Chapter 5. Sustainable urban development in the Czech Republic

This chapter discusses the economic and environmental conditions of the Czech Republic's urban areas, with a particular focus on Prague and Litoměřice. It examines the cities' main challenges regarding sustainable urban development and reviews key policies and measures addressing these challenges, such as policies on land use, sustainable transport and energy, and water management, as well as the role of multilevel governance, investment and finance.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

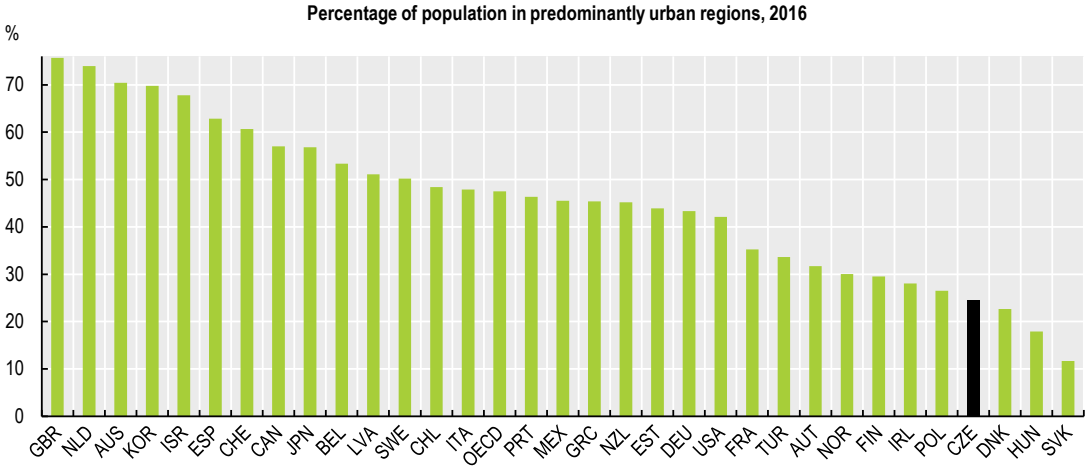
5.1. An overview of Czech cities

The Czech Republic's prosperity will largely depend on how well it manages its cities to promote economic growth and productivity. Cities are struggling to accommodate a more diverse population (elderly, immigrants) and provide services to people who increasingly reside outside the urban centres. The Czech Republic is among the least urbanised countries in the OECD. However, building sustainable cities, and improving the quality of life in urban centres while preserving the environment and promoting economic growth, are critical challenges.

5.1.1. The Czech Republic is a suburbanised country

There are different ways to define urbanisation. According to the Czech Statistical Office, in 2016, 73% of the population lived in urban areas[1] (CZSO, 2017a). However, by the OECD regional typology,[2] the Czech Republic is among the least urbanised countries in the OECD, with one-quarter of the population living in predominantly urban regions, half the OECD average (Figure 5.1). More than half the Czech population live in intermediate regions.

Figure 5.1. The Czech Republic is among the least urbanised of OECD countries



Source: OECD (2017), *OECD Regional Statistics* (database).

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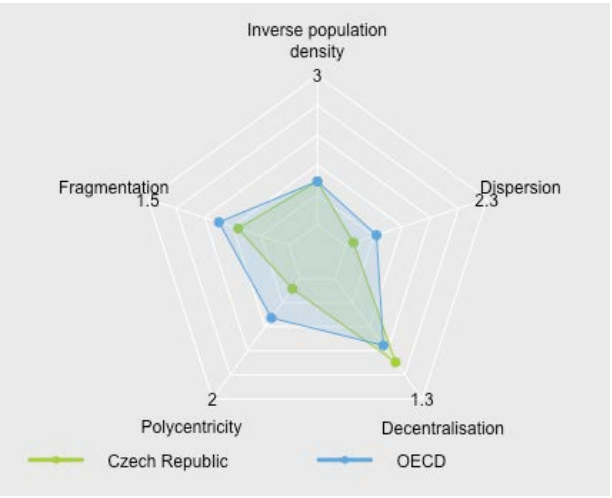
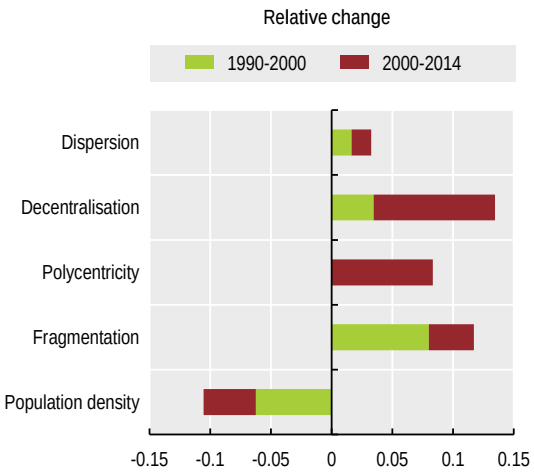
Cities of more than 100 000 inhabitants (Prague, Brno, Ostrava, Plzeň, Liberec and Olomouc) host 22% of the total population and occupy only 1.6% of the territory (CZSO, 2016). Since 2000, population has increased in Prague, Plzeň and Liberec and declined in other major cities. The capital and its surroundings in the Central Bohemia region have seen the strongest growth, with Prague's population expected to increase by 20% by 2050 (OECD, 2017b). As the decentralisation trend in Figure 5.2 shows, a rising share of urban population resides outside urban centres.

Figure 5.2. An increasing share of urban population lives outside urban centres

Urban sprawl indicators





Note: Data based on functional urban areas, an economic unit characterised by a densely populated "urban core" and a "hinterland" whose labour market is highly integrated with that of the core. The Czech Republic has 16 such areas, which account for nearly half the population and 29% of the land area. Population density: average number of inhabitants per square kilometre of land. Inverse population density: per capita land uptake. Dispersion: standard deviation of population density. Polycentricity: number of high population density peaks in an urban area. Fragmentation: number of urban fabric fragments per square kilometre of built-up area. Decentralisation: percentage of population residing outside areas of peak density.
Source: OECD (2018), *Towards Sustainable Cities: A New Perspective on Urban Sprawl.*

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As the fertility rate is low, internal and international migration is the main contributor to population growth. Over 2000-16, it accounted for 97% of the population increase in Prague, 133% in Plzeň and 56% in Liberec. The share of foreign-born inhabitants in total population rose from 4% in 2000 to 7% in 2015 (of which about 40% from Slovakia and Ukraine), well below the OECD average of 13%.

The population in major cities is ageing. This entails long-term challenges related to housing, transport, water and other public services. Such challenges are coupled with an expected rise in expenditure on pensions, healthcare and long-term care (OECD, 2016a). In Prague, the largest age group in the population is between 25 and 40, partly because of young people moving there for work. The proportion of children is smaller, however, due to families leaving for the suburbs as well as birth rates that are lower than in earlier generations (IPR, 2015).

Czech cities have relatively low population density by EU standards. That of Prague is the country's highest, yet its density level is low by comparison with the most densely populated cities in neighbouring countries (Table 5.1). Of course, population density in Prague varies by district (IPR Prague, 2015).

Table 5.1. Czech cities have low population density

Population density of local administrative units,[a] 2015

	Highest		Second highest		Third highest	
	Name	(Pop./km2)	Name	(Pop./km2)	Name	(Pop./km2)
Austria	Wien	4 335	Rattenberg	3 641	Matrei am Brenner	2 617
Czech Rep.	Prague	2 538	Havírov	2 340	Zastávka	2 139
France	Paris 11th arr.	42 138	Paris 18th arr.	33 798	Paris 20th arr.	33 117
Germany	München, Landeshauptstadt	4 531	Ottobrunn	3 972	Berlin, Stadt	3 837
Hungary	Budapest	3 347	Szigethalom	1 860	Diósd	1 674
Poland	Legionowo	4 008	Piastów	3 970	Swietochlowice	3 869
Slovenia	Ljubljana	1 044	Maribor	762	Isola	556
Slovakia	Kosice – Siddlisko KVP	13 922	Kosice – Západ	7 324	Kosice – Nad jazerom	6 969

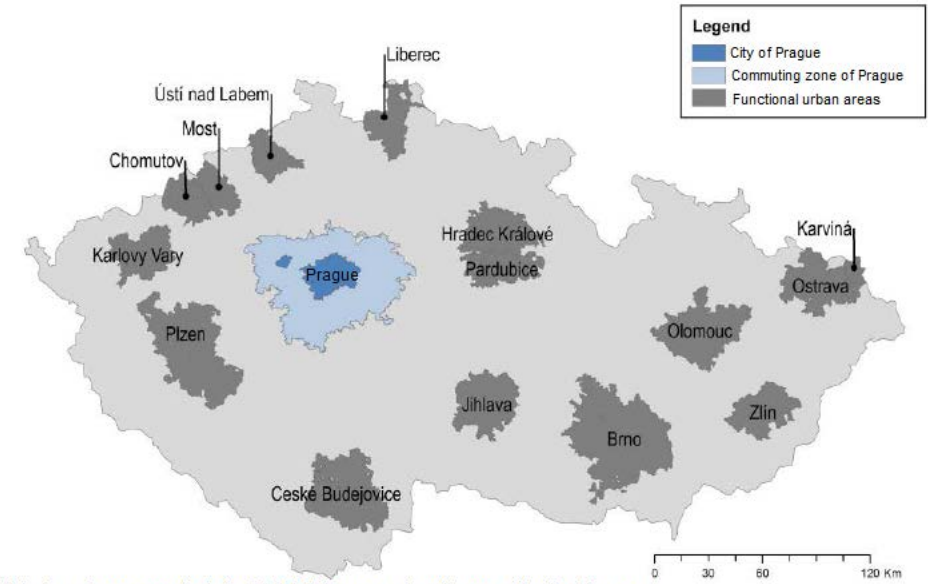
a) LAU2.
Source: Eurostat (2016), *Urban Europe: statistics on cities, towns and suburbs*.

Despite a relatively stable trend in the amount of built-up area over 2000-15, the land take of agricultural land resources for road infrastructure accelerated in the early 2000s (Chapter 1.). Urban regions experienced the strongest growth in developed land but since this growth was outpaced by population growth, the per capita area of developed land declined slightly (OECD, 2017c). Since 1990, cities have become more fragmented (Figure 5.2). Prague has grown through new construction and the incorporation of outlying villages (IPR Prague, 2015).

5.1.2. Prague, Brno and Ostrava are important sources of economic growth

Extending the definition of cities to their commuting zones, the Czech Republic has 16 functional urban areas[3] (FUAs), which account for nearly half of the total population (Figure 5.3).

