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A State of the Sector

May 2015

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International Association of Water Supply Companies in the Danube River Catchment Area

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Smart policies, strong utilities, sustainable services

WATER AND WASTEWATER SERVICES IN THE DANUBE REGION

A STATE OF THE SECTOR

Regional Report | May 2015

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Further resources. This report is part of a regional State of the Sector review led by David Michaud, World Bank. The authors welcome comments and can be contacted through David Michaud (dmichaud@worldbank.org). An electronic version of this report, as well as 16 country notes, are available at SoS.danubis.org. Utility performance information is available at www.danubis.org/eng/utility-database. Further resources on water and wastewater services in each country, are available at country resources pages of the DANUBIS web site (www.danubis.org).

Vienna, Austria / June 2015

This electronic version includes corrigenda for Figure 51 (page 54), 55 (page 56), 62 (page 64), and corrections of Figure 3 (page 5), 60 (page 61), and the Graph on page 88.

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Abbreviations

ARA	Asociația Română a Apei (Romanian Water Association)
BiH	Bosnia and Herzegovina
BOT	build-operate-transfer
CEN	Comité Européen de Normalisation (European Committee for Normalization)
CPA	Consumer Protection Agency
DWD	Drinking Water Directive
DWP	Danube Water Program
EC	European Commission
EEA	European Environment Agency
EU	European Union
EU MS	European Union Member State
FAO	Food and Agriculture Organization
GDP	gross domestic product
GIZ	Gesellschaft für Internationale Zusammenarbeit (German technical cooperation agency)
HBS	Household Budget Survey
IAWD	International Association of Water Supply Companies in the Danube River Catchment Area
IBNET	International Benchmarking Network
ICPDR	International Commission for the Protection of the Danube River
IFI	International Financing Institution
IPA	Instrument for Pre-Accession
IWA	International Water Association
JMP	Joint Monitoring Program of WHO/UNICEF
LSMS	Living Standards Measurement Survey
MICS	Multiple Indicator Cluster Survey
n.a.	not available
NRW	nonrevenue water
O&M	operation and maintenance
OECD	Organisation for Economic Co-operation and Development
ÖVGW	Österreichische Vereinigung für das Gas- und Wasserfach (Austrian Association for Gas and Water)
p.e.	population equivalent
PPP	public-private partnership
PPP	purchasing power parity
SHUKALB	Shoqata e Ujësjellës Kanalizime të Shqipërisë (Water Supply and Sewerage Association of Albania)
SILC	Survey on Income and Living Conditions
SoS	State of the Sector
UNDP	United Nations Development Programme
UWWTD	Urban Waste Water Treatment Directive
WB	World Bank
WDI	World Development Indicators
WFD	Water Framework Directive
WHO	World Health Organization
WISE	Water Information System for Europe
WSS	water supply and sanitation
WUPI	Water Utility Performance Index

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This regional report is complemented by 16 country notes describing in greater details the state of the sector in each of the countries covered in the State of the Sector review. All material is available electronically under SoS.danubis.org. Further resources on water and wastewater services, utilities, and policies in the Danube Region are available at DANUBIS.org.

FOREWORD

Junaid Ahmad,

SENIOR DIRECTOR, WATER GLOBAL PRACTICE, THE WORLD BANK GROUP

Dear Colleagues,

Two years ago, 120 officials and professionals responsible for water and wastewater services in the Danube region met in Vienna to discuss the sector's situation and launch the Danube Water Program. Back then, as today, a priority was to exchange experience and knowledge about regional trends, challenges, and opportunities in ensuring smart policies, strong utilities, and sustainable services for all. In many ways, this mirrors the World Bank's own approach to reduce extreme poverty and increase shared prosperity, our institution's overarching goals.

In the Water Global Practice, we not only focus on access to services but also on sustainability, and we understand institutions and policies matter. We work with our clients and the best analysis and knowledge available to inform, design, and implement the policies and programs that will bring sustainable water and wastewater services for all, especially the poor and less privileged. Therefore, I am particularly pleased to introduce this regional State of the Sector review, which I hope will provide a further basis for such important exchanges to continue to create solutions for the people in this region.

I would like to warmly thank the Ministry of Finance of Austria, whose financial support has been essential to the success of the Danube Water Program, and in particular the realization of this study; the International Association of Water Supply Companies in the Danube River Catchment Area, which has been a strong partner of the World Bank under the Danube Water Program; and most importantly, all of you, individuals and institutions, who have contributed information, knowledge, experience, and time to the Program's activities and this report, in particular. I hope you will find it worth your effort. I look forward to continuing this partnership to ensure sustainable services for all in the Danube region.

Junaid Ahmad

Senior Director
Water Global Practice
The World Bank Group

Walter Kling

IAWD GENERAL SECRETARY

The establishment of the Danube Water Program involved the coming together of two very different organizations – IAWD on the one side – an association of water utilities in the Danube River catchment – and the World Bank on the other. The marriage of these two very different organizations is reflected in the management of the program – IAWD is responsible for capacity building, particularly directly for utilities, and the World Bank is primarily responsible for the policy, analytical, and governance aspects of the program. Despite the divisions that exist, the program has been managed in a shared manner, focused on synergy between the expertise and networks of the respective organizations.

This State of the Sector study is a product of that marriage, where the Bank has taken the lead in bringing its enormous worldwide experience and analytical skills to produce a first-of-its-kind regional study of water services. IAWD is pleased to have played a supportive role in the data collection and providing some informational inputs, but is even more anxious to play a strong role in seeing that this study stimulates actions to improve services.

The World Bank team has done a commendable job in analyzing and presenting information about the sector. It is our expectation that this study will facilitate and support high-level debate on key policy questions (i.e., tariff setting, getting services to the poor), but also should trigger discussion down to the utility level on how best to organize and manage water utilities to achieve efficient and effective services. The people of the Danube region have a right to clean, safe, and efficient water and sanitation services, and this study examines where deficits exist in achieving that goal.

