economic importance historically was based on its strategic location on the main Kraków-Lviv road and railway lines for east-west traffic and as a hub on a north-south corridor. Rzeszów is now developing as a tourist destination based on its diverse cultural heritage and has sensitively restored its city center. Other important industries in the city and region include some of Poland's largest metal production plants, food processing, and textile mills. Some of these industries have not fared well in Poland's transition to a market economy and the city is now encouraging investment in knowledge-based industries.
9. Rzeszów has a surface area of 116.4 km^2 and a population of 182,500. The city's population has grown in recent years, but this was due primarily to the extension of the city's boundaries to incorporate adjoining municipalities with the approval of the Government of Poland. The surface area of the city increased from 54 km^2 to 116 km^2 in December 2005 due to these boundary changes. The mayor of Rzeszów believes that the city should expand further and incorporate two more municipalities in the northeast of the city where the airport and economic zone are located. This would require the consent of the local communities and the Government of Poland, which is not assured, so the decision-making process may take many years.
10. Rzeszów and Podkarpackie Voivodeship have approved a number of urban development and transport strategies for the city and region that provide a strategic context for current and proposed transport infrastructure development. The main thrust of these strategies has been to support the city's application for project funding under EU funding programs so the focus of the documents responds to the priorities agreed between the Government of Poland and the EU for transport development. The EU funding context may also explain the strong emphasis on upgrading physical infrastructure rather than setting priorities for spatial planning that would feature more prominently in comparable strategies in other EU countries.
11. This report begins by presenting an overview of the Polish context in which cities must develop their urban mobility plans before presenting the assessment of urban mobility in Białystok, Lublin, Olsztyn, and Rzeszów. The report then provides a brief overview of experience with inter-municipal cooperation in France and Poland. The findings are based on work carried out by the World Bank between December 2013 and June 2014 with a view to making recommendations to support the cities' goals of sustainable urban mobility. The report's scope is limited to passenger transport and focuses on how to ensure large investments in public transport infrastructure translate into an increasing modal share for public transport as a key mechanism for controlling the growth of transport-related GHG emissions.

THE POLISH CONTEXT

Introduction

12. With the fall of communism, Poland created a legal framework to give local governments the authority they needed to be able to meet their responsibilities as delegated by the central government and as required by their local communities. The administrative division of Poland has, since 1999, been based on three levels of public administration: 16 regions (voivodeships), 379 counties (sub-regional units *powiats*), and 2,479 municipalities (*gminas*). Major cities normally have the status of both *gmina* and *powiat*. Territorial self-government exists at regional, sub-regional, and local government levels. Regional authority consists of a voivodeship council and a marshal who is head of the executive body of the regional self-government, while the governor is a central government representative responsible for supervising the activities of the voivodeship council. There are three legal categories for municipalities: rural, urban, and urban-rural.
13. This chapter provides an overview of key laws and strategic documents that provide the context in which self-governing municipalities must operate, as well as a review of urban policy conducted by the OECD in 2012. One of the key challenges facing Polish cities in achieving their stated objective of developing greener cities and more sustainable transport is the context of stable to declining populations within the administrative borders of most cities. This is due to the decline in total population in Poland and population movement to the suburbs or more-developed cities. A critical piece of the puzzle is the absence of strong legal mechanisms to ensure coordination of spatial and transport planning within functional urban areas.

National Program for the Development of Low-Carbon Economy

14. The National Programme for the Development of Low-Carbon Economy is currently under preparation by the Polish Ministry of Economy. Its assumptions have been accepted by the Council of Ministers in August 2011. The program will aim to "provide development of low-emission economy, assuring sustainable development of the national economy," with a time horizon of 2050 as some of the actions require decades to have appropriate impact. It has six goals: (i) development of low-emission energy sources, also nuclear power plants; (ii) improvement of energy efficiency, including for buildings, and the introduction of a smart grid; (iii) improvement of raw materials and commodities usage; (iv) development and implementation of low-emission technologies, including clean coal technologies; (v) reduction of waste production and improvement of waste management, especially recycling; and (vi) promotion of new consumption patterns, including education. It will be prepared together with a dedicated social council. Road transport is one of the areas with the highest potential for improvement. The document aims to be coherent with the current spatial planning and transport development strategies. It lists some potential actions, but does not refer directly to transport modal share or integrated transport and land-use planning, an important omission.

Public Transport Policy

15. The Ministry of Infrastructure and Development was created in November 2013 following the merger of the Ministry of Regional Development and the Ministry of Transport, Construction and Maritime Economy. The Ministry of Infrastructure and Development is responsible for shaping and coordinating numerous policies, including i) development policy, aiming to ensure a durable and sustainable development of the country and socio-economic cohesion; ii) regional policy, with the objective of enhancing competitiveness of Polish regions as well as ensuring territorial and spatial cohesion; iii) spatial policy, with the aim of maintaining spatial order and a balanced development of Poland; iv) cohesion policy, focusing on reducing the developmental disparities between EU regions; and v) transport policy, aimed at improving mobility and accessibility by developing sustainable and integrated transport systems.
16. The National Development Strategy 2020 aims to increase the efficiency of transport in Poland. With regard to urban transport, it aims to facilitate the flow of traffic in urban areas.[3] Poor traffic flow in urban areas is attributed to the inconvenience of using public transport as well as significant transit traffic through town centers. The strategy details four key actions to improve urban transport in Poland: (a) construction of bypasses in large cities, (b) introduction of integrated ticketing systems in the functional area of cities and towns, (c) implementation of advanced traffic management and control techniques in big cities, and (d) the organization of the efficient movement of people and goods within cities and facilitating access to non-urban areas. It also recognizes the need to develop low-emission, alternatively powered vehicles due to limited fossil fuel resources and increasing pollution in urban areas.
17. The Transport Development Strategy until 2020 (with 2030 perspective) explicitly mentions the important role of urban transport in developing a sustainable transport system in Poland aimed at improving accessibility and mobility at

3 Government of Poland (2012), National Development Strategy 2020: Active Society, Competitive Economy, and Efficient State, Attachment to Resolution No. 157 of the Council of Ministers of September 25, 2012. Available at: http://www.mir.gov.pl/english/Regional_Development/Development_Policy/NDS_2020/Documents/NDS%202020.pdf

the local, regional, national, European, and global levels.[4] The strategy outlines the following key directions for urban transport-related interventions under the overall strategic objective aimed at modernization and integration of the current transport system:

- transforming urban transport networks into effective and functional components of regional and national transport systems coherent with the European transport system;
- improving the efficiency of urban transport systems in line with local communities' expectations and improving quality of urban and suburban transport services;
- minimizing impact of heavy traffic on urban traffic and quality of life; and
- assuring balanced role of urban transport systems in stimulating growth and improvements of living conditions, while at the same time addressing environmental protection issues.

The strategy is also expected to contribute to improved organization, management, and efficiency of urban transport systems through close cooperation among central and local government administrations, infrastructure authorities, and transport operators in shaping the demand and ensuring safe and effective transport services. The strategy lists a number of measures, such as promoting integration of spatial planning and transport planning, promoting railway transport within agglomerations, walking and cycling, as well as intermodal integration. It does not detail how the government will achieve the stated goals, except general statements, such as "providing optimal legal conditions."

18. The Public Transport Act of December 16, 2010, specifies statutory requirements for local authorities and the Ministry of Infrastructure and Development regarding the organization of public transport markets, transport planning, and the financing and management of public transport services. The act specifies local and national authorities' obligations in the areas of (a) planning of transport development, (b) organization of public transport, (c) management of public transport, and (d) financing of public transport. The act requires local authorities—municipalities or *gminy* and counties or *powiaty*—to develop and implement a "Plan for Sustainable Public Transport" only if they exceed a given number of inhabitants and are willing to contract PSO services in organizing public transport.[5] Public consultation is a key requirement for the development of these plans. The act also defines requirements for the selection of public transport operators, based on Poland's public procurement law, Concession for Construction Activities and Services Act, and through public service contracts with public transport operators. Such contracts must be for a defined period not longer than 10 years for road transport. This act helps local authorities work with the increasing number of private providers of public transport services and introduces the requirements provided in the Regulation (EC) No 1370/2007 of the European Parliament and of the Council of 23 October 2007 on public passenger transport services.[6]
19. By enacting a public transport plan, municipal authorities introduce a new local law that is valid only within a particular municipality.[7] This plan becomes the second legally binding planning document, alongside the land-use zoning law.[8] The guidelines on how to prepare a public transport plan can be found in the Regulation of May 25, 2011 on the detailed scope of sustainable development plans of public transport. A key element of the plan is to determine which transport routes are financed by a public entity. In theory, such plans are intended to counteract unregulated development of private non-PSO operators and to coordinate public transport in voivodeships, *powiaty*, and *gminy*, with a particular focus on metropolitan areas. However, the plan focuses on operators of public transport covered by PSO, states their exclusive scope of operation and protects them against competition, limiting the role of non-PSO operators that potentially could either serve at least part of the network more efficiently or without subsidies or both. A crucial step in the development of such a plan is the definition of the geographical scope, which should address spatial as well as functional considerations.
20. The draft National Urban Policy (NUP) prepared by the Ministry of Infrastructure and Development in 2014 aims to support sustainable development in urban areas, increase the quality of life in cities, and recognizes that urban issues need to be solved in a comprehensive and integrated manner.[9] Among other things, the NUP aims to indicate the development lines for cities and their functional areas, operationalize strategic government documents, and announces poten-

4 Ministry of Transport, Construction and Maritime Economy, Transport Development Strategy until 2020 (with 2030 perspective) adopted by the Council of Ministers on January 22, 2013.

5 A minimum of 50,000 inhabitants for an individual municipality or 80,000 inhabitants for an association of municipalities, 80,000 for an individual county or 120,000 inhabitants for an association of counties.

6 Regulation (EC) No 1370/2007 of the European Parliament and of the Council of 23 October 2007 on public passenger transport services by rail and by road, and repealing Council Regulations (EEC) No 1191/69 and (EEC) No 1107/70. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32007R1370&from=EN

7 Or other authorities, if they cede their public transport organization competences to the authority, according to a bilateral agreement.

8 Tomasz Chaberko and Pawel Kretowicz (2013), Geographical Input to Local Public Transport Planning in Poland. Bulletin of Geography, Socio-economic Series No.22 (2013):35-46.

9 Ministry of Infrastructure and Development (2014), National Urban Policy. The draft *National Urban Policy* is a working paper to be discussed with partners before formal interdepartmental and social consultations are held. It should not be treated as the official position of the Ministry of Infrastructure and Development or the Government of Poland.

tial solutions—knowledge centers, the need for legislative change, and measures—and is aimed at supporting cities that will be implementing the NUP's recommendations. The time horizon for NUP corresponds to the time horizon of the EU 2014-2020 financial perspective, but the scope of the policy goes beyond what can be financed through EU funds. The most important challenges facing Polish cities and their functional areas were identified in the National Regional Development Strategy, the National Spatial Development Concept, and the OECD Urban Policy Review for Poland.

21. Of particular relevance to this report, key challenges identified in NUP include the "low level of functional links between cities," as well as the "low level of network-based cooperation between main urban centers, as well as poor or nonexistent coordination of management in the urban functional areas." The NUP recognizes that an important issue is the inconsistent spatial development of city centers, the lack of coordination of spatial planning, which has led to intense urban growth in peri-urban areas, and "growing spatial chaos." It recognizes that the process of uncontrolled expansion of urban areas leads to a number of problems, including increasing costs of municipal services and reduced revenues for cities. The NUP recognizes that solving the issues faced by Polish cities requires planning from the perspective of functional areas and not administrative boundaries—the latter has largely been the case to date.
22. One of the NUP's objectives is the development of the compact city concept through supporting the sustainable development of urban centers, including "counteracting the negative effects of uncontrolled suburbanization" and by adopting measures to reduce the role of passenger cars in urban functional areas. The spatial development of cities, often leading to suburbanization, is reinforced by the lack of a coordinated and integrated approach to planning, which reinforces the usage of private vehicles. Investments in public transport do not always lead to increases in the modal share of public transport in cities, due in part to the failure to keep up with changing needs in terms of routes and frequency of services.[10] The working paper argues that in the transport sector priority should be given to investments in the public transport system and that integration of public transport systems should be encouraged through multi-modal transfer hubs, fare and timetable integration, construction of "park and ride" and "bike and ride" facilities, and interactive passenger information systems. Essential to this objective is that spatial planning and transport development planning be integrated even if existing laws are not presently effective in ensuring an integrated planning approach is adopted. With regard to the financing of public transport, the working paper states that there is a need to analyze the rules for operating and financing public transport, particularly the development of rules for co-funding and calculating fares for agglomeration public transport.

Framework for Regional and Spatial Policy

23. The National Strategy of Regional Development 2010-2020: Regions, Cities, Rural Areas (NSRD), adopted on July 13, 2010, re-formulates the thinking of regional policy in Poland. The strategy sets out the objectives of regional policy with respect to individual territories of the country, including, in particular, urban and rural areas, defining their relationships with other public policies. This document also establishes the manner of action of public entities, and especially of the government and voivodeship self-governments, which sought to achieve national strategic development objectives of Poland. The NSRD also considers the need to increase territorial cohesion on a national and regional scale through the establishment of functional relationships between voivodeship centers and their surrounding regions. The strategy argues that the marginalization of the least-developed areas should be prevented and the development of disparities between individual voivodeships limited.
24. The National Spatial Development Concept 2030 (NSDC 2030), which was adopted by the Council of Ministers on December 13, 2011, is the key national strategic document that addresses the spatial management of the country.[11] It has been prepared pursuant to the provisions of the Spatial Planning and Land Management Act of 2003. The arrangements and recommendations resulting from the NSDC 2030 are applicable to the preparation of voivodeship spatial development plans that have also been defined pursuant to the statutory requirements. The document presents a vision of the country's spatial development over a 20-year perspective. It specifies objectives and directions of the national spatial development policy that serve the purpose of its delivery. It also indicates the rules and mechanisms of coordination and implementation of public development policies that have a significant territorial impact. Hence, the NSDC 2030 has many characteristics of a development strategy, combining spatial development components with socio-economic development elements. Voivodeships are obliged to delimit them in their spatial development plans. The NSDC 2030 has six objectives:

10 The UNHABITAT Report of 2013 reports that in 2001 more than half of all mechanized trips (i.e. excluding walking) in Hong Kong and Eastern European cities (such as Bucharest, Romania; Moscow, Russia; and Warsaw, Poland) were by public transport, compared to an average of about 25 per cent for Western European cities. The four cities of Eastern Poland did not have data available on modal share. See UNHABITAT (2013), *Planning and Design for Sustainable Urban Mobility: Global Report on Human Settlements 2013, Global Report on Human Settlements*. Available at: http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3503&AspxAutoDetectCookieSupport=1

11 National Spatial Development Concept document is available at: http://www.mir.gov.pl/english/Regional_Development/Spatial_Policy/NSDC_2030/Documents/KPZK_2030_ENG_small.pdf

- To improve competitiveness of Poland's major urban centers in the European context through functional integration while preserving the pro-cohesive polycentric settlement structure;
- To enhance internal cohesion and achieve sustainable territorial development by promoting functional integration, creating conditions for spreading of development factors, multifunctional development of rural areas, and using all territories' internal potentials;
- To improve Poland's accessibility in different dimensions by developing transport and telecommunications infrastructure;
- To develop spatial structures supporting the achievement and preservation of Poland's high-quality natural environment and landscape;
- To enhance spatial structures' resistance to natural calamities and loss of energy security, and to develop spatial structures supporting national defense capability;
- To restore and consolidate spatial order.

25. The last objective aims to introduce an integrated (coherent and hierarchical) socio-economic and spatial planning system capable of effective coordination of public bodies and public policies of the greatest significance for spatial development at different governance levels, reorganize regulations to ensure efficiency and universality of the spatial planning system, strengthen institutions, and improve the quality of spatial planning. NSDC 2030 recognizes that one of the symptoms of the lack of spatial order in Poland is unregulated suburbanization, which destroys space value and is wasteful in economic and social terms with low public space quality.
26. According to the NSDC 2030, one of the basic measures required to increase the efficiency of the spatial planning system is to introduce a principle in legal regulations that brownfields must be used before the development of greenfields, and that greenfield development will be permitted only when brownfields are already fully developed. This would be a significant departure from current practice and perhaps too severe a regulation that would be difficult to implement and would face opposition. While favoring redevelopment of brownfield sites is appropriate, excluding greenfields until all brownfields have been developed would go well beyond what most countries do. The NSDC 2030 envisages the need for detailed regulations to be introduced to prevent scattered development, development alongside national and regional roads, and development in areas without water and sewage infrastructure and in flood-risk areas. The NSDC 2030 recognizes that strengthening of spatial planning requires institutional changes at all administrative levels and the introduction of systems for monitoring and assessing spatial development.
27. The integrated territorial approach is oriented toward functionally defined territories, integration of public measures in the spatial dimension, and multi-level governance. The NSDC 2030 assumes that similar integrated measures should be adopted in areas that share geographic (socio-economic and spatial) characteristics and are referred to as functional areas. From this perspective, the subject of the NSDC 2030 is the entire territory of the country and its objectives and tools are varied depending on the specificity of individual functional areas. After relevant amendments are introduced in the laws on spatial planning, the functional areas specified in the NSDC 2030 should be taken into account as an element of spatial planning at the national, regional, and local levels and, where reasonable, they should constitute a separate category of spatial planning. In order to achieve the objectives of the NSDC 2030, 22 functional areas have been designated and will be delimited at different levels of management (national, regional, and functional).

Spatial Planning Act[12]

28. The key legal document for spatial planning in Poland is the Spatial Planning and Land Management Act of March 27, 2003. This act regulates formulation of spatial policies and preparation of land-use plans, and divides power and responsibilities among the different tiers of administration.[13] According to the Spatial Planning and Land Management Act, spatial planning takes place at the national, regional, and local levels. At the national level the central government is responsible for preparing the Concept of National Spatial Development, which among other objectives, establishes the principles of the spatial system of settlement and national infrastructure development. This concept includes balancing the development of regions. Critically, the Planning Act cancelled the requirement to prepare local plans, allowing municipalities to decide whether to prepare such plans. This change, essentially, dismantled the land regulation regime.
29. By law, regional governments must prepare a Strategy for Regional Development, a Regional Spatial Development Plan, and Spatial Plan for Metropolitan Areas—the latter for areas defined as metropolitan areas. Regional Spatial Development Plans identify trends of spatial development and settlement organization and functioning, current and future location of main public infrastructure, and are based on the principle of balancing regional and local interests with those

12 This section is based on PLUREL (2008), Peri-Urban Land Use Relationships – Strategies and Sustainability Assessment Tools for Urban-Rural Linkages, Integrated Project, Contract Mo. 036921, D.3.3.4, *Analysis of Regional Spatial Planning and Decision Making Strategies and Their Impact on Land Use in the Urban Fringe, Warsaw Case Study*, Miroslaw Grocowski, Marek Pieniazek, September 2008. Available at: http://www.plurel.net/images/D334.pdf

13 Other legislative regulations that impact the planning process in Poland include the Environment Protection and Management Act (April 27, 2001), the Building Code (July 7, 1994), and the Law on Real Property Management (August 1997). All three acts have been amended.

of the nation. Sub-regional levels of government do not have to prepare plans for spatial development, but may prepare development strategies, which can present general concepts on economic development.

30. The municipalities are the key tier of administration preparing spatial development plans. Two spatial planning documents have been prepared: the Study of the Conditions and Directions for Spatial Development and the Land Use Development Plan.[14] The first document determines spatial policy in the municipality and rules for spatial management, but is not legally binding. A Land Use Development Plan can be prepared for a part or for the entire municipality, in line with the study, and the plan becomes the legal basis for detailed spatial management. However, municipalities can function without a Land Use Development Plan—the areas to be included in the plan are indicated in the study. Municipalities can manage spatial development through two administrative decisions: (a) Decision on Development Conditions, which is prepared for plots on which investors require building permits; and (b) Decision on Investments Serving Public Purposes.
31. The Act for Spatial Development Planning states that agglomerations of voivodeships' capitals should have their spatial developments plans as part of the regional spatial development plan. This regulation came into force on September 4, 2014,[15] and the regulations will refer to selected urban functional areas that may be defined in the regional spatial development plan and should be consulted within a special committee. The amended act states that the municipalities covered should be consulted in relation to spatial policy for FUAs and that a spatial development plan should be designed as part of a regional development plan for the FUA of the regional capital. However, this does not limit municipalities' primary responsibilities for spatial planning and does not transfer their rights to a higher (metropolitan) level.

OECD Urban Policy Review: Key Findings

32. In 2012, the OECD published an Urban Policy Review for Poland, which provided a comprehensive assessment of Poland's urban policies, including a review of urban systems and the challenges they face, national policies for urban development in Poland, and how to adapt governance for a national urban policy agenda.[16] As the findings from this assessment of the urban system and challenges were used as a key input in preparing the National Urban Policy Working Paper, this section will summarize some of these key findings, particularly those that are relevant to improving urban transport in Polish cities. The focus is on urban policy, which goes well beyond the confines of urban transport, but many of the findings are relevant for urban transport and provide the context in which urban transport planning decisions are made.
33. Demographic trends reveal that population growth in Poland is mainly taking place in suburban areas within urban labor market areas (ULMAs),[17] while population data based on administrative units reveal that urban areas are losing population. At the same time, Poland is facing a rapidly aging population and is expected, by 2050, to be among the top OECD countries in terms of aging population with forecasts of slightly more than one active worker supporting an inactive person, down from three active workers at present. Urban areas are faced with aging and outmigration, the latter reflecting a suburbanization process that has translated into urban sprawl. The economic performance of medium-size Polish cities may not be achieving full potential in terms of economic growth due to falling population. Another important factor limiting the growth potential of mid-sized cities is transport infrastructure, which fails to properly connect the national urban system and integrate areas within urban agglomerations. Large urban areas need to establish ULMA-wide transport infrastructure, as commuters reside beyond existing public transport routes.
34. The Urban Policy Review argues for the need to develop a national urban strategy to set monitorable objectives for urban development. It argues that there is a need to move toward implementation of a longer-term strategic vision for urban development, which is "currently only reflected on paper in the various policy documents." It argues that reforms are needed to (a) improve inter-municipal planning and service delivery within a single functional urban area; (b) ensure integrated urban planning across planning sectors; (c) strengthen inter-ministerial co-operation and coordination across the central government; (d) review the role of intermediate government levels to optimize urban policy outcomes; and (e) adapt the current local finance system.
35. Creating effective coordination mechanisms for efficient planning is critical in urban areas where city administrative boundaries do not match functional areas—something that is not uncommon in Poland. Current legislation empowers municipalities to cooperate on a voluntary basis through joint agreements or associations. While there are examples of cooperation, and most municipalities are involved in some form of inter-municipal co-operation, the review finds that there is a lack of a legal and financial platform to engage municipalities on a number of issues, including urban planning. Central government has a role to play in encouraging cooperation through legislation and financial incentives—

14 The Land Use Plan aims to regulate land use through coordination development activities, infrastructure investments, delineating protected areas, and dividing area covered by the plan into building plots.

15 Official Journal, 2014 poz. 2014, Item 379 379, The Act of 24 January 2014 amending the Act on the Principles of Development Policy and Other Laws..) http://isap.sejm.gov.pl/DetailsServlet?id=WDU20140000379

16 OECD (2011), OECD Urban Policy Reviews: Poland: 2011, OECD Publishing. Available at; http://dx.doi.org/10.1787/9789264097834-en

17 These are larger functional areas surrounding official urban municipalities.

for example, in the case of France, agglomerations can benefit from an additional grant to their existing block grant entitlements, while in Canada, the federal infrastructure program requires municipalities in a functional region to apply jointly for major project financing. In addition, in France the payroll tax has been an essential source of finance for urban transport improvements and has widespread support. In 2013, at the initiative of the Chancellery of the President, a committee was created to review how to create mechanisms for compulsory cooperation of local authorities within the main agglomerations of Kraków, Łódz, Poznań, Silesia, Tricity, Warsaw, and Wrocław, to be financed through a payroll tax of 0.9 percent. There was little appetite for the introduction of such a system and this committee is no longer active.

36. The review argues that stronger national spatial planning regulations are needed to achieve goals. At present, national spatial planning standards do not require municipal spatial plans to be integrated with other municipal sector plans. Meanwhile, only a small fraction of any urban area is covered by municipal physical development plans, with the result that decisions are made without considering municipal spatial development studies. One approach is to consider what some OECD countries do, which is to set standards that include common criteria for legally binding municipal strategic plans that integrate spatial, economic development, and other sectoral objectives, including standardized criteria to justify decisions. National criteria could specify which type of municipal spatial decisions would warrant regional approval due to their impact on regional objectives. Alternative solutions proposed include developing national regulations to support the creation of metropolitan agencies with spatial planning authority or requiring application for national and regional urban development funds to demonstrate that municipal spatial plans align with regional goals, as well as with plans from municipalities within the same functional area.

37. On the local finance system, the review argues that in order to solve important infrastructure gaps there is a need to review the basis for calculating property tax, which is based on surface area in Poland rather than on property values, which is the norm in most OECD countries. Poland should also ensure that any changes do not penalize businesses. The general grant system also needs to be reformed as it does not compensate cities for services they provide to suburban areas. One solution mooted is the introduction of a metropolitan fiscal equalization scheme. Such reform could provide funding to operate and maintain more extensive and frequent public transport services within an FUA.[18] [19]

Constraints on Public Transport Fares and Parking Rates

38. Numerous acts establish statutory fare discounts for certain categories of passengers using public transport in Polish cities, both for within city boundaries and for inter-city transport. Under Polish law, there are three groups of passengers who have the right to travel free of charge on urban public transport. These include members of parliament, wartime and military disabled persons as well as guides accompanying such persons, and civilian blind victims of warfare.[20] In addition, the following groups have a 50 percent statutory discount: veterans, undergraduate students, engineering or master's program students, students of teacher training colleges as well as social worker training colleges, and injured veterans receiving disability benefits due to injuries or illnesses developed as a result of participation in warfare conducted abroad.[21] These nationally-set statutory discounts are not directly reimbursed, but cities have to recover lost income from general subsidies they receive from the central government. In addition, many urban public transport systems offer discounts or free travel to children and elderly passengers by decision of city councils and not a statutory discount required by central government.

39. Poland also has statutory reduced fares for inter-city public transport as determined by the Act of June 20, 1992. The act details a long list of passengers who travel for free or with reduced fares that are 95 percent, 93 percent, 78 percent, 51 percent, 49 percent, and 33 percent less than the full fare, for different types of tickets, including single and monthly tickets. Discounts that apply to inter-city railways using single tickets are as follows: 51 percent fare for university students until the age of 26, doctoral students until the age of 35; 100 percent discount for children under the age of 4; 49 percent discount for children from preschool to secondary school; 33 percent fare reduction for kindergarten, school or university teachers. Children under four travel free, while children from kindergarten to secondary school are entitled to a 49 percent discount on inter-city public transport buses. University students are eligible for a 51 percent fare discount.

40. The costs related to financing statutory entitlements to free and reduced fares are covered by the state budget in full amount of the discount given. The differences between both schemes described above create barriers to fare integration of inter-urban bus and railway services with urban public transport systems, for when passengers buy integrated tickets,

18 P. Śleszyński, Delimitacja miejskich obszarów funkcjonalnych stolic województw, Polish Academy of Science, 2012. Available at:http://www.metropolia.bydgoszcz.pl/pliki/delimitacja.pdf

19 Kryteria delimitacji miejskich obszarów funkcjonalnych, Ministry of Regional Development, Warszawa 2013. Available at: http://www.kujawsko-pomorskie.pl/pliki/planowanie/20140211_spotkania/kryteria_delimitacji_mof_o_rodk_w_wojew_dzkich_mrr__luty_2013.pdf

20 Respectively, the Act of May 9, 1996, on the exercise of the mandate of a member of parliament or senator, the Act of May 29, 1974, on the supply of war and military disabled persons and families, and the Act of May 16, 2006, on the provision of funds and powers available to blind civilian victims of warfare.

21 Respectively, the Act of January 24, 1991, on the veterans and wartime and post-war victims, the Act of July 27, 2005, on the law of higher education, the Act of September 7, 1991, on the law on higher education, and the Act of August 19, 2011, on veterans' warfare abroad.

direct compensation of statutory discounts are not eligible any more. Provisions repealing statutory discounts financing will come into force on January 1, 2017, in relation to those services that are not covered by PSO in line with the Regulation (EC) 1370/2007. This may also lead to disappearance of many non-PSO, privately-operated suburban bus connections for which only a simple notification was required by the respective self-government.

41. European countries usually decide on fare discounts at a national level and transport operators are compensated for loss of revenue based on surveys. This usually involves a transfer from a national social welfare budget to a national, local or modal transport provider. The payment is usually based on a discount to the regular fare, on social inclusion policies, and the value to the payer of a bulk purchase. There are often restrictions on usage, such as second-class rail or off-peak for urban transport. However, discount schemes are under pressure throughout Europe. People are living longer and are more mobile in their old age. Transport operators have become more commercial, both private and public companies, and are demanding better compensation for free-travel schemes. Older people and people with disabilities are becoming more assertive about their rights and do not want to be restricted as to when they can travel or where they sit. Overall, existing discount fare schemes are costing more than intended when they were introduced and extended in the 1970s and 1980s. While many governments would like to replace existing public transport fare discount schemes with schemes that are more needs based or related to income levels, they are difficult to change. The Polish rules, particularly for inter-city public transport, appear extraordinarily detailed and suggest that agreeing on integrated fares across operators within a functional urban area could also be quite complex.

42. The Act on Public Roads from March 21, 1985, and subsequent amendments to the act, set ceilings on the parking rates in paid-parking zones. Article 13(b) states that the parking rate for the first hour of parking may not exceed PLN 3 (Euro 0.72), and that rates for the next three hours may increase, but may not exceed by more than 20 percent compared to the preceding hour of parking, while the rate for the fourth hour may not exceed the fee for the first hour of parking. Article 13(f) establishes that the fine for not paying parking fees may not exceed PLN 50 (Euro 12). While cities have freedom in terms of defining the area of paid-parking zones, they cannot raise parking fees above the values set by the act as part of an effort to discourage driving into the city center.

Conclusion

43. There are a number of issues related to spatial planning in Poland. A review in 2004 indicated that Land-Use Development Plans covered only 20 percent of Polish territory, which means that spatial planning is being conducted largely through administrative decision-making. This is not in keeping with sustainable development of cities. In addition, when spatial plans are prepared by authorities at lower levels of government, there is no effective requirement to recognize and implement objectives of authorities at higher levels of administration. This autonomy in planning and decision-making makes it difficult to coordinate development across larger areas, such as in functional urban areas or metropolitan areas. In addition, there is a lack of detailed spatial databases that could support decision-making and monitor implementation of land-use plans. What this translates into is the lack of an appropriate instrument for managing the development of complex areas that go beyond municipal administrative borders.

44. There is also an absence of sectoral integration in planning, which means that there can be divergence between strategies for economic and spatial development. As a result, a narrow approach from a single municipality perspective is often adopted due to the lack of incentives for cooperation, and the absence of a general culture of cooperation. In fact, there is a strong incentive for a suburban commune to go it alone and attract more development and property tax.

45. While the Polish system of spatial planning can be characterized as being decentralized, with municipal self-governments having become the key level of administration for land-use planning, planning instruments cannot be automatically copied into a different institutional context.[22] As noted by an academic paper, the "transition from communism to capitalism almost led to the complete dismantling of comprehensive planning," with the result that urban developments are largely determined by pure market forces, which have resulted in unconstrained urban sprawl.[23] In the absence of Land-Use Plans, every owner of a property is allowed to freely develop it if a permit for construction is given. The decision must be issued if four conditions are met: (a) at least one neighboring plot should be built up; (b) the plot must have access to a public road; (c) there is no conflict with special legislation concerning national parks or protected areas; and (d) the plot is equipped or will be equipped with technical infrastructure. Once abundant greenfield sites are available in the periphery of cities it becomes difficult to attract investments towards brownfield sites in the city center in order to reverse the trend of urban sprawl. At present, there are almost no legal means to pass necessary regulations down to local self-governments in order to pursue a policy to contain urban sprawl. This means that without legal changes, it will be difficult to constrain urban sprawl.