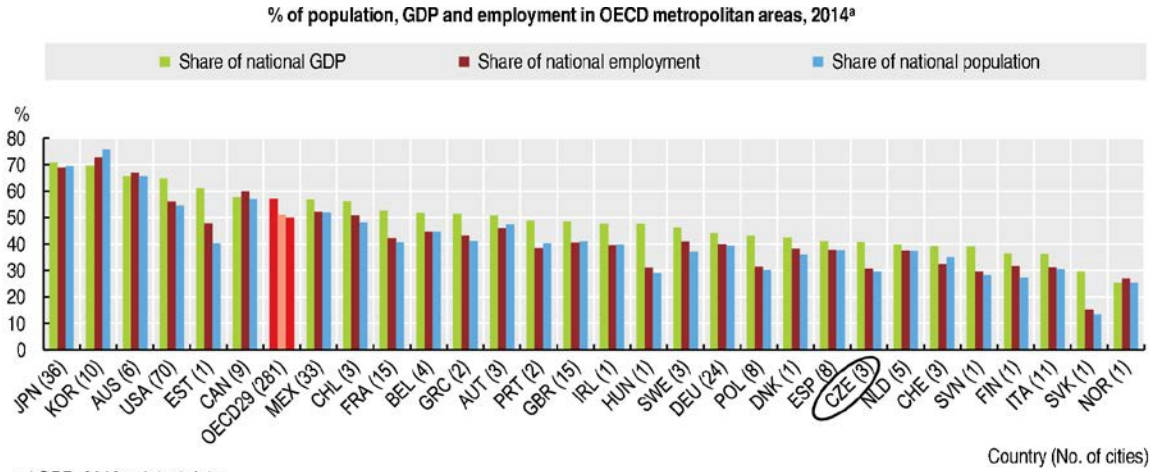
Figure 5.3. The Czech Republic has 16 functional urban areas



Note: Prague's core, according to the OECD definition, covers the entire area of the city of Prague as well as the nearby municipality of Kladno.
Source: OECD (2017b), The governance of land use in the Czech Republic: the case of Prague.

The Prague, Brno and Ostrava FUAs are the largest. With more than 500 000 people each, they fit into the definition of metropolitan areas. They account for 41% of GDP, 31% of employment and 30% of total population (Figure 5.4). This suggests they constitute the engine of the country's economic growth. Thus improving productivity and competitiveness in these three areas would have positive repercussions nationwide. Prague's FUA encompasses the territory of 435 municipalities of various sizes, Brno's 245 and Ostrava's 67.

Figure 5.4. Metropolitan areas are the engine of economic growth



a) GDP: 2013 or latest data.
Source: OECD (2017), "Metropolitan areas", *OECD Regional Statistics* (database).

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Prague (*Praha*) is by far the largest city, with 1.27 million inhabitants in 2016. It produces nearly a quarter of GDP and its disposable income per capita is 30% higher than the national average (CZSO, 2016). The service sector accounts for more than 80% of its value added. The second and third largest cities are Brno (pop. 377 000) and Ostrava (pop. 292 000). Most other cities are significantly smaller.

The unemployment rate has declined since 2000 to a level that put the Czech Republic among the best OECD performers in 2016 (Chapter 1.). However, the level of unemployment in Brno and Ostrava remains higher than the national average (Figure 5.5). Prague's unemployment rate is among the country's lowest but has been increasing over the past ten years.

Figure 5.5. Unemployment rates in some major cities remain high

Source: CZSO (2017), "Employment, Unemployment" (database).

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5.1.3. The urban population is well educated

Urban populations generally have the most opportunities to pursue tertiary education. Prague and Brno have the largest percentage of university graduates (24%), followed by Olomouc (21%), Plzeň (16%), Liberec (15%) and Ostrava (14%) (Krausova, 2014). A high share of well-educated residents benefits cities because highly educated people not only are more productive, on average, but also raise less educated residents' productivity level (OECD, 2015). Czech cities have reached the target set in the Europe 2020 Strategy of at least 40% of 30- to 34-year-olds having completed higher education (EC/UN-Habitat, 2016). However, as in other EU countries, rural areas lag behind.

In 2011, 72% of those employed in Prague and 65% in Brno and Olomouc worked in services, whereas in Ostrava, Plzeň and Liberec nearly one-third worked in manufacturing and construction (Krausova, 2014). Professional and scientific activities account for a significant share of jobs in Prague and Brno: in 2016, 56% of the employed in Prague worked as managers, professionals, technicians and associate professionals, while 26% worked in clerical support and in services and sales.

As in Hungary, Poland and Slovakia, the risk of poverty or social exclusion is lower in cities (8%) than in rural areas (11%) and suburban areas (10%) (EC/UN-Habitat, 2016).

5.1.4. Cities face a looming housing affordability gap

Access to affordable housing is a major concern

The cost, quality and affordability of housing are major concerns. In Prague only 30% of residents consider it easy to find good housing at reasonable prices, compared with 65% in Ostrava (EC/UN-Habitat, 2016). Demand is high in Prague, where the average price per square metre of an apartment was 30% greater than in Brno in 2016 (OECD, 2017b).

A key problem with housing is physical deterioration of housing estates. Physical obsolescence relates not only to buildings (low energy efficiency, poor technical quality, etc.), but also to neglected public spaces. Although significant investment is being made

to regenerate estates inherited from the Soviet era, many lack adequate maintenance. This has an effect on social cohesion as more affluent families move to better-off areas. Lack of finance for complex regeneration of housing estates is a crucial problem. Regeneration is mostly limited to physical renovation of panel houses (insulation, technical infrastructure, windows). A systematic approach to the surrounding greenery, public buildings and space is generally lacking (Temelová et al., 2011).

The rate of completed dwellings decreased despite growth in the total housing stock

Nationwide, the total housing stock increased. However, over 2010-16, the number of completed dwellings declined: by 26% for single-family houses and 18% for apartment buildings (CZSO, 2017b). Of the new housing construction in 2016, 29% of apartment blocks were built in Prague and 25% of houses in Central Bohemia. The number of building permits decreased faster in the capital (by 37%) than in the surrounding region (by 13%), including for residential buildings (down by 41% and 12%, respectively). The lengthy process for obtaining building permits contributed to the housing price increase.

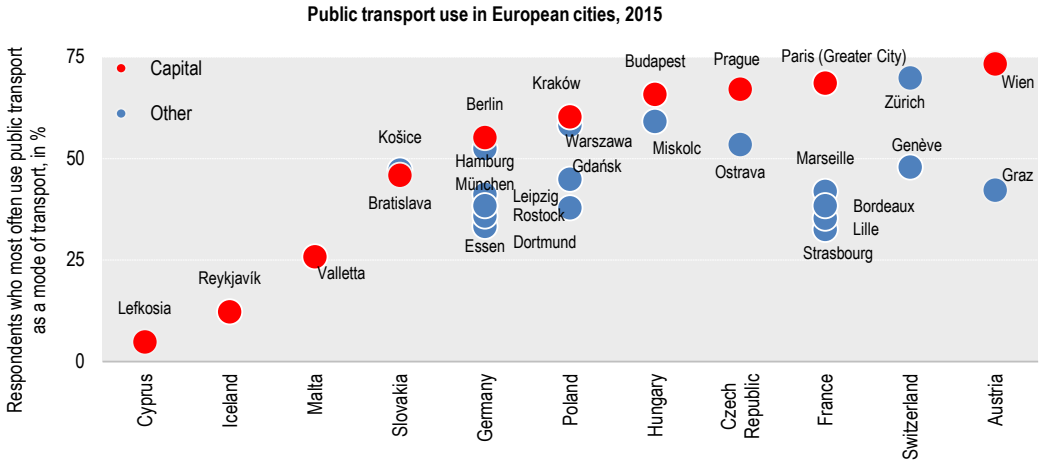
The Czech Republic has a high rate of home ownership.

As in other Eastern European countries, owner-occupied housing levels are high (EC/UN-Habitat, 2016). Among Prague residents, the largest share live in owner-occupied apartments (43%), followed by rented housing (31%), co-operatives and houses (11% each) and other accommodations (2%) (CZSO, 2016). It is worth noting that 76% of new houses built in Prague are for the owner's use and 24% are for sale. The percentage of housing for rent is relatively low, limiting labour mobility. There is practically no construction of flats or houses for rent. Regarding blocks of flats in Prague, the number of new co-operative buildings increased dramatically, from 70 completed in 2013 to 252 in 2015. A very accessible mortgage rate (2% per year) and economic growth have increased demand for houses in recent years, with prices rising accordingly.

5.1.5. Despite an efficient public transport network, car use increased

Prague has an integrated transport system (metro, trams, buses, trains, ferries and a funicular) that covers the entire city and one-third of the Central Bohemian region. It is the main transport mode of the city's residents (Figure 5.6). Since 2010, about 1.2 million passengers a year have used urban public transport, on average (MOT, 2017). In 2016, most people travelled by metro (36%), followed by bus (32%) and tram (29%) (City of Prague, 2017). As part of city government efforts to modernise the transport infrastructure and make it more environment-friendly, ageing vehicles are being replaced with CNG and electric vehicles, with a strong emphasis on providing buses and trams accessible to people with reduced mobility. A key outcome of investment in urban transport has been the high levels of satisfaction with public transport quality in Prague (86%) and Ostrava (81%) (EC, 2016).

Figure 5.6. Public transport is the main mode used in Prague



Note: Respondents could select up to two modes.
Source: EC (2016), "Quality of Life in European Cities, Country report Czech Republic", *Flash Eurobarometer 41*.

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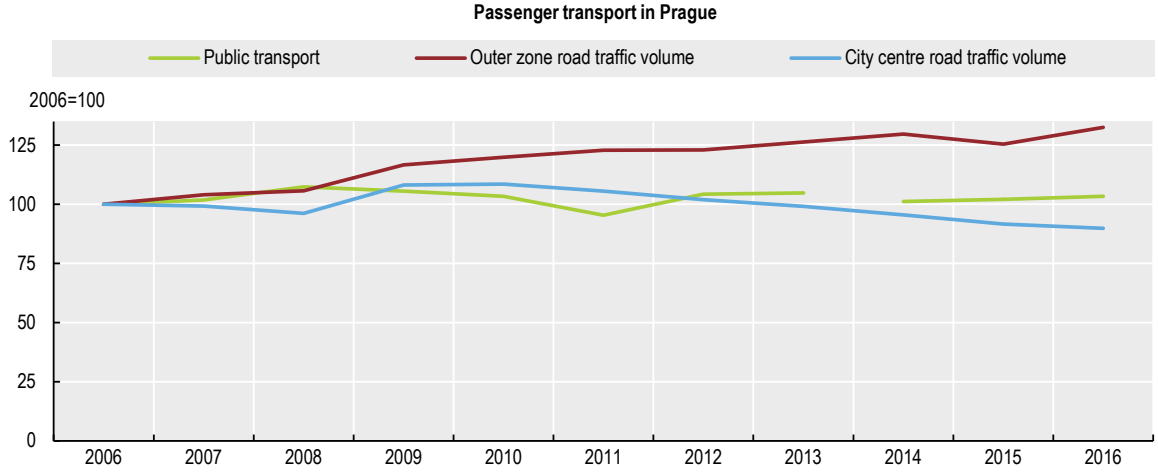
However, car ownership increased as incomes and suburbanisation rose. In Prague, it grew by 25% between 2010 and 2016, faster than in any other region. Congestion and parking problems, as well as noise and air pollution, have resulted. Over 2006-16, while the number of passengers using public transport remained broadly stable, car traffic volume increased significantly in the outer zone of the city, though it decreased in the centre (Figure 5.7) (City of Prague, 2017).