The study, and analytical work behind it, is a necessary building block to improving water services. IAWD looks forward to taking an active role in understanding and using the information presented in this highly informative study. We will also continue to work with the community of people active in the water sector to take the messages and lessons from this study to jointly work on ensuring smart policies, strong utilities, and sustainable services in the Danube region.

Sincerely,

Walter Kling

General Secretary
International Association of Water Supply
Companies in the Danube River Catchment Area

EXECUTIVE SUMMARY

This report analyzes the progress and challenges of 16 countries in the Danube watershed in delivering sustainable water and wastewater services to all, while meeting the European Union environmental acquis communautaire. After putting the services that are being delivered into context, the report analyzes the organization of services in the region and the level of access to services, that is, how well countries are doing in terms of providing access to water and wastewater services for the entire population. It then looks at the performance of the sector, including the quality of services provided and customer satisfaction with it. It also draws a picture of the efficiency of services, including whether they reflect accepted good practices. Finally, it analyzes the financing of services, looking at whether the financing of operation, maintenance, and investments is secured and affordable. The report is complemented by 16 country notes available at SoS.danubis.org.

The report draws largely from existing public data sources at the national and regional level, and consolidates them into a coherent, regional narrative and analysis. The methods of analysis include horizontal comparisons among countries at a given point in time and trends within the countries or the region over a given period of time. Given shortcomings in the availability and comparability of data across 16 countries, the report seeks to encourage and inform a policy dialogue around sector challenges rather than provide a definitive set of policy recommendations.

Context

Most of the Danube catchment area has shared a common trajectory over the last 30 years, and the development of water and sanitation services has broadly followed a similar process of transformation—one driven mainly by two major politico-economic processes—the fall of communism and European Union (EU) integration. While in the post-socialist period most countries saw strong decentralization and significant involvement of the private sector, EU integration has led to a need for enhanced regulation of municipal services, introduction of the cost recovery principle, a drive toward structural change, and increased efficiency and sustainability in service provision.

With the embracement of market-based economic principles and open borders, countries have achieved sizable growth in their per capita GDP, although with variations among and within countries, but about 2.3 million people within the Danube region live on less than $2.50 a day (purchasing power parity [PPP]), which is the regional level for extreme poverty. The poor disproportionately reside in rural areas, and there are 10 million to 12 million Roma, the largest and poorest minority group in the region.

The Danube River basin is relatively rich in water resources, and although this wealth is unevenly spread among different parts of the basin, only one country—the Czech Republic—can be qualified as water stressed, with a level below 1,700 cubic meters of renewable water resources per capita per year. Groundwater is the dominant source of water supply in the region, producing around 72 percent of the drinking water. Water management in the Danube basin is driven by the principles of the EU Water Framework Directive (WFD), under the auspices of the International Commission for the Protection of the Danube River (ICPDR).

Organization of Services

The organization of services is characterized mainly by the decentralization of service provision and ownership at the municipal level, while private sector involvement remains largely limited. Driven by the EU accession process, some of the recent trends include the aggregation and corporatization of service providers and the establishment of independent regulatory authorities.

About three-quarters of the region's population receive public service from one of the more than 10,000 formal utility providers in the region, leaving one-quarter to rely on informal providers or self-provision, mostly in rural areas. The size of the formal providers varies greatly, with private providers serving, on average, the largest customer base,

followed by regional, municipal, and small providers. In an effort to benefit from economies of scale and facilitate the absorption of EU funds, several countries are promoting the aggregation of small providers into regional ones. Water and wastewater service management are often provided by the same utility company, except in a few countries where they are separate entities.

Sector policy formulation remains the responsibility of central government authorities, whereby the EU agenda and transposition of the EU water directives, such as the Urban Waste Water Treatment Directive and the Drinking Water Directive, are a key force driving changes in the sector. In the last 15 years, there has been a trend toward greater independent regulation of water and wastewater service provision, and nine countries have such a regulatory authority. All nine regulators play a formal role in tariff setting and approval, often alongside the local governments, but only three are specific to the water sector, and they vary greatly in their independence. Common to all is the difficulty of regulating a large number of public, municipally owned utilities that are largely driven by local priorities rather than financial profits.

Except in a few countries, data and information about the sector and its service providers are still relatively scattered, and are sometimes inconsistent or of limited quality. Efforts to track utility performance and benchmark it against their peers and international good practices are increasing, but the information is seldom made publicly available.

Access to Services

Access to water and sanitation services in the region is high compared to the rest of the world. The collection and treatment of wastewater, however, generally lags behind the high level of access to piped water and private flush toilets, especially with regard to EU standards. Household coverage with piped water has remained consistently high since the beginning of the millennium, with 83 percent of the population having piped water in their dwellings, leaving 17 percent, or almost 22.5 million people, without this service, mostly in rural areas. The Roma generally have lower access to water and sanitation than the rest of the population. Almost 80 percent of the population of the Danube watershed report having a flush toilet in their homes, yet only 66 percent are connected to public sewer networks, with the greatest differences discernable in Bosnia and Herzegovina, Croatia, and Montenegro. Less than 20 percent of the poorest and less than half of the bottom 40 percent of the population have access to a private toilet in Bulgaria, Moldova, and Romania. Wastewater treatment coverage has shown significant improvement in recent years, but still remains the least developed sector service in the region.

Performance of Services

The overall performance of water and wastewater services in terms of their quality and efficiency varies widely within the region, and is generally below international good practices. However, there have been positive trends in a number of dimensions. In many of the countries, water service is generally continuous, and drinking water reaches national quality standards. Unsurprisingly, customer satisfaction is highest where service quality is highest, but overall customer protection mechanisms are somewhat underdeveloped, especially in countries without regulatory agencies. The level of customer metering has steadily increased to nearly universal coverage in many countries, bringing down individual consumption of water to 100 liters per capita per day to 120 liters per capita per day in most countries, which is in line with EU standards. Despite overall improvements and convergence, the efficiency of utilities in most countries is below international standards, and nonrevenue water and overstaffing of utilities continue to present significant challenges.