22 Grawronski, Van Assche, and Hernik (2010), Spatial Planning in the United States of America and Poland, Infrastructure and Ecology of Rural Areas, No. 11/2020, Polska Akademia Nauk, Oddzial w. Krakowie, p.53-69.

23 Halleux, Marcinczak, van der Krabben (2012), The Adaptive Efficiency of Land Use Planning Measured by the Control of Urban Sprawl. The Cases of the Netherlands, Belgium, and Poland. Land Use Planning 29 (2012), pp. 887-898

Key Recommendations

46. This section has reviewed the policy and legislative environment in which decentralized government in Poland carries out land-use planning. There is a clear gap between the principles of sustainable development that inform national policies on regional and spatial planning, development of a low-carbon economy, and public transport on the one hand and the practice of land-use planning on the other. The consequence of residential development in metropolitan areas being developer-led rather than guided and constrained by effective regional planning is that many Polish cities are experiencing significant suburbanization.

47. Analyses by Government of Poland agencies and the OECD have recognized that this suburbanization conflicts with policies to promote sustainable development, but policy instruments have not yet been developed to bring local practice in line with national policies. Many OECD countries have developed regulation and practice in land-use planning that achieves consistency between plans at national, regional, and urban areas and encourages compact urban development. These practices have often developed in institutional environments where responsibility for local planning and decision-making is delegated to local authorities, as is the case in Poland.

48. The absence of effective regulation of land-use development and the trend toward suburbanization in major cities inevitably leads to a modal shift toward private transport. This wide distribution of population within suburban areas makes it expensive, and in some cases impractical, for transport operators to provide a frequent service that would be attractive to car owners. Polish cities, which have been characterized by very high modal share for public transport, are now upgrading their infrastructure in an environment that has become more challenging for public transport. While the emergence of urban sprawl represents the greatest challenge for public transport provision, some other institutional and legislative developments may also limit cities' flexibility in making public transport competitive with private cars.

49. The following recommendations are made to the Government of Poland:

- *Introduce minimum requirements for land-use plans to be prepared at all levels of government.* Planning authorities could be encouraged to demonstrate how their plans are consistent with the National Plan for Regional Development, the National Spatial Development Concept, and other national policies such as those that seek to control GHG emissions. Land-use plans at each level of government could also demonstrate consistency with the spatial planning objectives of the plans for the next higher level of government. In this way, municipalities and other planning authorities would retain their delegated planning authority, but would make decisions within a clear policy context and with the knowledge that the same rules apply to neighboring planning authorities.
- *Establish a specialist policy unit within the Ministry of Infrastructure and Development* that would initiate necessary legislation and financing changes to influence policy in areas such as spatial planning and climate change, support integration across administrative borders, and disseminate best practice in public transport. This unit could establish common technical standards for smart-card ticketing schemes, which would facilitate integration across modes and jurisdictions.
- *Develop policies that would ensure the financial sustainability of commuter transport* from outside municipal areas and within rural communities after institutional changes planned for 2017. Existing services are unprofitable and public transport operators often cannot afford to replace life-expired vehicles, so the withdrawal of financial support for concessional fares is likely to result in withdrawal of services. Many suburban and rural services merit consideration for public service obligation (PSO) contracts. Those commuter bus services could be integrated with municipal bus and rail services in relation to scheduling, information, and ticketing. In addition, initiatives to integrate school transport services with contracts to bus services for the wider community would improve service and achieve value for money for both commuter and school services.
- *Rationalize concessional fare structures and remove obstacles to fare integration.* The arrangements for concessional fares in Poland appear to have emerged piecemeal and the very specific statutory provisions on discounts prevent urban transport operators from offering discounted fares across different modes. To address this, the statutory provisions for concessional travel could be consolidated allowing greater flexibility for transport authorities and public transport operators in setting fares, including integrated fares.
- Assign responsibility for integrated ticketing to a named authority for each region of Poland and develop national standards that would facilitate integration across jurisdictions and transport modes**.** There is consensus among municipal and regional transport authorities, as well as transport operators in Eastern Poland, that greater integration of ticketing across operators and modes would benefit passengers and transport providers. However, no authority believes that it has a mandate to lead projects that would integrate ticketing. The Ministry of Infrastructure and Development could initiate legislative changes that would mandate a single authority to develop integrated ticketing schemes for their respective regions. The ministry could also develop standards that would facilitate integration, within and across such schemes, including unification of statutory discounts and their compensation.
- *Encourage greater balance between investing in infrastructure improvement and promoting complementary measures.* The recent investment programs, including projects funded by EU Operational Programmes for Eastern Poland, have addressed deficiencies in fixed infrastructure and rolling stock resulting from years of underinvestment

in public transport. While further investment will be required to upgrade infrastructure, the Government of Poland could promote complementary initiatives that would make public transport more competitive with private cars. The four cities that were part of the World Bank study are tentative in their commitment to demand management measures that would impose a greater share of the cost of infrastructure on private car users. So there is a role for the Government of Poland to promote best practice and pilot schemes. For example, charges for on-street parking are controlled by the Government of Poland and apply in restricted geographical areas. The maximum charges should be relaxed and cities encouraged to extend their scope. The Government of Poland could support pilot schemes for commuter car-sharing, introduce lower speed restrictions on national roads to improve safety and environmental performance, and promote "walking buses" for school children to encourage them and their parents to walk to school in safety rather than drop children off by car.

- Request national railway companies—PKP, PLK, and PR—to prepare joint strategies for development of commuter rail services in designated urban agglomerations. Railways are an underutilized resource in Polish cities and there is no evidence that national investment planning takes into account the spatial plans of urban agglomerations. There is also concern that operating decisions systematically give priority to intercity and freight services ahead of commuter services. The railway companies could be obliged to consult with city and voivodeship authorities on investment decisions that affect the quality of railway services in the respective areas. These decisions would include addition or removal of stops, passing and turn-back facilities, and electrification of lines.
- *Review the provisions for vehicle taxation* to ensure that they are aligned with Government of Poland's policies for control of GHG emissions and reduce the incentive for other EU countries to dispose of used cars with high emissions in Poland. A car scrappage scheme that would incentivize purchase of new cars would not be appropriate for Poland as there is no need to stimulate the car market any further and much of the benefits would transfer to car manufacturers outside Poland.

ASSESSING URBAN MOBILITY IN EASTERN POLAND

Introduction

50. Poland's population has been declining gradually in recent years due to emigration to other EU countries and reduced family size. Within Poland, there has been migration from provincial areas to larger cities such as Warsaw and Kraków, and from city centers to suburban areas. There has been significant movement in population within metropolitan areas as families move from small apartments in the heart of cities to apartment blocks or single-family homes in the suburbs. The demographic and settlement patterns in Białystok, Lublin, Olsztyn, and Rzeszów fit this general pattern. In the case of Rzeszów, while the city's population has grown in recent years, this growth has been driven primarily by the decision to extend the city's boundaries to incorporate adjoining municipalities. The shift towards suburban sprawl in Polish cities has significant implications for urban transport as well as for other urban services. Importantly, expansion into peri-urban areas has been occurring at significant distances from the city center, with haphazard new developments along main arteries driven by low land prices and improved road access. Residents in these suburban areas typically depend on private vehicles for commuting into the city. A main result of this suburban sprawl has been that the hard urban cores that defined Polish cities before 1990 have given way to scattered suburban developments that make public transport networks in those areas impractical as well as raise challenges for provision of water, sewage, electricity, and solid waste management services. All of these aspects also contribute to rising GHG emissions. While Polish municipal and regional authorities recognize that suburbanization has adverse consequences for provision of transport and other services, there has been little coordination in spatial planning among the jurisdictions that make up Polish FUAs to guide new developments in a sustainable way.

51. Urban sprawl can be defined as unplanned incremental urban development, characterized by low-density mix of land uses in the urban fringe.[24] The phenomenon is driven by a number of factors, including the price of land, the attractiveness of existing urban areas, individual preferences for detached or semi-detached houses, demographic trends, as well as land-use planning policies at both local and regional levels. In the Polish context, there is also a preference for apartments within the periphery of cities. Evidence from the EU suggests that more compact forms of development are possible where growth around the periphery of cities is coordinated by strong urban policy. Compact urban development with higher population density has a number of advantages, including lower energy consumption and lower CO_2 emissions per capita. As population density falls in cities, private cars dominate transport, particularly as it becomes more expensive to provide public transport at a level competitive with private cars in low-density suburbs.

52. Against this backdrop, the four cities launched ambitious programs intended to enhance the quality of public transport services, making use of EU funds under the 2007-2013 financial perspective. For public transport users, the impact of these large investments is visible: brand new buses or trolley buses, introduction of electronic ticketing systems, new bus bays, and real-time passenger information systems. The integrated approach taken to enhance the quality of public transport will be an important element in attracting new passengers, in particular "choice riders" who are not dependent on public transport. Going forward, the cities are likely to benefit from considerable EU funds for the new 2014-2020 programming period, which presents a unique opportunity to complete necessary large investment projects aimed at promoting the use of public transport.

53. This chapter presents an overview of urban mobility in Białystok, Lublin, Olsztyn, and Rzeszów, including the findings from an assessment carried out by the World Bank team between December 2013 and June 2014, which evaluated current urban transport issues with the aim of supporting the cities' goals of attaining sustainable urban mobility.

A Comparative Perspective

54. In order to put in perspective Białystok, Lublin, Olsztyn, and Rzeszów, they were compared to other cities in Europe for which the World Bank has recent data from the Urban Transport Data Analysis Tool[25]. This tool has been developed by the World Bank to facilitate a diagnosis of urban transport problems so that remedial measures can be correctly targeted. The diagnosis is carried out through a benchmarking process whereby a range of city indicators for a test city is compared with similar indicators for a selected set of peer cities.[26] This allows an assessment of where a test city is doing well and where it is not doing well so that the specific needs for that city get identified in a systematic and scientific manner. In comparing cities, it is important to note that the data provided by cities are based on legal definitions of city boundaries, which may be more restricted than the metropolitan or FUA.

24 European Environment Agency (2011), Urban Sprawl in Europe: The Ignored Challenge. EEA Report No 10/2006. Luxembourg: Office for Official Publications of the European Communities, 2006. Available at: http://www.eea.europa.eu/publications/eea_report_2006_10

25 http://www.worldbank.org/en/topic/transport/publication/urban-transport-data-analysis-tool-ut-dat1

26 Certain variables are useful for such benchmarking analysis, but are not available from cities now, such as share of work trips by each type of transport, average trip length to work by car, average travel time to work by public transport or by car.

Figure 1: Population in Białystok

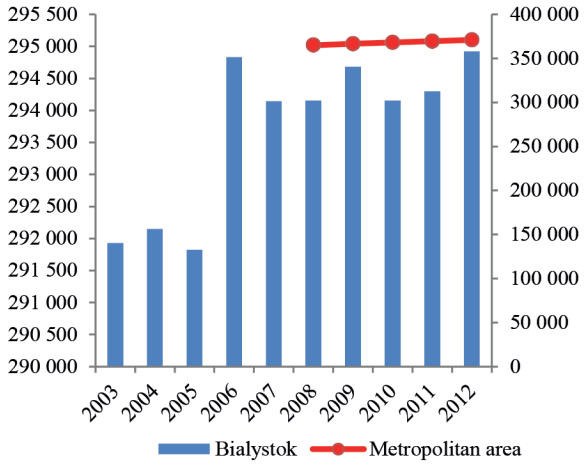


Figure 2: Population in Lublin

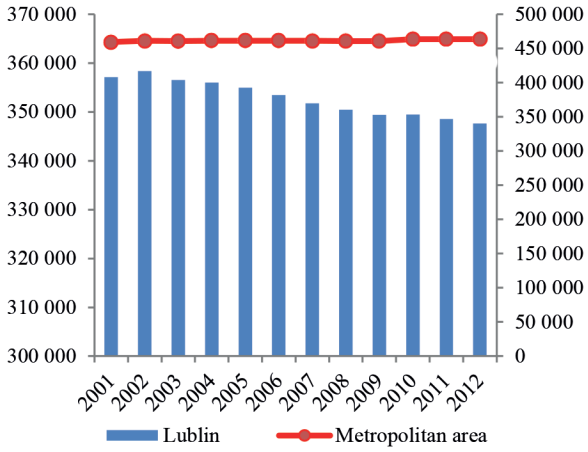


Figure 3: Population in Olsztyn

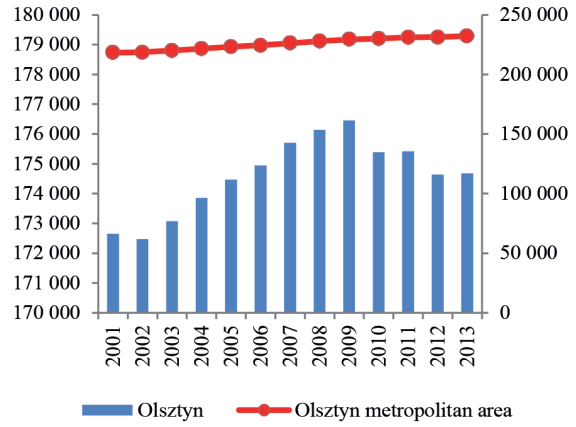
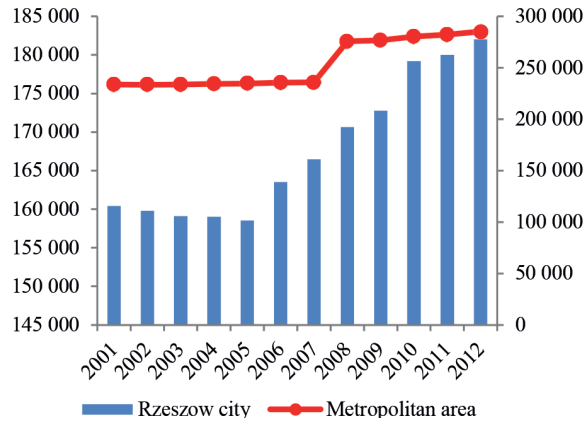


Figure 4: Population in Rzeszów



Sources: Białystok, Lublin, Olsztyn, and Rzeszów.

Box 1: Functional Urban Areas

Although there is no legal act describing the status of Polish agglomerations nor their geographical scope, the official policy of the Polish Ministry of Infrastructure and Development is based on an analysis, prepared in 2012 by the Polish Academy of Science, determining the geographical scope of functional urban area. The delimitation was based on seven factors:

- number of people commuting to the core city;
- number of people moving to the given commune form the core city;
- number of people working in non-agricultural sector;
- number of companies;
- number of companies delivering advanced services;
- density of population;
- number of new flats.

A municipality belonging to a functional urban area has to meet six out of seven minimum criteria (set as a relation to regional average), as well as adhere to the core city or other municipality meeting the criteria. The table below provides 2011 information on the number of municipalities, area, and population for four Eastern Polish cities in the core and within the functional urban area.

Core city	Number of municipalities			Area (km²)			Number of inhabitants ('000)		
	Functional Urban Area	Core	External zone	Functional Urban Area	Core	External zone	Functional Urban Area	Core	External zone
Białystok	9	1	8	1 601	102	1 498	387	294	93
Lublin	15	1	14	1 519	147	1 372	539	349	190
Olsztyn	7	1	6	1 452	88	1 363	231	175	56
Rzeszów	13	1	12	1 047	116	931	351	180	171

Source: Kryteria delimitacji miejskich obszarów funkcjonalnych, Ministry of Regional Development, Warszawa 2013

55. The output of the Urban Transport Data Analysis Tool shows that Białystok, Lublin, and Olsztyn are within range for most key indicators, such as urban density and public transport usage.[27] The increase in private car ownership in all of the cities to a level higher than is seen in French, Italian, and Swiss cities with higher average incomes is a cause of concern. While its density of population is lower than that of Western European cities of comparable size, Lublin has not yet experienced significant migration to suburbs seen elsewhere, which has the effect of reducing average density for the wider metropolitan area. The bus ridership comparison graph (Figure 8) suggests that compared with cities of similar size elsewhere in Europe, Rzeszów and Lublin still have room to improve in order to attract more bus users despite recent investments in fleets, ticketing, and passenger information systems. International best practices, such as experience from Transport for London and New York City Transit, but also that of medium-sized cities, shows that proper marketing and customer outreach can attract more public transport users. Conducting regular performance measurement and evaluation would help urban transport authorities identify problems and areas for further analysis.[28]

56. Published data on car ownership in Poland may not be reliable as car owners are not obliged to pay tax and register vehicles annually with the local authority, as is the case in many other countries. Allowing for these data limitations, it is clear that private car ownership in Poland increased rapidly during the transition period of the economy and is now at levels comparable to EU countries with higher per capita incomes. As shown in Figure 6 in the following comparative analysis, the car ownership per 1,000 inhabitants in Lublin is close to cities like Geneva, while car ownership in all four cities is higher than in cities like Tallinn, Nantes, and Bologna. The increased number of cars making trips within the four cities and for trips transiting through the cities where bypass routes are not complete is leading to longer journey times and there is evidence of congestion at critical locations in the road networks. The increase in total road capacity in and around cities, and the transfer of transit trips to new orbital routes financed through EU-funded programs, is helping to limit congestion to manageable levels. However, even if current congestion problems were not acute, continuation of recent trends would lead to much higher levels of congestion with adverse consequences for the efficiency and cost of operating public transport, for the cities' quality of life, and economic competitiveness.[29] Road and public transport infrastructure investments financed with EU support have been essential to reducing congestion, but further initiatives, such as demand management and control of low-density suburban development, will be required to achieve sustainable mobility patterns.

27 For the comparator cities, the latest data from the 2011 database were used. For the four Polish cities, most data are for 2013, except air quality data in Bialystok (2007), Lublin (2012), and Rzeszów (2012).

28 Annex 4 provides a description of how to develop performance measurement and evaluations in urban transport authorities as well as examples from London, New York City, and other EU initiatives. Annex 5 provides a sample of a customer satisfaction survey questionnaire that urban transport authorities can adopt to understand the public transport system from users' point of view.

29 An important consequence of increased car dependency in Poland has been a decline in road safety. This is also true in Lublin where fatalities resulting from road accidents in 2012 reached 25 in the City of Lublin and 243 in the Lublin Voivodeship.

Figure 5: City Population ('000)

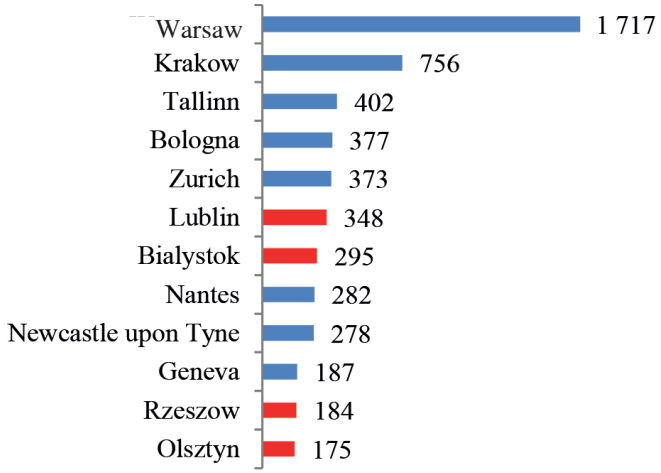


Figure 6: Private Vehicles per 1,000 Inhabitants

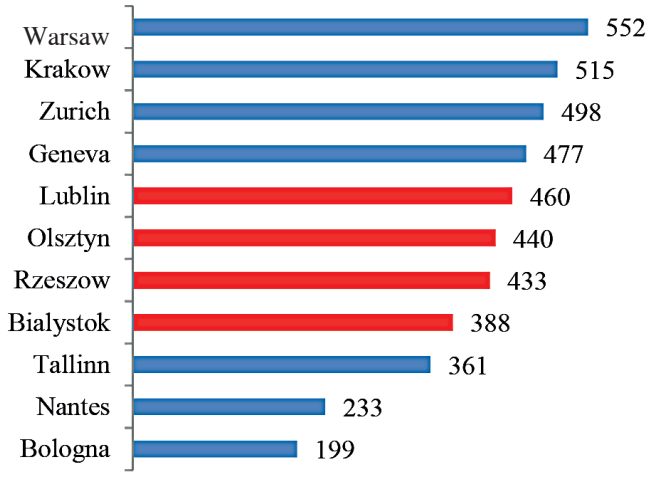


Figure 7: City Population Density (persons/sq km)

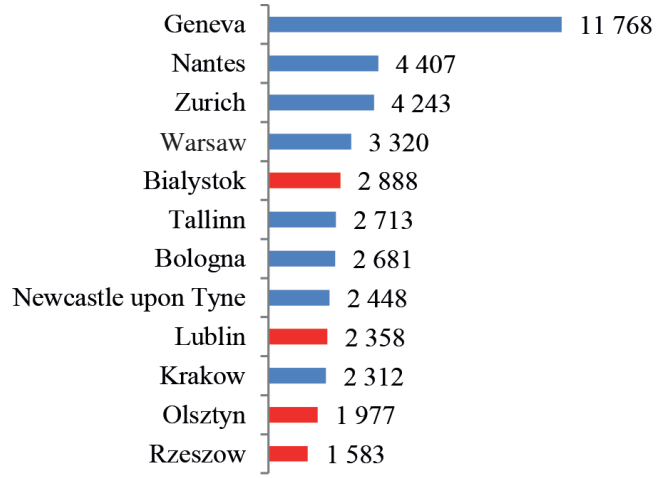


Figure 8: Bus Trips per Person Per Day

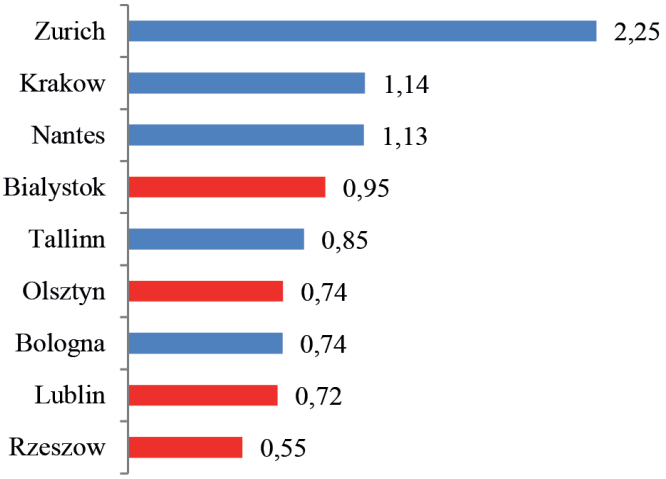


Figure 9: Public Transport Energy Use (MJ/Pass-km)

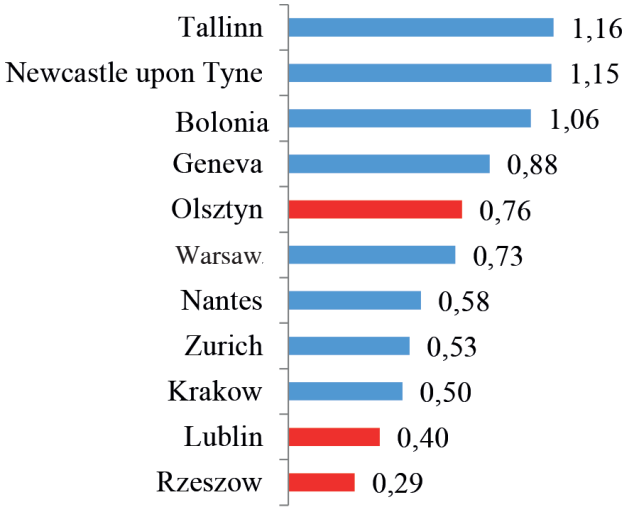
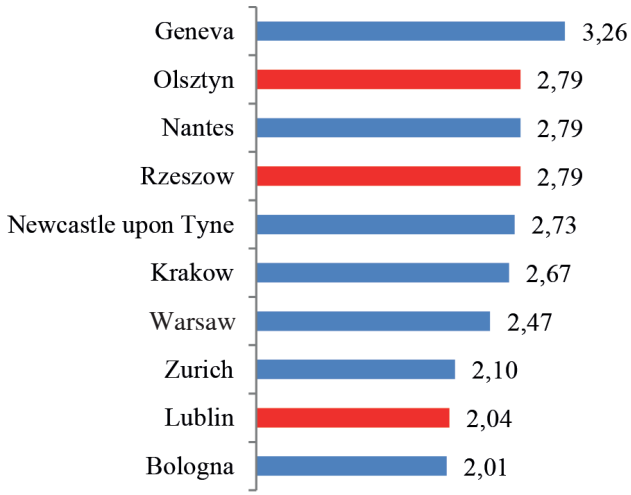


Figure 10: Private Transport Energy Use (MJ/Pass-km)



Source: World Bank

57. Transport is only one of the contributors to air pollution. In cities, large emitters include the heating systems, especially where coal is an important source of energy and there is no central heating. Nevertheless, it is important to review air quality, as poor air quality can often serve as an impetus for cleaner urban transport solutions. At present, the EU air

quality standards and objectives for three pollutants are as follows: up to 350 ug/m^3 for sulfur dioxide, up to 125 ug/m^3 for nitrogen dioxide, and up to 50 ug/m^3 for particulate matter (PM10).[30]

58. If we look at the four cities in Eastern Poland they are below the limits set by the EU and their air quality with respect to nitrogen dioxide and sulfur dioxide is better than in cities such as Zurich or Bologna. Recent investments in clean public transport fleets, together with policies such as the introduction of a paid-parking zone will assist in containing transport-related pollutants from growing.[31]

Figure 11: Nitrogen Dioxide (ug/m^3)

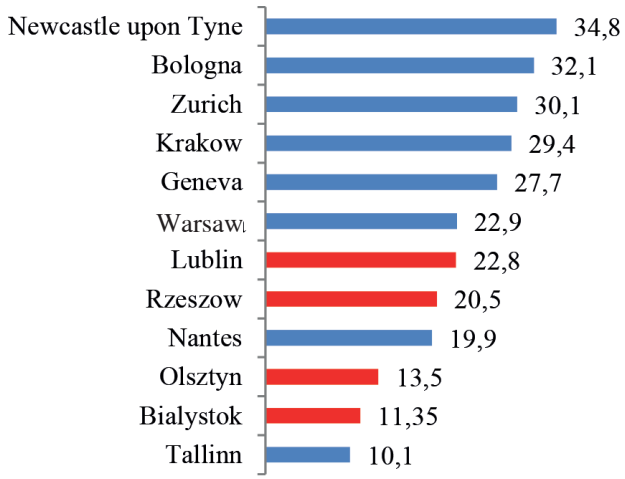
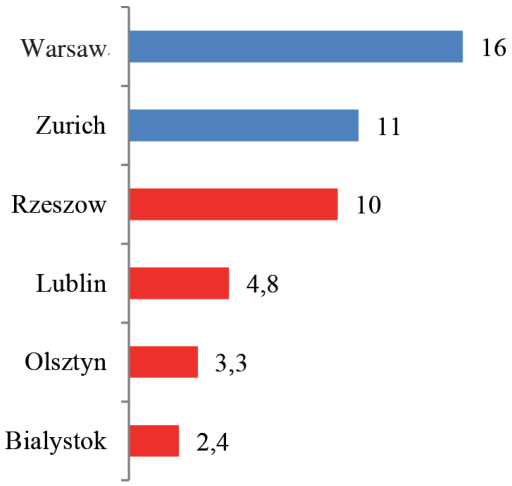


Figure 12: Sulphur Dioxide (ug/m^3)



Source: World Bank

59. Road transport generates one-fifth of the EU's total emissions of carbon dioxide (CO_2), the main greenhouse gas (GHG). At the level of the EU, CO_2 emissions from road transport increased by nearly 23 percent between 1990 and 2010, and without the economic downturn at the end of the period the increase would have been even larger. Transport is the only major sector in the EU where GHG emissions are still rising.[32] Effective monitoring, reporting and verification of GHG emissions are critical for tracking progress towards the achievement of emission reduction targets. As parties to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, the EU and its member states are required to report annually on their GHG emissions. They also have to report regularly on their climate change policies and measures through national communications. However, while there is a national obligation to monitor GHG emissions, there is no such obligation at the level of EU cities. Yet, transport represents 23 percent (globally) and 33 percent (OECD) of all CO_2 emissions. The majority of these come from urban centers, where about three quarters of the EU population lives.[33]

60. In the past decade, cities in the EU have introduced a range of strategies and policies aimed at reducing CO_2 emissions from the transport sector. However, due to a lack of monitoring and evaluation instruments it is difficult to tell whether these strategies and policies are working effectively. Initiated by the Covenant of Mayors, the Sustainable Energy Action Plan states that cities must develop estimates of current CO_2 emissions for the transport sector and set a proper reduction target based on the baseline and planned interventions. Around 28 Polish cities have signed up to the action plan aimed at CO_2 reduction by 2020 ranging from 20 to 44 percent.[34] Polish cities that do not have a CO_2 emissions baseline inventory will not be able to measure quantitative progress in reducing CO_2 emission growth even when cities are taking actions to reduce CO_2 emission growth in the transport sector. The provision of transport-related CO_2 emissions data to planners and policymakers can be seen as an instrument not only for measuring, but also for motivating decision-makers to adopt more climate-friendly transport policies, as well as for setting city-level targets.

30 These apply over differing periods of time as the observed health impacts associated with the various pollutants occur over different exposure times.

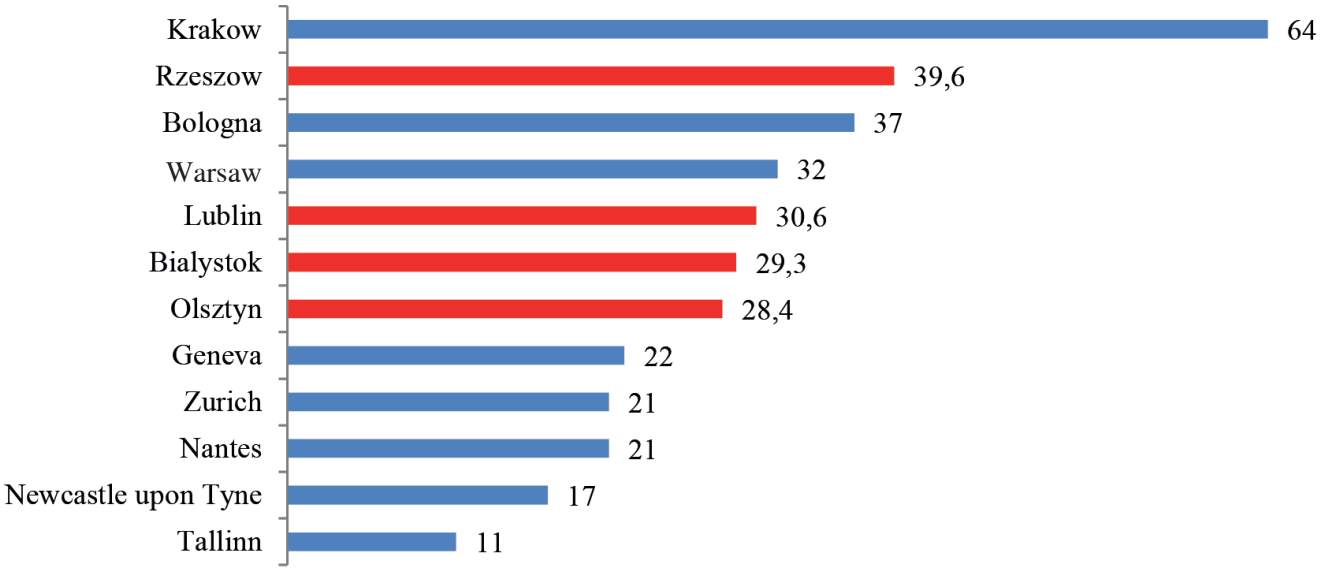
31 The European Commission adopted a Clean Air Policy Package in December 2013 consisting of a new Clean Air Programme for Europe with new air quality objectives for the period up to 2030, a revised National Emission Ceilings Directive with stricter national emission ceilings for the six main pollutants, and a proposal for a new directive to reduce pollution from medium-sized combustion installations.