Figure 5.7. Car traffic volume is growing in Prague's outer zone



Notes: Public transport: index based on the number of passengers transported; break in time series in 2014. Traffic volume: index based on the number of vehicles over the 24 hours of an average workday. City centre: bounded by Petřín in the west, Letná in the north, Riegrovy sady in the east and Vyšehrad in the south (the Strahov and Mrázovka tunnels lie outside the central cordon). Outer zone: traffic volume is measured where the main roads and motorways enter the city centre.
Source: City of Prague (various years), *Prague Transportation Yearbook*.

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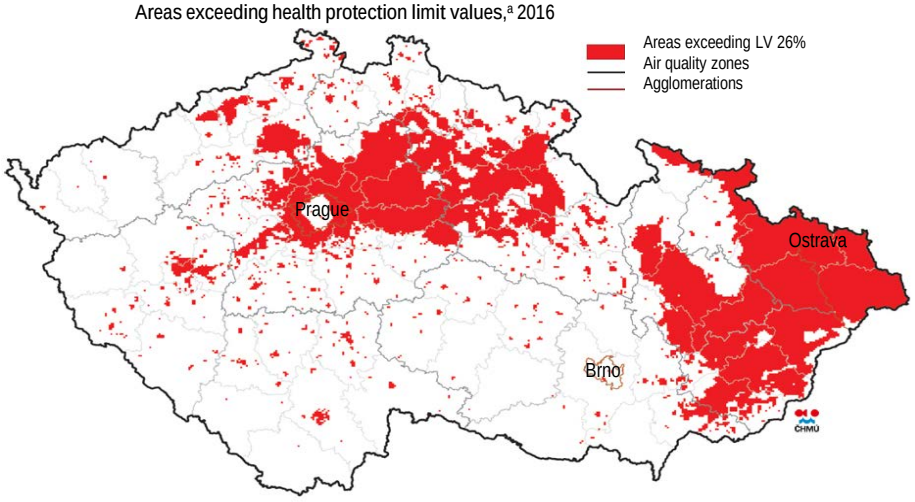
Prague lacks infrastructure for soft transport modes. It is ranked 5 (out of 100) on the Sustainable Cities Mobility Index (Arcadis, 2017). However, a limited percentage of residents use cycling as their main transport mode. Promotion of bicycle transport and installation of the necessary infrastructure are part of the city's development plan. Cycling solutions are being integrated into new building and construction projects.

5.1.6. Urban residents are exposed to higher air pollution levels

Urban residents are exposed to higher air pollution levels, though to a lesser extent in Brno (Figure 5.8). In 2016, areas exceeding health protection limit values accounted for 26% of the territory and 56% of the population. When including ozone, which also affects the western regions, the shares reach 43% and 59%. The major sources of local air pollution are road transport and fossil fuel combustion for residential heating. The Moravian-Silesian region is also affected by industrial sources and transboundary air pollution at the Polish border (Chapter 1.). Air quality poses disproportionally high health risks for the residents of Ostrava (Tomášková et al., 2016).

Figure 5.8. Air pollution is higher in urban, suburban and industrial localities



a) Annual limit values for PM_{10}, $PM_{2.5}$, benzo(a)pyrene, NO_2, lead, cadmium, arsenic, nickel and benzene, limit value for CO (max. daily 8-hour running average), daily limit value for PM_{10} and SO_2, 1-hour limit value for SO_2 and NO_2.
Source: CHI (2017), *Graphic yearbook 2016*.

Metropolitan areas are large energy consumers and greenhouse gas (GHG) emitters. FUAs in the Karlovy Vary, Ústí nad Labem, Moravian-Silesian and Central Bohemian regions and Prague account for three-quarters of national CO_2 emissions from energy production (EEA, 2017). While lack of information at territorial level impedes benchmarking of urban GHG emissions, available data suggest emissions in Prague proper are lower than in its commuting zone (7 tonnes per capita compared with 13 t./cap. in the FUA in 2008) (City of Prague, 2016; OECD, 2017d). In the capital, total GHG emissions have decreased since 2005 but transport's share increased to 29% by 2014. CO_2 emissions per capita in urban areas in general are lower than those in less densely populated regions (OECD, 2013). Czech metropolitan areas could be more energy efficient if a more compact city growth model were followed. National legislation on environmental protection, land use and public health should be reviewed to promote compact urban development.

5.1.7. Some cities are moving towards a sustainable energy approach

Overall, awareness of renewable energy development options seems to be low. Cities lack information about their own potential, have no conceptual documents and a low share of renewable energy use (Škopková, 2016). However, promising initiatives have been taken in some cities. Fuel consumption for heating and hot water has been decreasing over the past decade, due mostly to increased use of natural gas boilers with higher combustion efficiency. Electricity use has been continually increasing. Since 1994, the Prague city government has run a clean energy programme which provides subsidies to replace heating systems using solid fuel with environmentally friendly ones and use renewable energy sources.

Litoměřice is one of the pioneer cities in promoting clean energy. Its strategic development and energy plans aim to make it a low-carbon, energy self-sufficient city by 2030. Since 2000, it has been implementing measures to develop small-scale renewables, e.g. subsidising private solar thermal installations. Since 2012, the city has managed to save EUR 830 000 through energy efficiency projects, investing the funds back into energy saving through the Municipal Energy Savings Fund. It has also been working on an ambitious geothermal heating plant that could cover the needs of 70% of its population, but the national government's political, technical and financial support is essential. As a rather small city, Litoměřice finds it a challenge getting access to financial resources to implement its plans and programmes. To promote sustainable energy, Litoměřice, the cities of Chrudim, Kopřivnice and the district of Brno-Nový Lískovec set up a municipal energy manager association in 2014 (Covenant of Mayors for Climate & Energy, 2014).

5.1.8. Urban residents have almost universal access to drinking water and sewage treatment

Most Czech residents (94%) have access to public water supply, and in large cities, connection rates reach 100%. Drinking water is of very high quality, particularly in supply zones of over 5 000 inhabitants (SZU, 2017). EU financial support helped improve water infrastructure. The share of water lost to leaks fell from 21% in 2006 to 15% in 2016. In Prague, the rate decreased from 24% to 14%.

The share of population nationwide connected to public sewage treatment grew from 73% in 2005 to 81% in 2015, in line with the OECD average (Chapter 1.). In cities including Prague and Litoměřice, almost all households are connected to the sewerage system. The Czech Republic met the collection requirements of the EU Urban Waste Water Treatment Directive but not the 2010 treatment level objectives. By 2014, only 3.5% of wastewater collected in Prague underwent more stringent treatment, compared with 62.7% countrywide (MoE, 2017). This was largely due to delays in rebuilding the central wastewater treatment plant. The new plant, which will meet EU effluent standards, is scheduled to be commissioned in 2018 (Wanner, 2015). The Prague sewerage system mixes sewage and rainwater in the same pipes, while new housing estates on the outskirts have a system that separates the two.

5.2. Urban governance

5.2.1. The territorial division is fragmented

The Czech Republic is a unitary state divided into 14 regions (*kraj*). The Constitution (Article 99) assumes a two-level system of local government, with municipalities as the basic territorial self-governing units and regions as the higher level of self-governing units. There is no hierarchical link between the two levels. The state can intervene in territorial self-government only when provided for by law and for reasons of upholding the law. The Constitution stipulates that the territorial units are communities of citizens with the right to self-government. A statute specifies when they have the role of administrative districts.

The Constitution guarantees independent administration of municipalities by elected assembly and council. As of 2016, the municipal level comprised 6 258 municipalities (*obce*), including 604 towns (*město*), 26 statutory cities (*statutarni město*) and 223 market towns (*městys*) (CZSO, 2017c). The number of municipalities is very large compared with countries of similar population levels; for instance, Sweden also has 10 million people but 290 municipalities. Most Czech municipalities' population is less than 500. According to the Act on Municipalities (Act No. 128/2000 Coll.), a municipality with at least 3 000 inhabitants can be considered a city. The statutory cities (accounting for 34% of the population) have special status granted by law and can establish submunicipal districts with their own mayor, council and assembly (only eight cities have chosen this option). Municipalities have the right to manage municipal property, adopt municipal budgets, establish legal entities, adopt a municipal development programme, approve local physical plans and issue ordinances. They have independence in managing their property and financial resources and in the field of local strategic development and physical planning. The number of municipalities with town status grew from 527 in 2004 to 604 in 2016.

Prague has the level of a regional government. The Act on the Capital City of Prague defines the rights and duties of its assembly and council as well as those of metropolitan districts. Prague issues regulations and decrees within its areas of competence, such as building regulations. It has the powers of a region and those of a municipality. The interplay between these levels makes planning complex (OECD, 2017b). The municipality of Prague is divided into 57 boroughs (22 of which are also administrative districts), but the crucial power is at the central Prague municipal government level, at which decisions are taken about decentralisation of responsibilities to boroughs. For example, Prague municipality owns real estate, but decentralises the management of certain properties, such as public housing, to boroughs. Urban planning, on the other hand, is done at the central municipal level.

5.2.2. The distribution of responsibility across government levels is complex

The national government plays a decisive role in urban development through urban and regional policy, enactment of legislation and elaboration of national strategies and programmes.

The Ministry of Regional Development has a central role in defining regional, housing and investment policy, developing housing stock, providing the framework for spatial planning, issuing building rules and overseeing expropriation and tourism. It also administers the funding to implement the housing and regional policies and co-ordinates housing-related activities by other ministries and central government authorities. In

addition it is the national co-ordination authority for management and implementation of programmes financed by EU structural and cohesion funds.