The report uses a proposed Water Utility Performance Index (WUPI) to evaluate the overall performance of utilities. The WUPI analyses show that performance varies widely within the region and each country, but generally increases with the level of economic development of the country. Overall, the performance of water utilities has improved over the last 10 years, with the ones that display higher performance also generally charging higher tariffs. An econometric analysis shows that while larger utilities tend to perform better than smaller utilities, it is less clear that merging utility companies (aggregation or regionalization) always has a positive effect on overall performance.

Financing of Services

Increasing costs have driven increases in tariffs throughout the region to the point where services might become unaffordable for low-income customers in some countries; yet the region is far from implementing the Water Framework Directive's principle of cost recovery. Overall, the level of sector financing from tariffs, taxes, and transfers varies widely among countries, with EU countries showing the highest per capita financing. The structure of financing also shows variations from country to country, but investments are in general supported by public funds and external transfers, while operational expenditures are mostly covered by utilities' own tariff revenue. Despite the widespread adoption of the cost recovery principle in national legislation, only two countries—Austria and Moldova—the richest and the poorest, respectively—rely mostly on tariffs to finance the sector. Few countries have developed a dedicated water sector financing mechanism providing predictable funding, and the EU Funds now represent the largest share of external financing in the region.

On average, the sector directs about half of overall expenditures toward operating and maintaining infrastructure and half toward renewing or expanding it. Water and wastewater investments in the region are around €3.5 billion per year, significantly below the €5.5 billion estimated by the respective countries as needed to achieve EU and national targets. The costs of providing services vary among countries, but overall have grown significantly over the last 20 years, leading to parallel increases in tariffs. Both operation and maintenance costs and residential tariffs usually follow the level of economic development of countries, with costs and tariffs highest in EU member states.

Despite this increase in tariffs, current levels are still affordable to the average consumer, and estimates of the expenditure share of the bottom 40 percent show that affordability constraints are prevalent only in Ukraine. Several countries have defined thresholds to identify affordability constraints of below 5 percent of income, and Croatia, Hungary, FYR Macedonia, Slovenia, and Ukraine report having formal subsidy schemes to ensure affordability for low-income earners.

Conclusions

The report concludes that the water and wastewater sector has been strongly impacted by the region's trajectory over the last 30 years, going from a socialist period through a transition phase to the EU accession process. The EU accession process serves as a motivator to improve access, quality, and efficiency of water services, and assessments show that the status of the countries in terms of EU accession is positively related to the level of development of wastewater services. The availability of data is limited, including, surprisingly, in more advanced countries such as Austria and Slovenia. Further analytical work is necessary to understand some aspects of service provision in the region, such as the situation of the population without access to public supply, the drivers of utility performance, the impact of ongoing institutional reforms, the ways to address long-term affordability of services, and how to best manage wastewater treatment from a financial and institutional standpoint.

Regardless of the data and information gaps, some clear challenges emerge as countries seek to provide sustainable services to their citizens while meeting the EU environmental acquis communautaire, including the following: (a) while service provision remains a local government responsibility in most countries, policy trends around EU accession tend to subject it to increased central government regulatory and institutional oversight, creating the need for clear accountability mechanisms; (b) despite the overall high level of access to services in the region and focus on wastewater collection and management, there are still 22.5 million people without access to piped water on their premises and 28 million without flush toilets; (c) service providers' performance has improved in the last 15 years but continues to be below international standards, threatening the long-term sustainability of ongoing investment programs; (d) the sector's overall financing framework does not guarantee universal, high-quality service in the long run, and while the cost recovery principle has been widely adopted, many utility companies are barely recovering their operating costs from tariffs, and invest too little into asset management and development.

Despite these challenges, the region can still build on a few important opportunities. Recent history has shown that the water and wastewater sector is open to change, and if those governments, considering reforms in around a third of the countries, base their efforts on solid analyses, they can continue to build positive momentum for the sector. EU

integration continues to present a tremendous policy and financing opportunity for many countries; the widespread adoption of formal regulatory frameworks and utility corporatization reforms can help promote greater accountability; and despite managerial shortcomings, the sector has a strong technical workforce. The report also shows the need for further work to be done in response to some of the challenges identified and where the current information available was too limited to draw clear conclusions. Examples for further analyses include developing models to provide sustainable services in areas beyond the reach of public utilities, addressing potential affordability challenges through well-targeted subsidies, and/or improving the financing and institutional framework for wastewater treatments in those countries with no or limited prior experience.

I. INTRODUCTION

1. **Governments and water professionals in the Danube region are facing a combined challenge of meeting their citizens' demand for universal, good quality, efficient, and financially sound, or in a word, sustainable, services, while catching up to the environmental requirements of the European Union acquis communautaire.** As this report shows, much work remains to be done to provide sustainable water and wastewater services for all in the Danube Region, in particular among recent or future EU members. Millions in the region do not have in-house piped water or a flush toilet, with the bottom 40 percent and poor, rural, and minorities overrepresented. Some service providers still struggle to provide continuous, potable water to their clients; low tariffs and inefficient utility practices create challenges for the proper operation and maintenance of the existing infrastructure. At the same time, to satisfy the acquis communautaire, the Water Framework Directive is being transposed into the legal and institutional frameworks of the countries of the region, and large investments for the upgrading or development of water and wastewater assets are being made, which create further technical and financial burdens on service providers. Governments around the region are therefore revisiting the way services are being delivered and financed, and this State of the Sector review seeks to document and inform the process by showing how policies focused not only on EU compliance, but broadly on providing universal, high-quality, efficient, and financially sound services to all, including the poor, will help meet the spirit of the EU acquis communautaire and citizens' expectations in a sustainable and equitable manner.

FIGURE 1
COUNTRIES COVERED IN THE REGIONAL STATE OF THE SECTOR REPORT

SOURCE: AUTHORS' ELABORATION.