32 http://ec.europa.eu/clima/policies/transport/vehicles/index_en.htm

33 http://www.internationaltransportforum.org/Pub/pdf/10GHGTrends.pdf

34 http://www.covenantofmayors.eu/about/covenant-of-mayors_en.html. The Covenant of Mayors is the European movement involving local and regional authorities voluntarily committing to increasing energy efficiency and use of renewable energy sources on their territories. By their commitment, Covenant signatories aim to meet and exceed the European Union 20 percent CO2 reduction objective by 2020.

Figure 13: Particulate Matter (PM10, ug/m³)



Source: World Bank

61. To date, there are only four countries in the EU that have spatially disaggregated emissions inventories at a national level, namely, the UK, the Netherlands, Denmark, and Sweden. Meanwhile, the European Environment Agency in 2011 released a spatial emission database as part of the European Pollutant Release and Transfer Register (E-PRTR) at a 5km resolution, making it possible to estimate emissions for cities based on geographic boundaries. The EU Framework Seven project Carbon Aware Travel Choices (CATCH) sets a goal of filling this information gap on city-level CO_2 using these data, but there are issues relating to the use of E-PRTR data. The main one is that the methodology is a top-down approach based on the spatial disaggregation of national emissions totals. Secondly, the resolution of the data is at a 5 km level and CO_2 emissions data are distributed into 5 km by 5 km grids using geospatial-referenced datasets, such as road networks for the road transport emissions. As a result, the CO_2 emissions captured through this database at a sub-national level are not as accurate as when a bottom-up approach was adopted.

Box 2: Estimating City Level Road CO_2 Emissions Using E-PRTR Dataset

The CO_2 emissions from road transport in Polish cities are estimated using ArcGIS software with the E-PRTR dataset in 2011 at the 5km by 5km grid level. The E-PRTR maps cover emissions of six atmospheric pollutants (nitrogen oxides (NOx), sulfur oxides (SOx), carbon monoxide (CO), ammonia (NH3), carbon dioxide (CO_2) and particulate matter (PM10)), and divide the emissions across seven sectors (Agricultural, Domestic Aviation, Domestic Shipping, Industrial Releases, International Shipping, Non-Industrial Combustion, and Road Transport). The maps are intended to cover all EU27 states and the European Free Trade Association countries (Switzerland, Lichtenstein, Norway and Iceland), totals 31 countries. Whilst the data for conventional air pollutants is based on official submissions to United Nations Economic Commission for Europe under the Convention on Long-Range Transboundary Air Pollution, the CO2 emissions are based on national submissions to the United Nations Framework Convention on Climate Change5(UNFCCC). The inventory is produced using a top–down methodology (Lindley et al. 1996) based on the spatial disaggregation of nationally reported emissions totals.

The regional emissions are then gridded according to: (1) traffic volume and road network from TRANS-TOOLS[35] for highways and partly for rural roads; (2) road network divided by road type from GISCO (ROAD) (GISCO, 2011[36]) for the roads not covered in TRANS-TOOLS (secondary and local roads); (3) gridded population density as weighting factor for line sources in relation to rural and urban roads not covered by TRANS-TOOLS; (4) degree of urbanization from GISCO, 2011. A conventional Intersect method was used to capture CO_2 emissions estimation by city boundaries.

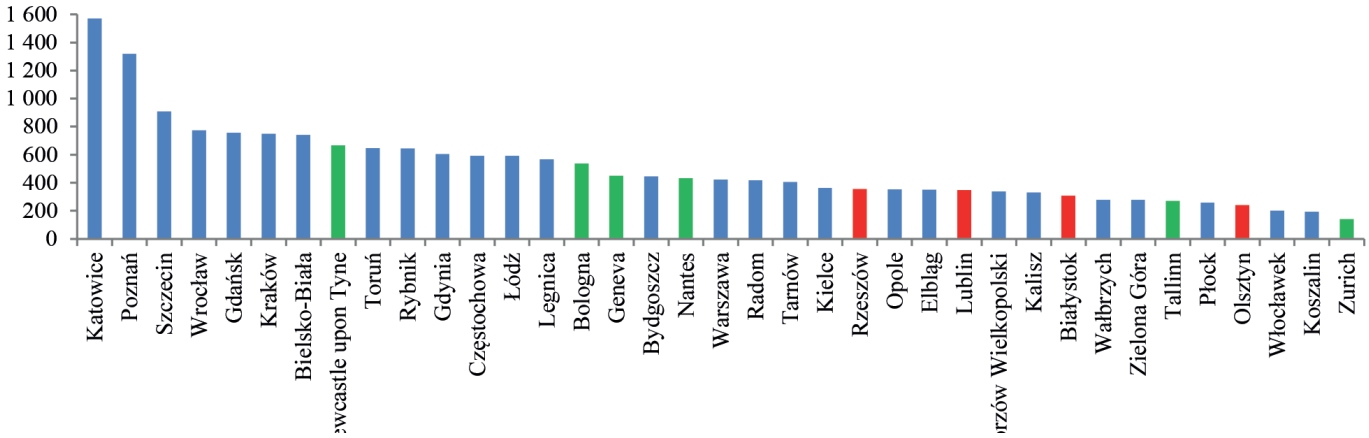
Source: World Bank

35 A comparison with the UK National Atmospheric Emissions Inventory (UK-NAEI, a bottom up approach and will be further illustrated in this chapter), which provides CO2 emissions estimations across a 1km by 1km resolution grid shows that the estimation of aggregate CO2 emissions from road transport in the functional built-up areas of British cities from the E-PRTR match sufficiently well with those based on the UK-NAEI data. It should be noted that road transport CO2 emissions per capita at the city level is used so that the size of the city does not distort the results. This suggests that in the absence of city level transport emission data in Poland, the E-PRTR data can be used to estimate road related CO2 emissions. http://energy.jrc.ec.Europa.eu/transtools/

36 GISCO 2011, Geographical Information System of the Commission: Progress Report. Eurostat. Available at: http://epp.Eurostat.ec.Europa.eu/portal/page/portal/gisco_Geographical_information_maps/documents/-GISCO-2010-11-Progress-Report.pdf

62. With these caveats in mind, a similar methodology was applied to analyze CO_2 emissions from road transport in Polish cities using the E-PRTR database, in order to obtain a baseline estimate. For this purpose, 31 cities in Poland with a population of more than 100,000 were selected. One of the key challenges in calculating CO_2 emissions at the city level is defining the city limits, as the E-PRTR database does not provide emissions by cities but by 5 km grids, which means that the actual area used to calculate emissions might be somewhat different from the actual administrative borders of the cities in question. Nevertheless, these estimates are a good starting point in the absence of bottom-up measurement of road transport emissions. Figure 14 shows the estimated CO_2 emissions per 1,000 persons from road transport in each city. All four Polish cities perform well, on the bottom range of the emissions. It should be noted that road transport CO_2 emissions per 1,000 persons is likely to be higher within the FUA, given the predominant use of cars outside the city administrative borders.

Figure 14: CO2 Road Transport Emission (CO2 Tons per 1,000 Population)



Source: World Bank estimates

Box 3: Estimating Greenhouse Gas Emissions from Urban Transport

There are at least 40 existing models and tools for estimating greenhouse gas emissions from transport operations. Some of the more well-known models include: Motor Vehicle Emissions Simulator (MOVES; US Environmental Protection Agency), Computer Program to Calculate Emissions from Road Transport (COPERT; European Environment Agency), the World Resources Institute Greenhouse Gas Protocol, International Vehicle Emissions (IVE) Model, ICLEI Harmonized Emissions Analysis Tool (HEAT), and the transport Clean Development Mechanism (CDM) methodologies under the United Nations Framework Convention on Climate Change (UNFCCC). Although there are different models and methodologies for estimating greenhouse gas emissions from the urban transport operations, nearly every model that results in a transport CO2 estimate is exactly the same – the difference lies in the data. There are four components that may be found, in some form, in every transport GHG emissions model, whether that model is intended to estimate transport emissions from a project, for a city, or for a country.

Content of fuel – how many kg of CO_2e are emitted per unit of fuel combusted?
Using internationally-recognized default parameters, carbon content of fuel can be determined by multiplying International Panel on Climate Change (IPCC) default carbon content values (kg CO_2e/kJ) by a country's national heating value for that fuel (annually updated by the International Energy Agency) (kJ/kg).

Vehicle inventory – what types of fuels are being combusted?
For vehicle inventory data, some models require a precise inventory (such as the CDM methodologies), whereas others rely on traffic count-based samples (IVE), while others rely on registered vehicle data (COPERT and MOVES). Each of these data choices has implications for what the model tells us about greenhouse gas emissions from transport, the accuracy of the model results, and the level of resources required to collect inputs.

Fuel efficiency – how much fuel is combusted per kilometer traveled?
Fuel efficiency data tends to be the most elusive and contentious parameter of the four basic components comprising transport operations GHG emissions models, because: (i) vehicle fuel efficiency is difficult to objectively measure without use of specialized test facilities and/or equipment; (ii) efficiency varies by vehicle make, model, and year of operation; and (iii) fuel efficiency for each vehicle type is uniquely affected by a combination of hundreds of external factors, such as weather, road surface conditions, degree of traffic congestion, average travel speed, and operator behavior.

Activity level – how many kilometers are vehicles traveling?
While collecting activity data for projects can be relatively straight forward, for urban transport carbon inventories, a variety of sampling, estimation, and default parameters are needed. For New York City's transport carbon footprint, for example, activity levels are derived from a sophisticated, proprietary travel demand model used for city transport planning. The IVE model, on the other hand, relies on survey data collected over a two-week period specifically for use in the GHG estimation work.
The four components are not arbitrary. They reflect, in some combination, all activities that can be undertaken to reduce GHG emissions from transport operations. For example, replacement of a traditional diesel bus system with CNG buses that operate in a well-managed, dedicated bus lane would affect the carbon content of fuel (from diesel to CNG), the fleet fuel efficiency (though new technology, as well as improved drive cycle through use of a dedicated lane), and reduction in activity level per passenger transported (through better traffic management).

Source: World Bank.

Institutional Structure

63. The organization and oversight of urban public transportation has been the responsibility of the urban public transport authorities in the cities of Lublin, Olsztyn, and Rzeszów since a restructuring separated network management and planning from the operation of bus services (and trolleybus services in Lublin). The restructuring also allowed the cities to take a strategic approach to the contribution that public transport could make to wider objectives such as revitalization of the central business district, increasing the quality of public transport, and control of emissions from transport. The urban transport authorities have developed specialist skills in transport planning and project implementation. These skills are reflected in the successful implementation of projects and the publication of strategy documents in relation to the future role of transport. The institutional restructuring that led to the separation of urban transport planning and regulation from operations also facilitated the contracting of municipal bus services to private operators in Lublin and Olsztyn.
64. In the case of Białystok, the present arrangement is that BKM is a department of Białystok's city administration whose director reports directly to the mayor (*prezydent*). This model of administration differs from the other cities in Eastern Poland that have established more autonomous transport administrations that publish their own financial statements. However, the distinction is not such an important one from the perspective of transport users or the principles of reform being implemented.
65. The urban transport authorities of the four cities generally maintain up-to-date websites that provide information to passengers regarding fares, types of tickets, maps, service diversions, and customer service information. Some cities have made greater progress in adopting smart-card ticketing, mobile phone applications, and other Intelligent Transport Systems (ITS), which are featured on the transport websites. In the case of Białystok, BKM has launched smart-transport applications to provide advanced traveler information through Internet and phone apps earlier than other cities in Poland or internationally. The city's website offered high-quality passenger information as early as 2002 and bus schedules and journey planners on mobile phones starting 2007/2008. Real-time journey information is also provided at bus stops and on vehicles. Białystok can justifiably claim to be a market leader in exploiting the potential of smart-card technology for a city of its size.
66. None of the four cities provides public information about service performance, whether it be passenger journeys, modal share ratio, customer satisfaction, improvement on customers' top concerns, journey time, fleet and stations in service. The transport authority websites do provide information on EU-funded capital investment projects and procurement exercises.

Voivodeships

67. Poland's structure of local administration places responsibility for regional planning on voivodeships and gives them important roles in managing infrastructure that serves all municipalities in their regions and the areas outside municipal administrations. Voivodeships, which are led by marshals, have major responsibility in relation to public transport. Marshals of voivodeships have been given certain approval and coordinating responsibility in relation to the EU-funded regional Operational Programmes for Eastern Poland. Regional rail services within voivodeships are contracted by marshals and operated by *Przewozy Regionalne* (PR) and, in a limited number of cases, privately owned companies. Regional bus services are licensed by marshals or other local authorities and in some cases the local operations of regional bus companies are controlled by marshals, other local authorities, but mostly by private owners.
68. While marshals appear to have considerable authority to ensure that planning is carried out in an integrated way within their regions and the ability to influence investment and management of public transport, the reality is different. Spatial

planning authority, including the powers to zone land and grant planning approval, is fully delegated to municipalities. Marshals' offices recognize the benefits of integrating modes of transport through ticketing, scheduling, and other means. However, because they have not been specifically mandated to promote such integration, they do not exercise a convening role or an ownership role with respect to railways and regional buses to achieve integration. Marshals could influence patterns of development through their approval role for investment in transport and other infrastructure, but there is no evidence that they are motivated to do so in cities in Eastern Poland. If voivodeships were to assume a more active role in these matters they would need to mobilize project management and regulatory resources. The reality is that Polish cities have developed these resources and skills, which has allowed them to take a leadership role in transport and other infrastructure development in their regions.

Public Transport Operators

Municipal bus operators

69. Municipal bus services in all four cities are dominated by city-owned operators that were corporatized during earlier institutional reform. Institutional arrangements vary by city. Unusually for a city of its size in Poland, Białystok owns three separate bus companies. There are historical reasons for these arrangements, including a prolonged bus strike in 1990. The city regards the incremental cost associated with separate governance for three operators as modest and justified in terms of the benefits from having a degree of internal competition and it is clear that they operate genuinely independently of one another. The three companies, *Komunalne Przedsiebiorstwo Komunikacyjne* (KPK), *Komunalne Przedsiebiorstwo Komunikacji Miejskiej* (KPKM), and *Komunalny Zaklad Komunikacyjny* (KZK), have the status of internal transport operators and are of approximately equal size.
70. Management representatives of the three bus companies were agreed that the gross-cost contracts with BKM for supply of bus services work better than conditions before 1991 when they competed directly for passengers, setting their own fares, and selecting service routes. They argue that the previous arrangements in the city were similar to the present industry structure in the suburbs where private bus operators compete directly and provide a low quality of service. Management of the three city bus companies now concentrates on meeting the quality standards specified by BKM and on improving fuel efficiency and other technical performance criteria. The companies cooperate with initiatives led by BKM to promote greater usage of public transport, such as school programs, car-free days, and educating the public on the fleet's energy efficiency. The bus companies have considered alternative fuel supply for their fleet and have experience operating test vehicles powered by Liquefied Petroleum Gas and Liquefied Natural Gas/Compressed Natural Gas, as well as hybrid-electric buses. The early experience of hybrid vehicles is positive, but gas-fuelled vehicles were less successful largely due to changes in fuel taxes.
71. MPK Lublin traces its origins to 1929 but its current mandate and scope of activities are based on its 2009 agreement with ZTM Lublin to operate trolleybus and diesel bus services under gross-cost contracts. MPK Lublin has exclusive route-based contracts for approximately 80-85 percent of services contracted for by ZTM Lublin on behalf of the city council. Three private operators contract for the balance of services. MPK Lublin receives payment based primarily on vehicle-kilometers traveled, with provision for performance deductions when the operator does not meet the published timetable. As the city-owned operator, MPK Lublin provides ancillary services to ZTM Lublin and to the police, such as maintenance of bus stops, accident response, and road safety education.
72. MPK Rzeszów is wholly owned by the City of Rzeszów and it provides services within the agglomeration. The company carries around 100,000 passengers per workday and accounts for 80 percent of the bus market, including trips from suburbs. Passenger numbers reached 29.8 million in 2012. Changes to the network coverage in recent years, particularly in services to neighboring municipalities, make it difficult to identify underlying trends in passenger numbers, but the urban transport authorities—ZTM Rzeszów and MPK Rzeszów—both recognize that passenger numbers on city bus services have fallen on a like-for-like basis. MPK Rzeszów had operated additional services to eight neighboring communes on a commercial basis until August 2012, but management of MPK Rzeszów and ZTM Rzeszów decided that the city could not continue to bear losses on these services so service to five municipalities was discontinued.
73. MPK operates services under a gross-cost contract entered into with ZTM Rzeszów in December 2009 for a 10-year period. The contract has been amended on a number of occasions, including in 2012, to give direct responsibility to ZTM Rzeszów for revenue protection and enforcement. The basis of the contract is that ZTM Rzeszów pays MPK per vehicle-kilometer operated (PLN 6.2/km in 2012; Euro 1.5/km) with deductions for non-performance of contractual obligations and lower payments for kilometers travelled outside of passenger service, generally between the depot and the beginning and end of service. ZTM Rzeszów decides on any changes to the route structure and is responsible for full fare-box risk.
74. The City of Olsztyn provides bus services within the city and certain neighboring communes under gross-cost contracts with two operators. MPK Olsztyn has been designated as the city's internal operator, under EU regulations, and it operates approximately 90 percent of city bus services. A further 10 percent of services are operated by privately owned KDD under a 10-year contract with the city and it is intended to open up a further 10 percent to third-party operators in 2014. All city buses bear the same livery as will the new tram service to reinforce the integration of all city transport

services. The city has decided to extend MPK's mandate to include operation and maintenance of the new tram service; consideration was given to tendering the service to third parties, but it was decided that better value and integration would be achieved by using the city's internal operator. A joint bus and tram operator will also facilitate reconfiguration of the public transport network and redeployment of staff when passenger service begins on the tramway and certain bus services will be withdrawn.

75. Olsztyn's city bus services extend to three communes adjacent to Olsztyn; these are Dywity, Purda, and Stawiguda. The city bus network had served all five communes adjacent to the city until around 2010, but Olsztyn City Council decided that it could not afford to provide operating subvention for such an extensive network and some of the neighboring communes were unwilling to contribute sufficiently for the high-quality service that the city provides. Bus services that cross city boundaries into adjoining municipalities account for a small proportion of overall vehicle kilometers.

Rail Services

76. The rail sector in Poland has been reorganized in recent years with separate entities responsible for infrastructure management and operations. Responsibility for operations is also divided between PKP, which operates intercity services, and PR, which operates regional services. Regional services in the four voivodeships in Eastern Poland are provided under contract between the respective voivodeship marshals and PR. The marshals also have the lead role in selecting and managing implementation of regional rail programs to be implemented with EU funding. There is little evidence that this work is carried out in a coordinated way with the EU-funded programs for urban transport led by the cities. The local branches of PLK, as infrastructure manager, and PR, as regional rail operator, also appear to have a very limited role in project development and implementation. Neither of these companies engages directly with the public transport authorities of the respective cities in relation to suburban rail investments as they see that as the responsibility of the marshals.

77. Greater integration of planning for upgrading rail infrastructure with planning for urban transport infrastructure would benefit both activities. The potential to increase patronage from new and upgraded railway stations depends on their location close to areas of population density and places of attraction, as well as good access to those stations. The Lublin division of PLK, as rail infrastructure provider, has taken initiatives to change the location of railway stations to respond to new residential development, but this has been done independently of the city and other municipal authorities. Indeed, PR reported that some of the upgraded stations are poorly served by adjacent road infrastructure due to steep gradients to reach the railway alignment. There is no evidence that planning authorities in any of the cities have encouraged more or higher density development adjacent to upgraded railway infrastructure.

78. Urban transport authorities do not have a direct supervisory role in any aspect of rail services and there is little evidence of bus routes or operations being planned to integrate with rail services in the city or region. Similarly, there is no integration of fares or ticketing between rail services provided by PR, under contract with the marshals and city bus services provided by public and private bus operators under contract with the cities. While all parties agree that such integration would be in the interests of passengers, the current institutional structures and relationships do not appear to encourage any party to take the lead in such initiatives.

Private Operators of City Bus Services

79. ZTM Lublin selects private operators to provide city bus services through competitive procurement. ZTM Lublin sets a minimum standard for vehicles, guarantees minimum kilometers of service to be purchased, and invites tenders based on cost per kilometer. Using this process, ZTM Lublin is progressively increasing the minimum standard of vehicles and offering longer contract periods to allow operators to invest in modern vehicles. The City of Olsztyn decided as a matter of policy to contract with private companies to offer city bus services based on competitive bidding for gross-cost contracts subject to minimum environmental standards. The first successful bidder was KDD, which is a privately owned transport, energy, and electronics company with contracts to provide city bus services in Olsztyn and Bydgoszcz. The rates paid by the city to KDD are reported to be approximately 25 percent lower per vehicle-kilometer than payments made to the publicly owned MPK Olsztyn. While this comparison does not take full account of the internal operator's legacy costs, as it provides a more extensive range of services, there seems little doubt that Olsztyn is generating savings through contracting some services to a third party. The presence of a private operator also gives the city a benchmark against which it can evaluate the cost of services provided by its internal operator and greater flexibility if it decides to increase or decrease service frequency over time. During the 1990s, a number of privately owned bus companies began offering services that competed directly with MPK Olsztyn and did not receive PSO payments from the city. These operations were not profitable and later withdrew from the market.

80. In addition to these PSO services, private bus operators provide services on commercially viable routes to the city and within neighboring municipalities in all four cities. The quality of bus and frequency of service is generally lower than for the PSO-contracted services and the urban transport authorities exercise a limited role in supervising these bus operations. Low service standards are thought to lead to further decline in patronage and therefore less investment funds are available to replace the fleet.

81. The lack of focus on improving the quality of bus services in suburban markets, either by the national or local governments, is regrettable and particularly problematic when the demographic trend is towards suburbanization. Extending municipal bus services to the suburbs, at the quality and cost levels within municipal boundaries, would not be affordable. The lack of investment in renewing bus fleets by private operators is understandable from a commercial perspective and the ex-PKS companies have become property companies with loss-making bus operations attached. The commercial viability of non-PSO bus services in the areas of population growth is in doubt and these services will become even less economic when institutional changes will be implemented in 2017—payment for fare concessions will be withdrawn for non-PSO operators. Linked to this, the increase in car dependence by suburban communities will have consequences for congestion on access routes to the cities and for parking requirements there. These developments have important social as well as environmental consequences as there will remain a group of residents who do not have access to cars due to age or income level.
82. The marshals of the voivodeships may wish to consider offering PSO contracts to commercial operators for bus services on routes connecting suburban centers of population with city center destinations or important interchange points. The routes should be selected based on forecast demand. While some of the demand is now served by bus operators based on full cost recovery and limited payment of fare discounts to passengers entitled to concessional fares, the financial return from this business is insufficient to cover the cost of fleet renewal and will decline further in 2017 when payment for fare concessions is withdrawn by the Government of Poland. This issue should be addressed with some urgency before the supply of transport on a commercial basis is reduced further. There is a risk that losses from bus operations will lead operators with local depots and terminals to dispose of those facilities for non-transport development and the cost of developing a new physical and managerial infrastructure for suburban bus services in the future could be much higher. This adds to the urgency of addressing the gap in service provision.
83. Consideration should also be given to combining the supply of bus services for general traffic in suburban areas with school bus services. Combining school transport with general bus transport would strengthen the financial sustainability of both services. It would not be practical to offer PSO contracts for bus services to suburbs with low population density, but by paying commercial bus operators to carry school children on general services, transport authorities would support the viability of these services at a modest cost. It would also provide the incentive to impose higher safety requirements, ticketing, and other standards on those services for the benefit of all passengers. Dedicated school buses would be retained for routes where population density requires that service.

Regional Bus Operators

84. National bus services in Poland were historically operated by the state-owned PKS, which also managed bus stations. After liberalization of the intercity bus market in the 1990s, PKS experienced financial difficulties nationally and in 2008 was divided into a number of regional companies. In all four cities, passenger numbers on regional bus services are declining annually due to a declining population in their catchment areas and the increase in private car ownership. While the companies operating regional services would like to renew their own fleets of buses, their pessimistic outlook for future passenger growth, and in some cases their debt, make renewal of fleets from own resources unlikely. Operating costs for the PKS operators owned by regional governments are likely to be higher than for privately owned operators due to legacy issues associated with being a state-owned company. The PKS companies sometimes operate long-distance bus services, connecting their home cities with other cities in Poland and the outlook for these services is more favorable due to higher entry barriers and reasonable demand for service quality.
85. All of the bus operators in Poland that operate services outside of PSO contracts are concerned about their commercial viability in the period after 2017 when statutory concessional fares will be withdrawn and there will be even easier market access for commercial bus operators. While operators of regional bus services are now required to seek a license from the voivodeship, it will be sufficient to inform the voivodeship of intention to provide bus services from 2017. Elsewhere in Europe, the financial performance of bus operators, whose business is based on stable or declining rural populations and who are not providing PSO services, is generally poor. In some countries, arrangements to integrate school bus services with general bus traffic in sparsely populated areas have provided support for bus operators and value for money for school services. There is no such integration in Poland.

Local Strategies and Planning Context

86. The cities of Białystok, Lublin, Olsztyn, and Rzeszów have approved urban development and transport strategies for their respective cities and regions, which provide a strategic context for the current and proposed transport infrastructure development. In addition to qualitative objectives, some published strategies provide benchmark data for current transport operations and set target values for future years. Where these targets are indicated, the commitment to measurable outcomes is welcome and even if those targets are not achieved the approach of publishing targets for passenger numbers, service reliability, modal share, and other operating criteria should be encouraged.

87. The preparation and approval of urban planning and transport strategy documents in Polish cities is at an early stage of development relative to other cities of comparable size in the EU. In many cases, the current strategy is the first such strategy to be approved for the city or region so there is variability in their structure and content. In some cities, the strategy documents are of a high standard in setting clear objectives for the city and in explaining how public transport can contribute to achieving those objectives, but in other cases there is greater emphasis on listing infrastructure projects to be constructed. Some of the cities' recently approved strategies recognize that investment in physical infrastructure is insufficient to retain passengers on public transport, but that soft measures focusing on the passenger experience are also required.

88. The preparation of strategy documents has also been strongly influenced by EU regional development policies and the availability of funds from the EU to support infrastructure development. There are areas where planning and transport strategies in Eastern Poland could benefit from experience and practice in Western Europe although it should be acknowledged that progress in some of these areas would depend on changes in legislation and practice in a wider Polish context.

89. Firstly, strategies approved by cities and regions in Eastern Poland place little restriction on patterns of land use that are likely to give rise to more car-dependent trip making. Polish cities' historic settlement patterns for residential, educational, and employment purposes were served well by public transport routes. Economic and social changes associated with Poland's transition to a market economy inevitably gave rise to more dispersed residential and employment settlement. The suburbanization trend that sees new residential development taking place in suburban municipalities leads to a shift from public transport use to commuting by private car for work or education. City investment in improved public transport is essential to limit this modal shift to private cars, but experience elsewhere in Europe suggests that improving the attractiveness of public transport infrastructure and operations is insufficient. Urban sprawl has been constrained elsewhere in Europe through complementary measures that place tight restrictions on greenfield residential and commercial development in suburbs. Such restrictions appear to be largely absent in Poland's planning regime, which is facilitating a pattern of suburban development that will be difficult for public transport to serve in an effective way, even with further investment in capacity and improved quality.

90. The absence of planning restrictions to limit sprawl cannot be addressed by individual municipal authorities introducing such restrictions on their own. Suburban development is taking place largely outside cities' jurisdiction and tight controls within cities would have limited impact in controlling sprawl or may even encourage it further. Suburban municipalities are less likely to restrict development as they benefit from additional property tax revenue and do not bear the cost of congestion for commuters accessing city centers. The devolved responsibility for spatial planning in Poland makes it difficult for any single authority to impose effective restrictions on suburban sprawl in municipalities adjoining urban areas. It is likely that changes to national policies would be required to set standards and that would require suburban planning authorities to take into account the external consequences of planning decisions.

91. The need for balance between "carrot" and "stick" in strategy documents extends to other policy areas that are within the control of a city. While the cities of Białystok, Lublin, and Olsztyn have imposed charges for on-street parking and all four cities have introduced public transport priority in limited areas, the main emphasis to date has been on improving the supply of public transport. The cities' decisions to give highest priority to offering the public a credible alternative to private cars for their commuting needs was appropriate for the first phase of urban transport investment. However, it would now be appropriate to consider further measures that would impose some of the congestion and other external costs of private cars on their users. For example, a paid-parking zone should be introduced in Rzeszów and for the other cities should be extended to wider areas. Similarly, the cities should consider greater segregation between public transport and other road users in priority areas of the city. All four cities are considering developing Intermodal Transport Centers near central railway stations, so it would be particularly important to provide dedicated bus routes for access to the proposed transport centers.

92. The third area where future planning and transport strategies for FUAs would benefit from international experience is in relation to the practice of regional planning. All four cities have responded to the ITI requirements to coordinate strategies between the regional cities and their neighboring autonomous municipalities, but the degree of cooperation between cities and their neighbors varies significantly. In some cases there have been preliminary discussions on how to cooperate. At the most advanced level of cooperation, urban transport authorities are committed to improving public transport services to suburban municipalities. While these initiatives are positive, they fall short of transport planning based on trip origins and destinations within the FUA, independent of municipal boundaries. For example, a bus network review for the full FUA is likely to lead to different conclusions from one based on a city's boundaries, even where there is a commitment to serving the commuting needs of the suburbs. The decentralized nature of municipal government in Poland makes it difficult to achieve regional planning that would be effective in restricting suburban municipalities from allowing development that results in urban sprawl. However, the trade-off between municipalities having full freedom to allow or even encourage suburban development on the one hand and the consequences of suburban sprawl in terms of congestion on access routes and the higher cost of providing services in dispersed communities should be recognized.

Box 4: Accessibility Planning

There is a clear "cause-effect" relation between planning policy (zoning regulation, infrastructure investment, and urban development) and future urban accessibility. Accessibility is the fundamental measure of the effectiveness of the transport system, i.e. the ability to reach employment areas, service locations, central business district etc., within reasonable time and at a reasonable cost. Many studies have concluded that accessibility can have strong implications for economic growth (providing access to employment) and environmental sustainability (enabling public transport service competitive with private cars). Accessibility planning can assist policy makers in visualizing land use and transport accessibility by analyzing how different areas within the same metropolitan area compare with each other in terms of accessibility for metropolitan inhabitants, to jobs and urban services, and how future development of urban transport infrastructure, such as tram, urban rail, or new master-planned areas may enhance or hinder accessibility.

Data needed for such an exercise will be mostly land use maps of metropolitan Lublin and multi-modal transport networks with adjusted design speeds. There are already tools and cutting edge technologies available that could help cities to integrate accessibility planning into their urban and transport planning process, such as available open source tools that build on the combination of OpenStreetMap and the General Transit Feed Specification. The General Transit Feed Specification defines a common format for public transportation schedules and associated geographic information. Such "feeds" allow public transit agencies to publish their transit data and developers to write applications that consume that data in an interoperable way.

Source: World Bank.

93. The phenomenon of cities growing beyond their historic boundaries and into municipalities that have autonomy in making their own spatial planning decisions is not unique to Poland. In other European countries that are committed to limiting urban sprawl, regional or national standards have enforced planning regulations that protect suburban greenbelts from developer-led construction. These zoning decisions encourage compact residential development in suburbs, with high-capacity public transport links to city centers. The absence of effective mechanisms for coordinating the spatial plans of adjoining planning authorities and mediating their conflicting interests is the main gap between the planning process in a city and the corresponding processes in cities of comparable size in EU countries where planning is more developed.
94. Zoning decisions can be reinforced by giving priority allocation of investment funds to infrastructure projects that are compatible with policies that promote sustainable development. Suburban development can be accommodated in a more sustainable manner by designating areas within reach of commuter rail services for high-density development and giving lower priority to investing in services for areas with little potential for high-capacity public transport.
95. In all four cities in Eastern Poland there is real potential for encouraging more compact development in suburban areas that could be served by high-capacity rail services. This could be achieved through priority funding for transport and other municipal services in areas immediately adjacent to existing or potential railway stations. Similar benefits would not be available in greenfield sites. Such an approach would require tight integration of the planning, municipal services, and transport functions of the respective cities in their neighboring municipalities and with the marshals of respective voivodeships. While marshals does not have authority over the municipal authorities within their voivodeships, in relation to planning decisions they have an important role in funding and supervising suburban rail services and in funding other infrastructure that is necessary for new residential development. Placing strong emphasis on the need for sustainable planning and the importance of linking approvals of new residential development to the availability of sustainable transport would also be consistent with the EU's policy objectives.