Regions are responsible for upper secondary education, regional roads, public transport, healthcare and general hospitals, social assistance and other areas, including several functions related to planning and spatial development: they approve planning and zoning documents and oversee regional economic development and environmental protection. Regional governments can issue binding ordinances or decrees in their areas of independent or delegated authority. Municipalities are responsible for local and urban planning, public transport, local roads, housing, land use and spatial arrangements, environmental protection and infrastructure (including water management and treatment, urban heating and waste processing), agriculture, provision of primary health care and social services, and local development in general. Competencies and responsibilities of local government, particularly municipalities, on urban issues are established by national law.[4]

Municipal authorities are delegated some central level functions.[5] While municipalities have equal status, they are divided into three categories according to the scope of their delegated responsibility: 205 municipalities with extended powers; 1 036 municipalities with some delegated powers (e.g. registry office, building authority), including 388 with authorised municipal authority; and "basic" municipalities. Municipalities without extended powers are assigned to a municipality with extended powers, which fulfils several administrative functions for them, such as maintaining records of births, deaths and marriages. Most municipalities (over 90%) have delegated some functions to other municipalities. Municipalities with extended powers draw up local territorial plans, regulatory plans and planning studies for their own territory and that of adjunct municipalities without extended powers. The plans must be approved by the council of every affected municipality. Local councils can also comment on and object to regional development principles and plans of neighbouring municipalities (OECD, 2017b).

5.2.3. Metropolitan-wide planning approaches are lacking

The Czech Republic is taking a more integrated approach to territorial development so as to use EU structural and investment funds in certain areas, not only to support national competitiveness but also to reduce territorial disparity. Instruments to use these funds include integrated territorial investment, integrated territorial development plans and community-led local development. However, such investment projects are hindered by a lack of effective metropolitan-area governance arrangements that support productivity and competitiveness. Integrated territorial investment cannot fully replace metropolitan-area planning because it focuses on individual projects. For instance, Prague has no metropolitan-area planning approach to land use, and its proposed strategic plan for the metropolitan area does not appear to involve significant co-operation with municipalities elsewhere in Central Bohemia. National legislation does not let Prague use land use planning tools beyond its administrative borders, contrary to the metropolitan or functional approach to managing a metropolitan area. Any future measures to enhance metropolitan-area co-ordination should focus on land use planning, including to address urban sprawl resulting from inadequate co-ordination (OECD, 2016b). Moreover, most municipalities are too small to ensure cost-effective provision of public services. Municipalities' lack of incentives to merge and form larger units has important implications for spatial and land use planning. Such decisions are made at the most local level, often resulting in conflicts, competition and apathy that prevent co-operative solutions. Territories that are functionally connected do not co-ordinate on joint spatial strategies or benefit from

approaches emphasising the collective public good, such as protection of forest, agricultural land and natural amenities. To meaningfully influence the environmental impact of urban development issues such as land use and transport, authorities must act at a level that considers central cities and suburbs together (OECD, 2015b).

In a context of high territorial fragmentation, adopting a metropolitan-area approach to urban management could bolster competitiveness and productivity and ensure better urban policy outcomes. Efforts could build upon the fact that municipalities are entitled to co-operate with other municipalities to carry out tasks in their competence. They can even form associations of municipalities to protect and promote their common interests in a wide range of areas.[6] Thus, the national government should continue providing incentives for inter-municipal co-operation and joint service provision. Contractual arrangements and financial transfers would be key tools for co-operation: the central government would commit to giving metropolitan areas specific advantages in return for stronger inter-municipal co-operation, as with France's inter-communal grants and Mexico's metropolitan fund.

Identifying concrete metropolitan-area projects (transport, water, sanitation, even cultural events), building metropolitan ownership, tailoring reliable sources of metropolitan financing, designing incentives and compensations for metropolitan compromises and implementing mechanisms for monitoring and evaluation could guide effective metropolitan-area governance reforms (OECD, 2015b). Reforms might build on transport system experience: the Prague, Brno and Ostrava metropolitan areas have governance bodies (e.g. jointly owned companies) that run integrated transport systems, successfully overcoming municipal borders and reducing the costs that fragmentation imposes (OECD, 2016a). One promising step towards a metropolitan strategy is that the 2015 Spatial Development Plan tasks the Ministry of Regional Development, the city of Prague and the Central Bohemia region with conducting regional studies focused on regional infrastructure interaction, co-ordinating development and conducting territorial studies on suburbanisation and unsystematic development in the area.

Another option would be to explore the possibility of creating "metropolitan cities" such as those in Italy, where 10 *città metropolitana* have key responsibilities in areas such as spatial planning and economic development. The Italian government provided financial incentives through EU structural funds to support investment at the metropolitan scale (OECD, 2015b). The Czech Republic has an advantage in that some municipalities can transfer responsibilities to larger municipalities, which could be the foundation for Czech metropolitan cities. The Prague Institute of Planning and Development (IPR Prague), the main city planning body, has the accumulated experience to serve as a planning institute at FUA level (IPR Prague, 2017).

5.3. Policy framework for sustainable urban development

5.3.1. The Czech Republic has a robust strategic framework for sustainable development

Czech Republic 2030 sets the strategic vision for sustainable development (GOCR, 2017). A consensual framework for preparation of sector policies and action programmes, it is the starting point for strategic decision making within individual departments and for interdepartmental co-operation. The annual National Reform Programme, a conceptual document on stimulating economic growth (GOCR, 2016), sets priorities and reports on key measures to implement the Europe 2020 strategy, including

on transport, environment, climate and energy. The Regional Development Strategy 2014-20 aims at supporting competitiveness and reducing economic, social and environmental territorial disparity (MRD, 2013). It defines sustainable development as a priority for metropolitan areas, large agglomerations and regional centres. It covers i) management of public spaces (buildings, parks, natural habitats), ii) waste management, iii) territorial development (co-ordination of spatial planning, functional use of territory, participation of actors in land use planning), iv) smart energy management (energy saving in buildings and transport, development of biomass and other local renewable energy resources), v) reduction of air emissions and noise and vi) flood protection measures.

Czech Republic 2030 is the main implementation platform for the Sustainable Development Goals (SDGs; Chapter 1.). Its priority on regions and municipalities provides a framework for mainstreaming sustainable development in regional and local policies. It contributes to the achievement of SDG 11 on sustainable cities and communities, among other goals. The Government Council on Sustainable Development (GCSD) co-ordinates implementation of Czech Republic 2030 and other sustainable development issues across ministries (Chapter 2.). Its committees on sustainable municipalities and sustainable transport are very much related to urban development. But the national government does not always implement the GCSD's recommendations, with politics to play a major role. Moreover, not all stakeholders seem to have the same level of influence on the GCSD.

The 2015 Spatial Development Policy establishes planning priorities for sustainable development, corridors and areas for transport infrastructure and areas of expected development for energy and water management. It seeks to ensure integrated territorial development in cities and regions, prevent spatial or social segregation in the urban environment, support polycentric development of the settlement structure, develop brownfields to protect agricultural and forest land and preserve public green areas, improve territorial accessibility through transport infrastructure while preserving landscape permeability and minimising landscape fragmentation, improve public transport infrastructure, ensure transport connectivity of residential, leisure and production spaces, and take measures to mitigate floods. The policy sets development planning priorities of the Prague, Brno and Ostrava metropolitan areas and other main cities.

5.3.2. The principles of urban policy provide a specific policy reference framework

In 2017, the national government updated the Principles of Urban Policy, a framework document, to propose guidelines and activities conducive to sustainable urban development, co-ordinate the approach taken by all government levels and ensure implementation of the UN-Habitat New Urban Agenda (Box 5.1). The principles, which reflect the interdisciplinary and cross-cutting nature of urban development, are binding for central government and are recommendations for city governments. They are also the basis for the forthcoming regional development strategy Czech Republic 2021+. They are valid until 2023, when they are to be revised and updated again. The principles aim to enhance competitiveness and sustainable development while promoting co-ordinated, integrated urban development. One aspect the new principles may need to emphasise, based on the experience of Litoměřice and OECD countries such as Sweden, is the need for strong organisational and individual leadership. Sustainable development cannot be achieved without political and public support. Similarly, the promotion of citizen engagement in urban planning should be stressed.

Box 5.1. Principles of Urban Policy in the Czech Republic

The Principles of Urban Policy outline the views of the central government on cities' standing and importance for economic and regional development.

- **Principle 1: Strategic and integrated approach to the development of cities**. City development requires a long-term vision and adequate planning tools. Urban and regional development cannot be disunited. The smart cities concept should inform the promotion of planning at the local level. Links between urban and rural policy and other relevant policies at the various levels of government need to be created.
- **Principle 2: Polycentric development of the settlement system.** Growth and development of large urban areas should not hinder the development of medium-sized and smaller cities.
- **Principle 3: Cities as poles of development in the territory.** Cites should help promote rural development, the knowledge economy and innovation in production. Brownfield redevelopment, investment in public transport and improved access to housing and public services are among the key priorities.
- **Principle 4: Protection of the urban living environment**. Strategic directions include adopting measures to prevent negative effects of climate change, efficient use of resources and energy, preservation of green areas, balance in the relationship between rural and urban areas, environmental education and public awareness.
- **Principle 5: Implementation of the New Urban Agenda.** A framework for implementation of the New Urban Agenda is to be prepared.

Source: MRD (2017), Principles of Urban Policy, 2017 update.

5.3.3. Cities' strategic plans are largely aligned with national directives

Czech cities have strategic plans aimed at providing basic understanding of their long-term socio-economic direction. For example, the Strategic Development Plan 2030 of Litoměřice gives priority to areas such as enhancing the city's attractiveness and prosperity, making it energy independent and low emission and promoting efficient city management. The 2016 Strategic Plan of Prague seeks to promote business and creativity, foster participation and communication of citizens in the city's daily life, transform the city into a cultural centre, pursue social cohesion and revitalise public spaces. The elaboration of this plan followed a bottom-up approach, as it included the opinions of professionals and residents.

Prague's strategic plan also sets the basis for a general flood management and drainage plan for the city and a water supply and sewerage system development plan. The former, adopted in 2002, is a strategic tool to guide the planning, investment and operation of measures to manage floods and ensure the drainage of rainwater and sewage. The water supply and sewerage plan aims to ensure drinking water supply to the city and wastewater treatment. It sets the direction for investment in water supply and sewerage infrastructure construction and guides joint action with neighbouring territories on water management. The municipality of Litoměřice, by contrast, is trying to keep rainwater on its territory and is conducting a pilot project to use rainwater in the town hall.