2. **The State of the Sector report analyzes the region's progress and challenges in delivering sustainable water and wastewater services for all.** The Word Bank's twin goals are to eliminate extreme poverty and increase shared prosperity, and water services play an important role in achieving those goals. The report therefore focuses particular attention on understanding the situation of the bottom 40 percent of the population (with respect to income), and on the extreme poor living on less than $2.50 a day PPP. While some of the information is available only for services provided by utility companies, the report aims to cover the entire population, including rural areas. The review covers 16[1] countries contained within or bordering on the Danube watershed (Figure 1), which represent a great diversity of socioeconomic, development, and geographic realities, but share a joint resource, the Danube; an intertwined history;

1 A small part of the national territory of Germany, Italy, and Switzerland is also within the Danube Watershed. Those three countries were not covered, however, because they are not traditionally seen as part of the Danube region, and the reality and organization of their water services is of limited direct relevance to countries of the watershed.

and a common trajectory toward European integration. Given the relevance of the EU accession process for water services, the report presents many of the results separately for EU members, EU candidates (including potential candidates), and Non-EU countries. The report is a flagship product of the World Bank / International Association of Water Supply Companies in the Danube River Catchment Area (IAWD) Danube Water Program (www.danube-water-program.org), which provides parallel support to many of the region's stakeholders to achieve **smart policies, strong utilities, and sustainable services.**

3. **The analysis assumes that the delivery of sustainable services depends on four main dimensions: access infrastructure to be in place, service providers to operate and maintain it, sector governance that helps those thrive, and the proper financing mechanisms to maintain and expand services in the long term.** Before describing those four dimensions, Chapter II highlights the context in which services are being delivered; Chapter III provides an overview of the organization and governance of the sector in the various countries; Chapter IV describes the level of access to water and wastewater services in the region; Chapter V deals with the performance of service providers, in terms of service quality, efficiency, and overall performance; Chapter VI discusses the financing of services; and Chapter VII presents conclusions. A number of boxes provide additional information on good practices or key concepts. The report includes two annexes; the first (Country Pages) offers a comprehensive, country-by-country list of indicators; and the second (Methodological Notes) provides further methodological details on the main sections of the report. The report also includes a comprehensive list of sources for all data and information used throughout the document. The report is complemented by 16 Country Notes, which provide greater details on the State of the Sector in each country. All material are also available online on the **sos.danubis.org** website. Further information is also available on the **www.DANUBIS.org** water platform, an online repository of resources for and about water and sanitation services in the Danube region.

4. **This report and the State of the Sector review is the result of a team effort of more than 30 contributors spread over the entire Danube watershed and beyond, and builds largely on publicly available data and the collective work of many institutions in the region, including line ministries, regulatory authorities, and national waterwork associations.** The report draws largely from existing, public data sources at the national and regional levels, although it represents the first time those various sources have been consolidated into a coherent, regional narrative and analysis. In-country data (referred to as "SoS data collection") were collected by a team of local consultants in each of the countries covered by the report, and validated with key stakeholders in each country. To keep the main text readable, many of the references have been moved to the end of this report, along with some of the methodological descriptions. The national data were complemented by publicly available household survey data in each country, as well as regional resources such as the EU's EUROSTAT, the FAO's AQUASTAT, the World Bank's World Development Indicators, the European Environment Agency's (EEA's) WISE, the WHO/UNICEF Joint Monitoring Program, and the IBNET / DANUBIS database. While preparing the report, assumptions were made, and although an extensive validation effort was undertaken, it is to be expected that some of the data and information provided could be questioned. The report's preparation has also shown that some countries have much better information than others, and sometimes official statistics do not reconcile fully with the reality that sector professionals know. The team therefore welcomes comments and corrections.

5. **While great care has been taken to ensure consistency and accuracy of the data and information, the main aim of the report is to support an informed dialogue around the sector's challenges rather than provide a definitive set of policy recommendations.** This report, by itself, will not solve the challenges highlighted in the last chapter. By design, the report is limited to an analysis of the current situation, and does not include formal policy recommendations for the region or the individual countries. National stakeholders are best placed to discuss whether and how to address them, drawing on the analysis provided in this report, and the opportunities and good practices described throughout the document and in its supporting Country Notes. It is the authors' hope, however, that this report will provide a solid information and analytical basis to inform the necessary dialogue, despite any limits and shortcomings in the data available and the resulting conclusions. The authors will gladly provide any necessary support to this process, and hope that the next edition of this State of the Sector Review will be able to build on a much stronger database and document progress in addressing the sector's main challenges.

II. CONTEXT FOR SERVICES

6. **Water services are strongly dependent on the political, socioeconomic, and natural context in which they are delivered.** Following the collapse of socialist systems, most countries of the Danube region have shared a common political and economic development transition path over the last few decades, with the European Union (EU) integration agenda an overarching aim in almost all countries of the region. Major differences among countries still remain, but those differences are gradually diminishing, and a convergence toward EU standards is occurring. The region is also generally well endowed with water resources, despite the potential impact of climate change.

7. This chapter looks at the political-economic-social context in which water service provision in the region is taking place; it describes the historical perspective and development, analyzes the socioeconomic situation in different countries, and describes the richness and diversity of water resources, with consideration for expected climatic changes and their potential impact.

8. The data and information used in this chapter come mainly from World-Bank elaborated/collected data, including World Development Indicators, but also include publicly available United Nations Development Program (UNDP), European Commission (EC), and Food and Agriculture Organization (FAO) publications and databases. The information is complemented by a country-by-country data collection effort (referenced as "SoS data collection" in the text) that relies primarily on country-level public sources, and is fully referenced in the country pages at the end of this report.

A. Historical Perspective

9. **Provision of water supply and sanitation services and their development in the region have mirrored the dramatic political and economic changes in the region since 1990, during which the region has moved from a centrally planned, state-run, socialist economy to a western-style democratic, capitalist system and EU membership.** The largest part of the Danube catchment area belongs geopolitically to South-East Europe, and in general has shared the same destiny over the last 50 years. Countries that are the subject of this report, from the Czech Republic to Albania (with a partial exemption of post-Yugoslavia countries), have during the second half of 20th century belonged to the so-called socialist block of European countries, and their economic and political situation and development, regardless of major differences among them, has broadly followed a similar path. Development of and issues in water and sanitation services provision in those countries, being part of overall municipal service provision, have also followed a broadly similar process of transformation that can therefore be viewed as a region-wide development process.