Financial Arrangements

Gross-Cost Contracting

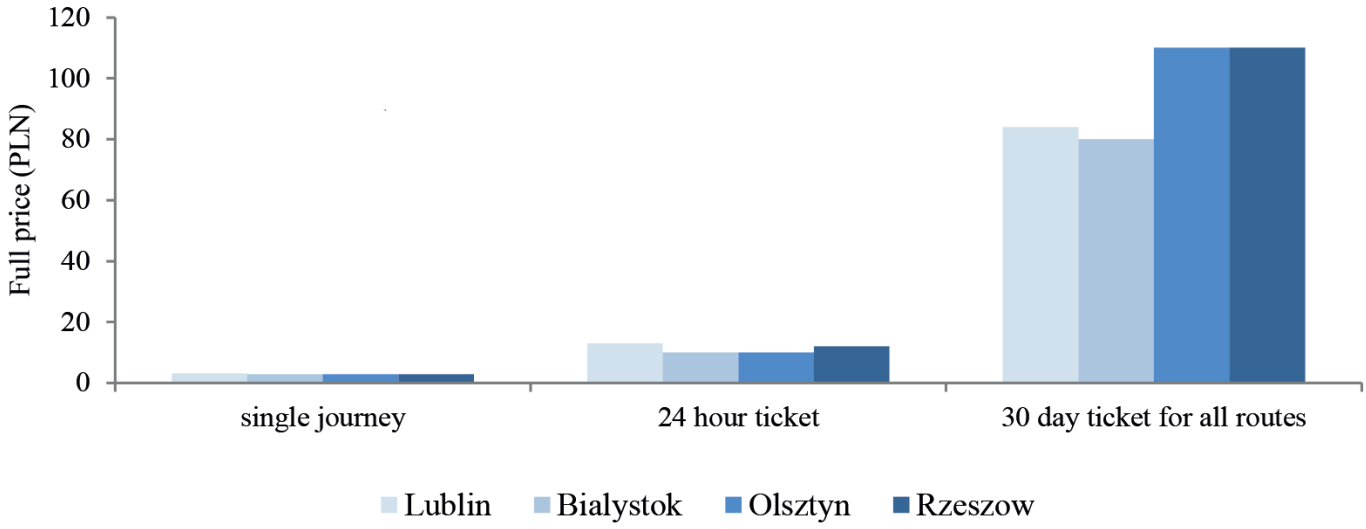
96. A gross-cost contracting model for public transport services has been adopted in Białystok, Lublin, Olsztyn, and Rzeszów, as in many cities in Poland. The urban transport authority as the contracting authority retains responsibility for specifying service frequency, fare levels, and for promoting public transport usage. Public transport authorities throughout Europe believe that they achieve value for money through regular procurement of services from private operators, which also provides a cost benchmark for internal operators. The public transport authorities in Olsztyn and Lublin already contract out limited bus services and Białystok achieves competitive tension through owning three bus operators. Rzeszów has not contracted with third parties. The experience of gross-cost contracting is relatively short in the four cities so a direct comparison of operating cost per kilometer between the municipal and private operators would not be reasonable. It is also the case that the municipal operators typically retain wider responsibilities and continue to bear legacy costs associated with the historic structure of public transport services in Poland. However, the four cities

should be able to achieve better value for bus services through a greater commitment to contracting out services over the coming years and encouraging internal operators to achieve comparable costs of operation and maintenance. It would be appropriate for the public transport authorities in each of the cities to advise municipal operators of their plans to benchmark costs against market comparators at the end of current contractual periods so that those operators have the opportunity to implement cost-reduction programs, if necessary.

Fare Structure and Types of Tickets

97. Ticketing and fares for city bus and trolleybus services are approved periodically by the city councils of the respective cities and generally offer passengers a wide range of fares. Rail fares are set by the marshal of the voivodeship, which contracts with PR to provide services, and the operators set fares on commuter bus services. Fares are generally changed infrequently. The city councils also approve discounted fares for school children, certain college students, people with moderate disability, and pensioners. Separate national legislation grants free-of-charge or discounted travel benefits to certain groups of passengers, such as members of parliament, disabled veterans, students attending certain categories of school on their way to or from those schools, and university students. Figure 15 shows the price comparison of public transport fares for different types of tickets in Białystok, Lublin, Olsztyn, and Rzeszów. The fares are similar for single-journey and 24-hour tickets, while fares in Olsztyn and Rzeszów are much higher than fares in Lublin and Białystok for the 30-day all-route pass—this may reflect the geographical reach of the routes.

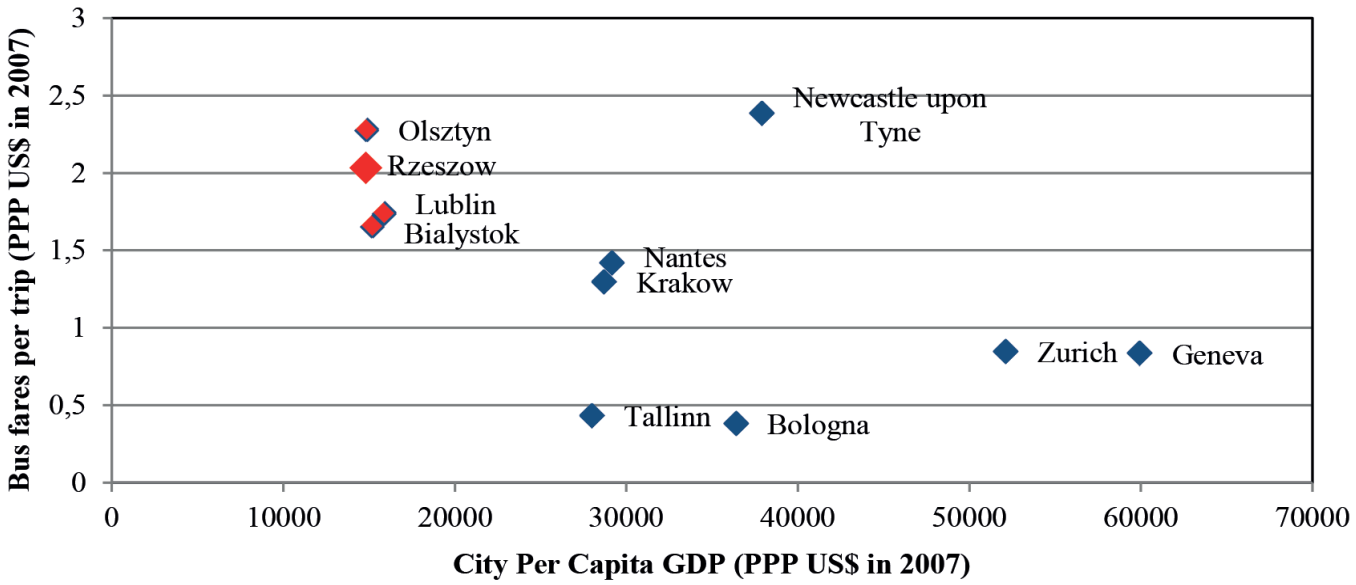
Figure 15: Public Transport Fare Comparison



Sources: Białystok, Lublin, Olsztyn, and Rzeszów

98. The level of fares among the four studied cities is within range for Polish cities, but could be regarded as high relative to municipal transport fares elsewhere in continental Europe. This is especially the case when relative income levels are taken into account, as shown in Figure 16. The fare structure gives appropriate incentives to passengers to purchase fares in advance, rather than on the vehicle, and for non-cash payment. The cities are at various stages of introducing smart-card ticketing, which will give transport authorities and operators the opportunity to simplify fare structures, reduce the cost of cash handling, and facilitate more targeted marketing by category of passenger. The highly-segmented menu of fares depending on time validity and routes included offers passengers a wide range of choices and can be accommodated and checked with smart-card technology. Many transport providers are now simplifying the range of ticket choices and dispensing with the need for passengers to commit to multiple fares in advance. Smart-card technology offers the facility to cap cumulative fares depending on the number of journeys taken and allowing validity periods to commence on any date rather than at the beginning of a week or month. Capped fares are more in keeping with changing lifestyles and transport users' reluctance to pay in advance for extended validity periods. Smart-card ticketing also facilitates integrated fares and integrated ticketing across modes where the smart-card reader can recognize that a prior stage of the journey was begun or completed within a defined period. The current institutional arrangements will need to be changed to allow transport providers greater flexibility in setting fares and negotiating arrangements across operators and modes.

Figure 16: City per Capita GDP vs. Bus Fares per Trip (2007 PPP US$)[37]



Source: World Bank

99. Polish cities have followed international practice in introducing smart-card ticketing that offers convenience to the passenger and savings to the operator through reduced fraud, shorter dwell times at stops, and less cash handling. Smart cards also offer more flexibility in setting and varying fares. However, one of the main benefits of smart-card ticketing internationally is in relation to integrating fares and ticketing across operators and modes. This potential benefit has not been realized in Poland and little effort has been made to establish a common platform for ticketing, even within metropolitan areas. Integrated ticketing would encourage more multi-modal trips through integration of fares and greater convenience to passengers. In many countries it has been an important step in facilitating better integration of information provision and scheduling.

100. A commitment to integrated ticketing in Poland would require the Government of Poland to set a common technical platform that transport providers would be obliged to subscribe to for all new ticketing schemes. Such a national standard would not restrict transport providers to purchase from a single supplier, but would require all suppliers to the Polish market to meet the standard. International suppliers of ticketing equipment and systems would oppose such restrictions and would argue that modifications to their proprietary technology would increase the cost to the operators, but they have accepted such policies in other countries and the net cost to transport in these countries has not increased as a result of common standards.

    Integration of new ticketing systems with legacy schemes adds complexity to integrated ticketing and it may be argued that such integration in Poland may not be practical considering that ticketing schemes on municipal transport in Polish cities were introduced only recently and in some cases is still under implementation. It is true that the cost of integrating new schemes with the range of proprietary technologies now in place could be very high, but this should not discourage the Government of Poland from implementing a national standard. Rail services and most commuter and regional bus services in the four cities studied do not have smart-card ticketing, but are likely to upgrade their ticketing systems at some point in the future. A national policy that would require all new PSO services for buses and any new rail-ticketing system for rail to adopt the national standard would give critical mass to such a standard. Moreover, the expected life of all ITS systems is shortening as new systems offer better functionality at lower prices. Some European transport authorities are adopting Account-Based Ticketing (ABT) in partnership with financial institutions and mobile phone operators. ABT systems require less technical sophistication on readers and smart cards with fare processing taking place remotely or cloud-based. It would be appropriate for the Government of Poland to adopt a common ticketing standard now before cities embrace a next generation of technology in an uncoordinated way.Revenue Control

101. Urban transport authorities rely on independent surveys of passengers and in some cases representative samples of public transport users. These interviewees report a very low level of fare evasion. However, public transport operators internationally, with access to vehicles similar to those in use Białystok, Lublin, Olsztyn, and Rzeszów, report fare evasion levels of 4-10 percent even when significant resources are invested in revenue protection. It is likely that cities in Poland have similarly high levels of fare evasion, particularly considering that revenue protection did not attract high priority in Polish cities prior to the transition to a market economy.

37 Fares per trip are calculated using the price of network monthly pass divided by 40, assuming that frequent riders would use monthly pass and make two trips per day with 20 work days/ travel days a month.

102. Public transport authorities and operators invest considerable management effort and financial resources in minimizing revenue lost through fare evasion. International experience shows that in the absence of effective enforcement, large numbers of otherwise law-abiding citizens can rationalize traveling on public transport without paying the appropriate fare or without paying at all. However, it is also the case that passengers who pay fares resent fare evasion by others and welcome effective revenue control. Revenue lost through fare evasion in European public transport systems can range from as little as 2 percent in London's Docklands Light Railway to up to 50 percent in Athens LRT when it was launched. Investment in effective revenue protection offers a very high return on investment up to a certain point, but generally the effort required to apprehend the final cohort of determined evaders is not worth the incremental investment. The level of fare evasion at which it is uneconomic to invest further resources depends on cultural issues such as attitudes to public authorities and the legislative support available for enforcing penalties.

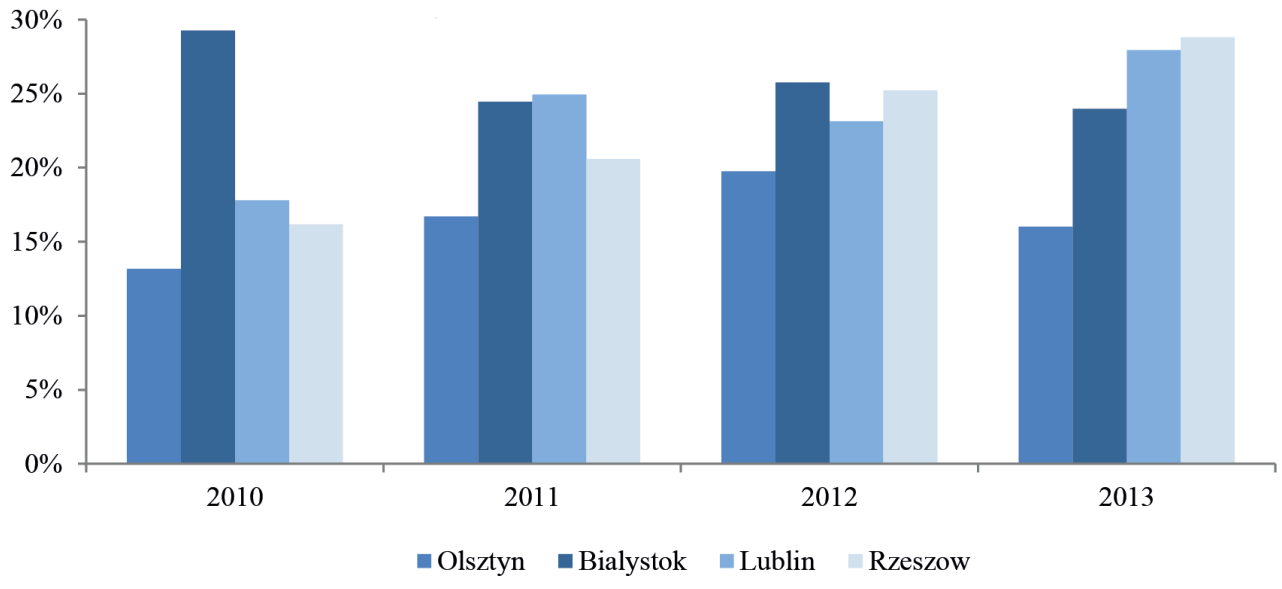
103. Some of the techniques that are generally successful in reducing fare evasion include ensuring that penalties are a genuine deterrent in terms of the multiple of fare evaded and that the penalty increases for repeat offenders. Successful prosecution of fare evaders can lead to criminal conviction in some countries such as the UK and Ireland. Transport operators often need to convince their own staff that fare evasion is a serious concern and that while certain staff is designated as revenue protection officers, there is a shared responsibility to remind passengers of their obligations and to be vigilant for patterns of evasion. Docklands Light Railway management attributes their low fare evasion to incentives paid to revenue protection staff for successful convictions. The pattern of fare inspection should be sufficiently random that passengers cannot accurately predict when they will be checked, but concentrated at times or locations where poor compliance has been observed.

104. In open systems, transport authorities designate zones on stops where inspectors may check tickets for alighting passengers who may be evading detection. Teams of revenue protection officers can be deployed at times so that there is very good coverage between stops. Transport authorities should ensure that regulations are displayed prominently and fare collection equipment is well maintained so that evaders are deprived of excuses such as ambiguity of rules or ticketing equipment being out of service. The high rate of evasion in Athens, referred to above, was related to ticketing equipment being out of order frequently making it difficult for honest passengers to purchase fares. Lastly, revenue protection needs to respond to "innovation" by evaders. Revenue protection officers should adopt new techniques regularly so that all passengers are aware of the seriousness of the transport authority in enforcing revenue control rules.

City Expenditures on Transportation

105. The studied cities are committing substantial financial resources to upgrading and operating their transport infrastructure, both for roads and public transport. For example, the total transport expenditure by the City of Lublin in 2013 was Euro 124 million, which represented 28 percent of the city's budget. Investments made by MPK Lublin, financed through EU funds, make the total higher. Urban transport has consistently received a higher proportion of capital expenditure than roads and some road expenditure, such as area traffic control and new access roads, benefits public transport. Figure 17 demonstrates the percentage of city expenditures on transport among the four studied cities. Two of the cities are showing declines of city expenditures on transport.

Figure 17: Percentage of City Expenditures on Transport



Sources: Białystok, Lublin, Olsztyn, and Rzeszów

Financial Sustainability of Planned Transport Services

106. The net cost to the City of Lublin of subventing bus and trolleybus services under PSO contracts reached EUR 27 million in 2013, which represented 6 percent of the city's budget. For Białystok and Rzeszów subventions represented 7.5 percent and 5.8 percent of the cities' budgets, respectively. However, this very low net cost to the city disguises the continuing cost of operating and maintaining city transport services. In 2013, the expenditure on maintaining new fixed infrastructure and fleet was likely to have been minimal as much of the new infrastructure was still being built or under warranty and very old vehicles were being withdrawn from service. The cost of operating and maintaining city transport services could increase by a multiple of costs reported in 2013 as EU-funded capital expenditure programs near completion and a regular program of maintenance will be required.

107. The replacement of life-expired buses and trolleybuses in Lublin with EU funding has reduced the net cost of operating and maintaining the public transport fleet for equivalent service. New buses and trolleybuses are more fuel-efficient than the vehicles being replaced and are unlikely to need replacement of parts for around the first 400,000 kilometers of passenger service. Regular preventative maintenance and well-planned life cycle maintenance should result in this new fleet of vehicles operating reliably for 15 to 20 years. Major overhaul of the public transport fleet could extend their working lives by many more years. Municipal transport operators will need to budget for this maintenance program, which is likely to require additional subvention rather than be covered by additional passenger revenue.

108. Even taking account of the greater efficiency and reliability of a new fleet of vehicles, the cost of operating and maintaining the municipal, public transport fleet of Białystok, Lublin, Olsztyn, and Rzeszów will increase substantially over time. The new vehicles have significantly more ancillary functions, which are important to attract passengers. However, the cost of operating and maintaining air conditioning, passenger information, on-board ticketing, and other modern features adds to the full cost of passenger service. The improved facilities at bus stops also add to the cost of maintaining service, including lighting and communications, revenue collection, cleaning and repair of damage due to vandalism or wear and tear.

109. In addition to factors that add to the operations and maintenance cost for an equivalent level of passenger service, the cities will need to maintain an expanded fleet of buses and a wider trolleybus and tram network in Lublin and Olsztyn that are being implemented with EU funding. As public transport is provided under gross-cost contracting, there is a high risk of these additional costs not being covered by increased fare-box revenue so the cost will be borne by the urban transport authorities. It is very unlikely that the incremental revenue will be sufficient to cover the additional costs.

110. An important consequence of a wider distribution of population in the FUA, particularly for Lublin and Rzeszów, is that the cost of operating and maintaining public transport in areas with lower density of population is substantially higher than for dense urban neighborhoods. The main costs of operating and maintaining public transport vehicles are for fuel and wear and tear, which are directly related to the kilometers traveled, and for labor costs, which depend on hours of operation. Suburban transport services, particularly to areas with low population density, will require substantially higher subvention than for city services. While municipal governments in the wider areas to be served may contribute to the additional cost of operations, the practice in Poland has been that suburban governments have been reluctant to contribute financially at a level that would compensate the city transport authority or private operators for the full costs of serving low-density neighborhoods.

111. The combined effect of these factors is that the cost of operating and maintaining the planned level of bus services in the FUAs (and trolleybus and tram services in Lublin and Olsztyn) will increase substantially over the coming years and that it would be unrealistic to expect fare-box revenues to cover that increased cost. The scale of the cost increase will depend on the level of service that will be provided to suburban municipalities and the net impact on the cities' budgets will depend on the increase in passenger numbers and neighboring municipalities' willingness to contribute to the cost of service. However, it would be reasonable to foresee a requirement to increase the cities' annual subvention to transport operations. Cities will need to plan for life cycle and other capital renewal of infrastructure to ensure that public transport continues to provide a service that is competitive with private cars. At these levels of expenditure, the financial sustainability of the planned level of service in the FUA will be a challenge for the cities. This analysis supports the need for the urban transport authorities to focus attention on increasing passenger numbers and achieving cost efficiencies in existing and replacement contracts with municipal bus operators and third-party operators. More detailed analysis of the direct and indirect operator costs should also inform decision making on the frequency of service to suburban communities.

Management of Car Access and Cycling

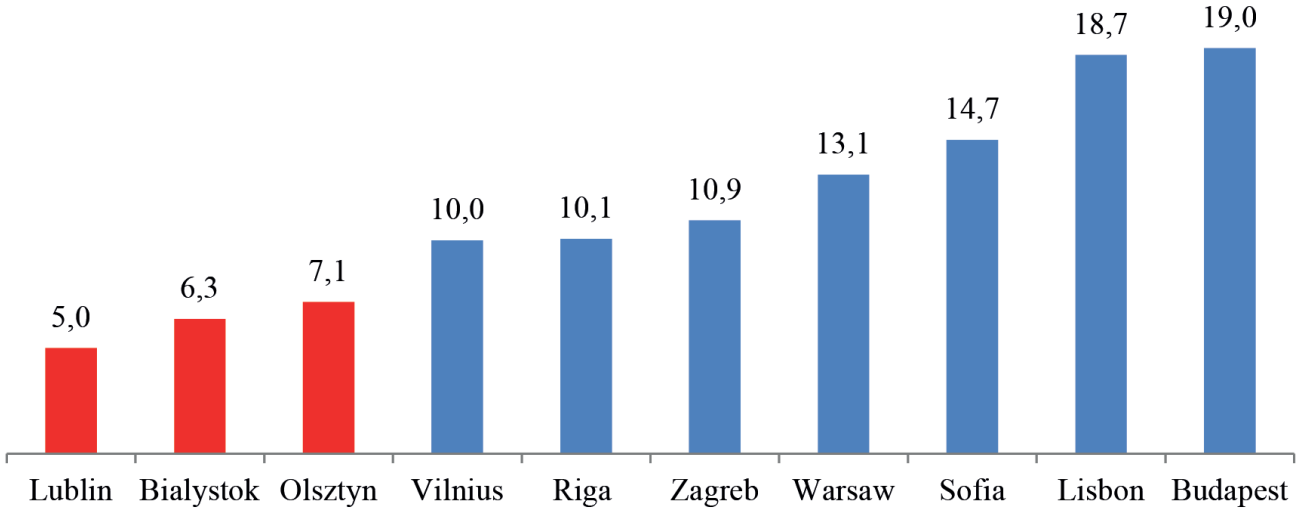
112. Białystok has regulated parking in the Market Square and adjoining streets for many years and modest charges for on-street parking were introduced in 1999. The paid-parking zone has been extended and charges increased over time in line with increased demand. Differential rates were introduced to reflect higher demand for parking and the need to increase turnover of spaces in the central business district. Payment by SMS is now allowed in addition to paper ticket-

ing. While paid parking was controversial when it was first introduced, the benefits to business and greater availability of spaces through charging are now well recognized.

113. Transport planning in Lublin has emphasized improving the quality of public transport supply, but the city has recognized the need for complementary demand management measures. Lublin introduced paid parking in designated zones in the city center in 2012. Payment is required between 8 a.m. and 5 p.m. for approximately 1,600 spaces. There is evidence of informal parking taking place immediately outside the boundaries of the paid-parking zones so the city is considering extending the geographical reach of the zones. Changed parking habits to avoid even modest charges are common when cities introduce new paid-parking schemes. Extending the zones should address this practice. It should also improve the take-up of the discounted add-on bus fares that are not used much at present. The initial paid-parking zone is well within walking distance for most people, but if the zone is extended to cover a larger area of the city, more people are likely to use buses.

114. Olsztyn has implemented paid parking in three zones extending from the City Center, but not including major residential areas. Most of the historic core of the city and business area is included in the Red Zone, which is bordered by a Yellow Zone with a lower rate, and a smaller Green Zone that is located north of the City Center with an even lower rate. The city intends extending areas subject to parking charges and reducing the spaces available in the City Center as more street space is allocated to public transport. Charges apply from 8 a.m. to 4 p.m. on Monday to Thursday and from 8 a.m. to 3 p.m. on Friday with no charges on weekends or holidays. Parking charges are modest and are structured to encourage greater circulation of spaces, particularly where the demand is likely to be highest. The city's approach of extending the total coverage of paid parking, but reducing the number of spaces where public transport supply is being increased, is appropriate.

Figure 18: Daily Parking Rate (US dollars; 2011, unless otherwise indicated)



Note: Data for Lublin, Olsztyn, and Białystok is for 2014. Available at: http://lublin.spp24.pl/wysokosc-oplat-za-parkowanie/
Sources: Colliers International (2011), Global/Central Business District Parking Rate Survey, Lublin, Olsztyn, and Białystok

115. One pricing mechanism to discourage using private cars is to adopt a policy of high priced parking, particularly if parking is expensive in relation to mass transit. An annual survey of daily parking rates from 2011 shows that parking fees vary widely in Eastern European cities. In the EU, changing parking policies are part of larger goals, such as complying with air-quality standards or reducing GHG emissions. As Figure 18 reveals, the rates in Eastern Poland are generally lower than for other European countries, particularly so for Lublin. While there is scope for increasing parking charges to encourage greater use of public transport, the World Bank considers that the most pressing policy priority is to extend the paid-parking zones to wider areas, rather than raise parking fees. Rzeszów should give priority to introducing charges for on-street parking in the Central Business District and extend that zone over time.

116. Non-motorized transport (NMT), namely cycling and walking, is an integral part of a sustainable urban mobility plan. Confronted with severe congestion and the negative environmental impact of increasing car traffic, many industrialized countries (including Canada, Denmark, Germany, Japan, the Netherlands, and the UK) are now giving more attention to the potential benefits and complementary role of non-motorized transport. The full benefits of integrated transport systems are best seen in the Netherlands, which has actively pursued a pro-NMT strategy over the past decade. In the Netherlands, the bicycle accounts for over 30 percent of total daily trips, which places it second right after the private car. The experience of Copenhagen, Denmark, also has relevance for Poland. The modal share for cycling

in Copenhagen had declined to a very low level through the 20th century, but through investment in cycle infrastructure and promotion of NMT it now accounts for a substantial share of all trips (more than 30 percent and 150,000 people cycle each day to work or educational institutions) in the city.[38] The full potential of NMT is best achieved through the development of comprehensive strategies and policies that involve all relevant levels of government with participation from all stakeholders in NMT.

117. Having the ability to move around safely, comfortably, and conveniently, on foot or by bicycle, will provide a number of benefits to residents and businesses, such as mobility, economy, health, and environment. Dedicating space to NMT has the additional benefit of calming motorized traffic and improving safety for all road users. It is therefore important to integrate NMT into the strategic plan in order to (a) increase cycling and walking as active modes of transport; (b) make cycling and walking comfortable and enjoyable choices for transport; (c) expand the network of pedestrian walkways and bike paths throughout the city; (d) create safe and inviting walking and biking environments for residents and visitors; and (e) coordinate planned improvements with other agencies having jurisdiction over elements of the transport network.

118. Białystok, Lublin, Olsztyn, and Rzeszów generally have all invested in recent years to develop bike path networks, which have been extended through projects co-financed by the EU. The push to improve infrastructure for cyclists and pedestrians is being led by the desire to make the cities more attractive to tourists, but it is also creating the infrastructure that will allow more individuals to travel within city borders using bicycles.

EU-Funded Investment Program

EU 2007-2013 Financing Perspective

119. Białystok, Lublin, Olsztyn, and Rzeszów all prepared Integrated Public Transport Projects with the aim of increasing the attractiveness of the wider public transport system through its comprehensive reconstruction. These projects are enhancing urban mobility by: (a) increasing the reliability and efficiency of public transport; (b) improving the comfort of traveling by public transport; (c) improving accessibility to public transport for people with mobility impairment or other disabilities; and (d) reducing the negative impact of the urban transport system on the environment. These projects finance infrastructure, new vehicles, modern information, and ticketing systems for public transport users, and traffic management systems. Implementation of Area Traffic Control (ATC) systems for the cities will give priority to public transport at junctions and provide real-time passenger information for display at stops and on vehicles. The cities have also invested in public transport vehicle management systems that improve the efficiency of transport operations and allow real-time regulation of buses. The projects have been implemented on a phased basis and there has been good integration between increasing capacity of the road network and improving facilities for public transport. The subcomponents of the road investment have allowed the cities to redirect transit traffic away from city centers and ensured that the design of upgraded streets in the historic core of the cities gives effective priority to sustainable modes of transport, including walking, cycling, and buses.

Box 5: Electricity Supply in Poland

Poland's electricity generation is dominated by coal: 90 percent of electricity came from coal firedpower plants in 2009. Gas-fired generation accounts for 2 percent and grew substantially over the past decade, to reach just over 3 TWh in 2009. The use of hydropower remains marginal as the potential is limited. Wind power is just beginning to make inroads into Poland's electricity generation with a share of just 0.7 percent in 2009 but there is potential for further development. Oil-fired generation has been falling slowly but steadily since 2004, in response to higher oil prices. The decline of coal's share has already started at a slow pace. In 1990, 97 percent of electricity generation was coalbased. This share fell to 96 percent in 2000 and to 90 percent in 2009. Progress has been made in recent years to reduce dependence on coal reflecting efforts to comply with the European Union's Emissions Trading Scheme and the EU-wide renewable energy target. As of 2012, according to the Polish regulator, the amount of electricity generated by coal had gone down to 88.6 percent.

Source: OECD/International Energy Agency (2011), Energy Policies of IEA Countries: Poland 2011, Review. Available at: http://www.iea.org/publications/freepublications/publication/Poland2011_web.pdf

120. Cities have replaced worn and outdated rolling stock with modern, comfortable, and environmentally friendly vehicles complying with applicable emission standards, which will contribute to reducing emissions and noise. In Lublin, new **vehicles include the purchase of 70 modern trolleybuses** and **100 modern buses** that meet the emission standard Euro 5 and Enhanced Environmentally friendly Vehicle (EEV). Olsztyn has decided to restore tram service to the city after an absence of more than 50 years. The project now being implemented comprises 11 km double track and

38 http://kk.sites.itera.dk/apps/kk_pub2/pdf/823_Bg65v7UH2t.pdf

is intended to connect the city center with residential estates with high population density to the south of the City Center. An important fact to bear in mind is that 88.6 percent of electricity in Poland—2012 data of the electricity regulator—is coal-generated and that electric vehicles, trams, and trolleybuses are less carbon friendly than would be the case if electricity were generated from other sources. Nevertheless, a modal shift from passenger vehicles to public transportation has positive GHG impacts, irrespective of the source of electricity.