Environmental protection and sustainable development are key priorities for Czech cities. For example, to save energy, diversify energy sources and reduce GHG emissions, the Prague city government prepared a territorial energy concept for 2013-33, in line with the National Energy Management Act and the city's land use plan. The concept seeks efficiency in energy supply and management to contribute to the sustainable development of the city. The Litoměřice strategic plan, meanwhile, has a goal of making the city energy independent, with high quality of life, by 2030. Its city energy city plan set a goal for 2030 of reducing energy consumption by 20% compared to 2012. As part of its action plan, the city government tries as much as possible to renovate and reconstruct public buildings using renewables and convert them into nearly zero energy consumption buildings.

5.3.4. Silo-style administration of urban policy prevails

Interviews for this review revealed a widespread perception that urban, social and environmental policies are still largely conducted in siloes, with a lack of unified direction for ministries on policy implementation. This suggests that the urban sustainability vision has not been integrated holistically in various policy areas. Sectorisation and specialisation seem well-rooted in the administration, and while they provide clarity for accountability and responsibility, they limit the ability to co-operate on holistic solutions. For example, there is no administrative unit dealing with cross-sector issues in the city hall of Prague (Von Radecki et al., 2016).

The problem appears to be not a lack of co-ordination instruments but rather how the instruments operate. For instance, the GCSD does not fulfil its role as an intersectoral co-ordinator of sustainable development policies because it does not always influence decision making. There is no cross-cutting distribution of responsibility for urban development across ministries, which thus conduct planning and work specific to their sector not only without co-ordination but also with little reference to one another. An alternative approach would be for the Czech Republic to revise the operation of the GCSD and its working groups based along the lines of Sweden's Platform for Sustainable Cities (Boverket, 2017). The five central agencies that constitute the platform collaborate on key issues for sustainable development. The GCSD and its working groups should similarly have a mandate for specific joint delivery as well as promotion of collaboration, co-ordination, knowledge dissemination and exchange of experience. The Czech Republic could also make the allocation of responsibility across ministries more cross-cutting and give more clarity on their responsibility for urban development.

5.3.5. A 3C development model and more support to Local Agenda 21 could boost urban policy effectiveness

Czech authorities may wish to pursue the type of urban development model known as 3C (compact, co-ordinated, connected), where housing and transport policies are a central part. The model may be explicit in strategic urban development documents. A 3C model provides a holistic approach to urban development by linking housing, spatial planning and transport policies to facilitate synergy building in urban development disciplines. Housing, for instance, is not only seen as basic infrastructure but valued for location, environment and services. This linkage would underpin environmental sustainability and assist authorities in their quest for better water management and flood prevention, among other issues.

At a local level, the Czech Republic could build on the Healthy Cities platform, which emphasises addressing the determinants of health through intersectoral partnerships and stresses collaboration across public, private, voluntary and community sector organisations.[7] As the 2005 Environmental Performance Review of the Czech Republic recommended, Local Agenda 21 – a voluntary tool for sustainable development at the local level – is being implemented mostly through the Healthy Cities platform. Municipalities that have adopted the agenda (180 in 2017, up from 40 in 2006) seem to have generated more environmental awareness among citizens and economic actors (Kveton et al., 2014, CENIA, 2017). The national government should further support the initiative by disseminating its advantages among other municipalities through the Union of Czech Towns and Municipalities and assessing its results. The GCSD LA21 Working Group has approved the methodological tools for evaluating initiatives under the agenda. So far, the four best-performing municipalities (Chrudim, Litoměřice, Jihlava, Kopřivnice) have been reviewed.

5.4. Policy instruments

5.4.1. Spatial planning and land use

The Czech Republic has a relatively solid, hierarchical planning system…

The spatial planning system in the Czech Republic is legally robust; planning instruments are clearly defined and regularly updated, and have a clear multilevel structure (OECD, 2017b). The country has a hierarchical system in which lower level plans need to comply with higher level plans. The 2015 National Spatial Development Policy, at the top of the hierarchy, contains general guidelines for planning and specific requirements for sustainable development, outlines the key spatial relations within the country and related national government objectives (e.g. areas important to technical and transport infrastructure development) and collects and analyses data relevant to regional and local territorial planning (MRD, 2015). However, it does not outline a vision for future spatial development. Rather, it mostly focuses on identifying key areas and corridors for development and protection – in some cases, at a very detailed scale.

The 2007 Building Act introduced development principles as a new instrument of regional planning documentation. They provide details for specific policy areas (such as roads) or for territories of particular importance, set regional spatial development priorities and co-ordinate municipal planning activities.

At the municipal level there are three types of plans. First, local territorial plans show permitted land uses and cover the entire municipal territory. There is no legal obligation to adopt local territorial plans but, once adopted, they are binding for landowners. While they are strictly enforced, they are frequently updated to fit developers' needs. Second, regulatory plans are prepared for specific areas, such as redevelopment zones, and cover only small parts of municipalities. They provide further regulations on details of permitted developments, such as architectural specifications. Third, planning studies are ad-hoc documents that regional and local authorities can procure to develop solutions to particular planning problems. They are non-statutory and have no legal consequences for either landowners or public authorities. Planning studies do not have clearly defined contents and can range from broad strategic documents to precise land use plans.

Czech spatial management is affected by a lack of co-ordination between economic policy and spatial planning at all levels of government. Regional strategic and spatial

plans are disconnected. Municipal land use plans are not always well connected to regional spatial plans. There is no direct link between spatial and land use planning and financial planning: the central government, regions and municipalities often make statutory plans without clearly anchoring them in public budgets. Resources and ambitions thus may be mismatched (OECD, 2017b). Better integration of sectoral plans in spatial planning is needed to co-ordinate investment.

The system of territorial planning is strongly affected by sector policies and interests that may be difficult to reconcile and accommodate. Examples include conflicts between i) monument and nature preservation and projects for transport infrastructure, and ii) adjoining municipalities in the case of new infrastructure investment (e.g. roads, bike paths, bio-corridors) (OECD, 2017b). The effectiveness of a city's strategic plan is undermined by the fact that other municipal strategies and frameworks, programmes or sector concepts prepared by the city administration, as well as borough-level strategic plans, are not obliged to confirm to its objectives.

… but Prague's intense suburbanisation suggests a lax local land use planning system

Prague has seen the most intensive urbanisation and suburbanisation of any municipality in the Czech Republic. It has a large share of agricultural and natural land in its territory,[8] but urbanisation has affected the landscape's character and landscape protection has been insufficient (City of Prague, 2016). Prague's intense suburbanisation suggests highly permissive land use policies contributing to expansionary and often sprawling development. Between 2000 and 2012, developed land across the Prague FUA increased by 0.7% per year, compared with the OECD Europe average of 0.4% (OECD, 2017b). The greatest increase was in the commuting zone, where developed land grew by 1% per year compared with 0.3% in the urban core.[9] Developed land per capita in the commuting zone is much higher than the OECD Europe FUA average. This may in part reflect a preference by commercial and industrial firms to locate operations outside the city's administrative boundary to qualify for EU funds in the Central Bohemian region. Other factors include a cultural preference for large suburban homes. The Principles for Urban Development suggest that forming rural-urban partnerships, with relevant rural and urban stakeholders working together on initiatives aimed at yielding collective benefits for all through a functional approach, may be the way forward.

Prague requires strategic land use planning to manage urbanisation and protect the environment

Prague's 2016 strategic plan contains three strategic directions on the themes of i) a cohesive and healthy metropolis, ii) a thriving and creative metropolis and iii) a well-run metropolis. Prague's Metropolitan Plan, on the other hand, rather than defining zones and their functions, describes an area's characteristics and how it can be improved, given its unique character. The plan focuses on encouraging development in built-up areas and protecting unbuilt landscape and fields from development. It thus allows for increased intensity of use in inner city areas and development of brownfield sites.

Authorities in Prague have been working on a public space development plan primarily focusing on the urban character. It includes a strategy and a manual setting general principles, rules and procedures for development of public spaces. The plan's elaboration is a long-term process of updating, responding to the city's current needs and investment priorities (IPR Prague, 2014).

The city is also in the final stages of approving a new land use plan to control urban sprawl and protect surrounding green areas. However, though it is called the Metropolitan Plan, legal restrictions mean it covers only the municipality, not the larger metropolitan area, where some of the largest growth is taking place. Grounded in a compact city approach, the plan aims to concentrate and intensify use of existing areas and to develop brownfields while designating almost no greenfield areas to be developed. It further aims to reforest open areas as much as possible to increase ecological stability. The plan's main drawback seems to be the lack of reference to the FUA or regional priorities. A more promising strategy for sustainability would be to work co-operatively across administrative borders and sector boundaries to protect and manage land.

Authorities could also ensure that the zoning system is reoriented to promote overall community interests. Sound regulatory design suggests that zoning frameworks should provide as much flexibility as possible. The need for restrictions, and the benefits and costs they create, should be evaluated, taking into account the interests of the community as a whole. Authorities have learned from previous critiques of relatively closed processes, so the Metropolitan Plan's elaboration has been participatory, with many efforts to engage the public, boroughs, developers and other key stakeholders. The process has also sought to address the criticism that past land use plans have been rigid and inflexible, static regulatory documents that do not adequately encourage new and innovative uses. The new plan makes locality the basic unit, defining it by its position in the city, the prevailing character of the built-up area and landscape, and cultural and economic conditions. Preserving the urban green environment while developing a compact city that provides sufficient housing alternatives to a population that is growing, albeit slowly, is a difficult balance to achieve.

Brownfield development is central to environmental protection and bridging the housing affordability gap

Brownfield sites account for a considerable share of most Czech cities' territory. Prague, for instance, has disused railway stations and factories that could be given a new purpose. Even housing estates require renovation to be attractive to residents. Brownfield regeneration offers cities a valuable opportunity to prevent loss of green areas, enhance urban spaces and sometimes remediate contaminated soil. Such sites are usually well connected within the urban boundaries, offering a competitive alternative to greenfield investment. However, cities have trouble redeveloping these spaces because i) several owners claim some properties, ii) it is easier and cheaper for investors and more attractive for potential users to develop green land, iii) it is difficult to change the land use, as the related plan would have to be modified or exemptions to it would have to be made, iv) some places are bound by historical uses and it is difficult for cities to change that, v) brownfield restoration and decontamination can be costly and technically complex, and vi) dialogue between owners and city authorities is not always fruitful.