10. **During the last 25 years, the sector's development and changes were driven by two major political and economic processes.** The first one was the fall of communism and disintegration of the Eastern European socialist block in 1990, which led to change in the political and economic system in those countries. The second was the expansion of the EU toward Eastern Europe, bringing gradual alignment with the EU acquis communautaire in candidate and new member countries. Both of those processes have also seriously impacted water service provision and environmental standards in the region, leading to changes in service standards, financing, and governance. While the current sector organization is described in detail in Chapter III, the following provides a brief historical synthesis of the main stages of public service delivery in the region in the recent past.

- **Socialist system period (until 1990).** This period was characterized by rapid industrialization, a lack of environmental sensitivity, and strong urbanization. The necessarily rapid development of the water supply infrastructure was not followed by adequate wastewater and wastewater treatment provision, causing major deterioration of natural water quality in receiving waters. Property, service provision, and management of utility providers was mostly in the hands of the central government (with some differences in the Former Yugoslavia). The overall water sector development and pricing approach focused on delivery of affordable service for all, at the expense of economic efficiency, quality, and sustainability of service provision, and lack of demand management combined with inefficient use of resources.

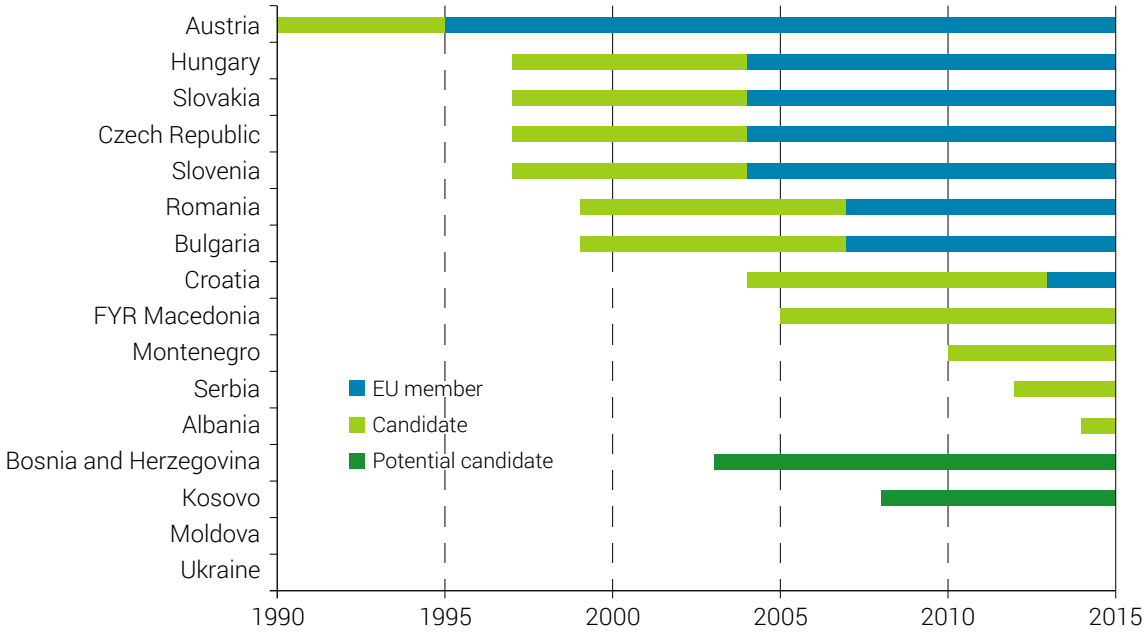
- **Post-socialist period (1990 until EU integration).** After the collapse of the socialist system, countries of the region explored different public service delivery frameworks. In most countries, a strong decentralization took place, sometimes coupled with more significant involvement of the private sector (in the Czech Republic and Hungary, for example). The disappearance of state funding and the need for modernization of infrastructure led to increased attention to economic efficiency and consumer-based financing. International financial institutions (IFIs) played an important role in the transition.

- **EU integration (from the beginning of EU integration to today).** The EU accession process and the transposition of EU legislation into national laws led to the introduction of the full cost recovery principle, a drive toward structural changes in the service provision sector, and, in the long run, increased efficiency and sustainability of service provision. EU regional policy, with its objective to narrow the development disparities among member states, meant EU funding became an important source of sector investment, in particular through Cohesion Funds financing environmental and transport infrastructure projects.

EU integration status in the Danube region

Of 16 countries in the region, 8 are currently EU Member States (Austria, Bulgaria, Croatia, the Czech Republic, Hungary, Romania, Slovakia, and Slovenia), and 4 (Albania, FYR Macedonia, Montenegro, and Serbia) have formal EU candidate status and are at different levels of the accession process. Two countries (Bosnia and Herzegovina and Kosovo) have expressed their desire to eventually join the EU and received a potential candidate status; they are at the preliminary stages of aligning their governance setup with the EU acquis, but they do not have formal candidacy status. Two countries (Moldova and Ukraine) have not yet formally defined EU accession as their objective; however, both governments signed in 2014 an association agreement with the EU and have expressed their commitment to EU integration. Therefore, the whole region is in various stages of EU integration, making it an overarching and mutually connecting regional process that will continue to dominate development in the region for the foreseeable future (Figure 2).