EU 2014-2020 Financial Perspective

121. Białystok, Lublin, Olsztyn, and Rzeszów all intend applying for co-funding for projects under the Operational Programs (Infrastructure and Environment or Development of Eastern Poland) for the period 2014-2020. Applicants for funds under this new phase of EU funding are required to demonstrate how the proposed projects would contribute to the overall objectives of the strategies agreed in the Partnership Agreement between the Government of Poland and the EU. Central to these objectives is public transport system development in the area covered by "voivodeship Integrated Territorial Investments (ITI) Strategy." In response to this requirement, the main objectives of the proposed investments are developing sustainable urban transport and eliminating capacity deficiencies in the most important transport connections within the FUA, compared to projects under the 2007-2013 program, which focused on transport within city boundaries. In the case of Olsztyn, the focus of the projects remains within the city's boundaries as there has been less development in the suburbs. The projects in all four cities are likely to be a continuation of the integrated public transport projects initiated under the 2007-2013 framework, as well as development of Intermodal Transport Centers.
122. The cities propose to implement Intermodal Transport Centers around central railway stations that would upgrade interchange facilities for city bus, provincial bus, and rail services. This concept appears to have strong support and there is agreement among city and voivodeship authorities and relevant transport operators on the choice of location. The respective cities are taking the lead in developing the concept and preliminary designs for the centers, but there appears to be limited direct involvement in the project planning by stakeholders other than the city transport authorities. If the Intermodal Transport Centers are to achieve genuine integration between modes of transport, planning and implementation need to take into account the experience and requirements of the relevant operators. The proposed locations of the centers are at varying degrees of distance from the historic core of the cities, but reconfigured bus networks and other initiatives to integrate services across modes could overcome any disadvantages of remote location.
123. The mayors and other city managers recognize that investing in public transport is central to improving the quality of life and economic competitiveness of their cities and neighboring communities. The projects being implemented under recent EU programs for Eastern Poland have resulted in public transport offering a credible alternative to private commuting for residents of all ages and social backgrounds. Most of the sub-projects are at the final stages of implementation and appear to be well-designed and effectively implemented. It is too early to assess the impact of these investments, but the scope and scale of interventions are appropriate for mid-sized cities and are essential for achieving an objective of retaining modal share for public transport.
124. The full potential of the investment in public transport infrastructure will not be realized until there is greater integration between public transport modes and city and commuter services. Cities have made good progress in upgrading their fleets of city buses and in investing in passenger information, ticketing, and other ITS within city boundaries. They have extended these services to a limited number of suburban communities, but generally the quality of suburban bus services is poor relative to city services and they do not offer a credible alternative to commuters who have access to private cars. Heavy rail does not play a significant role in offering services to commuters and the current national investment program to upgrade railways appears to prioritize improving intercity services. Intermodal Transport Centers adjacent to central railway stations in the four cities will, on their own, achieve little in increasing patronage on heavy rail within the city agglomerations.
125. All relevant parties acknowledge the absence of modal and regional integration of public transport in Poland and the consequences of these gaps are apparent in declining service quality in city suburbs where more people live. All parties also acknowledge that it would be in the best interests of passengers to have integrated ticketing and other initiatives to facilitate interchange from one mode to another as part of an integrated network. The decentralized nature of local government in Poland and municipal authorities' autonomy in decision-making means that no agency is mandated to lead initiatives to integrate transport. In other countries, local authorities are often incentivized to cooperate through allocation of investment funds. The requirement for cities in Eastern Poland to demonstrate commitment to ITI initiatives is a first step in this direction, but the level of integration is still high and does not extend to integrating transport operations.

Conclusions From City-Level Assessments

126. The demand for high-quality public transport in the four cities of Eastern Poland that are the focus of this study has developed rapidly in keeping with changes to economic conditions and the expectations of residents of the cities and

their neighboring municipalities. The mayors recognize the importance of upgrading the supply of public transport as part of the cities' strategies to attract modern industry and to protect their environmental and cultural heritage. These objectives are aligned with the goals of the Government of Poland and the EU in supporting regional development in Eastern Poland resulting in substantial funding being made available to transform public transport supply. The cities have risen to the opportunity and have replaced a large portion of their fleets of life-expired buses with modern vehicles and associated fixed infrastructure and ITS.

127. The decision to separate the functions of a transport authority from operations is in keeping with good practice internationally. The urban transport authorities have made good progress in developing strategic skills necessary for long-term planning and project management in implementing the EU-funded projects. All of this has been achieved for most cities since 2009 and with limited staff. In planning the next phase of public transport investment and the period beyond then, when less funding will be available from the EU, it would be appropriate for urban transport authorities to consider the skills that they will need to promote greater use of public transport and to control costs. Public transport regulators internationally are seeking to exploit the value of large volumes of data being gathered by ITS to help improve service performance and customer satisfaction. They also recognize that for many users the decision to use public transport is more complex and dynamic than just the expected journey time relative to private cars so they systematically survey users, publish the data, and change service patterns.

128. The urban transport authorities are now at a stage of maturity at which they should consider developing performance management techniques and publishing the results on their websites. The output from these tools would be of value in developing future PSO contracts for the period when current contracts expire. Most transport services in the four cities in Eastern Poland are provided under contracts with municipal bus operators that will expire in the coming years, so it would be useful to have published performance data on a range of performance criteria in advance of preparing contracts for the next contractual period. The Annexes to this report give examples of how performance management regimes have been developed by other transport authorities internationally, how passengers are surveyed for a wide range of transport attributes, and how Transport for London makes use of data gathered from smart-card readers on its buses.

129. The four cities in Eastern Poland have transformed their supply of city transport with EU funding and have made public transport a credible alternative to private cars for residents of all ages and social backgrounds. The projects have generally included an appropriate balance between investment in replacing life-expired vehicles, improving accessibility of infrastructure at stops, upgrading ticketing and passenger information, and investing in traffic control systems. The scope of the projects is well integrated with other urban planning objectives such as restoring the historic heart of the city and reducing air and noise pollution. While the projects are not fully implemented, it is clear that they are being well managed and the reported outturn costs for subcomponents completed are reasonable. The management teams in the cities are to be congratulated on their achievements in delivering public transport of high international standards within a short period of time.

130. Less progress has been made in upgrading the supply of public transport in the areas surrounding cities' administrative borders and for suburban commuters accessing the cities. There has been a strong modal shift from bus to private cars among suburban residents of driving age who can afford cars. Officials responsible for regional transport have low aspirations for public transport and see it as largely for people who do not have access to cars due to age or income levels. Passenger numbers on regional bus services serving cities and neighboring municipalities are declining. The majority of connections are run commercially (with statutory discounts reimbursed by the state budge, but not covered by public service obligation contracts) and with lack of optimization of bus services related to school services and general transport services often provided by the same bus companies. The decline in patronage is due to demographic trends, increased car ownership, aging regional bus fleets, and low frequency of bus services. Poland's current institutional arrangements and resourcing for regional bus services are not conducive to reversing the decline in patronage. The fortunes of the regional bus company in some cities appear to be based on their property portfolios more than on their success in attracting passengers.

131. The four cities have a valuable resource in their inter-city rail connections and some regional services, even if they are less extensive than in some other Polish cities. Recent investments include new Electrical Multiple Units, track renewal, and, in Lublin, relocation of stops to take account of changes in settlement patterns in the metropolitan area. However, passenger numbers on commuter railway services are low and the resources of railway infrastructure are not being exploited to their potential. There is little evidence that investment decisions for system upgrading, rolling stock or new lines are integrated with spatial plans or based on population projections. The regional management teams of PR, which operates railway services, and of PLK, which manages the infrastructure, are very committed to greater use of rail transport, but are not directly involved in planning for new projects. The short length of PR contracts with marshals is not conducive to long-term planning and PR's national management appears to be focused on how to reduce the company's large debt rather than on maximizing passenger numbers. PLK's decision-making appears to be quite centralized. Cities and regions recognize the need to upgrade tracks to achieve competitive journey times

vis-ŕ-vis private cars, but there are concerns about possible priority being given to freight over passenger service and the high track access charges for operators of local services.

132. While it makes sense to build on the success of the earlier program of investments, the cities and voivodeships should now consider whether the combination of proposed sub-projects and the present institutional arrangements best meet the needs of the population in the FUAs. A growing proportion of people who work, study, and shop in the cities do not live within city boundaries. There is a widening gap between the quality of public transport offered to suburban commuters and to people within the city boundaries. This inevitably leads to greater car dependence among suburban commuters and to congestion on access routes to the City Center. All four cities have accepted the goals of the ITI strategy in their strategic planning and in their proposals for public transport development. However, the present institutional arrangements have not yet resulted in projects being planned or operations being managed in an integrated way. There is an absence of effective integration between city transport and regional services and between road-based and railway services. While this poor integration is a result of responsibility for different transport services being based on geographical allocation of responsibility, there should be no obstacle to the city and voivodeship authorities agreeing to better integration on a bilateral basis. Such an approach would be in the interests of residents within and outside the city boundaries.

133. The experience of most European countries is that expansion of urban areas based on the convenience of private developers tends to be car-dependent and is unlikely to take account of the full cost of providing transport and other municipal services to residents over the long term. Transit-led development requires careful zoning of areas that can develop in a sustainable way and where other municipal services can also be provided in an affordable way. It appears that municipal authorities adjacent to the cities in Eastern Poland have already zoned greenfield land for residential development and that there are no regional or national requirements that would encourage compact development adjacent to high-capacity transport links. The clear delegation of planning authority to individual municipalities, which collect property taxes from new development, make it extremely unlikely that the municipalities that make up the FUAs would agree voluntarily to tighter restrictions on suburban development. The consequences of these distributed planning powers should be recognized, including the increased cost of providing high-quality public transport and other services to suburban residents. It appears that imposing requirements for spatial development to take place in a more sustainable way would require intervention at a national level. This may involve development of national standards or legislative change. Any such change would be outside the remit of planning authorities in Eastern Poland.

134. All four cities propose to increase public transport usage in the FUA through development of Intermodal Transport Centers. If these proposed centers are to achieve their objective of offering high-quality interchange between rail and bus, the existing rail offer will have to be improved in parallel with development of modern buildings. The poor integration between city transport services overseen by the urban transport authorities on behalf of the cities and railway services overseen by the marshals of the voivodeships will need to be addressed. While it is appropriate that the cities should take the lead in these developments as they have project management resources, the marshals' staff and the operators of the other transport services should also be involved in planning and implementation.

135. The cities and voivodeships are all committing substantial resources to improving and operating transport infrastructure. A large proportion of the capital cost is being met by EU funds, but expanding the supply of public transport and developing an organizational infrastructure to manage contracts and services commits the authorities to continuing expenditure for operations and maintenance. This expenditure will be met from their own resources. The scope for generating increased funds from fares is limited by demographic trends and the already relatively high fares. Some ancillary revenue is generated from advertising and property leasing, but the scope to increase funds from these sources is limited.

136. The cost of operating and maintaining public transport will increase as city bus services serve lower density suburban communities. Regional buses will need to be replaced and the cost of operating railways for few passengers remains high. The convergence in salary levels between Poland and Western Europe will also increase operating costs. This suggests the need for the cities and voivodeships to focus attention on controlling the cost of providing services. City bus services are provided on a gross-cost contract model, which was an appropriate choice of contract to achieve a transformation in the quality of service. Urban transport authorities have the opportunity to encourage municipal transport operators to reduce their operating costs between now and when current contracts expire. The cities should also consider modified gross-cost provisions for procurement of future contracts that would incorporate rewards and penalties for operator performance that affects attractiveness to customers. Such contracts would retain the main responsibility for attracting passengers with the authorities, but could achieve a better alignment between the authorities' objectives and those of the operators by offering specific payments for behavior that is demonstrated to attract additional passenger numbers.

137. City management has been focused on improving the performance and attractiveness of public transport relative to private cars, which is appropriate, but it should also consider the environmental consequences of the age profile of private cars. The rapid increase in car ownership in Poland since EU accession has resulted, to some extent, from import of used cars from other EU countries. The high level of emissions from old cars aggravates the growth in emissions

from transport, which has prompted other EU governments to introduce initiatives to improve the emissions performance of the private car fleet. The Government of Poland should also consider such initiatives and reduce the risk of Poland being seen as an attractive market for the sale of high-emissions used cars.

138. The main policy intervention by EU countries has been to give financial incentives to remove old cars from use. The details of these "car scrappage" schemes have varied across the EU, but in most cases car owners have been given a cash or tax incentive of around Euro 1,000 to replace a car that is more than 10 years old with a new car. Variations on the scheme include a matching premium from car suppliers in Germany and Spain or an additional Euro 750 premium offered by the City of Amsterdam. The case made for car scrappage schemes is that they stimulate the economy and achieve environmental improvements. Car scrappage schemes have been so successful that the principle has been extended in some countries to initiatives to replace other appliances that emit GHGs such as refrigerators and central heating boilers.

139. Governments in the UK and Ireland have modified their car taxation rules to incentivize motorists to choose low-emission vehicles. Car tax in the UK and Ireland had traditionally been based on the size of engine, but over the last 10 years this system has been modified to assess car tax based on CO_2 emissions as well as engine size and fuel type. All car models are assigned to tax bands based on approved emissions standards and in Ireland the annual tax on a low-emissions hybrid car is around 10 percent of the tax on high-emissions cars. The modifications to the car tax regime were designed to be revenue neutral to the exchequer, but to change consumer behavior to favor low-emission vehicles. This objective has been realized and with less of a market stimulation effect than earlier car scrappage schemes. A car scrappage program that would stimulate demand for new cars would not be appropriate for Poland, but it would be appropriate to consider changes to tax rates on vehicles that would recognize the environmental impact of cars with poor emissions performance, many of which are imported second-hand from other EU countries.

Recommendations

140. Based on the assessment made above, the following recommendations are made for the consideration of the cities of Białystok, Lublin, Olsztyn, and Rzeszów:

- *Refocus urban transport policy across city borders.* Residents of the four cities and of their neighboring municipalities will clearly benefit if investment in transport development and management of operations were to be carried out in a more integrated way across modes and geographical boundaries. While the mandate of urban transport authorities does not extend to railways or to regional bus services, there should be no institutional obstacle to initiatives such as coordination of schedules, passenger information provision, and an agreement on integration of tickets and fares.
- *Integrate spatial land-use planning with transport*. Effective integration of spatial land-use planning with transport would bring benefits in the medium- to long-term by encouraging compact development and limiting suburbanization in keeping with the Integrated Territorial Investment (ITI). This is more difficult in the absence of national standards for sustainable planning and the devolved responsibility for planning decisions to municipal governments. However, marshals of voivodeships have discretion over the allocation of investment funds for a range of infrastructural development and when exercising that discretion they could give priority to investment in municipal infrastructure, such as water and electricity, in areas that are consistent with sustainable development. Future urban development and transport strategies for the cities and their Functional Urban Areas (FUAs) should make specific commitments to promote development within walking distance of public transport and discourage dispersed development.
- *Implement complementary measures.* In the next phase of investment, Białystok, Lublin, Rzeszów, and Olsztyn may wish to consider a more ambitious program of complementary measures that would impose a greater share of the cost of congestion on private cars. Examples of measures that would increase the attractiveness of traveling by public transport in congested areas of the city include extending the paid-parking zones within the city—in the case of Rzeszów the first step would be to introduce paid-parking zones; provision of Park & Ride facilities in the suburbs to be served by high-frequency public transport; and the creation of bus lanes in the busy access routes to the proposed Intermodal Transport Centers. The level of congestion does not call for penal measures that would be unpopular with the wider population, but interventions should focus on providing higher quality and more reliable public transport services for users. It is important that the rationale for changes, such as extending the paid-parking zones, be explained to the public as encouraging more efficient use of valuable on-street parking spaces and greater use of high-quality public transport services.
- *Upgrade content and timeliness of communication with passengers.* Urban transport authorities are encouraged to provide information on their websites on public transport service performance, including information on passenger journeys, modal share, customer satisfaction, improvement in customers' top concerns, journey time, and fleet and stations in service. They should also provide an own-branded, user-friendly Journey Planner with information about different modes of public transport and pedestrian and cycling links. Some of the cities' websites have

more accessible information about public transport services, but in all cases the transport authorities should use the websites as marketing tools for customers with Internet and smart-phone access rather than as a platform for public-service notices.

- *Control the net cost for the cities of operating larger transport networks.* The cost of operating and maintaining public transport infrastructure in all of the cities will increase corresponding to the number of buses serving a wider FUA with lower average residential density. The increase in cost in Olsztyn will be greater when tram services begin. Urban transport authorities should identify ways to control the net cost of operating public transport services, including new services to less densely populated communities in the suburbs. The best approach to control the financial exposure for gross-cost contracts is to increase passenger numbers. This should receive highest priority, but it would also be timely to consider modified gross-cost contracts that allocate some proportion of payments to improve customer satisfaction and other features that attract additional passengers. Cities should plan for a program of preventative and life cycle maintenance to optimize the whole-life cost of the new vehicles and fixed infrastructure.
- *Examine scope for broadening the tax base to ensure financial sustainability through a review of the local finance system.* Given the long-term demographics in cities—declining and aging populations—and the large investments in more expensive, high-quality public transport services, and infrastructure financed through the EU, there may be merit in carrying out a comprehensive assessment of the tax base to finance public transport services. Options for consideration could be employment taxes to finance inter-municipal transport services or changes to the way in which property taxes are calculated. Such a study would need to take into account the existing tax burden, assess whether there is scope for additional taxation, and could potentially be financed by technical assistance funds under the EU 2014-2020 financial framework.
- *Involve relevant agencies in planning Intermodal Transport Centers.* If it is confirmed that Intermodal Transport Centers are to be built near the cities' railway stations under the 2014-2020 financial framework for EU co-financed projects, the public transport authorities should ensure that the other public transport providers are active participants in planning for this initiative. Construction of Intermodal Transport Centers would be unlikely to alone generate additional patronage. At the very least, the cities should take a lead in ensuring better service integration across modes and encourage the marshals of the voivodeships and the railway companies to improve rail services. These initiatives would be worthwhile, even in advance of building Intermodal Transport Centers.
- *Control growth in GHG emissions from the transport sector.* Poland's car ownership has grown rapidly since EU accession in May of 2004. The average age of the car fleet is high relative to other EU countries. The cities should monitor and publish energy usage and GHG emissions from the transport sector, particularly to assess impact of energy efficient or alternative-fuel vehicles, both for the city itself and for the functional urban area. Participation in efforts like the Covenant of Mayors could help signal the cities' commitment to increasing energy efficiency and use of renewable energy sources on its territory.

INTER-MUNICIPAL COORDINATION

Introduction

141. As populations move to the periphery or to neighboring municipalities, it becomes critical that the organization of urban public transport services is coordinated within FUAs and not be limited to city administrative borders. This is of critical importance to Rzeszów, Lublin, Białystok, and Olsztyn in order to ensure that public transport services meet current and potential demand, as population shifts to the periphery outside city borders. This chapter briefly describes the experience of France with inter-communal urban public transport organizing authorities (*autorités organisatrices des transport urbains* or AOTU) as an example of how an EU country with high-quality urban transport services has established a legal and regulatory framework to encourage inter-communal cooperation consistent with delegation of planning powers to municipal authorities. This section will then deal with Polish examples of inter-municipal cooperation in the Gdańsk Bay area and Upper Silesia.

Inter-Communal Transport Authorities: The Case of France

142. For many years, and especially since 1999, France has favored the creation of inter-municipal jurisdictions based on large state grants that contribute to the cost of solving problems of municipal fragmentation. The Domestic Transport Orientation Law of 1982 delegated to urban transport organizing authorities (AOTU) the mission of organizing urban public transport services, and subsequent laws have added a focus on mobility plans. An AOTU can be a commune or a group of municipalities created to manage one or more areas of responsibility, including public transport. AOTUs are responsible for defining urban public transport services (frequency, type of rolling stock, operators, contractual procedures, fare system, etc.), developing urban mobility plans, procedures for financing and implementing investments and operation of urban transport networks, managing the infrastructure, regulating transport activities, and producing information on transport systems.

    Until recently, France had over 200 AOTUs, the simplest being at the level of a commune (or local administrative unit). However, municipalities can join together in inter-communal cooperation agencies, whose mandate can cover urban transport, but also urban policy and land-use planning. With over 36,000 municipalities, the approach of using inter-communal cooperation agencies for urban transport has become the norm. These can take the form of inter-communal authority boards, inter-communal authorities, urban authorities, greater urban authorities, and joint management boards. The difference between these types of agencies is on the "rigidity" of the structure, the attribution of obligatory competencies, and the extent of the power granted to levy taxes. An urban authority can be created for a population in excess of 50,000—the so-called Chevenement Law of July 1999—and its mandate includes urban transport as well as three other responsibilities out of a list of five: economic development, urban transport organization, development of community land use, habitat, and urban policy. It can also include roads and car parking. In some cases, urban authorities delegate direct responsibility for urban transport to joint management boards or inter-local authority boards. A crucial aspect of urban authorities is that their mandate can cover land-use planning and urban transport organization, allowing for the integration of urban planning and urban transport.

Box 6: CASCADE Assessment of Nantes Métropole

CASCADE is an EU-funded project led by EUROCITIES with the aim of improving the implementation of sustainable energy policies in large- and medium-sized European cities. One of the formats for mutual learning used within CASCADE is peer reviews, where a team of experts from different European cities assesses the current situation of a host city for one of the specific focal areas of CASCADE. The primary aim of peer reviews is to provide the host city with an external view on their current strategy and efforts by a team of thematic experts from different cities. The assessment identifies areas of strength and weaknesses, points out critical issues and can give suggestions for actions, networking, and mutual learning actions on local energy leadership among European cities. In the case of Nantes, the following recommendations were made:

Progress towards the set goals should be systematically followed up and the results fed back to the political leadership on a regular basis. This is partly done for modal share and traffic development, but could be deepened in the fields of energy use and GHG emissions.
Consider how private investments into sustainable transport could be stimulated and involved more. Examples are investments into energy-efficient or alternative-fuel vehicles and energy efficiency in transport, but also choice of location to reduce travel demand.
Explore possibilities to motivate developers to co-finance investments in sustainable mobility measures when building new properties, e.g. by conditions in the building permit.

Develop the links between public health and transportation more prominently. Active travel offers the opportunity for significant synergies between transport and public health policies. The potential financial benefits of active travel for the health sector should be considered in transport decisions. Consider establishing systematic cooperation with representatives for the public health sector for the promotion of active travel.
Develop the link between schools, urban planning, and transport planning both in terms of location of schools, but also by developing travel plans for schools and measures to stimulate sustainable travel to school for both students and staff.
Continue with and increase the efforts of actively involving citizens, NGOs, and companies in mobility issues.
Explore possibilities of using financial instruments to influence travel behavior and as a funding source for sustainable transport investments to a greater extent. Examples are parking fees or levies on parking lots.
Source: CASCADE

143. The law of January 14, 2014, on modernization of public territorial action (MAPAM) replaces the AOTU with the organizing authority of mobility (AOM), which now has the possibility of including in its mandate car-pooling, bike hire services, and organizing service delivery of goods in town and city logistics to minimize congestion and pollution with the transport tax funding activities. In the past, AOTUs were responsible for developing Urban Mobility Plans but did not have a mandate outside of organizing public transportation services. Policies on bicycles (bike routes, location), management of roads (traffic plans and signaling), and parking remain the responsibility of municipalities. This still raises issues of consistency and compatibility between different modes of transport although efforts are underway to address this problem, including the creation of Park & Ride facilities, for example.

144. One example of intercommunal cooperation is the Urban Community of Nantes (Nantes Métropole), a local administration constituted in 2001 that groups 24 municipalities surrounding the City of Nantes with a total population of 595,000. Nantes Métropole has various responsibilities, including for planning, urban policies, management of public services and public transport, transport facilities, and protection and improvement of environment and living conditions within its territory. It also has the responsibility for coordination, implementation, and monitoring of transport, climate change, and energy policies. In 1982, the first inter-communal structure, which included 19 municipalities, was created with a key role for urban mobility in structuring agglomeration economic development. It subsequently went through several changes to its legal status, reflecting, in part, changes in legislation. Its key objective is regional development and it has a mandate that covers mobility, economic and spatial development, housing, and urban development, among others. This means that the issue of integrating urban planning and urban transport happens within one institution.

145. Nantes Métropole is governed by an assembly of 113 elected officials appointed by the municipal councils of the 24 individual towns in the area. Nantes Métropole delegates the organization of public transportation to the *Société d'Economie Mixte des Transports de l'Agglomération Nantaise* (SEMITAN), a mixed private and public-sector company. The public transport network comprises tramway lines, an extensive network of buses, an airport shuttle bus line, and a night bus network. A single common fare system covers all these modes and extends to suburban trains within the Métropole boundaries, although SEMITAN does not operate these trains. A recent review of Nantes Métropole found that it has been strategic and consistent in its work to reduce energy consumption and climate impact from transport, together with evidence of political commitment towards sustainable transport, both through past action and current goals and plans.[39]

Polish Experience with Intermunicipal Cooperation

146. In the existing legal and organizational framework in Poland, the easiest and most popular way of expanding public transport networks to suburban areas is by entering into bilateral agreements between the city and its surrounding communes, transferring organizational competences from the latter to the former in exchange for covering the deficit of the sub-network that is subject to the agreement. This method, which refers to bus transport only, is popular in Eastern Poland, but not as widespread as in other metropolitan areas. In order to make this approach more attractive, cities should offer potential partner municipalities transparent algorithms of cost and revenue estimation, including individual tendering of lines, clear revenue allocation, and the possibility to determine service quality level. There is less traffic congestion in suburbs so these services typically have lower costs per vehicle-kilometer, but may have higher costs per passenger-kilometer than for urban services. It is likely that suburban municipalities would accept service using secondhand vehicles with fewer ancillary features than the new air-conditioned vehicles favored by the cities, but that have higher operating costs. In some cases a fare union between the city and the association of surrounding municipalities (as in KZK GOP – MZKP case described below) may be a good solution to connect one fare system and different quality needs.

39 CASCADE (2012). Energy Efficient Urban Mobility in Nantes Metropole. Feedback Report from the CASCADE Peer Review Available at:http://nws.eurocities.eu/MediaShell/media/CASCADE%20PR%20feedback%20report%20%20for%20Nantes.pdf

147. Polish law does not provide much scope for special metropolitan arrangements, as there is no specific regulation governing metropolitan areas or even a legal document that would clarify the delimitation of a metropolitan area. Under the present legal framework, metropolitan areas may either start informal cooperative initiatives or establish formal associations of municipalities or counties (but not both at the same time).[40] The association created may be a separate legal entity to be financed and managed jointly by several local governments. The current structure of self-government in Poland, that delegates powers to local authorities, is only 20 years old and with some exceptions of single-target associations, there is little tradition of metropolitan cooperation or development of relationships across jurisdictional boundaries. Development of effective associations would require municipalities to compromise on particular issues and transfer powers that they received rather recently. This is not easy to achieve. International experience suggests that the development of cooperation needs to be encouraged through incentives provided by the central government, which is not the case in Poland.[41] In what follows, the experience with inter-municipal cooperation in the Gdańsk Bay region and Silesia will be presented, as they provide a template of what can be achieved under the existing legal framework in Poland.

Tricity (Trojmiasto)

148. The Tricity metropolis (unofficial name) is constituted of the three largest cities, Gdańsk, Gdynia, and Sopot, and seven municipalities. The full metropolitan area has 1.2 million inhabitants. Since 2004, the Metropolitan Council of Gdańsk Bay, established on the initiative of the marshal, has operated in the region. Regular monthly meetings are attended by mayors of all the member municipalities and have led to agreements regarding the coordination of public transport within the metropolitan area. The head of the council is the marshal of the Pomorski Region. Other members are mayors of member counties and municipalities. The main areas of focus of the council are (a) public transport; (b) marketing, promotion, and coordination of common investments; and (c) joint applications for EU funds. Some of the key issues discussed in the council have been the restructuring of Fast Urban Rail, the delimitation of the Gdańsk Metropolitan Area, and the Concept of the Spatial Development Plan of the Metropolitan Area. The activities of the Metropolitan Council were overtaken by the creation of new associations: the Metropolitan Association for Public Transport in the Gulf of Gdańsk/Gdańsk Bay (organizing public transport) and by the Gdańsk Metropolitan Area (GOM) association (other activities, including promotion, spatial planning and managing Integrated Territorial Investments).

Metropolitan Association for Public Transport in the Gulf of Gdańsk

149. The Metropolitan Association for Public Transport in the Gulf of Gdańsk (MZKZG) registered as a municipal association on June 5, 2007. It is located in Gdańsk and members include Gdańsk, Gdynia, Sopot, as well as four other cities and seven municipalities.[42] The association consists of a General Assembly and a board—the chairman of the board is appointed for one year and each year the new chairman is from a different municipality. Members of the General Assembly include mayors of municipalities as statutory members of the association and additional representatives of the municipalities, which are elected by municipal councils, are a function of the population of each municipality. Urban transport authorities in the association include the (a) Public Transport Authority of Gdańsk (ZTM Gdańsk); (b) Public Transport Authority of Gdynia; (c) Public Transport Operator in Wejherowo (MZK Wejherowo); (d) Fast Urban Railways (SKM); and (e) Regional Railways, *Przewozy Regionalne* (PR).[43] The main task of the association is to develop transport policy and manage public transport within the metropolitan area. Key activities have included (a) development and approval of public transport fares and settlement of metropolitan income generated by fares; (b) market research, planning, and programming of development of public transport; and (c) the use of an integrated fare system. Initially, two models of integration were considered: the creation of a separate association and contractual arrangements without the creation of an association. Politicians selected creation of an association, even though a team of experts from the University of Gdańsk recommended the contractual approach. The next stage in inter-municipal cooperation would involve organizational and functional integration within the Gdańsk Bay and would include the introduction of uniform fares throughout the area, coordination of various modes of transport, and optimization of

40 Lackowska, Marta, and Karsten Zimmermann (2011), New Forms of Territorial Governance in Metropolitan Regions? A Polish-German Comparison. European Urban and Regional Studies 2011 18: 156-169. The legal basis for the establishment of the association is the Local Government Act of March 8, 1990, which provides that the obligation to the organization of public transport is the responsibility of municipalities. At the same time it also provides the ability to create (e.g. in urban areas) inter-municipal organizations.

41 Swianiewicz, Pawel, and Marta Lackowska (2007). From Doing Nothing to Metropolitan Government Institutions? Governing Metropolitan Areas in Poland. Available at: www.vrm.ca/documents/Montreal_Swianiewicz_Lackowska.pdf

42 This includes the cities of Gdańsk, Gdynia, Pruszcz Gdański, Reda, Rumia, Sopot, and Wejherowo, as well as seven municipalities (Kolbudy, Kosakowo, Luzino, Pruszcz Gdański, Szemud, Wejherowo, and Zukowo).

43 The area of operation of (a) ZTM Gdańsk is Gdańsk, Sopot (together with ZTM Gdynia), Kolbudy, Pruszcz, Gdański, Zukowo; (b) ZTM Gdynia is Gdynia, Sopot (together with ZTM Gdańsk), Kosakowo, Reda, Rumia, Szemud, Wejherowo, Zukowo; (c) ZTM Wejherowo is Wejherowo, Reda, Rumia, Luzino; and (d) Urban Railways (SKM) within the area of Gdańsk operates trains from Luzino to Cieplewo.

timetables. This stage envisages the association taking on the functions of the individual public transport authorities within the Gdańsk area, including communication, marketing, and setting common standards regarding quality of services. This has not been achieved to date, firstly because municipalities have wanted to keep fare revenues in their budgets in order to improve their credit ratings, and later, because of different quality standards and cost levels of different operators (especially railways, that have no active organizing authority). Nevertheless, in the context of the next EU financial perspective, MZKZG is planning to replace the existing electronic ticketing system with a newer one allowing better integration. It will include private, self-financing bus services. The creation of the Regional Transport Authority, planned for 2017, will facilitate the process.

150. Integrated ticketing allows a person to make a journey that involves transfers within or between different transport modes with a single ticket that is valid for the complete journey across modes. The purpose of integrated ticketing is to encourage people to use public transport by simplifying transfers between transport modes and by increasing the efficiency of the services. The association has moved in the direction of fare integration by allowing passengers to purchase one ticket, which is valid within the Gdańsk area. The association has created a metropolitan single-fare ticket (excluding trains) as well as 24-hour, 72-hour, and monthly metropolitan tickets valid on buses, trams, trolleybuses, and SKM trains as well as trains from PR within the Gdańsk Area.[44] Apart from metropolitan tickets, it is possible to use tickets that are valid only with the public transport operators under the responsibility of ZTM Gdańsk, ZTM Gdynia, MZK Wejherowo, and SKM. At present, there are six different public fare systems in the area:
    (a) fares applicable for Gdańsk buses and trams and surrounding municipalities that transferred their public transport organization competences to Gdańsk (five municipalities);
    (b) fares applicable for Gdynia buses and trolleybuses and surrounding municipalities, that transferred their public transport organization competences to Gdynia (eight municipalities);
    (c) fares applicable for Wejherowo buses, and surrounding municipalities, that transferred their PT organization competences to Wejherowo (four municipalities);
    (d) fares applicable to SKM trains;
    (e) fares applicable to PR trains; and
    (f) an integrated MZKZG fare system.
151. Integrated MZKZG tickets have gained rising ridership. Between 2008 and 2013, revenues rose from PLN 5 million (Euro 1.2 million) to PLN 20 million (Euro 4.8 million) and the number of tickets sold from around 100 000 to around 500 000. Currently, sales revenue is rising about almost 10 percent annually. An estimated 4 percent of passengers using metropolitan long-term tickets have stated they had not bought season public transport tickets before.
152. The revenue from integrated ticketing is distributed according to the following rules: (a) 60 percent of the revenues from tickets, including railways are transferred to railway operators (52 percent to SKM and 8 percent to PR); (b) half of the remaining funds are distributed between the communal authorities proportional to supply (number of vehicle-kilometer); and (c) the other half of the remaining funds is distributed according to the results of a survey, conducted at ticket sales points of mobility on the previous day. MZKZG is financed by its member municipalities, which refund its costs as well as the difference between regular and metropolitan ticket prices. Both are distributed between members proportional to the number of inhabitants and amount, respectively PLN 1.50 (Euro 0.36) and PLN 3 (Euro 0.72) per inhabitant.