Redeveloping brownfields could nevertheless help bridge the housing affordability gap and make more sustainable use of valuable land. Experience in other OECD countries suggests that fiscal instruments are key to provide incentives for brownfield investment and guide land use to a more sustainable path; examples include subsidised insurance, development fee waivers and property tax abatement. Portugal, for instance, imposes a heavier tax burden for development outside urban areas and provides tax relief to encourage redevelopment in the city centre. Czech cities could also explore the possibility of establishing i) revolving urban development funds, ii) land value finance tools designed to recover the capital cost of urban investment by capturing some or all of the

increments in land resulting from the investment, or iii) public-private partnerships. It is important to stress that the quality of the landscape plays an important role in brownfield development. Belgium's experience suggests that using cultural heritage and green spaces as levers to obtain public support for regeneration leads to positive results. Czech cities could explore a combination of instruments, valuation and indicators to deal with the complexity of brownfield regeneration. Local governments should ensure that citizens and investors see brownfield sites as a valuable opportunity to preserve the environment and generate economic development, rather than as a costly problem. Czech authorities could use the smart city concept and strategies to guide urban regeneration. Korea, for instance, is linking its smart city vision to urban regeneration and public housing projects. Smart cities are seen as a tool for solving urban problems and improving the quality of life by applying new technology to cities.

Specific approaches to housing estate regeneration are needed, focusing on particular aspects such as the state of physical decay and the population's ageing and socio-economic structure. Prague, for example, should continue efforts to develop brownfields, plan land use strategically and combine urban and socio-economic development policies. But it requires its own strategy, since central brownfield sites present the largest development opportunities, with potential to transform entire neighbourhoods and districts. In other cities, such as Karvina, brownfield sites are outside the city (former coal mining sites) or near housing estates (industrial zones), and city authorities and citizens lack awareness of the social and environmental problems associated with them. National, regional and municipal policies on brownfields show gaps in how they conceptualise the issue (Martinat et al., 2016).

5.4.2. Prague's building regulations promote better urbanisation…

Prague has new building regulations, approved in May 2016, that are grounded in urbanism principles aiming to create walkable, bikeable, attractive neighbourhoods with high quality public and green spaces. The regulations emphasise having new or modified buildings fit the existing character of a neighbourhood. They also stress the importance of trees and green spaces to the urban landscape, along with the importance of rainwater management. Unlike other Czech cities, Prague can issue its own building regulations, although the national government reviews them and can rejected those that are deemed to not meet its standards. The focus of the 2016 regulations is to resolve the disintegration of urban structure and the associated economic, environmental and social impact. The text also contains traditional urban planning instruments, such as street and building lines.

Prague's land use plan is the key document governing what gets built where. It is complemented and made operational by the building regulations, which set out technical standards about building height, placement on a lot, distance between buildings, height of individual rooms, number of parking places, etc.

5.4.3. …but the lengthy building approval process compromises their effectiveness

Prague has a lengthy two-step building approval process consisting of i) planning permission and ii) building approval. The administrative costs are low by European standards but the length of time it takes to receive a permit is much longer and the process is more complex as it requires binding opinions by 23 authorities. By contrast, the Berlin system's administrative costs are higher but the building office secures all documents needed for a project (OECD, 2017b).

The investor is responsible for collecting opinions from all relevant government authorities before proceeding with the approval process. Next, individual neighbours are informed about the proposed development directly and their remarks or objections are collected. Non-government organisations can be also involved. In the building approval phase, the construction and design are checked. Again, the investor must receive stakeholder advice; the process is similar to planning permission. If a project does not meet zoning requirements, a change to the land use plan is sought, which can take one to two years and entails several phases. The two-step process offers more space for objections, which the regional planning authorities must address. If any of the bodies involved disagree with the result, an opinion or decision of the Ministry for Regional Development may be sought. Later there is a possibility of judicial appeal.

5.4.4. Challenges remain in developing sustainable urban transport

Significant transport projects have recently been completed or are planned, e.g. in Prague (Box 5.2). However, the lack of public transport options connecting the city and outlying areas has led to increased car ownership and traffic. Prague plans to build new outer and inner ring roads, which should reduce congestion. But construction delays are hampering efforts to transfer road transit transport away from the developed parts of the city.

Through a project called P+, Prague is developing a sustainable mobility plan for the city and its suburbs, which is expected to be finalised in 2018.[10] It will be the basic conceptual document on mobility and traffic infrastructure, providing a comprehensive view of traffic policy for the capital. The mobility vision, called Effective Prague, is based on improving rail transport to facilitate mass transit with a low environmental impact. It also focuses on car traffic regulation. The expected direct impact of implementing the sustainable mobility plan includes accessibility improvement, reduced pollution, increased passenger and goods transport efficiency, creation of attractive, high quality public areas and increased traffic safety.

Political support for soft transport modes seems to be lacking. However, the Prague government plans to build cycling infrastructure and to encourage walking. Given growing car use in the region, much more will be needed to promote sustainable mobility, e.g. car sharing, park-and-ride sites, regional rail and a low-emission zone (OECD, 2017b). The 2016 Programme to Improve Air Quality in Prague is rightly linked to transport strategies reflecting a more integrated approach to urban development. The Ministry of Transport is leading cross-ministerial efforts to look for ways to promote green mobility. Smaller municipalities such as Litoměřice are also promoting sustainable mobility, e.g. introducing electric vehicles and e-bikes for city employees.

Box 5.2. Public transport improvements in Prague

To deal with increasing use of cars, the city of Prague undertook a range of policy measures, such as parking management with preference for residents, while increasing prices and limiting parking time. Public transport improvement focused on expanding and modernising the metro, tram and bus systems and integrating fares, ticketing, routes and co-ordination among 17 public transport operators in the metropolitan area. From 1990 to 2016, Prague's metro expanded from 39 km to 65 km and the tram network from 130 km to 143 km. The bus network (urban, suburban and regional) was expanded to 2 611 km. Traffic safety was also improved, with fatalities decreasing from 94 in 1990 to 21 in 2016. The integrated transport system operates 3 metro lines, 33 tram lines, 320 bus lines, 29 railways, 1 funicular and 6 ferries. One of the biggest priorities is building a fourth metro line. The expansion of Line A in 2015 was one of the city's main public transport achievements of recent years.

Source: EC/UN-Habitat (2016), The State of European Cities 2016; City of Prague (2017), Prague Transportation Yearbook 2016; Kruml (2015), Extending Prague Metro Line A and Ongoing Network Construction Plans.

To improve mobility and reduce pollution levels, Prague, like other metropolitan areas in the country, needs to link new transport solutions to housing and land use policies. Many people commute to the city daily from a concentrated network of bedroom communities. Such areas have grown rapidly, despite there being ample land within the city to develop. In the US state of California, the impact of new development on transport distances is explicitly tied to ambitious targets for reducing GHG emissions. Increasing the supply of affordable housing and connecting low-income residents to areas of employment are also important drivers of the state regulations. While compact development is not cited as a priority, the requirement to assess the impact of new development on transport encourages more compact development, and connectivity is explicitly stated as a goal in state policy documents.

5.4.5. Progress on energy efficiency is slower than expected

Promoting sustainable energy is one objective of the State Energy Policy (Chapter 1.). Improving energy performance of buildings is expected to provide the largest savings in the National Energy Efficiency Action Plan (Chapter 3.). However, government programmes for retrofitting buildings[11] lack co-ordination. There is also room to improve compliance with the EU Energy Performance of Buildings Directive (2010/31/EU).

Under the Operational Programme "Prague – Growth Pole of the Czech Republic 2014-2020", the EU financially supports sustainable mobility and energy saving projects (City of Prague, 2015). While grant applications for energy saving projects in public transport and urban road equipment have progressed, the take-up of EU funds for renovating city buildings has been low (Hope Group and Naviga 4, 2017). As a result, Prague is not on track to fulfil its intermediate objective on energy saving in public buildings. In Litoměřice, citizens can combine a small town subsidy with state grants and get up to six years' financial return on a solar installation. The city has won several awards in the Czech Solar league. About 5% of households have a solar water system, which has helped decreased particulate and SO_2 emissions (Dutkevicova, n.d.). The 2013 Municipal Energy Plan expects 20% energy savings by 2030 compared to the 2012 level. Photovoltaic systems have been installed in public buildings and schools. Part of the

savings generated are used to pay for other energy efficiency and renewable projects – 30% of savings is allocated to the energy saving fund for that purpose, 35% to the municipal budget, 30% to municipal organisations and 5% to the commission fund.

5.4.6. Czech cities face constant threats of flood and drought

The Czech Republic already has a high degree of flood risk, and climate change is expected to lead to more precipitation extremes and climate variability in general (European Climate Adaptation Platform, 2016). It also bears noting that soil sealing through peri-urbanisation generates knock-on environmental effects, including flood risk. National water policy aims to i) protect water as a component of the environment, ii) protect against flooding and other damaging effects of water, and iii) promote long-term sustainable use of water resources, in particular ensuring drinking water supply.[12]

In the case of Prague, the city sits in the heart of the Bohemian Basin and is surrounded by high hills. It is bisected by the River Vltava, which is prone to occasional flooding. Erosion along its banks and flood protection are critical elements of land use planning for the city. In 2002, Prague experienced severe flooding, with infrastructure, housing and the environment heavily damaged. Intensive farming, forestry practices and watercourse and flood plain management have led to very low retention capacity of the landscape, augmenting the flood risk. The city has been investing in flood control measures along the river (Box 5.3). In 2014, city authorities approved the Prague Waterfront Concept, aimed at co-ordinating plans and investment of the central administration, the city of Prague and private investors to make the area around the river a public space, with both banks freely accessible within the entire city limits.

Box 5.3. Flood protection measures for Prague

The severe flooding Prague experienced in 2002 inflicted damage amounting to CZK 24 billion (EUR 1 billion) on infrastructure, housing and the environment. Climate change raises the likelihood of similar scenarios in the future, but the city does not have yet a strategy to deal with the impact of climate change. Its strategic plan, currently being updated, mentions tentative adaptation measures. It is expected that by 2018 the city will have developed its adaptation strategy. Meanwhile, since the 2002 floods the municipality has implemented flood control measures consisting mostly of grey infrastructure, such as fixed and mobile barriers and safety valves in the canalisation network along the River Vltava. The city also speeded up development of a more resilient flood risk management system.

The cost and benefits of the flood protection measures were calculated for a 20-, 50-, 100- and 500-year flood. The estimated total cost amounted to EUR 145.94 million in 2013. The estimated benefits include avoidance of damage to residential buildings, infrastructure, industrial buildings and equipment, of citizen evacuation and of cleaning and other costs, along with protection of environmental and cultural assets. It is estimated that even in a scenario of just one 50-year flood during the measures' expected lifespan of about 80 years, the benefits would outweigh the costs, even counting annual maintenance and storage. Prague's flood protection system is now finished and protects most of the city from events up to a 500-year flood. Overall, 52.5 km^2 of previously threatened area is now protected. Less densely populated areas have more limited protection.

Source: European Climate Adaptation Platform (2016), Realisation of flood protection measures for the city of Prague.