FIGURE 2: EU MEMBERSHIP STATUS IN THE REGION

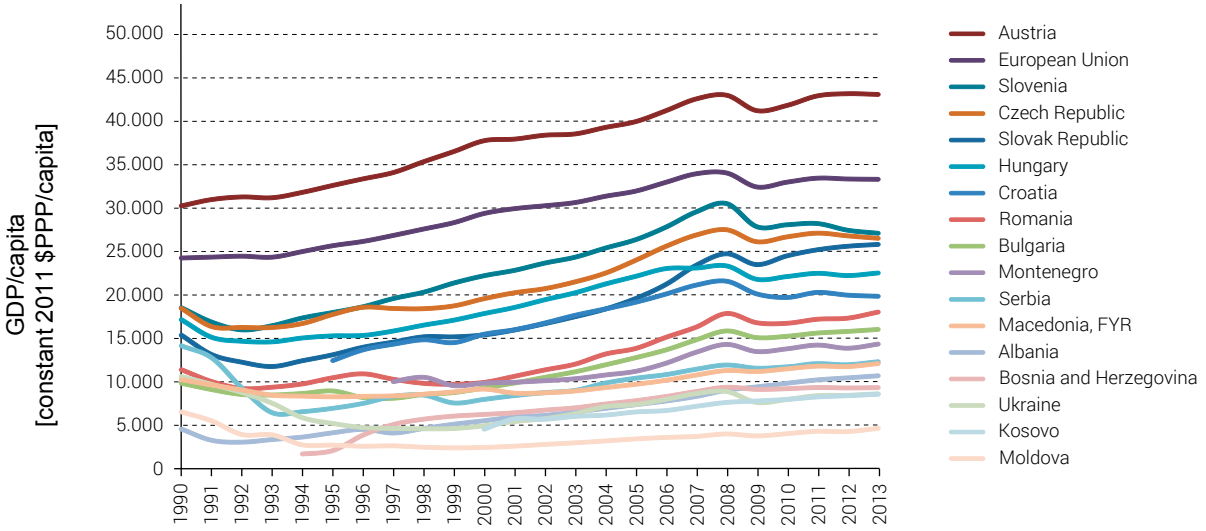


SOURCE: EC 2015.

B. Socioeconomic Situation

11. **With the change of political systems, as outlined in the previous section, Eastern European countries witnessed dramatic economic and demographic transitions.** Having been closed to the movement of goods, services, people, and ideas under socialist rule, the opening of borders following the disuniting of the Former Soviet Union enabled people and money to move toward areas of economic opportunity, with resulting changes in GDP per capita and population at subnational levels.

FIGURE 3: GDP PER CAPITA, 1990–2013



SOURCE: CALCULATIONS BASED ON WORLD BANK 2015.

12. **The embracement of market-based economic principles and open borders generated sizable growth in the per capita GDP of several countries, with signs that economies farther away from markets are lagging behind.** As can be discerned from Figure 3, above, differences in GDP per capita (current 2013 US$ purchasing power parity [PPP]) are still significant across the countries within the Danube watershed, with Moldova (at US$4,669) being the poorest, with one-tenth the per capita GDP of the richest country, Austria (at US$44,149).

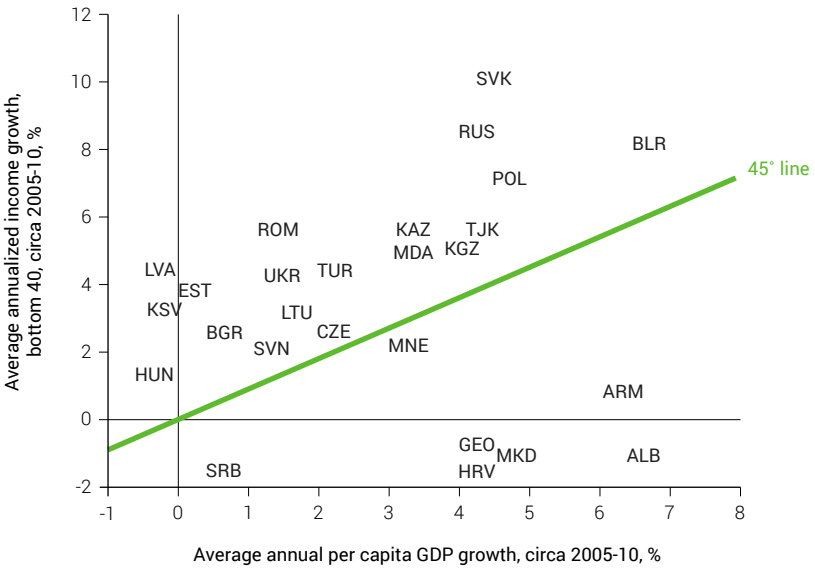


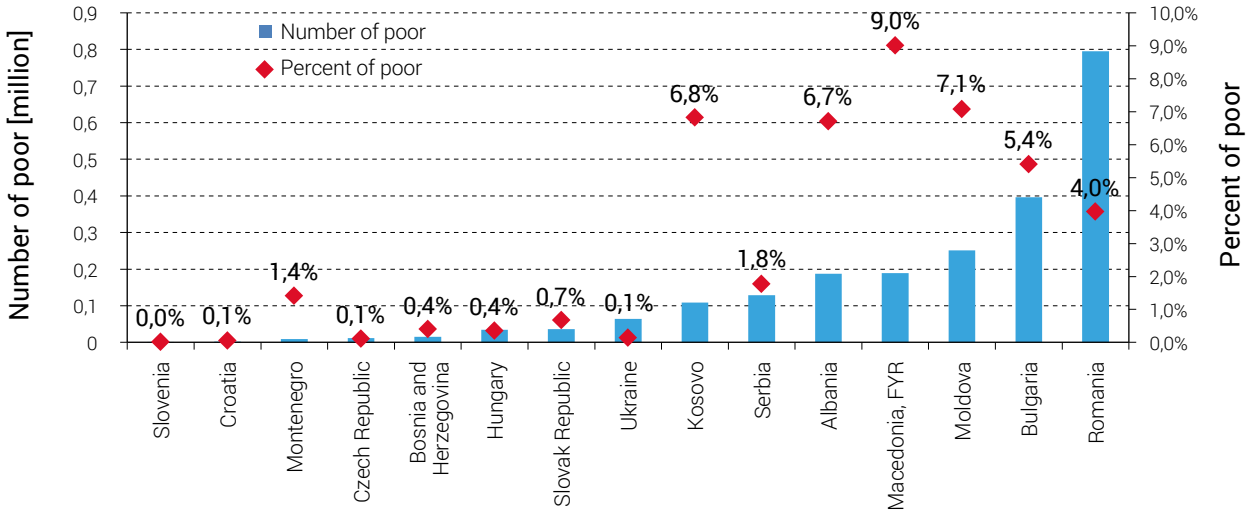
FIGURE 4: GROWTH IN INCOME OF THE BOTTOM 40 PERCENT

SOURCE: BUSSOLO AND LOPEZ-CALVA, SHARED PROSPERITY: PAVING THE WAY IN EUROPE AND CENTRAL ASIA 2014, 15.