Gdańsk Metropolitan Area

153. Gdańsk Metropolitan Area (GOM) is the association responsible for the metropolitan development of the area. GOM also acts as secretariat for Integrated Territorial Investment (ITI), although ITI contract parties also include non-GOM members, especially Gdynia. GOM intends to prepare a low-emission strategy and metropolitan transport strategy for the area comprising some, but not all, of its member municipalities. It also aims to prepare a metropolitan spatial development plan. Currently a study gathering all communal development plans has been prepared. It reveals gaps in the planning process, including areas not covered by any plan and different underlying assumptions. Detailed guidelines for the municipalities have been prepared. These are to be used in future spatial development plans.

Public Transport Municipal Association for the Upper Silesia Industrial Area

154. The Public Transport Municipal Association for the Upper Silesia Industrial Area in the Katowice metropolitan area (Upper Silesia) is the largest and most densely urbanized region in Poland, comprising 17 cities and a population of 2.2 million. One long-lasting example of cooperation is the Public Transport Municipal Association for the Upper Silesia Industrial Area (KZK GOP) in the Katowice metropolitan area, which consists of around 12 cities of com-

44 The standard price for a single-fare ticket is PLN 3.20 (Euro 0.77) and PLN 1.60 (Euro 0.38) for reduced fares. For a 24-hour ticket the price is PLN 20 (Euro 4.81) and PLN 10 (Euro 2.4) for reduced fare. For a 72-hour ticket the price is PLN 40 (Euro 9.62) and PLN 20 (Euro 4.81) for reduced fare.

parable size. Since 1991, a large part of public transport has been delivered by KZK GOP.[45] The Public Transport Municipal Association of Upper Silesian Industrial District was established in 1991. The objectives of the association are to (a) organize local public transport; (b) conduct studies for the development of the public transport system; (c) promote public transport services; and (d) initiate and coordinate projects for traffic management and parking in cities. Key activities performed by KZK GOP include the organization of public transport, fare policy, raising finance, development of ICT, fostering relations with surrounding municipalities, and integration of transport within the framework of KZK GOP. Two projects are currently under implementation with co-funding from EU funds: ŚKUP (Box 8) and dynamic passenger information.

155. The association was created as an answer to problems which occurred in the early 1990s, just after the former stated-owned company was separated into independent companies, based around the different depots and co-owned by a small number of municipalities. At first, integration was based on a rule that companies would accept one another's tickets, but this led to an increased focus on distribution at the expense of public transport operations. An association was created immediately after it was permitted by the legal framework. This initiative had the support of a number of city mayors, led by the mayor of Sosnowiec. The association consists of a General Assembly and a board. The nine board members are appointed and dismissed by the assembly. The assembly members are the municipalities. The assembly, which has oversight of KZK GOP, is composed of the marshal and mayors of municipalities participating in the association.

156. From the beginning, all competences in public transport organizations were transferred from the municipalities to KZK GOP, with full downstream financing. They were fully financed by participating municipalities with no state funding as in countries such as France or Germany. One-third of the financial contribution paid by the municipalities to the association was based on a fixed percentage of the participating municipalities' total income, and two-thirds by the number of vehicle-kilometers driven within the territory of the given municipality. Then, for many years, the municipalities' financial contribution was a fixed percentage of their total incomes—this fixed percentage was kept at a low level to encourage participation—contributing to the overall poor quality of public transport as there was little possibility for a single commune to obtain better quality public transport.

Box 7: KZK GOP Strategy 2008-2020

The Strategy of KZK GOP for 2008-2020 states the key objectives for the association during this time period. It updates an earlier strategy document and was necessary due to the changes to the Development Strategy of the Province of Silesia for 2000-2020 in 2005, the development in 2004 of the Integrated Plan for Development of Public Transport in the Upper Silesian Conurbation, and the creation of the Upper Silesian Metropolitan Association in 2007. In 2007, a study, *Diagnosis of the Conditions of Transport System and Plan for Development of Public Transport in the Area of Activities of KZK GOP,* was prepared by Ernst & Young. The strategy recognizes two basic trends faced by Upper Silesia: (a) declining population, with an average annual fall in population of 0.6 percent over 2002-2006; and (b) massive rise in motorization rate, from 290 vehicles per 1,000 inhabitants in 2003, rising to 346 in 2006. Both negatively impact the number of passengers using public transport.
With regard to public transport services, key directions include: (a) managing public transport service provision as the main organizer of public transport in the region; (b) coordination of public transport services within the Upper Silesia; (c) increasing quality requirements stipulated in contracts for service provision, including use of energy efficient vehicles; and (d) implementation of quality monitoring system for services provided (GPS-based vehicle tracking, dynamic passenger information displays).

Regarding fare and ticketing policy, key directions include: (a) implementation of electronic ticketing through the development of the ŚKUP card; (b) increased ticket inspection activity; and (c) gradual development of passenger service centers and ticket vending machines. The strategy recognized that cost-recovery is not possible because of national statutory fare discount policy, as well as the need to provide unprofitable services to meet certain transport objectives. The strategy argues for efforts to change the existing fare discount policy, including transferring those responsibilities to local governments or refunding the law-imposed discount rates.

In the area of improved integration within the Upper Silesia Conurbation, key directions include (a) introduction of electronic ticketing system; (b) promotion of transfer system in journeys within the conurbation; (c) cooperation with municipalities and non-municipal entities, including solutions regarding location of parking to meet Park & Ride objectives; and (d) establishing and developing transfer centers.

Source: KZK GOP. Available at: http://www.kzkgop.com.pl/strony/p-1-strategia.html

45 The name of the association in Polish is Komunikacyjny Związek Komunalny Górnosląskiego Okręgu Przemysłowego. Currently, the KZK GOP includes Katowice, Bytom, Bobrowniki, Będzin, Chełm Śląski, Chorzów, Czeladź, Dąbrowa Górnicza, Gierałtowice, Gliwice, Imielin, Knurów, Mysłowice, Piekary Śląskie, Pilchowice, Psary, Pyskowice, Radzionków, Ruda Śląska, Siemianowice Śląskie, Siewierz, Sławków, Sosnowiec, Sośnicowice, Świętochłowice, Wojkowice, and Zabrze. See http://kzkgop.com.pl/strony/p-l-geneza.html

157. As a result, since 2007 gradually and since 2012 in full, the contribution was calculated based on the individual deficit of a given line, estimated as the difference between the number of passengers (from representative passenger counting) multiplied by an average income per passenger (uniform across the network) minus real costs. The deficit is split between the municipalities, basing on the number of vehicle-kilometers within the territory of a given commune. This leaves the municipalities much more freedom in setting their own quality requirements, although in case of longer lines, a compromise between a number of municipalities is required. There is no distinction between different passengers' profitability (for example, single, regular ticket vs. season, reduced), but this would require much more complex and expensive research. Further development of the scheme is planned, after the introduction of ŚKUP e-ticketing.

Box 8: Silesian Public Services Card (ŚKUP)

Silesian Public Services Card (ŚKUP) is a system allowing the processing of payments for services provided by public institutions. The system will allow the use of different services: transport, culture, sports and recreation, library or paid parking. It will also be a platform for the exchange of information between the participants and residents. Participants of the project are: KZK GOP, which oversees its implementation, as well as 21 cities in the Silesian agglomeration. The project has received funding from the European Regional Development Fund under the Regional Operational Programmeme of Silesia 2007-13.

The project addresses the implementation of electronic public services in 120 institutions in the area of 21 municipalities. ŚKUP introduces in the voivodeship a single strategy on pricing policy in the area of transport and parking. This will allow for the development of demand for the products of the institutions involved in the project, including through the implementation of a coherent fare discount policy tailored to the specific user groups. It will also apply special tariffs for specific groups of users.

Source: http://www.kartaskup.pl/strony/p-1-dwadziescia-jeden-miast-we-wspolnym-systemie.html

158. KZK GOP has cooperated with the regional railway operator Koleje Śląskie by offering "Silesian Ticket," a monthly ticket that is a combination of routed railway ticket and chosen public transport ticket both at discounted prices (by 20 percent) with possibility of additional statutory discounts, separately for railway and public transport. Currently this is rather a niche offer. KZK GOP cooperates also with neighboring association MZKP (Intercommunal Association for Public Transport) in Tarnowskie Góry. The latter remains an independent association in terms of contracting and scheduling, but does not issue its own tickets, accepting only KZK GOP tickets. The revenues are distributed using a fixed, contractual formula, based on passenger number estimation for past periods. Unfortunately, in the cities of Tychy and Jaworzno, separate public transport ticketing systems exist. Those cites are perceived to have better quality public transport and are afraid to lose that quality after integrating. They also have separate e-ticketing systems and their incompatibility increases integration barriers.
159. Since the entry in force of the 2010 Transport Act KZK GOP can no longer contract services with non-member municipalities. Integration of urban public transport with railways is made difficult by the existing regulatory framework as railway discounted tickets are co-financed by the state budget, while integrated public transport tickets are not. In addition, the net-cost model used in railways and gross-cost model used in public transport cause some compatibility challenges.
160. In mid-1993, a number of fare systems operated in parallel in the Upper Silesia Industrial Area, with different fare systems for each tram and bus sub-system. However, in that year KZK GOP took over the system of bus organization in 16 municipalities. In 1999, a common bus-tram ticket was developed.[46]

Silesian Metropolis

161. The Silesian Metropolis (*Metropolia Górnośląska*), formerly known as the Metropolitan Association of Upper Silesia, is a territorial entity operating on the principle of metropolitan municipality composed of 14 adjacent cities in the Polish province of Silesia. It was established in 2007. The seat of the metropolitan council is Katowice, the largest district of the Silesian Metropolis. The aim of the union is the creation of a strong metropolitan center with pooled resources, an internationally competitive profile and unified management of common infrastructure. Its main focus is planning and joint application for EU funds, and not joint provision of services. The territorial entity lobbies for legal reform that would allow it to have the status of a metropolitan organization based on obligatory cooperation. According to its statutes, the entity has a number of tasks, including:

46 More details can be found in Polish at http://www.kzkgop.com.pl/strony/p-1-geneza.html.

- Establishing a common development strategy for municipalities participating in Silesian Metropolis in accordance with the Law on Spatial Planning and Development so that this is factored in when preparing municipal spatial development plans;
- Execution of the tasks covered by the common strategy of city development; and
- Raising funds from domestic and foreign funds earmarked for the implementation of the tasks of the territorial entity (currently only funding for strategic documents and studies has been acquired).

Silesian Metropolis consists of an assembly and a management association (executive body). Cities appoint two delegates to the assembly (including the mayor), with the exception of Katowice, which appoints three delegates. Delegates to the assembly are appointed by city councils while the management association is elected by the assembly.

Conclusion

162. Reform of local government in Poland that delegated responsibility for planning and transport to municipalities and other local government authorities left a gap in administration for activities that cross municipal boundaries. This gap is most obvious when a metropolitan area straddles a number of independent jurisdictions and where a large proportion of transport trips cross these boundaries. Public transport needs to be organized to respond to this pattern of trip making if it is to offer a credible alternative to private cars.
163. The phenomenon of cities expanding beyond their historic boundaries is common across Europe and elsewhere. Local governments have found ways of sharing responsibilities and coordinating transport provision. This necessarily involves authorities agreeing to transfer power to a wider metropolitan authority and contributing financially to the provision of transport in the interests of the wider community. National governments often encourage metropolitan-level coordination through legislative requirements for adjacent authorities to integrate plans and through financial support for projects that cross boundaries. These structures are compatible with delegated responsibility for planning and transport.
164. Some metropolitan areas in Poland have agreed to share responsibility and financing for transport provision and operations on a voluntary basis. Polish legislation facilitates these structures and helps to set standards for governance. The Government of Poland has not provided direct financial support for inter-municipal associations, but it welcomes applications for funding under EU programs from the associations on behalf of the constituent municipalities. The associations are also consistent with the ITI policies promoted by the EU and the Government of Poland.
165. The organization of rail transport in Poland and the financial support provided by the Government of Poland through statutory discounts tend to undermine efforts to coordinate transport across municipal boundaries. For example, while compensation is available from the national government for railway tickets for certain categories of passengers, this compensation is lost if rail tickets are integrated with bus or tram tickets in urban areas. The local authorities would then need to compensate for this discount from their own budgets. While this is likely to be an unintended consequence of the statutory discount scheme for rail travel, it is an example of how national regulations and funding do not give sufficient attention to the need to encourage metropolitan structures for public transport.
166. The best examples of inter-municipal coordination of transport provision in Poland are from metropolitan areas where there are a number of constituent cities of approximately comparable size. These metropolitan authorities also incorporate small municipalities, but there is little risk of decision-making and funding being dominated by a single municipality. While there is undoubted complexity in bringing together a large number of autonomous authorities, and the governance arrangements have evolved over time, it may be easier to establish structures in areas with a number of large cities than in Eastern Poland where the regional capital dominates in terms of size and resources.

Recommendations

167. The cities of Eastern Poland could develop structures that would promote and support public transport services for metropolitan areas rather than being based on the needs of city residents. The following recommendations are made to the Government of Poland and to the cities to encourage inter-municipal structures for public transport planning and operation:
    - *Remove existing barriers to inter-municipal cooperation for transport*. The statutory concession schemes that compensate local transport operators for granting free or discounted fares to certain categories of passenger prevent integration of fares and ticketing. This is most obviously the case for railway services, but is also relevant for bus services outside PSO contracts for the time being. The Government of Poland could consider reviewing its compensation schemes for statutory discounts and introduce structures and payment mechanisms that support integration across municipal boundaries and modes of transport. This could be done at the earliest opportunity to avoid suburban and regional bus services being withdrawn in anticipation of further market liberalization after 2017. The marshals of the relevant voivodeships could consider tendering for PSO contracts for bus services between the major cities and their neighboring municipalities.

- *Give explicit preference to applications for funding under EU and other programs that are based on inter-municipal structures.* Applicants for funding under the 2014-2020 financial perspective are required to demonstrate a commitment to ITI policies. However, there is a high level of cooperation implicit in the ITI memoranda of understanding entered into by cities and their neighboring municipalities in Eastern Poland. It would be appropriate for the Government of Poland to consider giving greater strength to ITI policies by allocating more funds to initiatives that demonstrate improvement in transport that cross municipal boundaries.
- Formal agreements between cities and neighboring municipalities can mitigate the risk of weaker parties being dominated by stronger partners. The size and resources of the regional capitals in Eastern Poland, relative to their neighboring municipalities, inevitably give rise to concerns that the interests of the stronger partners would dominate those of the smaller ones in any agreements. For their part, the city administrations may have concerns that neighboring municipalities with limited resources would not contribute proportionately to improved public transport. The Ministry for Infrastructure and Development could consider developing a draft agreement suited to the needs of a metropolitan area that is dominated by a city, but with population sprawl to neighboring communes. This draft agreement would set out mutual commitments to transparency, shared decision-making, and equitable financial contributions to be negotiated at a local level. To further support such agreements, the Government of Poland could commit to providing additional financial support to initiatives developed by the inter-municipal associations that will make measurable contributions to national policies such as the National Plan for Regional Development and National Plan for Spatial Development.

ANNEX 1
LIST OF PERSONS MET

BIAŁYSTOK

1. Adam Poliński
   Deputy President (Mayor)
   City of Białystok
2. Piotr Firsowicz
   Director of Urban Development Department
   Białystok City Hall
3. Tomasz Buczek
   Director of Strategy and Development Department
   Białystok City Hall
4. Marzenna Dubowska
   Deputy Director of Roads and City Investments Department
   Białystok City Hall
5. Bogusław Prokop
   Director of Białystok Urban Transit Authority
   Białystok City Hall
6. Leszek Maciej Lulewicz
   Director of Infrastructure and Environmental Protection Department
   Marshal's Office of Podlaskie Voivodeship
7. Henryk Toczydłowski
   Deputy Director Infrastructure and Environmental Protection Department
   Marshal's Office of Podlaskie Voivodeship
8. Elżbieta Załuska
   Director of Przewozy Regionalne Sp. z o.o.
   Podlaskie Branch of Przewozy Regionalne
9. Anna Cieśluk
   Head of Section
   Marketing and Sales Section
   Przewozy Regionalne Sp. z o.o.
   Podlaskie Branch of Przewozy Regionalne
10. Dariusz Wojtan
    CEO
    Przedsiębiorstwo Komunikacji Samochodowej w Białymstoku SA [Road Transport Enterprise in Białystok]
11. Józef Piotr Klim
    Deputy CEO
    Przedsiębiorstwo Komunikacji Samochodowej w Białymstoku SA [Road Transport Enterprise in Białystok]
12. Daniel Górski
    Director of Regional Development Department
    Marshal's Office of Podlaskie Voivodeship
13. Janusz Ostrowski
    Municipal Road and Investments Authority in Białystok
14. Andrzej Jacek Kierman
    Director
    PKP PLK Branch in Białystok

LUBLIN

1. Grzegorz Siemiński
   Deputy Mayor of the City of Lublin
2. Tomasz Fulara
   CEO – General Director
   Urban Transport Enterprise Lublin Sp. z o.o.

3. Michał Zdun
   Director
   Department for Transport Policy and Roads
   Marshal's Office of Lubelskie Voivodeship
4. Marek Musiej
   Branch Manager
   Department for Regional Operating Programme
   Projects Evaluation Section
   Marshal's Office of Lublin Voivodeship
5. Andrzej Satke
   Operations Director
   Urban Transit Enterprise Lublin Sp. z o.o.
6. Jerzy Leziak
   Coordinator for Organization and Ownership Supervision
   Przedsiębiorstwo Komunikacji Samochodowej " Wschód" SA [Road Transport Enterprise "East"]
7. Justyna Mądry
   Director
   Przewozy Regionalne Sp. z o.o.
   Lublin Branch
8. Grzegorz Malec
   Director
   Urban Transportt Authority in Lublin
9. Sławomir Podsiadły
   Deputy Director for Transport
   Urban Transit Authority in Lublin
10. Ryszard Witkowski
    Deputy Director for Economic Issues
    Chief Accountant
    Urban Transit Authority in Lublin
11. Mr. Kazimierz Pidek
    Director
    Municipal Road and Bridges Authority in Lublin
    Lublin City Hall
12. Mariusz Sagan,
    Director
    Strategy and Investor Relation Unit in Presidential Department
    Lublin City Hall
13. Elżbieta Matuszak
    Director
    Planning Unit in Investment and Development Department
    Lublin City Hall
14. Bernadeta Krzysztofik
    Director
    EU Funds Unit in Investment and Development Department
    Lublin City Hall
15. Eugeniusz Janicki
    Deputy President of the Board
    Engineers and Transportation Technicians Association in Lublin (SITK – Stowarzyszenie Inżynierów i Techników Komunikacji)
16. Grzechulski Zygmunt
    Director
    PKP PLK Branch in Lublin
17. Andrzej Celejewski
    President
    Lubelskie Dworce Company

OLSZTYN

1. Piotr Grzymowicz
   Prezydent (Mayor)
   City of Olsztyn
2. Magdalena Onych
   Presidential Plenipotentiary for Urban Transport Project Implementation
   Olsztyn City Hall
3. Jerzy Roman
   Director of Roads and Transportation Authority in Olsztyn
4. Magdalena Rafalska
   Director of City Development Unit
   Olsztyn City Hall
5. Krzysztof Śmieciński
   Urban Investment Department
   Olsztyn City Hall
6. Marek Malinowski
   Director
   EU Funds Unit
   Olsztyn City Hall
7. Stanisław Wojciechowski
   Director
   Olsztyn Branch of Przewozy Regionalne
8. Ireneusz Merchel
   Director of
   Railway Lines Branch in Olsztyn
   PKP Polskie Linie Kolejowe SA
9. Bogusław Żmijewski
   Advisor to the Mayor of Olsztyn
   Coordinator of Advisors and Assistants Team
   Olsztyn City Hall
10. Mieczysław Królak
    CEO
    MPK Olsztyn [Olsztyn Public Transit Enterprise]
11. Jacek Semczuk
    CEO
    General Director
    PKS Olsztyn - Przedsiębiorstwo Komunikacji Samochodowej w Olsztynie SA [Bus Transport Enterprise in Olsztyn]

RZESZÓW

1. Tadeusz Ferenc
   Prezydent (Mayor)
   City of Rzeszów
2. Anna Raińczuk
   Director of City Development Office
   Rzeszów City Hall
3. Stanisława Bęben
   Director
   European Funds Office
   Rzeszów City Hall
4. Paweł Potyrański
   Deputy Director
   European Funds Office
   Rzeszów City Hall

5. Daniel Kozdęba
   European Funds Office
   Rzeszów City Hall
6. Andrzej Sowa
   Deputy Director for Investments
   City Roads Authority in Rzeszów
7. Łukasz Mikołaj Dziągwa
   Urban Transit Authority in Rzeszów
8. Lesław Kornak
   Director
   Department of Roads and Collective Public Transit
   Marshal's Office of Podkarpackie Voivodship
9. Adam Hamryszczak
   Deputy Director
   Regional Development Department
   Marshal's Office of Podkarpackie Voivodeship
10. Jan Lech
    Deputy Director of
    Infrastructure and Transport Department
    Marshal's Office of Podkarpackie Voivodship
11. Anna Kowalska
    Urban Transit Authority in Rzeszów
12. Jerzy Churawski
    Director of
    Przewozy Regionalne Sp. z o.o.
13. Marek Filip
    CEO
    Urban Transit Enterprise – Rzeszów Sp. z o.o.
14. Piotr Klimczak
    President of
    MKS - Intercomunnal Urban Transportation Company
15. Wiesław Szeliga
    CEO
    Przedsiębiorstwo Komunikacji Samochodowej w Rzeszówie SA [Road Transport Enterprise in Rzeszów]
16. Piotr Klimczak
    Deputy Mayor of Boguchwała
    Boguchwała City Hall
17. Marian Sulencki
    Chairman
    SITK RP branch in Rzeszów
    Association of Engineers and Technicians of RP
    Branch in Rzeszów

MINISTRIES/GOVERNMENTAL AGENCIES

1. Monika Pałasz
   Director
   Supra-Regional ProgrammesDepartament
   Ministry of Infrastructure and Development
2. Stanisław J. Sudak
   Deputy Director
   Department for Coordination of Development Strategies and Policies
   Ministry of Infrastructure and Development
3. Jan Niemczyk
   Department for Zoning Policy
   Urban Development Section
   Ministry of Infrastructure and Development

4. Anna Rudowska
   Department for Supra-regional Programs
   Management Section 1
   Ministry of Infrastructure and Development
5. Maciej Berliński
   Director of
   Infrastructure Projects Department
   Polish Agency for Enterprise Development
6. Monika Łyk
   Head of Section for Transport Projects and Large-Size Projects
   Infrastructural Projects Department
   Polish Agency for Enterprise Development
7. Sebastian Głąbicki
   Senior Specialist
   Section for Transport Projects and Large Size Projects
   Infrastructural Projects Department
   Polish Agency for Enterprise Development

RAILWAY SECTOR – NATIONAL LEVEL

1. Dariusz Liszewski
   Member of the Board
   Director for Technical and Operations Issues
   Przewozy Regionalne Sp. z o.o.
2. Marcin Mochocki
   Board Plenipotentiary for Strategy and Planning
   PKP Polskie Linie Kolejowe
3. Krzysztof Mrozicki
   Head of Division
   Office for Strategy

GDAŃSK

1. Dr. Hubert Kołodziejski
   Chairman of the Board
   Metropolitan Association for Public Transport in the Gulf of Gdansk Bay
2. Michał Glaser
   Executive Director
   Gdańsk Metropolitan Area
3. Sławina Klawiter
   Project Manager
   Gdańsk Metropolitan Area

KATOWICE

1. Prof. Grzegorz Dydkowski
   Vice-Chairman of the Board for Development
   Public Transport Municipal Association for the Upper Silesia Industrial Area
2. Krzysztof Sobański
   Vice-Director for Operation
   Public Transport Municipal Association for the Upper Silesia Industrial Area
3. Wojciech Gorgoń
   Head of Unit for Research & Development
   Public Transport Municipal Association for the Upper Silesia Industrial Area
4. Anna Urbanek
   Specialist
   Public Transport Municipal Association for the Upper Silesia Industrial Area

ANNEX 2
THE EUROPEAN FRAMEWORK

Introduction

Cities are home to over 70 percent of the EU population and account for some 85 percent of the EU's GDP—the proportion of the population residing in urban areas is projected to rise to 82 percent by 2050.[47] Most trips begin and end in cities. Increasing demand for urban mobility in many cities has resulted in congestion, poor air quality, high noise emissions, and high levels of CO_2 emissions. The Europe 2020 Strategy and the legislative package from the European Commission provide EU member states a framework and means for moving towards a greener and more competitive low-carbon economy that makes efficient use of resources and is resilient to climate risk. As a member state of the EU, the Government of Poland is committed to fighting climate change and pursuing low carbon development. The integration of mitigation actions into Poland's national policies, programs, and strategies will be a critical step in shifting its development path towards a climate-resilient, low-carbon, and green economy.

Transport is responsible for around a quarter of EU greenhouse gas emissions making it the second-biggest GHG emitting sector after energy. Road transport alone contributes about one-fifth of the EU's total emissions of carbon dioxide (CO_2), the main GHG. While emissions from other sectors are generally falling, those from transport have increased 36 percent since 1990. The EU has policies in place to reduce emissions from a range of modes of transport, such as including aviation in the EU Emissions Trading System (EU ETS) and CO_2 emissions targets for cars. GHG emissions generated from transport are among the fastest growing in Europe, posing a challenge in creating a low-carbon future as economic development has been paralleled with a modal share increasingly dominated by cars.[48] This modal shift has been driven by a number of factors, including growing affluence, suburbanization, and falling land-use densities in urban areas, which have translated into more widespread vehicle ownership, increasing trip numbers and lengths, while reducing the financial viability of public transport and non-motorized transport. Thus, Eastern European countries are moving towards EU motorization rates for passenger transport—with much higher GHG emissions growth than in the EU-15, although overall levels remain lower. Without any changes to transport policy, these trends in Eastern Europe, and in Poland, are likely to continue unabated in the next decades.

Decoupling GHG emissions from the transport sector and economic growth, or at least lowering the emissions intensity of future transport growth, represents a key challenge and will require departure from the "business as usual" policies in the transport sector.[49] As noted in the EU's 2011 White Paper on transport, the main issue facing the transport sector is how to reduce the system's dependence on oil without sacrificing efficiency and compromising mobility. Curbing mobility is not an option. Concerns about climate change are not likely to be the key driver of transport policies or investment decisions. Instead, local co-benefits—such as reduced traffic congestion and noise, improved air quality and road safety, or enhanced energy security—are much more likely to drive the development of transport policies.[50] Looking at congestion levels and trends towards increased motorization in Polish cities, it becomes apparent that the issue is as much a classic problem of transport and urban planning as it is a GHG emission problem. Co-benefits can motivate discussions on improved transport policies that are also GHG-friendly policies.

This Annex presents a brief overview of the EU's transport strategy and policies, before presenting the funding framework for 2014-2020 Operational Programmes (OPs) and the European Commission's Position Paper for Poland, outlining its vision of the key urban transport priorities to be financed under the 2014-2020 programming period. This provides the broad context in which the OPs for urban transport are prepared, which is important as this is the key source of financing for new urban transport infrastructure projects for the cities of Białystok, Lublin, Rzeszów, and Olsztyn.

EU Transport Strategy and Policies

There are several formal documents adopted by the EU that are relevant for Poland's urban transport sector. Key among them is the European Commission White Paper *Roadmap to a Single European Transport Area: Towards a Competitive*

47 European Commission (2013), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions: Together Towards Competitive and Resource-Efficient Urban Mobility, Brussels, 17.12.2013, COM(2013) 913 final. Available at: http://ec.Europa.eu/transport/themes/urban/doc/ump/com(2013)913_en.pdf

48 In the case of the EU-27 in 2007 CO2 emissions from the transport sector accounted for 25.1 percent of the total, up from 18.1 percent in 1990. Projections from the European Environment Agency estimate that the sector's emissions will increase by 25 percent over 1990-2020, whereas they are expected to decline from industrial and energy sectors.

49 OECD/International Transport Forum (2008), Greenhouse Gas Reduction Strategies in the Transport Sector. Preliminary Report. Paris: OECD /International Transport Forum.

50 James Leather and the Clean Air Initiative for Asian Cities Center Team (2009), Rethinking Transport and Climate Change, Asian Development Bank Development Working Paper Series No.10, December 2009.

and Resource Efficient Transport System adopted in March 2011.[51] The White Paper is a key document setting the targets and directions for transport sector development. EU transport policy is focused on assuring sustainable mobility for people and goods with a strong emphasis on contributing to very ambitious GHG emissions targets set for the EU as a whole. More specifically, the policy and related activities are expected to significantly reduce Europe's dependence on imported fuels (mostly oil) and cut carbon emissions in transport by 60 percent by 2050 compared to 2005. A key goal for urban transport is to halve the use of "conventionally-fuelled" cars in urban transport by 2030; phase them out in cities by 2050; and achieve essentially CO_2-free city logistics by 2030.

The European Commission adopted the Green Paper *Towards a New Culture for Urban Mobility* on September 25, 2007. With the Green Paper, the commission set a new European agenda for urban mobility. The Green Paper does not propose concrete policy measures, but rather launches a further debate on possible options for action. It structures the main challenges related to urban mobility around five themes: (a) free-flowing towns and cities, (b) greener towns and cities, (c) smarter urban transport, (d) accessible urban transport, and (e) safe and secure urban transport. This new consultation helped identify actions that were included in an Action Plan on Urban Mobility. The European Commission adopted the Action Plan on Urban Mobility on September 20, 2009.[52] The Action Plan recognizes that developing efficient transport systems in urban areas is an increasingly complex task with both congested cities and greater urban sprawl. Public authorities have an essential role in providing the planning, funding, and regulatory framework. The Action Plan proposes 20 measures to encourage and help local, regional, and national authorities achieve their goals for sustainable urban mobility. These measures are structured around six themes: (a) promoting integrated policies, (b) focusing on citizens, (c) greening urban transport, (d) strengthening funding, (e) sharing experience and knowledge, and (f) optimizing urban mobility. With the Action Plan, the European Commission presented for the first time a comprehensive support package in the field of urban mobility.

Box 9: EU Initiatives Supporting Sustainable Multimodal Urban Mobility

There are a number of initiatives from the EU to improve urban mobility, including CIVITAS, ENDURANCE, and CH4LLENGE. CIVITAS was launched in 2002 to redefine transport measures and policies in order to create cleaner, better transport in cities. More specifically, CIVITAS has helped introduce numerous innovations and measures that have already made transport more eco-friendly in over 60 European metropolitan areas dubbed "demonstration cities." Thanks to an EU-funded investment of well over EURO 200 million, the project has guided cities to introduce improvements in four phases of the project, each building on previous successes. Examples include a public transport ticketing system in Tallinn, Estonia; a 100 percent clean bus fleet in Toulouse, France; waterborne goods transport in Bremen, Germany; and a new traffic control system in Bologna, Italy.