A critical challenge for Czech cities is to build systems that discharge storm water and avoid mixing it with wastewater. In Prague, only new developments have separate systems for rainwater and wastewater. This is an expensive and technically challenging project for all cities. In some, such as Prague, pedestrian redevelopment includes building drainage of paved areas in such a way that water does not run onto the street but soaks into the grass. To satisfy water demand, Prague is overusing its groundwater resources, which cannot be renewed sufficiently, so that water has to be brought from elsewhere, increasing costs. For Prague to restructure its water policy, the city needs to adopt a holistic approach, taking its unique characteristics into account, even at neighbourhood level. Development in areas such as green spaces, tourist facilities, buildings and commuting routes should be harmonised with water solutions. Long-term thinking in water planning, linked to land use planning, would be a way to balance water demand and supply.

5.4.7. Cities require diverse economic instruments for urban development

Fiscal tools are sometimes at odds with spatial objectives

Prague has a wide variety of fiscal instruments, which it could use more effectively to meet its spatial objectives (OECD, 2017b). For example, its low parking rates incentivise commuting by car, but national legislation limits the amount that can be raised through parking fees or new tolls. Yet these are important tools for spatial and traffic management, and their use should be reconsidered.

Property taxes could be differentiated at more detailed territorial level to promote more compact cities. The rate should be based on a property's value, rather than size, to reflect the externalities of development and promote more sustainable land use. Prague does not employ any fiscal instrument to encourage density, despite this being a critical spatial objective. The city could use, for example, transfer of development rights[13] to preserve open space and limit density in underserviced peripheral areas and increase density in well-serviced ones. Another critical tool, brownfield redevelopment incentives, could help meet the city's goal in this regard more quickly by offering subsidies or grants. Such incentives can also carry other criteria, such as making high-quality public spaces part of the project. A differentiated hotel tax, with higher rates in the urban core, could encourage visitors to stay in outlying areas, thus lessening the environmental impact of tourism in the higher-use zone.

Fiscal and urban planning are poorly co-ordinated. For example, the fiscal implications of land use plans are not considered. IPR Prague is analysing the cost differential between development in inner areas vs peripheral ones.

The use of environmentally related taxes and charges could be improved

A range of environmentally related taxes and charges are in place, but their rates are too low to achieve environmental goals (Chapter 3.). Czech cities could use a mix of fiscal instruments to reduce transport externalities, including congestion charges, vehicle taxes, subsidies for clean vehicles and public transport, and higher parking charges. Decision on the mix of instruments should be based on the type of problem and cost of solutions.

Water tariffs in Prague are below the average for statutory towns (PVS, 2016). Other cities, including Brno, Ostrava and Olomouc, have even lower prices. Water bills cover operating costs for drinking water supply and sanitation infrastructure. However, tariffs remain too low to cover infrastructure renewal and new investment, partly because legal

provisions prevent depreciation costs from being fully taken into account in tariff setting (Chapter 3.). The national government should consider reforming the water pricing system to cover infrastructure maintenance and renewal.

Municipal waste fees are also too low to both cover the cost of service provision and provide incentives for waste reduction and recycling (Chapter 4.). In Prague, the fees covered 56% of the cost of service provision in 2014, and the share has been steadily declining over the past decade (City of Prague, 2016). Municipal waste generation increased over 2005-11, then stabilised. While energy recovery increased, material recovery has shown no real progress since 2009.

5.4.8. Community engagement seems strong, but more needs to be done to retain momentum

IPR Prague promotes participatory planning to help harmonise the views of assorted stakeholders, prevent conflict and contribute to a long-term consensus. The premise is that this will save time as well as human and financial resources, and facilitate involvement of marginalised groups in urban planning. IPR Prague has issued a participation manual to help local public employees understand participatory processes and improve their ability to involve residents in spatial and strategic planning and the design of public spaces and infrastructure. For example, for the 2015 reconstruction of Vinohradská Street, citizens got involved in preparatory work and improvement of the urban design concept prepared by IPR Prague.[14] More recently, the participatory process on updating Prague's strategic plan included professionals and the general public.[15] In-depth interviews, workshops, working groups and consultations were organised so as to develop a common vision and set development priorities. However, Veselý and Vacek (2013) argue that most Czech municipalities still distrust participatory processes, as they are afraid of civic protests. Yet it is precisely the lack of participation and information that leads to social dissatisfaction. The authors argue that residents' participation in revitalisation of public spaces is essential to enhance locals' identification with the public space.

Litoměřice also has mechanisms to encourage public participation through, for instance, the Healthy City Forum, where the public defines the top ten issues the municipality should address in a given year. Round tables and discussion groups are organised to analyse specific problems and projects. The municipality has also issued an action plan for the development of co-operation with entrepreneurs. Each city project must be in line with the plan and undergo a sustainability assessment on its economic, environmental and social impact.

5.5. Financing and investment

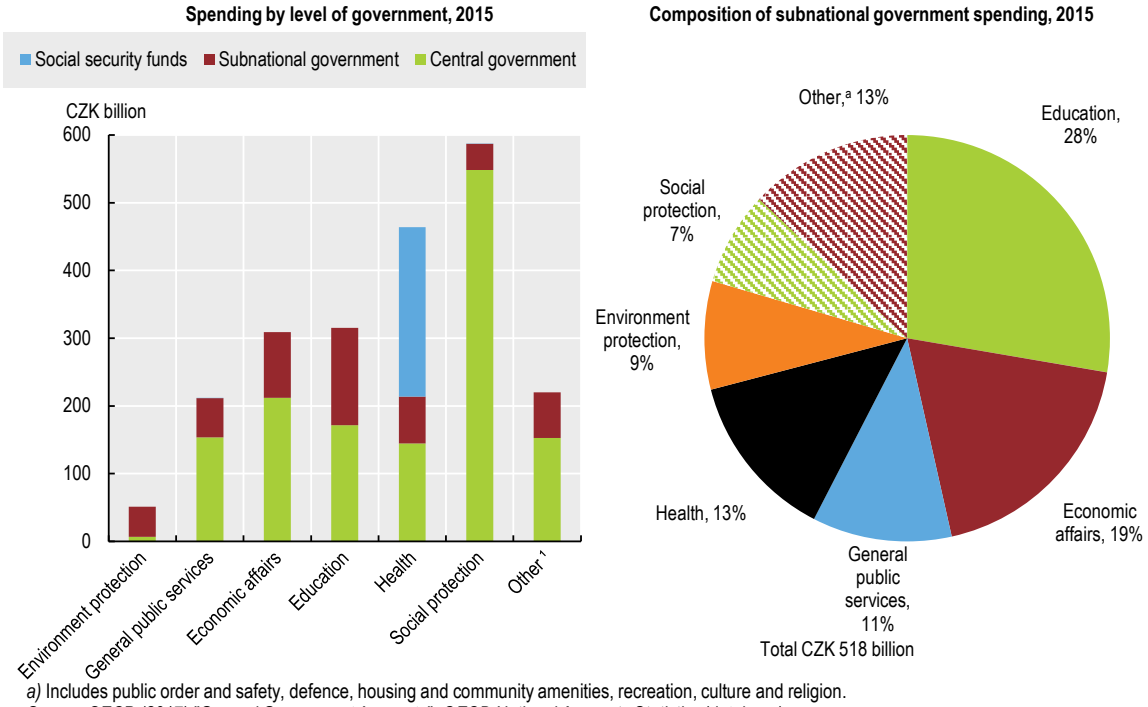
5.5.1. Municipalities rely heavily on central government financing

The Czech public finance system is highly centralised. Central government spending accounts for two-thirds of general government expenditure and subnational spending for about one-quarter (OECD, 2017e). Overall, municipalities have greater spending responsibilities than regions (OECD, 2016a). Subnational government spending is sizeable on education, economic affairs (particularly transport), general public services and environmental protection (particularly waste and waste water management) (Figure 5.9). However, discretionary powers of subnational governments are limited, as much spending is on behalf of central government. In practice, local governments have

limited fiscal and spending autonomy and are in many respects centrally regulated. For example, central government regulates part of the water price, and determines local government employees' salaries (Bryson, 2010).

Subnational governments are financed mostly through a mix of shared taxes (personal and corporate income tax and value added tax), grants and transfers from central government, and fees for public service provision (OECD, 2016a). About 60% of municipalities' revenue comes from shared taxes, while the majority of regional revenue comes from grants and transfers (around 60%). Local governments raise 1.2% of total tax revenue – the second smallest share in the OECD (Chapter 3.). Thus, municipalities are heavily reliant on central government to deliver programmes, services and infrastructure. The share of taxes allocated to municipalities is mostly based on population, which can act as an incentive for sprawling development.

Figure 5.9. Subnational government spending is significant in some areas



a) Includes public order and safety, defence, housing and community amenities, recreation, culture and religion.
Source: OECD (2017),"General Government Accounts", *OECD National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933723625

Tax distribution has long been debated. The share of subnational revenue is determined annually. In 2016, it was set at about one-tenth for regions and one-fifth for municipalities (OECD, 2016a). Changes in the tax sharing formula strengthened revenue for smaller municipalities but offered few incentives for mergers. Recent amendments reduced the revenue for the four largest cities. The formula is not transparent in distinguishing between a municipality's tax raising capacity and the transfer it needs from central government.

Recurrent tax on immovable property is low, at 0.7% of general government tax revenue, compared to the OECD average of 3.3% (OECD, 2016a). This is partly because most municipalities do not impose tax rates above the minimum, even though they have the

power to charge up to five times as much. Increasing recurrent taxation on immovable property would increase the share of municipal revenue that is directly controlled. This could help drive improvement in public service provision by strengthening the link between taxation and services. In addition, the property tax could be differentiated to reduce greenfield development and increase urban density (OECD, 2017b).

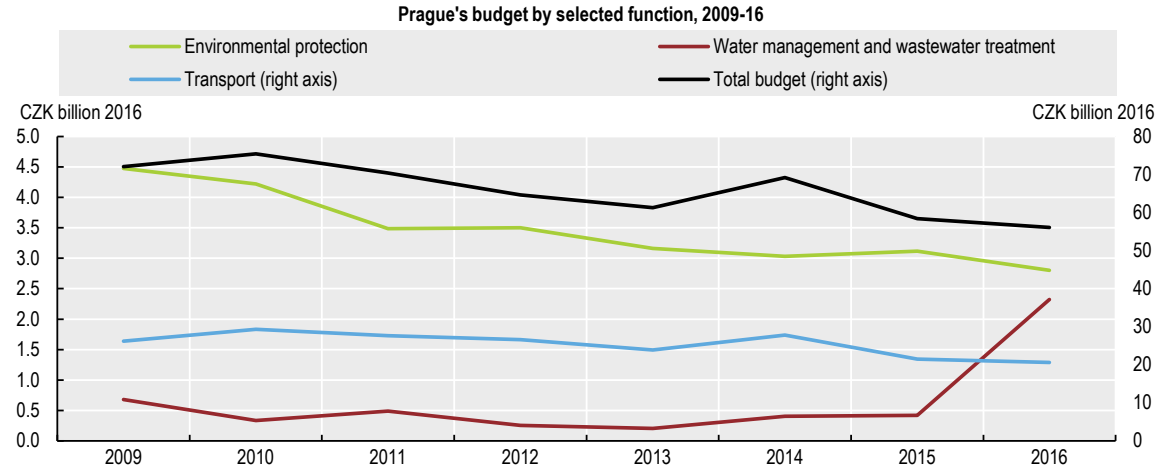
In 2015, most of Prague's revenue came from shared taxes. The largest revenue contributor was the value added tax (29%), followed by corporate (17%) and personal income taxes (16%) (CZSO, 2016). Property tax represented only 1% of total revenue. Transfers and grants from central government accounted for about a quarter of Prague's revenue. The vast majority is earmarked, mostly for education and investment (OECD, 2016a).