13. **Growth in GDP per capita was heterogeneous within countries.** With respect to income, the bottom 40 percent of the population in Albania, Croatia, FYR Macedonia, Montenegro, and Serbia experienced lower GDP growth per capita compared to their respective country average, and, with the exception of Montenegro, those incomes even declined between 1 and 2 percent annually from 2005 to 2010, as shown in Figure 4. In contrast, households among the bottom 40 percent in Slovakia and Romania enjoyed annual increases in their incomes to more than double and triple the average, although transfers are estimated to explain almost 90 percent of the increase in Romania (Bussolo and Lopez-Calva, Shared Prosperity: Paving the way in Europe and Central Asia 2014, 37). While some countries register higher growth in incomes among their bottom 40 percent, most countries still have a long way to go to close the income gap between this group and the top 60 percent. The share of the bottom 40 percent in Bulgaria, Hungary, FYR Macedonia, Moldova, and Romania was less than 20 percent of total income, closely followed by Albania, Croatia, Kosovo, Montenegro, and Serbia, with about 22 percent (Bussolo and Lopez-Calva, Shared Prosperity: Paving the way in Europe and Central Asia 2014, 19). Even in Austria, the bottom 40 percent holds only about 23 percent of the total income (authors' computation using EUSILC data from 2012).

14. **About 2.3 million people within the Danube water region live of less than $2.50 a day (PPP), the regional level for measuring extreme poverty.** On average and excluding Austria, this means that about 1.8 percent of the total population in the area is extremely poor. As Figure 5 shows, by far the largest incidence of poverty is in Romania, which, with a population of 20 million, is the second-largest country after Ukraine. However, in terms of percentage of poor, FYR Macedonia[2] outranks the others, closely followed by Moldova, Kosovo, and Albania.

FIGURE 5: NUMBER AND PERCENT OF POOR CONSUMING LESS THAN $2.50 A DAY, PPP



SOURCES: INDICATORS ARE DRAWN FROM THE WORLD BANK POVERTY AND INEQUALITY DATABASE: EUROPE & CENTRAL ASIA 2015 AND ARE REPORTED FOR DIFFERENT YEARS; DATA FOR KOSOVO WERE COMPUTED FROM THE HOUSEHOLD BUDGET SURVEY 2010.

15. **The Roma community, with 10 million to 12 million members (EC 2015), is the largest and poorest minority in Europe and in the region.** Although the precise number of Roma is highly debated, the largest populations reside in Bulgaria, the Czech Republic, Hungary, Romania, and Slovakia, though Roma also live in Albania, Austria, Bosnia and Herzegovina, Croatia, FYR Macedonia, Moldova, Montenegro, and Serbia, among the countries within the Danube watershed. Compared to non-Roma, Roma have the worst socioeconomic indicators in almost all areas[3], including health, education, work participation, salaries, and living conditions, which is why their integration and improvement has become an urgent focus of the poverty agenda of the European Commission, the World Bank, and other development partners. To demonstrate an example from a household survey[4] conducted in 2012 in these countries,

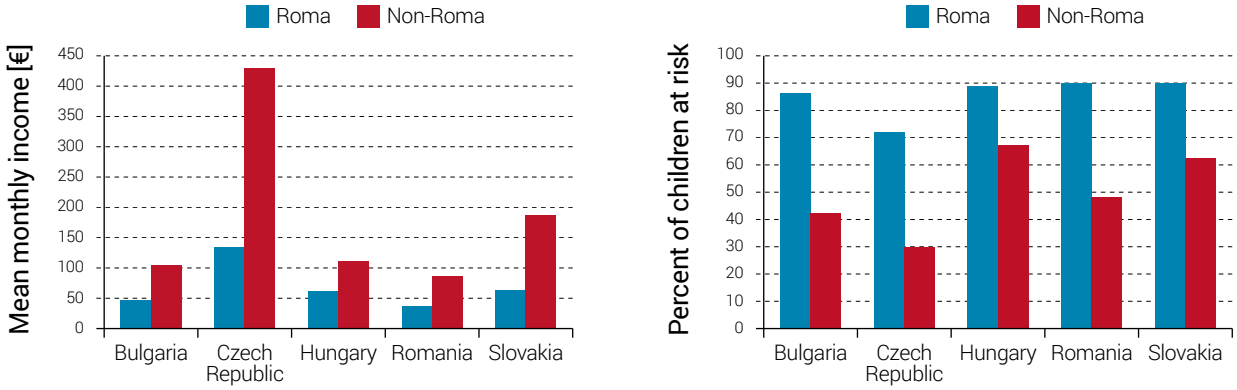
2 Macedonia's poverty estimates are reported for 2008, representing the last Household Budget Survey for which poverty was assessed (World Bank's Poverty and Inequality Database: Europe & Central Asia 2015).

3 For detailed indicators, see World Bank 2014.

4 In 2011, the UNDP, the World Bank, and the European Commission conducted a sample survey of the largest Roma agglomerations in these countries, with the purpose of enumerating the socioeconomic situation of Roma and non-Roma households (20,018 Roma and 9,782 non-Roma living nearby). Reported statistics are significant only at the settlement level, not at the national level.

average remuneration has been found to be significantly lower for Roma in paid jobs compared to their non-Roma neighbors, and Roma children are at higher risk of poverty compared to non-Roma children living next door, as can be seen in Figure 6.