ENDURANCE is an EU-wide establishment of enduring national and European support networks for sustainable urban mobility, co-funded through the Intelligent Energy Europe Program of the EU. ENDURANCE aims to assist cities and regions with developing Sustainable Urban Mobility Plans (SUMPs) by facilitating networking, mutual learning, and sharing of experience and best practice across countries. Objectives include:

- Establish engendering national SUMP networks in all EU countries and Norway;
- Establish an enduring and integrated European SUMPs audit, training, and policy transfer network;
- Activate 250 cities in Europe to engage in SUMPs and their implementation; and
- Raise awareness about SUMPs and its benefits at national and European-level institutions.

Strategic objectives for the long term (2020) include establishing SUMPs as major urban policy supported on a local, national, and European level and reducing modal share of the car by on average 5 percent in 400 of the 483 cities with above 100,000 inhabitants in Europe.

CH4LLENGE's focus is addressing four challenges to sustainable urban mobility planning. Achieving sustainable, energy-efficient and environmentally friendly transport systems is one of the key aims in Europe. Cities frequently face major barriers while creating their own SUMPs. In CH4LLENGE (2013-2016), nine European cities and eight supporting organizations have teamed up to overcome the four most pressing challenges in sustainable urban mobility planning: stakeholder participation and citizen involvement, institutional cooperation between sectors and disciplines, identification of the most effective policy measures, and monitoring and evaluation of progress in SUMP development. Polish cities have been active in these initiatives—Gostyń, Gdynia, Kraków, and Warsaw in the case of CH4LLENGE.

Source: CIVITAS, ENDURANCE, and CH4LLENGE

51 European Commission (2011), White Paper: Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System. Brussels, March 28, 2011, COM (2011) 144 final.

52 European Commission (2009), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, Action Plan on Urban Mobility, Brussels, COM(2009) 490/5. Available at: http://ec.Europa.eu/transport/themes/urban/urban_mobility/doc/com_2009_490_5_action_plan_on_urban_mobility.pdf

The European Commission adopted a new Urban Mobility Package on December 17, 2013. The commission will reinforce the exchange of best practice, provide targeted financial support, and invest in research and development. In addition, it is encouraging the development of "sustainable urban mobility plans" to stimulate a shift towards cleaner and more sustainable transport in urban areas. The central element of the Urban Mobility Package is the Communication *Together Towards Competitive and Resource Efficient Urban Mobility.*[53] It is complemented by an annex that sets out the concept of SUMPs, as well as four Staff Working Documents on urban logistics, urban access regulations, deployment of ITS solutions in urban areas, and urban road safety. With the 2013 Urban Mobility Package, the commission reinforces its supporting measures in the area of urban transport by: (a) sharing experiences, showcasing best practices, and fostering cooperation; (b) providing targeted financial support; and (c) focusing research and innovation on delivering solutions for urban mobility challenges. The SUMP concept considers the functional urban area and proposes that action on urban mobility be embedded into a wider urban and territorial strategy. These plans should be developed in cooperation across different policy areas and sectors (e.g. transport, land use and spatial planning, environment, economic development, social policy, health, road safety, etc.); across different levels of government and administration; as well as with authorities in neighboring areas. It highlights citizen and stakeholder, and fosters changes in mobility behavior.

Box 10: EU Guidance on Sustainable Multimodal Urban Mobility

In the context of the EU 2014-2020 financing perspective, the EU has issued a draft thematic guidance fiche on Sustainable Multimodal Urban Mobility, which provides an overview of key elements the European Commission expects to see in urban transport projects. These include: (a) urban mobility as a component of an urban integrated approach, which takes into account access to services and of mobility from home to work; (b) intelligent urban transport to cover functional urban areas; (c) sustainability mobility, including not only public transport, but cycling and walking.

Member states need to demonstrate how their investments will contribute to climate change objectives, as urban mobility has been moved to thematic Objective 4, which supports the shift towards a low-carbon economy across all sectors. The European Commission would like to see in the Operational Programmes an integrated approach based on a comprehensive mobility concept for a city or functional urban area, address all passenger and freight modes, moving and parked. Investments should be accompanied by additional measures to ensure take up of supported new transport systems. The strategic focus should be on making non-car mobility more attractive than cars, supporting greener, fuel-efficient vehicle technology and alternative fuels.

Indicators to monitor progress in achieving specific objectives set in Operational Programmes should be realistic. These could include for urban public transport, door-to-door travelling time in minutes on representative routes, GHG emissions from transport in kT of $C0_2$ equivalents, average speed per km as compared to free-flow speed to measure reductions in congestion.

The European Commission has commissioned guidelines for the development and implementation of sustainable urban mobility plans, which are available at:

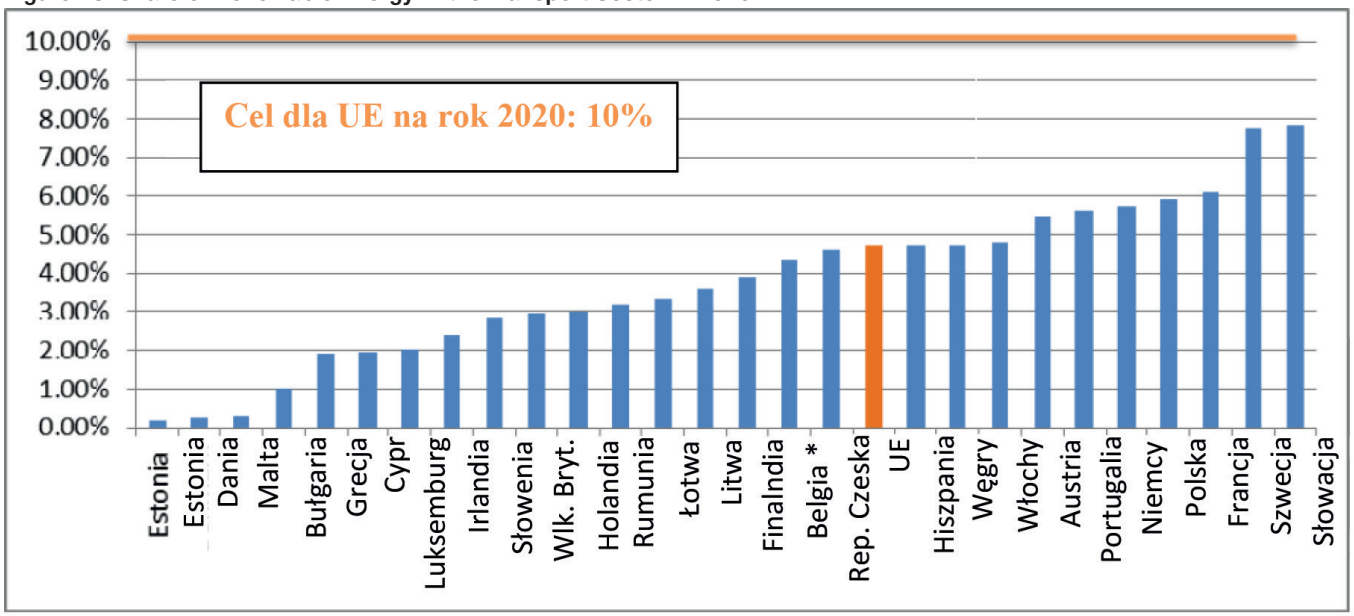
http://www.eltis.org/sites/eltis/files/guidelines-developing-and-implementing-a-sump_final_web_jan2014b.pdf

Source: European Commission

In order to ensure complementarity, the country-specific strategic and policy directions should be coherent with the EU-level transport strategy, as well as countrywide specific programs and policy measures. In practice this means that national-level strategy, programs or master plan(s) should complement and "transpose" the guidelines from the European Commission White Paper and other important components of EU urban transport sector policy framework into Poland's transport sector. In addition, any regional, local or municipal transport strategies or programs should complement and be fully coherent with national-level policies and EU policies. Therefore, Poland's transport strategy and policies should be internally coherent and complement the EU transport strategy and policies by translating EU-level documents into Polish reality. While all EU member states have to follow the general directions of the EU transport policy, they also have significant flexibility in designing their own transport strategies, programs, and implementation arrangements reflecting country-specific needs in infrastructure development programs and policy measures. At the same time, country-level strategies should be aligned with and contribute to EU transport policy goals.

53 European Commission (2013), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, Together Towards Competitive and Resource-Efficient Urban Mobility. Brussels, 17.12.2013, COM(2013) 913 final. Available at: http://ec.Europa.eu/transport/themes/urban/doc/ump/com(2013)913_en.pdf

Figure 19: Share of Renewable Energy in the Transport Sector in 2010[54]



Source: European Commission

The European Commission undertook a recent assessment of progress towards achieving the Europe 2020 targets, which were to create 20 percent of energy consumption from renewables and increasing energy efficiency by 20 percent by 2020. Poland's national targets include GHG emissions 14 percent higher compared to 1990 levels, 15.48 percent share of renewable energy in gross final energy consumption, and 10 percent use of renewables in transport. Poland needs to make a continued effort to increase the share of renewable energy used in transportation, which has an EU-wide target of 10 percent (Figure 19). The 2010 rate is 5.9 percent. There is a need for further efforts aimed at reducing the energy intensity of the transport sector, as well as raising the use of renewable energy powering the transport system. As this report will emphasize, there is a need to make investments in the urban transport sector that can contribute to an increase in the modal share of cleaner transport modes, public transport, not only because of GHG considerations, but because it makes sense when confronting issues such as congestion and overall efficiency of the cities' urban transport system. The European Commission is taking stock of the Europe 2020 strategy and EU level target—the analysis finds that the EU is on course to meet or come to meeting the energy targets. New proposals concerning the Europe 2020 strategy are expected in early 2015.[55]

Table 1: Europe 2020 Targets

Europe 2020 Headline Target	Poland's Current Situation	Poland's National Target
20% reduction in GHG emissions compared to 1990	-4.5% (2020 projections compared to 2005) +12 % (2020 emissions compared to 2005)	14% (national binding target for non-ETS sectors compared to 2005)
20% of energy from renewables including	9.5% (2010)	15%
10% use of renewables in transport	5.9% (2010)	10%
20% increase in energy efficiency	96.9 Mtoe (2010)	96 Mtoe (reduction by 13.6 Mtoe compared to business as usual scenario)

Source: European Commission

54 http://ec.Europa.eu/clima/policies/g-gas/progress/docs/13_energy_and_ghg_en.pdf

55 European Commission (2014), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions, Taking Stock of the Europe 2020 Strategy for Smart, Sustainable and Inclusive Growth, Brussels, 5.3.2014, COM(2014) 130 final, Available at: http://ec.Europa.eu/Europe2020/index_en.htm

EU Funding in 2014-2020 Programming Period

It is important to understand and briefly discuss the three most relevant EU funding mechanisms available to Poland for supporting urban transport programs and investments during the period 2014-2020. Cohesion Policy will remain an important element of the upcoming 2014-2020 programming period and annual EU budgets. An innovation under the current programming period is the focus on integrated territorial strategies.

As integrated territorial strategies are vital for the achievement of the smart, sustainable, and inclusive Europe envisaged by the Europe 2020 strategy, the Common Provisions Regulation governing use of EU funds[56] introduces the Integrated Territorial Investment (ITI) initiative as a key instrument to implement such strategies, which is of particular relevance for urban transport activities financed through EU funds. This provides a flexible mechanism for formulating integrated responses to diverse territorial needs, without losing the thematic focus through which cohesion policy is linked to the Europe 2020 Strategy. The ITI is a tool to implement territorial strategies in an integrated way. It is not an operation, nor a sub-priority of an OP. Instead, ITI allows member states to implement OPs in a cross-cutting way and to draw on funding from several priority axes of one or more OPs to ensure the implementation of an integrated strategy for a specific territory. As such, the existence of ITI would provide flexibility regarding the design of OPs and enable the efficient implementation of integrated actions through simplified financing.

The actions to be implemented through ITI shall contribute to the thematic objectives of the relevant priority axes of the participating OP(s), as well as the development objectives of the territorial strategy. They can be financed by the European Regional Development Fund, European Social Fund, and Cohesion Fund, but it is not compulsory to combine all funds in each ITI. Nevertheless, it is encouraged that ITI combine with other funds as the integrated approach requires that soft investments be linked to investments in physical infrastructure. This is particularly relevant in the case of sustainable urban development. It is important to underline that ITIs can only be effectively used if the specific geographical area concerned has an integrated, cross-sectoral territorial strategy. Compared to the 2007-2013 period, the financial framework in 2014-2020 focuses on a reinforced integrated approach to urban challenges, while the introduction of the ITI allows for the implementation of Operational Programmes in a crosscutting way within integrated urban strategies that encompass functional areas and therefore go beyond the borders of city jurisdictions. This is an important change in focus, which forces cities to develop plans and strategies beyond city border jurisdictions, helping to address an important lacunae in city planning in Poland.

The Common Provisions Regulation set out the means to achieve consistency with the economic policies of the EU and its member states, coordination mechanisms among the European Structural and Investment Funds (ESIF) and with other EU policies and instruments, horizontal principles and crosscutting policy objectives.[57] It lays down arrangements to address territorial challenges, suggests action with high value-add, and sets out the principles and the priorities for action. Based on a proposal put forward by the European Commission, the European Council concluded on February 7-8, 2013, that "Climate action objectives will represent at least 20 percent of EU spending in the period 2014-2020 and therefore be reflected in the appropriate instruments to ensure that they contribute to strengthen energy security building a low-carbon, resource-efficient, and climate-resilient economy that will enhance Europe's competitiveness and create more and greener jobs."[58]

The Common Provisions Regulation defines 11 Thematic Objectives, which will contribute to the implementation of the EU's strategy for smart, sustainable, and inclusive growth. Of particular relevance are Thematic Objective 4, supporting the shift toward a low-carbon economy in all sectors and Thematic Objective 5, promoting climate change adaptation, risk prevention, and management, representing mitigation and adaptation climate action, respectively. The fund-specific regulations define particular investment priorities for each Thematic Objective. In this manner, ESIF can significantly contribute to the achievement of the climate objectives and the transition to a low-carbon and climate-resilient economy.

56 Regulation (EU) No 1303/2013 of the European Parliament and of the Council of December 17, 2013, laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development, and the European Maritime and Fisheries Fund, and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006. Available at: http://ec.Europa.eu/digital-agenda/en/news/eu-regulation-common-provision-regulation-cpr

57 European Commission (2013), Draft Assessment of Climate Action: How to Assess the Mainstreaming of Climate Action in Operational Programmemes. ERDF and CF. European Regional Development Fund and Cohesion Fund 2014-2020.

58 The EC has prepared a draft methodology for tracking climate change-related expenditure. The commission recommends managing authorities use multiple codes for major projects. The approach involves two phases; (a) attaching weights to the codes under the intervention category; (b) in the case of intervention fields with a zero weighting, the information could be filtered through Thematic Objective N.4 "supporting the shift to the low carbon economy in all sectors" and Thematic Objective N.5 "promoting climate change adaptation, risk prevention, and management." The financial data reported (in connection with codes which generally have a weighting of 0 percent) under these two climate-related thematic objectives would be counted as contributing to the climate objective with a 40 percent weight. The draft nomenclature of categories of intervention for transport has a 40 percent coefficient for urban transport infrastructure projects. The decision on how the 20 percent of climate change expenditure for all Operational Programmes will be applied is a decision left to each member state. It remains to be defined how this target will be applied, and whether transport will need to make a contribution larger than 20 percent. It will potentially affect the final modal composition of the proposed infrastructure investments.

The mainstreaming of climate action across the Operational Programmemes will be assessed, with a focus on those investment priorities that have the greatest potential for climate action. For each of the priority axes, the climate assessment will cover the relevant investment priorities, the types of actions, and selection of operations. The assessment will verify consistency between, on the one hand, the strategic approach and the anticipated contribution to the Europe 2020 strategy and, on the other, the specific objectives, anticipated actions, and principles for selection of operations. The assessment will furthermore investigate how the principle of sustainable development has been addressed. A key indicator for climate action at member state level is the share of ESIF support that will be used for climate-change objectives. This relates to the target that climate-related expenditure will correspond to at least 20 percent of the EU budget in the period 2014-2020. The indicative share envisaged for the program will be assessed against this objective and against the program's scope.

In line with EU transport policy, the Polish Partnership Agreement[59] and drafts of two national OPs foresee explicitly the use of EU financial support for sustainable and energy efficient (green) urban transport and encourage local authorities to develop specific projects. The draft Operational Programmeme Infrastructure and Environment (OPIE), the largest program, has about Euro 20 billion allocated to transport—out of Euro 27.5 billion—from the European Regional Development Fund (ERDF) and Cohesion Fund and Operational Programmeme for Eastern Poland (OPEP) providing around Euro 1.1 billion (of the total Euro 2.1 billion) of additional financial assistance for transport from ERDF to five least-developed Eastern Poland regions. The regional capitals of four of these regions (Rzeszów, Lublin, Białystok, and Olsztyn) are the subjects of the World Bank's technical assistance project, hence they will be eligible for EU support through these two OPs. In addition, they can benefit from support from ERDF via the respective Regional Operational Programmes managed by their regional self-government partners (Podkarpackie, Lublin, Podlaskie, and Warmian-Masurian voivodeships).

The allocations for urban and functional area transport systems available through different OPs to the four Eastern Poland regional capital cities covered by this technical assistance may reach in total Euro 1.0 billion—on average Euro 250 million per city. The draft OPs for Poland contain specific allocations for sustainable and energy-efficient (green) urban transport. As part of the OPIE there are two explicit investment priorities mentioned, which could provide funding for urban transport: (a) Priority 4.5, development of low-emission urban transport in providing services to residents within the functional areas of the towns, for which over Euro 2 billion is allocated; and (b) Priority 7.4, improvement of the status of national railway connections and the railway system in the urban functional areas and development of low-emission urban transport in providing services to residents within the functional areas. In addition to these two areas, the OPEP also foresees support under Priority 7.2, improvement in accessibility of urban areas not connected to the backbone road network. Although the precise amount of EU funding for urban transport in 2014-2020 is hard to estimate precisely at this stage, based on draft OPs and cautious assumptions, the total allocation for urban transport project for all Polish cities may reach Euro 4 billion. Given that the draft OPEP alone contains almost Euro 0.85 billion for the five Eastern Poland capital cities, Euro 250 million as the average allocation per city seems quite feasible.

Given the prominent role of sustainable urban mobility in the EU strategy and significant funds earmarked for the Polish cities under EU financial support package many cities are advancing identification and preparation of candidate projects for 2014-2020. Most of the projects proposed are likely to continue and expand activities initiated under ongoing EU financial perspective. The period 2014-2020 offers significantly larger funds for urban and metropolitan transport, since these may reach Euro 4 billion.

On Dec 22, 2014 the EC approved five of six national Operational Programmes for Poland, including Infrastructure and Environment and seven of 16 of the Regional Operational Programmes for Polish voivodeships. The remaining ones are expected to be approved in early 2015. As any expenditures related to eligible projects incurred after January 1, 2014, will most likely qualify for retroactive financing from EU funds, many cities interested in EU support are advancing preparation of the necessary local strategic framework documents and project-level documentation for their investment projects.

European Commission Position Paper on Poland

As the bulk of financing for new urban transport projects in Białystok, Lublin, Rzeszów, and Olsztyn will be through the European Structural and Investment Funds in 2014-2020, these investments need to be in line with EU policies and strategies on climate change in order that EU funding allocations can be agreed. The European Commission has prepared a Position Paper that sets out its views on the main challenges faced in Poland and on funding priorities.[60] The main points of that paper that relate to the urban transport sector are discussed below.

59 The Partnership Agreement for EU financial assistance to Poland for 2014-2020 was accepted by the EC on May 23, 2014. Partnership Agreement is a general high-level, strategic-level document governing the EU assistance to Poland in 2014-2020. It refers to the EU and Polish strategic context and development priorities, defines priority areas for EU support, formulated general results expected, and sets the framework for more detailed arrangements to be provided through a set of Operational Programmemes.

60 European Commission (2012), Position of the Commission Services on the Development of Partnership Agreement and Programs in Poland for the Period 2014-2020, Ref. Ares (2012)1138133 - 28/09/2012.

Under the thematic objective of promoting sustainable transport and removing bottlenecks in key network infrastructure, one of the key objectives is the development of environmentally friendly transport systems and the promotion of urban mobility. In this regard, the Position Paper lists as priorities:

- Develop intelligent urban transport systems, urban sustainable mobility plans, environmentally friendly and low-carbon transport systems, promote clean vehicles and implementation of schemes for in-city user, charging and access restrictions. Intelligent urban transport should cover the FUAs in order to improve urban-rural linkages and provide access to jobs and services from rural areas, too. Harmonize different modes of transport and service providers;
- Develop well-functioning intermodal transport system by investing in construction of multi-modal and interoperable nodes;
- Facilitate the shift of road freight transport to other transport modes; and
- Support the development of the necessary infrastructure for promotion of alternative low-carbon fuels in road and non-road transport.

The paper emphasizes the need to ensure the financial sustainability of investments through the preparation and implementation of an appropriate maintenance strategy by applying the "polluter pays" and "user pays" principles. Revenues from pricing systems need to be used to finance maintenance costs. This is an important point as many of the public transport projects financed under the EU will require costly maintenance in order to ensure that they continue to meet the expectations of passengers in terms of quality of service. The paper also highlights that in order to meet the National 2020 target for GHG emissions and renewables, there is a need to "step up efforts to improve incentives for investment in energy generation and efficiency" and for the transport sector, an increase in the share of renewable energy, including use of biofuels.

Conclusion

This Annex has presented an overview of the EU strategy and policies for urban transport, as well as an overview of the financing framework for the 2014-2020 programming period. Both are crucial for the cities of Białystok, Lublin, Rzeszów, and Olsztyn, as the EU framework sets objectives and targets, while the European Structural and Investment Funds provides large-scale funding for important urban transport projects. The new focus on functional areas addresses the issue of how to make urban transport plans that go beyond city borders in order to encompass surrounding areas is an important change in the new financial perspective. It will be critical to ensure that future infrastructure projects in public transport in these four Polish cities translate into an increase in passenger numbers and either increases or prevents a decline in the modal share of public transport. In this regard, a recent report published by the European Court of Auditors (ECA) is timely and instructive.

This report reveals that two-thirds of urban transport projects co-financed by EU structural funds are underutilized.[61] The court audited the performance of 26 public transport projects in 11 cities in five member states, including projects in Kraków and Warsaw, during 2000-2006 and 2007-2013. One of the findings was the underutilization of public transport when compared with forecasted passenger projections. The report found that overestimation of users and the lack of coordination between modes of transport, parking policy, and the absence of urban mobility plans contributed to underutilization. In the European Commission's response to the ECA, the commission argued that because public transport demand is a derived demand, and due to the nature and strength of the international financial crisis that erupted in 2007, the demand for public transport was likely to be less than originally projected. It also impacted on the financial situations of cities and possibly their ability to maintain and subsidize public services to the extent originally envisaged, with negative impacts on utilization. This means that the pollution and congestion benefits, among others, were less than originally forecast. The underutilization also increases the financial burden to the public transport authorities, which must compensate the lower revenue from lower ticket sales.

One of the key recommendations of the report is the need to monitor the quality of services and the level of user satisfaction once the project is operational. The commission, in its response to the report, also proposes, where appropriate, to recommend that major projects have a minimum set of indicators and performance-based remuneration for the operator of the public transport service. Ensuring that infrastructure investments translate into increased ridership and user satisfaction, while ensuring that cities can afford to finance the operation and maintenance of enhanced and more expensive public transport services, is an important objective going forward.

61 European Court of Auditors (2014), Special Report: Effectiveness of EU-Supported Public Urban Transport Projects. Available at: http://www.eca.europa.eu/Lists/ECADocuments/SR14_01/QJAB14001ENC.pdf

ANNEX 3
PUBLIC TRANSPORT PRICES

Table 2: Selection of Public Transport Tickets in Lublin

	Full Price		Reduced	
	PLN	Euro	PLN	Euro
Single-journey ticket purchased from driver, vending machine or mobile phone	3.2	0.77	1.6	0.38
Single-journey night ticket	5.8	1.40	2.9	0.70
Carnet of five single-journey tickets	14	3.37	7	1.68
30-minute ticket, between origin and destination stops	2.8	0.67	1.4	0.34
90-minute ticket, between origin and destination stops	8.2	1.97	4.1	0.99
24-hour ticket, valid for 24 hours from first validation, including night services	13	3.13	6.5	1.56
30-day ticket for single route, valid from the first to last day of the month	62	14.92	31	7.46
30-day personal ticket for two routes	73	17.56	36.5	8.78
30-day personal ticket for all routes	84	20.21	42	10.10
30-day bearer ticket for all routes	130	31.27	130	31.27

Source: ZTM Lublin

Table 3: Selection of Public Transport Tickets in Białystok

	Full Price		Reduced	
	PLN	Euro	PLN	Euro
Single journey, city zone	2.8	0.67	1.4	0.34
Single-journey, city zone, electronic ticket	2.7	0.65	1.35	0.32
Period pass, 60 minutes, city zone	3.5	0.84	1.75	0.42
Period pass, 24 hours, city zone	10.0	2.41	5.0	1.20
Single journey, city plus 3 suburban zones	10.0	2.41	5.0	1.20
Monthly, one line	70.0	16.84	35.0	8.42
Monthly, all lines	80.0	19.25	40.0	9.62

Source: BKM

Table 4: Selected Public Transport Ticket Prices in Rzeszów

	Standard		Concessional	
	PLN	Euro	PLN	Euro
Single-journey ticket	2.8	0.67	1.4	0.34
4 journey carnet of tickets	10.6	2.55	5.3	1.28
60-minute travel	4	0.96	2	0.48
24-hour travel	12	2.89	6	1.44
Monthly travel on single route	70	16.84	35	8.42
Monthly travel on network: Personalized ticket	98	23.58	49	11.79
Monthly travel on network: Bearer ticket	250	60.14	125	30.01
Six-month travel: Personalized ticket	199	47.87	N.A.	N.A.

Source: ZTM Rzeszów

Table 5: Selected Public Transport Tickets in Olsztyn

Ticket Type	Standard		Conces-sional		Number of Trips
	PLN	Euro	PLN	Euro	
Journey within Olsztyn or any one of 3 communes	2.90	0.70	1.45	0.35	1
Journey within agglomeration, within 60 minutes	4.00	0.96	2.00	0.48	1
Ticket purchased on vehicle, journey within city or any one commune	8.40	2.02	4.20	1.01	3
Ticket purchased on vehicle, journey across boundaries	11.40	2.74	5.70	1.37	3
Daily travel within Olsztyn	10.00	2.41	5.00	1.20	Unlimited
Travel for 5 consecutive days within Olsztyn	42.00	10.10	21.00	5.05	Unlimited
Weekend travel within Olsztyn	16.00	3.85	8.00	1.92	Unlimited
Monthly travel, all lines within Olsztyn	110.00	26.46	55.00	13.23	Unlimited
Monthly travel, all lines within agglomeration	140.00	33.68	70.00	16.84	Unlimited

Source: ZDZiT

ANNEX 4
PUBLIC TRANSPORT PERFORMANCE AND EVALUATION

Introduction

Performance measurements are required in every kind of operation or service. In public transport, stakeholders have an interest in measuring a variety of indicators, for example operational performance or comfort level provided. In addition, it is often required for a number of reasons, such as external requirements to obtain funding, and internally to (a) identify major and potential problems in agencies for further analysis; (b) generate inputs for policy formulation and decision-making; (c) measure goal attainment for priority initiatives and/or investments; and (d) provide improvement incentives for managers and employees. Performance measurements may be viewed from four perspectives:[62]

- Customer. Studies have identified two areas of greatest concern to passengers: service reliability and the comfort and convenience of service. Firstly, public transport is an option for a trip only when it is spatially and temporally available, meaning that services are available at or near the locations and at times when a customer wants to travel, and can get to and from the public transport stops. In addition, customers need to know how to use the service and there should be sufficient capacity available at the desired time, namely, information and capacity availability. Secondly, customers may choose public transport if its comfort and conveniences are competitive with other available travel modes. Urban transport authorities have full or partial control over the following aspects to improve the comfort and convenience of public transport services: a) service delivery, b) travel time, c) safety and security, and d) maintenance.
- Community. Community residents might be concerned with costs and negative aspects of public transport service, such as the amount of taxes directly or indirectly paid for public transport service, empty buses, noise or diesel fumes from buses, the perception of waste and inefficiency of bus services, among others. While public transport services in general are regarded as bringing benefits to improve people's mobility and accessibility, reducing air pollution, reducing traffic and parking congestion etc., urban transport authorities can experience greater success in obtaining community support if they document its success and identify and address some of the negative concerns associated with service performance.
- Urban transport authorities. Authorities / agencies will mostly be concerned with organizational performance and results of performance measures will give the agency some guidance as to actions needed. Authorities / agencies should also be aware of customer and community concerns and apply performance measures as a means to address those concerns and develop support from community and customers. Measures can be used to evaluate the overall organizational performance, departmental performance, individual operator or customer service agents' performance, and the past performance in order to understand the trends and assess the impact of certain policy or other organization changes in order to identify the organizational needs, passenger needs and community needs. Measures can also be used to compare the service performance with similar public transport systems, and last, but not least, to predict future performance.
- Driver/vehicle traffic engineering measures. The interaction of cars with buses plays a vital role in determining how well bus services can be provided. Increasing traffic congestion can result in longer travel times, less reliable service, and potentially increased costs to public transport agencies. Similarly, actions to make public transport services faster and more reliable may also impact the car drivers and passengers. Therefore, it is necessary to quantify the impacts of cars and buses on each other and bear in mind that while a single-occupancy vehicle and a bus carrying 45 passengers may experience the same amount of delay due to traffic congestions, the passenger delay experienced by the bus is 45 times as great as the single-occupancy vehicle.

In general, the rule of thumb for performance measurement is to define objectives first, and then select measures.

Primary Performance Measure Categories[63]

Public transport performance measures can be divided into a number of categories based on their focus and likely audiences. Eight primary categories are listed here. Public transport agencies may develop associated measures based on the goals for each of these categories.

- Availability: This refers to where and when service is provided and having sufficient capacity available for passengers to take trips at their desired time (customer point of view). It is vital for attracting potential passengers. Most aspects of this category are under control of public transport agencies, within the agencies' constraints of finance, staff, and capital resources.
- Service delivery: This includes reliability, customer service, passenger loading, and agency goal accomplishment (customer point of view). Many measures within this category assess performance directly under the control of public transport agencies, such as evaluation of service reliability, passenger comfort, and overall customer satisfaction. Service delivery measures require quite large amounts of data and these data need to be collected on a regular basis. The following two tables illustrate the measurement from Transport for London[64].

62 http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_report_88/Guidebook.pdf

63 http://www.tcrponline.org/PDFDocuments/TCRP_RRD_56.pdf

64 http://www.tfl.gov.uk/cdn/static/cms/documents/Board-20130925-Part-1-Item06-Q1-OFR-IP-Reports.pdf

Table 6: Transport for London – Scheduled Services Operated

Scheduled services operated

Per cent	Quarter 1, 2013/14			Full year 2013/14			
	Actual	Variance to target	Variance to last year	Quarter 1 Forecast	Variance to target	Variance to last year	2010 – 2014
▲ *higher is better*							
London Underground	98.0	0.8▲	1.2	97.2	0.0▶	-0.4	
London Buses	98.0	0.3▲	1.2	97.7	0.1▲	0.1	
DLR	99.4	1.4▲	1.7	98.0	0.0▶	-0.5	
London Tramlink	98.8	0.8▲	1.3	98.0	0.0▶	0.1	

Source: TfL

Taking London buses as an example, scheduled services operated were better targeted mostly due to a reduction in mileage losses caused by traffic delays, despite serious disruption caused by the closure of Notting Hill Gate for repairs during this measured period.