5.5.2. Expenditure for urban environment-related infrastructure and services

Expenditure for environmental protection in Prague

Public and private investment in environmental protection[16] in Prague remained around CZK 4-5 billion over 2009-15 (CZSO, 2017d). In 2016, it nearly doubled due to increased investment in air and climate protection and wastewater treatment. In the aftermath of the crisis, Prague's environmental budget dropped significantly in real terms (Figure 5.10). The decline in the city's capital spending is a general trend which reflects rising operational costs and debt repayment. The water sector is an exception explained by the additional investment needs to meet EU requirement on wastewater treatment. Investment in this domain is nearly fully financed from the city's own resources; by contrast, less developed regions benefit from EU support. The Operational Programme "Environment" has been a major source of environmental infrastructure funding nationwide (Chapter 3.). The 2016 Strategic Plan of Prague foresees a steady decline in investment until 2021, highlighting the need to give priority to projects with the highest social return.

Figure 5.10. Prague's environmental budget has dropped significantly



Source: CZSO (2010-16), Statistical Yearbook of Prague.

StatLink http://dx.doi.org/10.1787/888933723644

Sustainable transport and clean energy

Prague's transport budget is mostly (66%) devoted to public transport, due to high operational expenditure (City of Prague, 2017). However, the share of public transport in the city's transport investment has been decreasing, suggesting growing priority on road. Prague is investing heavily in the construction of inner and outer ring roads to channel transit traffic out of the city. Although this could be influential in curbing CO_2 and local air emissions, it could also encourage greater use of cars. Evaluation criteria to select transport projects are unclear. The Prague Public Transport Company plans to invest CZK 6.6 billion (EUR 245 million) in 2017, including on preparation for a new metro line, modernisation of metro safety technology and renovation and construction of tram lines (UITP, 2017).

The Operational Programme "Prague" allocates EUR 121 million (half of it from EU funds) to support energy savings in public and urban road transport and in city buildings and the construction of park and ride facilities over 2015-20 (City of Prague, 2015). The city, its boroughs, organisations established and run by the city, the Prague Public Transport Company, Prague Integrated Transport Organiser, Railway Infrastructure Administration, and research and knowledge transfer organisations can apply for funds from this operational programme.

In 2015, the government adopted a national action plan for clean mobility, which plans on 250 000 electric vehicles by 2030. It includes measures such as subsidies, tax incentives and public procurement to promote clean vehicles. In cities, drivers of electric vehicles will be allowed to park free of charge and use preferential public transport lanes. Prague administration had 15 electric vehicles in 2014 (City of Prague, 2016).

In Prague, the Clean Energy Programme focuses on supporting renewable sources of energy for space heating, water heating and electricity generation in residential buildings. In 2016, the city supported 92 projects with funds that amounted to CZK 13 million (about EUR 480 000). The municipality of Litoměřice has been investing in installation of solar thermal panels with grants to citizens of up to CZK 40 000 (EUR 1 480). The aim

is to improve the environment by cutting GHG emissions through reduction in fuel and energy consumption, elimination of local heaters run on solid fuels and, especially, reduction of particulate emissions.

Recommendations on sustainable urban development

Urban governance

- Strengthen the urban governance system by i) sharpening the distribution of expenditure responsibilities across levels of government; ii) using a functional rather than administrative approach in delimiting metropolitan areas; iii) considering creating metropolitan governance bodies (e.g. have the Prague Institute for Planning and Development cover the entire metropolitan area and/or integrate responsibility for transport and housing planning in a single metropolitan body); and iv) incentivising co-operation through concrete inter-municipal projects (e.g. infrastructure or even cultural events).
- Enhance horizontal collaboration across government agencies on urban policy by i) ensuring that related recommendations of the Government Council for Sustainable Development are implemented and ii) making responsibilities of ministries, agencies and municipal departments more cross-cutting and clarifying their role in urban development.

Policy framework

- Increase sustainability through density by i) adopting the compact, co-ordinated, connected development model, with a holistic approach to urban development; raising awareness on the benefits of a compact city model to achieve sustainability among public, private and non-profit stakeholders; and ii) easing administrative burdens of the building approval process to support urban regeneration and brownfield redevelopment.
- Continue to promote Local Agenda 21 beyond the Healthy Cities platform by developing the use of evaluation tools and disseminating benefits through a dedicated communication strategy.
- Ensure that the Principles of Urban Policy emphasise i) monitoring and evaluation as permanent features of the urban planning system and its programmes; ii) the need for strong political and organisational leadership, long-term vision, and citizen engagement in urban life (based on the experience of Litoměřice in energy efficiency); iii) integrated policies for urban development that link transport solutions to housing and land use policies and facilitate synergy building in various policy domains involving all municipalities in the Functional Urban Area; and iv) building rural-urban partnerships for regional development.

Policy instruments

- Review the land use planning system to promote urban sustainable development by: i) making land use planning, including implementation strategies, mandatory; ii) adopting integrated spatial planning to coordinate investments; iii) using fiscal incentives to complement spatial development objectives; iv) encouraging metropolitan spatial planning through fiscal incentives and regulatory frameworks

set by the national government; v) ensuring that cities, particularly Prague, align sector and borough-level plans with the strategic plan; vi) linking urban transport solutions to housing and land use planning to improve mobility and reduce air pollution; and vii) monitoring the impact of spatial development plans in relation to urbanisation, land use, and environmental objectives.

- Adopt a wide set of measures to deal with the housing shortage by i) revising building laws to reduce unnecessary procedures that lead to higher construction costs; ii) establishing a one-stop process for building permits so that the onus is not on the developer to obtain multiple approvals from individual departments; iii) adopting ways for low-income households to gain access to housing (e.g. by developing the rental market); and iv) if needed, increasing the availability of land for new development through land use planning, especially on brownfield sites.
- Promote the development of brownfield sites to help deal with urban environmental challenges and bridge the housing gap. For that purpose: revise fiscal instruments to incentivise brownfield investment and guide land use to a more sustainable path; and ii) facilitate access to affordable, environmentally sound building materials.

Financing and investment

- Improve the use of environmental fees and taxes at city (municipal) level to tackle urban air pollution and congestion, considering the cost of the various options (congestion charge, vehicle tax, subsidies, parking charges); revise water and sewage treatment charges to recover the costs of investment, operation and maintenance of water and sanitation infrastructure.
- Remove the demographic criteria for tax sharing, considering population size only when assigning responsibilities to local governments. Thus, larger cities could have responsibility for some services provided by the central government in more sparsely populated regions. This could remove the incentive to compete for population to get more fiscal resources.
- Increase municipalities' capacity to adjust revenue or spending (taxing autonomy, mandatory spending), and increase borrowing (access to credit, fiscal rules), carefully monitored by the national financial authority. Provide financial incentives to support inter-municipal collaboration for service delivery and/or infrastructure projects, through matching grants or co-financing of urban projects by the national government and subnational associations. Specific contractual arrangements could be envisaged to support metropolitan areas.

Notes

[1] Municipalities of more than 2 000 inhabitants.

[2] The OECD has classified regions as predominantly urban (PU), predominantly rural (PR) and intermediate (IN) to facilitate international comparability (OECD, 2017a).

[3] A functional urban area is an economic unit characterised by a densely inhabited urban core and a hinterland whose labour market is highly integrated with that of the core.

[4] For example, water management responsibilities are set out in the Water Act, and those on spatial planning, construction and urban planning in the Building Act. The Municipalities Act and the Act on District Offices regulate the relationship between local governments and territorial public administration.

[5] Local government in the Czech Republic is based on the principles of decentralisation, deconcentration, delineated competencies, subsidiarity and citizen participation.

[6] The areas include education, welfare, healthcare, public order, environmental protection, management of public greenery and public lighting, municipal waste collection, wastewater management, water supply, urban public transport, air protection (promoting use of environment-friendly thermal energy sources), local road management, forests, housing funds and housing stock, and cultural activities.

[7] The concept of Healthy Cities was inspired and supported by the WHO European Health for All strategy and the Health21 targets. It generally conceives of healthy cities as defined by a process, not an outcome, and sees a healthy city as one that continually creates and improves its physical and social environments and expands community resources that enable people to support each other in performing life function and developing to their maximum potential.

[8] Agricultural land occupies 40% of the city's total area, followed by other land (37%), forest (10%) and built-up areas (10%).

[9] Prague's core, according to the OECD definition, covers the entire area of the city of Prague as well as the nearby municipality of Kladno.

[10] This is a condition to draw EU funds.

[11] These include the New Green Savings programme, the Integrated Regional Operational Programme and the Operational Programme "Environment" 2014–2020.

[12] The 2001 Water Act states that the water management planning system consists of the main river basins plan, river basin districts plans and programmes of measures. It aims to protect surface water and groundwater, improve water quality and reduce the effects of floods and droughts. The water management system seeks to ensure long-term sustainable use of water resources and economic water management. The plans are key to regional land use planning, regional decision making and construction permitting.

[13] Transfers of development rights are market-based incentives for landowners to forfeit development rights in areas targeted for preservation and sell them to buyers who want to increase development density in areas local authorities have designated as growth areas.

[14] In 2015, IPR Prague and the city launched a pilot project to revitalise the housing estates in Vybíralka courtyard and its surroundings. Citizens were a key stakeholder group involved, as the project sought sustainable solutions that fit local needs.

[15] Some 4 000 individuals participated in its development through various outreach efforts (e.g. workshops, conferences, online engagement).

[16] Investment of the public and business sectors (including specialised producers of environmental protection services). Includes investment in air and climate protection, waste and wastewater management, protection and remediation of soil and groundwater, other environmental protection activities (R&D, administration, education) and biodiversity and landscape protection. Excludes investment in water supply.

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