Table 7: Transport for London: Scheduled Services Operated

Delivery

Reliability

Performance indicator	Unit	Quarter 1, 2013/14			Full year 2013/14			
		Actual	Variance to target	Variance to last year	Quarter 1 Forecast	Variance to target	Variance to last year	2010 – 2014
▼ *lower is better*								
London Underground: total lost customer hours	Millions of hours	4.6	-1.2▼	-2.3	25.0	0.0▶	2.2	
London Underground: excess journey time	Minutes	4.84	-0.55▼	-0.73	5.68	0.0▶	0.41	
London Buses: excess wait time	Minutes	1.0	0.0▶	-0.1	1.0	0.0▶	0.0	
TLRN: serious and severe disruption	Hours	430	n/a▶	n/a	2,030	0.0▶	-220	
▲ *higher is better*								
DLR: on-time performance	%	99.5	2.5▲	1.4	97.0	0.0▶	-1.8	

Source: TfL

In this period, London Underground lost customer hours are 4.6 million, 21 percent lower than target in Quarter 1, and 30 percent improvement from the same quarter last year. London Underground excess journey time averaged 4.84 minutes, which is 30 seconds better than target. Excess wait time on buses was on target despite the serious disruption caused by the

closure of Notting Hill Gate. On-time performance on the Docklands Light Railway (DLR) in Quarter 1 was above target for all routes and resulted in record performance of 99.5 percent, which is 2.5 percent better than the target and exceeds the same quarter the previous year by 1.4 percent. Performance during the London Marathon was a great success, with 340,000 passengers carried and on-time departures reached 99.7 percent.

- Safety and security: This reflects the likelihood that one will be involved in an accident (safety) or become the victim of a crime (security) while using transit (customer point of view). In many instances, customer perceptions of safety and security are as important as the actual conditions and a customer satisfaction survey can assist in uncovering these perceptions. The following Tables 12 and 13 reflect two aspects of this measurement, from Transport for London and New York City Transit, respectively. In addition to using customer satisfaction surveys to understand customers' perception of safety and security in public transport system, Transport for London also records and publishes the number of crimes reported in its public transport network. Annex 5 provides a sample of a customer satisfaction survey questionnaire.

Table 8: Transport of London: Safety and Security Measures from Crime and Injury Data

Safety and security

Performance indicator	Unit	Quarter 1, 2013/14			Full year 2013/14			
		Actual	Variance to target	Variance to last year	Quarter 1 Forecast	Variance to target	Variance to last year	2010 – 2014
▼ *lower is better*								
LU and DLR recorded crime	Million passenger journeys	8.7	-0.5▼	-0.8	9.0	0.4▲	-0.6	
London Buses: recorded crime **	Million passenger journeys	8.0	-0.8▼	-0.7	8.6	0.0▶	0.0	
LU / LR Major Injury Frequency Rate	Major injuries/ m hours	0.32	0.05▲	0.00	0.27	0.0▶	0.02	-

Source: TfL.

The rate of crime per million passenger journeys on London buses, London Underground (LU), and DLR networks in this measured period was better than target and an improvement on the same period from the previous year. The British Transport Police (BTP), which has responsibility for policing the LU and DLR networks, has put additional measures in place to deal with the increase in theft experienced in 2012/13. These measures, which are now starting to take effect, include Operation Magnum — the redeployment of officers to theft hot spots, a new crime-reduction and awareness campaign, and targeted police enforcement activity against organized thieves operating on the network.

On New York City Transit, customers' perception of safety and security in using the city's public transport system was captured through a customer-satisfaction survey. As shown in Table 13, in 2012, 84 percent of the 1,829 customers surveyed were satisfied with the overall safety and security on the New York City Transit buses, and among them 32 percent were very satisfied.

Table 9: New York City Transit Safety and Security Measures from Customer Satisfaction Survey[65]

	TOTAL SATISFIED			2012	
	2010	2011	2012	Very Satisfied	Satisfied
	888	887	869		
	%	%	%	%	%
OVERALL LOCAL BUS SERVICE	**62**	**70**	**69**	**16**	**52**
OVERALL LOCAL BUS SERVICE ON ROUTE USED MOST	**63**	**71**	**70**	**15**	**56**
OVERALL AVAILABILITY OF SERVICE	**62**	**68**	**64**	**14**	**50**
Frequency of service	59	65	63	14	49
How long you have to wait for a bus to arrive	51	58	56	14	42
OVERALL RELIABILITY OF SERVICE	**68**	**77**	**75**	**19**	**55**
Maintaining buses so they do not break down and cause delays	NA	87	85	25	60
The predictability of bus travel time	65	73	69	15	53
How fast the local bus gets you where you want to go in	68	81	75	19	57
OVERALL SAFETY AND SECURITY ON THE BUS	**81**	**86**	**84**	**32**	**52**
Safety from accidents while riding the bus	86	90	88	36	53
Personal security on the bus	80	83	82	32	50
OVERALL INFORMATION AND COMMUNICATIONS ABOUT LOCAL BUS SERVICE	**68**	**70**	**66**	**18**	**48**
Knowing how far away the next bus is	NA	54	48	15	33
Clarity of announcements on the bus	67	74	70	21	49
Usefulness of announcements on the bus	68	70	70	22	48

Source: New York City Transit

- Maintenance and construction: Evaluating the effectiveness of an agency's maintenance program, and the impacts of construction projects on customers (customer and agency point of view) will reflect the quality of an agency's maintenance program, the quality of vehicles, and the impact on the overall quality of service as perceived by passengers.
- Economic: Measures in this category assess public transport service performance from a business perspective, such as how well agency's resources are being utilized, how efficiently services are provided within constraints, how effectively the demand is met, and how well the agency is administrated (agency and community point of view).
- Community: Measures of transit's impact on individuals and on the community as a whole (community, agency, and driver/vehicle point of view), such as mobility, accessibility, affordability, and pollution. Measures in this category can also be used to identify areas that may be productive to increase ridership and to evaluate the distribution of public transport services.
- Capacity: The ability of transit facilities to move both vehicles and people (community and driver/vehicle point of view). If passenger demand approaches or exceeds the system's capacity, it is likely to impact the quality of service that the system provides, as dwell time tends to increase and reliability tends to suffer.
- Travel time: How long it takes to make a trip by transit (a) by itself, (b) in comparison with another mode, or (c) in comparison with an ideal value (driver/vehicle and customer point of view). Such measures are useful for demonstrating effects of traffic congestion on scheduled run times and when additional buses might be needed to maintain headways, and identifying the need for more direct services between two locations as when trips take too long, particularly compared with automobiles, they will become less attractive to potential riders.

65 http://web.mta.info/mta/news/books/docs/2012LocalBus_CSS.pdf

Box 11: London Underground Performance Reports

Transport for London (TFL)'s key London Underground performance measures are: (a) total operated kilometers, (b) total number of lost customer hours (all causes), (c) average excess journey time, and (d) percentage of schedule operated. Also available from TFL are a list of Tube stations containing passenger entry and exit statistics. London Underground conducts surveys each year. Information collected includes counting the number of people using the service, where they travel to and from, and how long their journeys last. TFL also monitors performance and assets, how far trains have traveled, and how many trains, lifts, and escalators are in service. TFL is committed to providing passengers with details of how well the network is working and regularly publishes performance updates. This is updated every four weeks—defined as a period—and gives figures for a range of service and network-related matters. A snapshot of a recent published performance report (March 2014) is provided here to demonstrate such practice in TFL.

A snapshot of Period 13 Performance Report

- *Customer Satisfaction Survey* – The score improved by one point to 83, exceeding the target of 82. Improvements were reported in excess journey time, percentage of schedule kilometers operated, and lost customer hours (excluding industrial action).
- *Passenger Journeys* – 107 million passenger journeys were made in this period, which is 0.6 million below target.
- *Journey Time* – Network excess journey time at 5.14 minutes, 0.53 minutes better than target.
- *Train Service* – Network percentage of scheduled kilometers operated improved by 5.7 percent to 98.2 percent. The peak and off-peak network services operated 98.1 percent, and 98.2 percent, respectively, of the scheduled.
- *Station Service* – 270 stations were served during this period. 41 stations closures reported and the total duration of these closures was under 37 hours, presenting an availability of 99.9% of the scheduled opening hours.
- *Service Disruption* – Lost Customer Hours (LCH) at 1.48 million. Five incidents with the highest lost customer hours values on each underground line are Bakerloo Line, Central Line, Victoria Line, District Line, Met, Circle & H&C Line. The specific reasons that caused significant LCH are provided in the detailed report.

Source: http://www.tfl.gov.uk/cdn/static/cms/documents/lu-performance-report-period-13-2013-14.pdf

Steps to Develop a Performance Measurement Program

This section provides an overview of how public transport authorities can develop performance-measurement programs or improve existing ones. The information presented here is based upon a comprehensive literature review, a survey of more than 20 public transport systems, and the research team's experience working with various public transport systems throughout the United States[66]. There are eight main steps involved in establishing or refining performance measurement programs as illustrated in Figure 20. It is important to keep in mind that none of these steps in this process should be isolated from the others as implementing and updating a performance-measurement program is an iterative process.

There are great variations of resources and techniques for data collection. Though manual data collection is very labor intensive and often has limited sample size because of the costs involved, as well as likely measurement errors when data are collected or transcribed, it continues to be the way that many urban transport authorities collect ridership, passenger load, and reliability data.

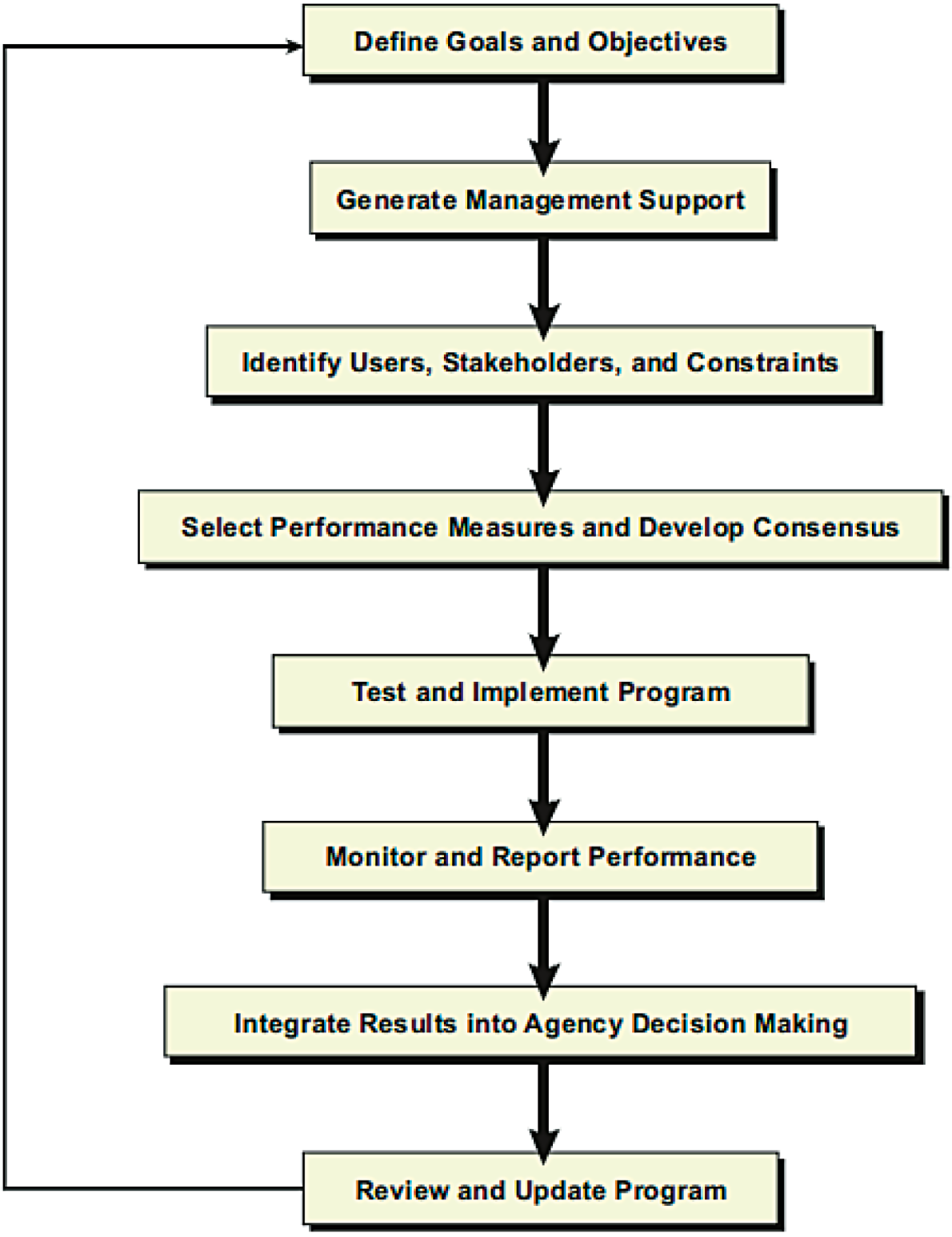
In recently years, the ever-increasing use of Automated Data Collection System (ADCS), such as Automatic Fare Collection (AFC), smart card, Automatic Vehicle Location (AVL), generates new transport data that can be used by service providers for a range of applications. For example, smart cards record every transaction the cardholder makes while traveling on the public transportation system. AVL equipment can track the real-time location of AVL-equipped buses, therefore, the data can be used for track dispatching, real-time bus arrival information, and facilitate quicker response to emergencies. Meanwhile, it can also be used to collect and store data about bus arrival and departure times at specified stops. Data obtained from AVL systems can be used to analyze dwell time patterns along bus stops, travel time variability between days, times of day and different operators, on-time performance, and headway adherence among others. Although ADCS is usually designed to support specific agency functions, the resulting data can be applied to areas far beyond their design purposes. Recent research has examined the potential benefits of using ADCS for public transport planning, specifically using archived ADCS data to infer origin—destination matrices to assess service performance for service planning. An example of applying smart card and AVL data for bus network planning is provided in Annex 6.

Data Management: The data collected through a performance-measurement program needs to be organized for analysis, reporting, and archiving. The sophistication of the system that is required will depend on the amount of data collected, which in turn depends on the agency size and the number and kinds of measures collected. For example, a simple spreadsheet may be adequate for rural and small urban systems, while a more sophisticated database will likely be needed for

66 http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_report_88/Guidebook.pdf

a medium-sized system. Larger systems may require an information management system to integrate data collected and maintained by various agency departments.

Figure 20: General Approach for Developing a Performance-Measurement Program



Source: TRB

ANNEX 5
SAMPLE OF CUSTOMER SATISFACTION SURVEY QUESTIONNAIRES

Screening

1. Do you or does a member of your family work for the transit (bus/metro) company? (If yes, terminate with thank you; if no, continue).
2. On average, how many times would you ride the transit in a week, including weekend? Please count a one-way trip as one ride and a round trip as two rides. (If the number of rides is more than 1, then go to customer satisfaction questionnaire; if 0, terminate with thank you).

Trip-Maker Basic Information

1. Are you: 1) a resident of this area; 2) from other cities, but temporarily study or work here; 3) from other cities for business tourism
2. For how many years have you been a regular bus/metro user: # of years.
3. What age group are you in: 1) 15-19 yrs; 2) 20-24 yrs; 3) 25-34 yrs; 4) 35-44 yrs; 5) 45-54 yrs; 6) 55-64 yrs; 7) 65 or over
4. Name of community you live in? Postal code?
5. Gender: 1) female; 2) male
6. Number of cars or motorcycles owned by family: 1) 0, 2) 1, 3) 2 or more

Transit Trip Basic Information

1. Travel Purpose: 1) work; 2) school; 3) homebound; 4) business; 5) shopping; 6) entertainment; 7) visit friends; 8) hospital; 9) tourist; 10) other (please specify)
2. Transfers: For a typical trip you take on transit, how many times do you have to transfer?: 1) None; 2) One; 3) Two; 4) Three; 5) Four; 6) Five or more; 7) Unsure

Time of Travel during Day

1. During what time period do you use transit most often: 1) no specific time period; 2) rush hour only; 3) rush hour and other time periods; 4) non-rush hour only
2. When do you usually take transit during non-rush periods (weekday midday/evening, or weekend): 1) weekday midday; 2) weekday evening; 3) weekend; 4) unsure)

Payment

1. How do you usually pay for your trips: 1) smart card; 2) monthly pass; 3) cash; 4) other (please specify)
2. Is it convenient to purchase tickets or passes or add value to smart cards? If not, why? 1) Too inconvenient (too few places to pay); 2) Vending machines often broken: 3) Pre-paid fares require too much money.

Transit System

1. Quality of Drivers

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Refused	Not applicable
1) Drivers are knowledgeable of the services they provide	1	2	3	4	5	6
2) Drivers usually wait for passengers when they see them running for the bus	1	2	3	4	5	6
3) Drivers usually wait until passengers are seated before leaving the stop	1	2	3	4	5	6
4) Drivers drive their vehicles safely	1	2	3	4	5	6

2. Vehicles

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Refused	Not applicable
1) The bus is never too crowded	1	2	3	4	5	6
2) The seats are comfortable	1	2	3	4	5	6
3) The temperature is usually agreeable, even in summer	1	2	3	4	5	6
4) The exterior is attractive, well-maintained and clean	1	2	3	4	5	6
5) The interior is attractive, well-maintained and clean	1	2	3	4	5	6
6) Buses are easy to board or alight	1	2	3	4	5	6

3. Stops/Stations

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Refused	Not applicable
1) Stops/stations are clearly marked	1	2	3	4	5	6
2) Stops/stations are clean and well-maintained	1	2	3	4	5	6
3) Stops/stations usually have an attractive, well-maintained shelter with weather protection	1	2	3	4	5	6
4) There is usually a bus stop/station within an acceptable walking distance of my origin and destination	1	2	3	4	5	6
5) The bus stopped too much (too many stops)	1	2	3	4	5	6
6) I feel secure and safe (free from crime, accidents) walking to/from bus stops	1	2	3	4	5	6
7) I feel safe crossing the street to get to bus stops	1	2	3	4	5	6
8) I feel safe waiting at stations before 6 p.m.	1	2	3	4	5	6
9) I feel safe waiting at stations after 6 p.m.	1	2	3	4	5	6
10) There is information available at stops that make it easy to use bus system	1	2	3	4	5	6
11) It is convenient to transfer between bus routes/metro	1	2	3	4	5	6

4. Service Quality

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Refused	Not applicable
1) The bus/metro is usually on time	1	2	3	4	5	6
2) The bus/metro is not overcrowded	1	2	3	4	5	6
3) Waiting times are acceptable	1	2	3	4	5	6
4) The route alignment (layout) is direct and efficient	1	2	3	4	5	6
5) The services are worth the fare	1	2	3	4	5	6
6) The times during the week and weekend when services are available are acceptable	1	2	3	4	5	6
7) Travel time between trip origins and destinations are acceptable	1	2	3	4	5	6

Source: World Bank

ANNEX 6
BUS ORIGIN-DESTINATION ESTIMATION AND RELATED ANALYSES

Introduction

London has one of the largest bus networks in the world, with more than 6 million passengers transported on its 700 routes daily. Every five to seven years, a Bus passenger Origin and Destination Survey (BODS) is conducted by Transport for London (TfL) for each bus route. This survey provides detailed information about passenger travel patterns, including the number of people boarding and alighting at each stop, the purpose of travel, the boarding and alighting locations for each journey, and how passengers get to the boarding stop and from the alighting stop to their final destination.

TfL launched the Oyster smart-card system in London in December 2003 as a new ticketing medium. It is now accepted on the Underground, buses, the Docklands Light Railway (DLR), Tramlink, and National Rail stations in London (excluding regional buses accessing London).[67] Oyster smart cards are very popular among travelers, and till today its market penetration has reached more than 85 percent. Oyster data are readily available, provide large sample sizes, and potentially offer a full network perspective rather than strictly a mode-level view. In addition, using Oyster smart-card data enables one to link trip segments and to determine origin and destination flows across the network. This process can be repeated on a daily basis to assess variability in trips and get more accurate estimates of ridership for specific days of the week and times of the year. It provides an easier and more reliable way to get more detailed passenger behavior information than manual survey data, which potentially can help transit agencies improve efficiency and reduce cost.

iBus is a Ł117m Automatic Vehicle Location (AVL) and radio system that aims to help London Bus Services Limited run more reliable and consistent bus service.[68] The first installations took place in March 2007, with system-wide deployment completed in April 2009. iBus data contain information about the route and trip number as well as the direction for each bus trip, and most important, they provide a unique bus stop identifier and record the departure time from each stop.

Methodology

The basic premise is that it should be possible to determine the boarding stop for every passenger who uses an Oyster card to board an iBus-equipped bus. For a given route and trip, the fare collection timestamp (including the date) from the Oyster card is used to search through the iBus dataset to determine the boarding stop and vehicle ID. The boarding location of the next trip taken by the passenger is then used to infer the alighting stop, where possible. The first step in this process is to infer the origins for bus passengers by matching the smart-card boarding transaction times with the AVL data. It then implements the trip-chaining methodology to infer each bus passenger's alighting location.

The destination inferences are based on the trip-chaining method and use the same assumptions proposed by Zhao et al. (2007), Cui (2006), Trepanier et al. (2007), and Barry et al. (2008).[69] The process starts by checking whether the bus fare transaction under examination is the only Oyster transaction for that card on that day. If it is, then the trip-chaining method cannot be applied and thus the trip destination cannot be inferred. Otherwise, check whether this bus fare transaction is the last of the day for this card. If it is not, the trip-chaining method is applied by 1) determining whether the next fare transaction for this card is on bus or rail; 2) if the next transaction is also on bus, the algorithm moves onto the "next trip" rule with a bus lookup table sub-procedure; 3) if the next transaction is on rail, the algorithm moves onto the "next trip" rule with a rail lookup table sub-procedure. If the fare transaction currently under examination is the last of the day for that card, then the first transaction of the day is treated as the transaction immediately following this last trip segment so that the "next trip" rule can be applied here to infer the destination of this last trip segment.

The lookup table mentioned here defines the stops on the bus route under examination that are closest to the boarding stop of the next transaction. While the two sub-procedures for bus and rail are similar, the London rail and bus networks are in two different GIS files, and the lookup tables are generated separately. The "next trip" rule is actually the same as

67 The Oyster card is not accepted on regional bus services accessing London despite TFL's wish to do so and the universal popularity of the card.

68 Hardy, N. (2009), iBus benefits realization workstream: Method & progress to date. 16th ITS World Congress and Exhibition, Stockholm, Sweden.

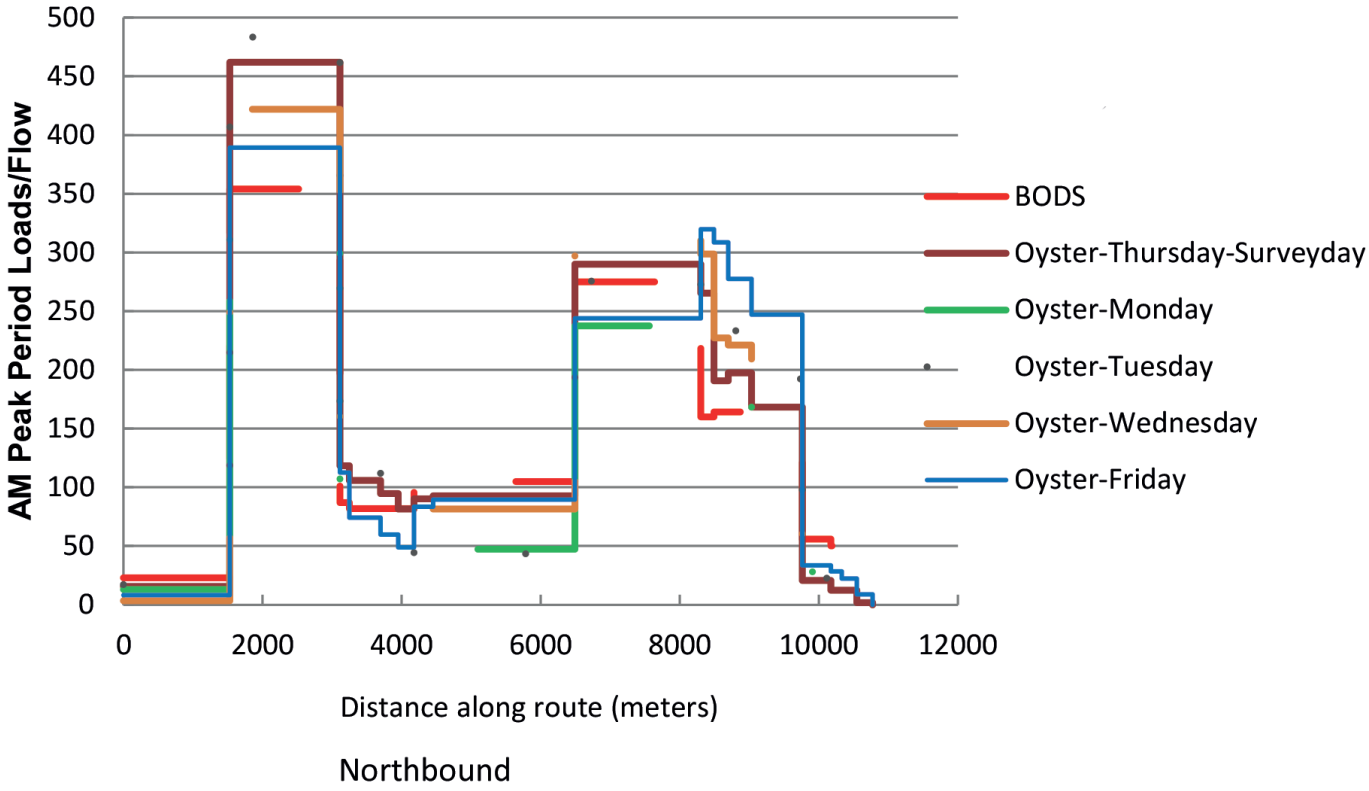
69 Barry, J., R. Freimer, and H. Slavin (2008), Using Entry-Only Automatic Fare Collection Data to Estimate Linked Transit Trips in New York City. Transportation Research Board 2008 Annual Meeting CD-ROM, Washington, D.C.; Cui, A. (2006), Bus Passenger Origin-Destination Matrix Estimation Using Automated Data Collection Systems. MS Thesis, Massachusetts Institute of Technology, Cambridge; Trepanier, M., N. Tranchant, and R. Chapleau (2007), Individual Trip Destination Estimation in a Transit Smart Card Automated Fare Collection System. Journal of Intelligent Transportation Systems: Technology, Planning and Operations 11(1): 1-14; and Zhao, J., A. Rahbee, and N. H. M. Wilson (2007), Estimating a Rail Passenger Trip Origin-Destination Matrix Using Automatic Data Collection Systems, Computer-Aided Civil and Infrastructure Engineering 22(5): 376-387.

assumption 2) listed in the literature review, meaning that travelers start their next trip segment at another station in close proximity (within walking distance, for example at most 1 km) to the destination of their initial trip segment.

Application to Bus Network Planning

- Daily Load/Flow Profile Variation: Load/flow profiles are standard graphics showing passenger activity (boardings, alightings) and passenger load (or flow past a stop or segment in the case of multiple trips) along a route by direction. They allow planners to identify locations and values of the peak load, as well as underutilized route segments. Route W4 in London during the a.m. peak (7:00 to 9:30 a.m.) is chosen here as an example of how the daily load/flow profile varies over five successive weekdays. Figure 21 shows that there are large variations in the load/flow profile and specifically in the peak loads, even within the same week.

Figure 21: Daily Load/Flow Variation along Route W4 During A.M. Peak



Source: Wei Wang et al [70]

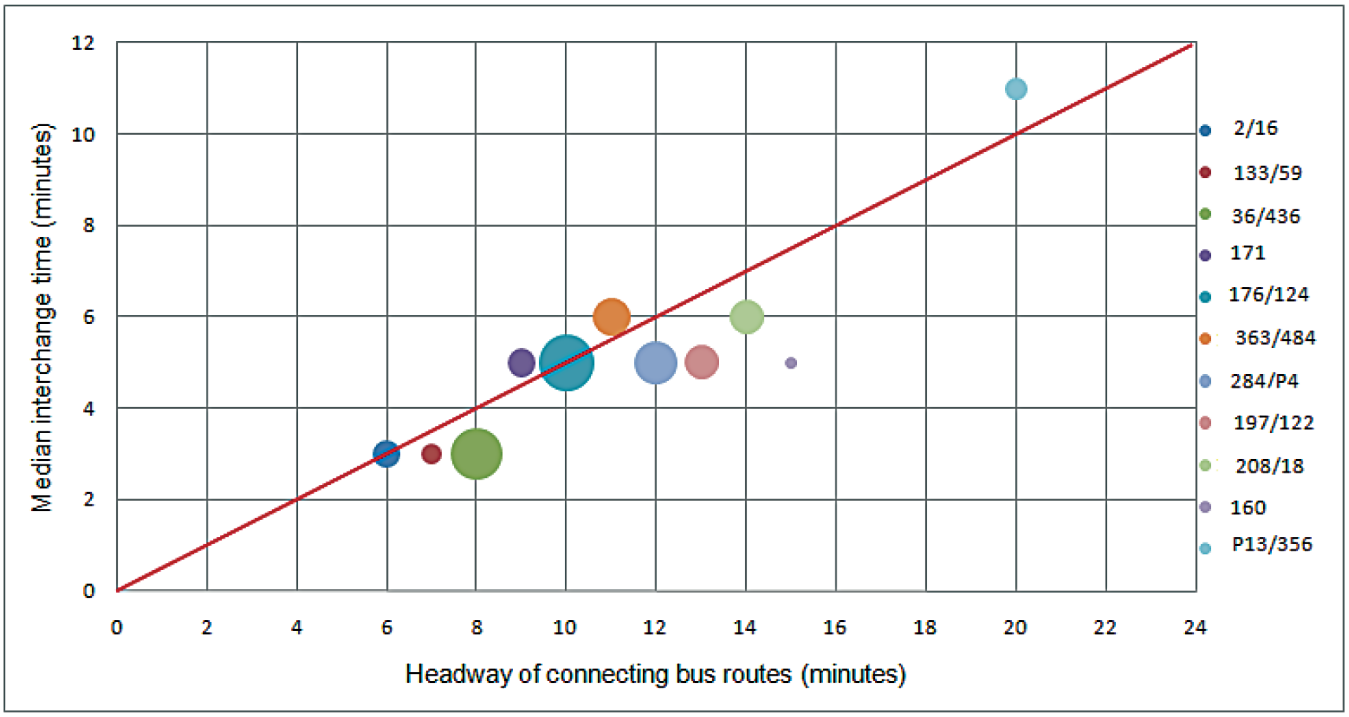
- Interchange/Transfer Time Analysis: Interchanges affect the attractiveness of public transport. Making interchanges less burdensome is a critical consideration in public transport planning. Improving the level of service at interchange locations would enhance the overall quality of public transport services. Both practitioners and researchers tend to pay most attention to the initial waiting experience and to in-vehicle travel for their obvious effects on ridership, but less work has been done on interchanges between segments of a linked journey (Guo and Wilson, 2010). However, reducing the out-of-vehicle times can help make public transit more attractive resulting in ridership increases. In this research, bus passenger alighting locations are inferred from the ADCS archived data. Also, since iBus AVL data provide information about the observed departure time for each bus trip at each stop, by matching the inferred alighting locations with the iBus AVL data, the alighting time for each individual passenger trip can be estimated. Hence, the interchange time can be calculated more accurately as the difference between the subsequent trip's boarding time and the previous trip's alighting time.

  In Figure 22, the size of each dot indicates the number of interchange passengers and the color indicates the scheduled headway of the connecting route. By comparing the median interchange time with the headway of the connecting

70 Wei Wang, John P. Attanucci, Nigel H.M. Wilson. (2011), Bus Passenger Origin-Destination Estimation and Related Analyses Using Automated Data Collection Systems. Journal of Public Transportation, Volume 14, No. 4, 2011. Available at: http://www.nctr.usf.edu/wp-content/uploads/2011/12/JPT14.4.pdf

routes (the legend on the right side provides the bus route number of the connecting routes), the passenger experience provided by those bus-to-bus connections can be evaluated further. For example, the dots under the red diagonal line suggest that these bus routes provide good (or at least better than random) connecting services, while the dots above the red diagonal line suggest that those bus routes (Routes P13 and 356) provide poorer connecting services. Thus targeted improvements could be made to coordinate the timetable.

Figure 22: Relationship between Connecting Routes' Headway and Interchange Time



Source: Wang, Attanucci and Wilson, Journal of Public Transport, Volume 14, No. 4, 2011. Available at http://www.nctr.usf.edu/wp-content/uploads/2011/12/JPT14.4.pdf