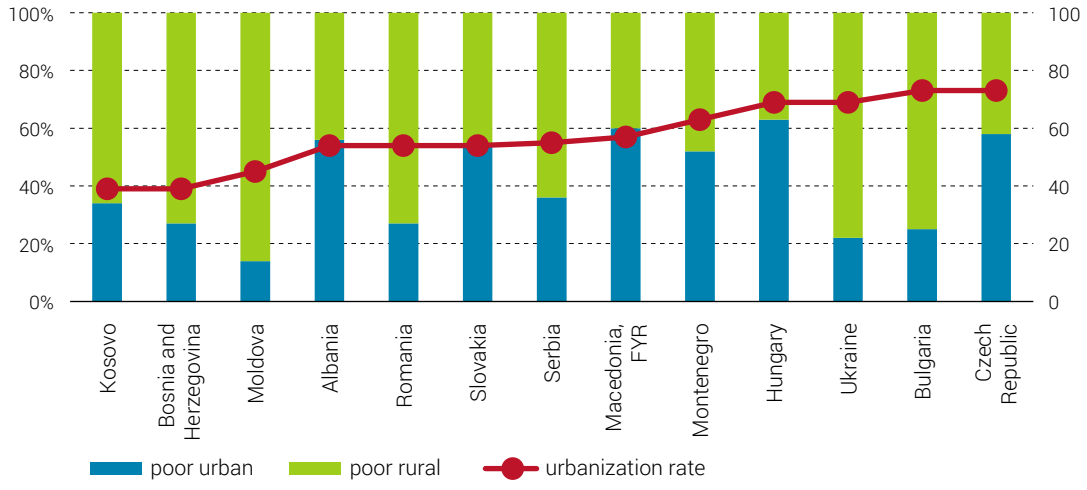
FIGURE 6: ROMA EARN LESS THAN THEIR NEIGHBORS, AND THEIR CHILDREN ARE AT HIGHER RISK OF POVERTY



SOURCE: ADAPTED FROM WORLD BANK 2014, 107.

16. **In Albania, FYR Macedonia, Kosovo, and Slovakia, the poor are distributed between rural and urban areas in equal proportion to the population, but in all other countries the poor disproportionately reside in rural areas.** As shown in Figure 7, 86 percent of the poorest in Moldova reside in rural areas, although only 55 percent of the total population are rural based. In Bulgaria, Romania, and Ukraine, at more than 70 percent, the share of the rural poor significantly exceeds the respective share of the rural population. In some countries—notably Serbia, Slovakia, and Ukraine—the share of the rural poor increased between 2002 and 2008 (Sulla 2011). A growing share of rural poor poses a challenge to modern infrastructure services, because investments lack the economies of scale to be provided cost-effectively, and the population is unlikely to be able to afford the maintenance of modern infrastructure services. The average urbanization rate of countries within the Danube watershed is 63 percent, which is slightly higher than the country average of Central Europe and the Baltics (62 percent), but significantly lower than the rate of EU countries, at 74 percent.[5] Overall, urbanization has been stagnant in Danube countries since the early 1990s.

FIGURE 7: THE LOCATION OF THE POOR (CONSUMING LESS THAN $2.50 DAY, PPP)

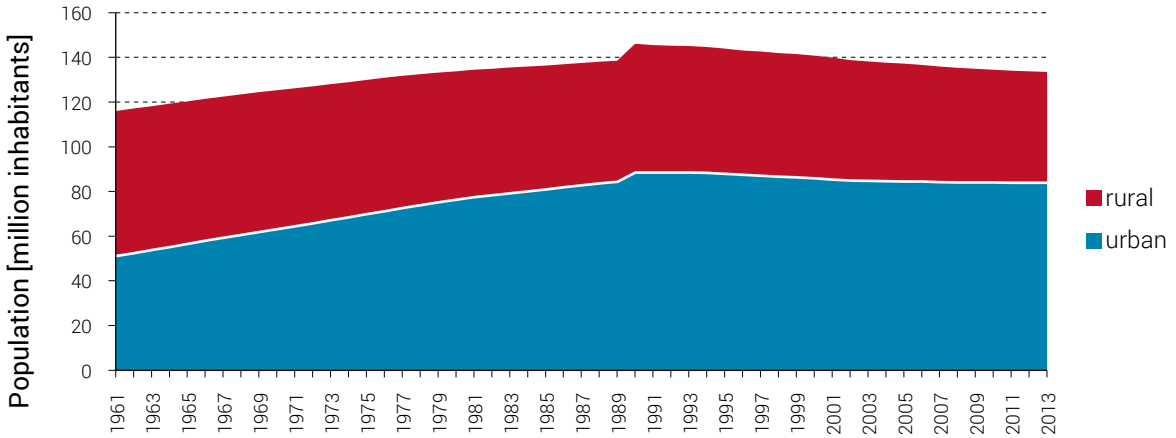


SOURCES: THE URBANIZATION RATE IS DRAWN FROM WORLD BANK 2015; THE KOSOVO URBANIZATION RATE IS DRAWN FROM THE KOSOVO 2011 CENSUS; PERCENT OF POOR, RURAL-URBAN, CONSUMING LESS THAN $2.50 A DAY PPP ARE ESTIMATED FROM HOUSEHOLD SURVEYS AND REPORTED FOR 2010–2012, WITH THE EXCEPTION OF FYR MACEDONIA, WHICH IS REPORTED FOR 2008.

5 Regional urbanization rates are drawn from World Bank 2015. Since countries apply different definitions of what constitutes "urban," caution is needed when drawing comparisons.

17. **The combination of low natural population growth and outward migration has resulted in a decline in the total number of people living in countries within the Danube watershed.** From 1961 to 1989, countries experienced a joint annual increase in the population of 0.8 percent, which declined from 1990 onwards at a rate of 0.4 percent per year. Lower fertility rates and an aging population in Europe—East and West—will make Europe the only continent in the world in which the population is expected to decline over the next 40 years (Bussolo, Koettl and Sinnott, forthcoming). However, countries within the Danube watershed are already experiencing a population decline triggered by, in addition to a natural decrease, an outward migration following the opening of borders to the West (Figure 8). Although it is mostly rural areas that are depopulating, some of the urban areas have also declined in population numbers, especially those located remotely and isolated from global markets and transport corridors. This has resulted in several cities facing an oversized infrastructure that lacks economies of scale and is costly to maintain and upgrade.

FIGURE 8: POPULATION TRENDS OF COUNTRIES IN THE DANUBE WATERSHED



SOURCE: CALCULATED USING DATA FROM WORLD BANK 2015.
NOTE: KOSOVO AND SERBIA NOT INCLUDED.

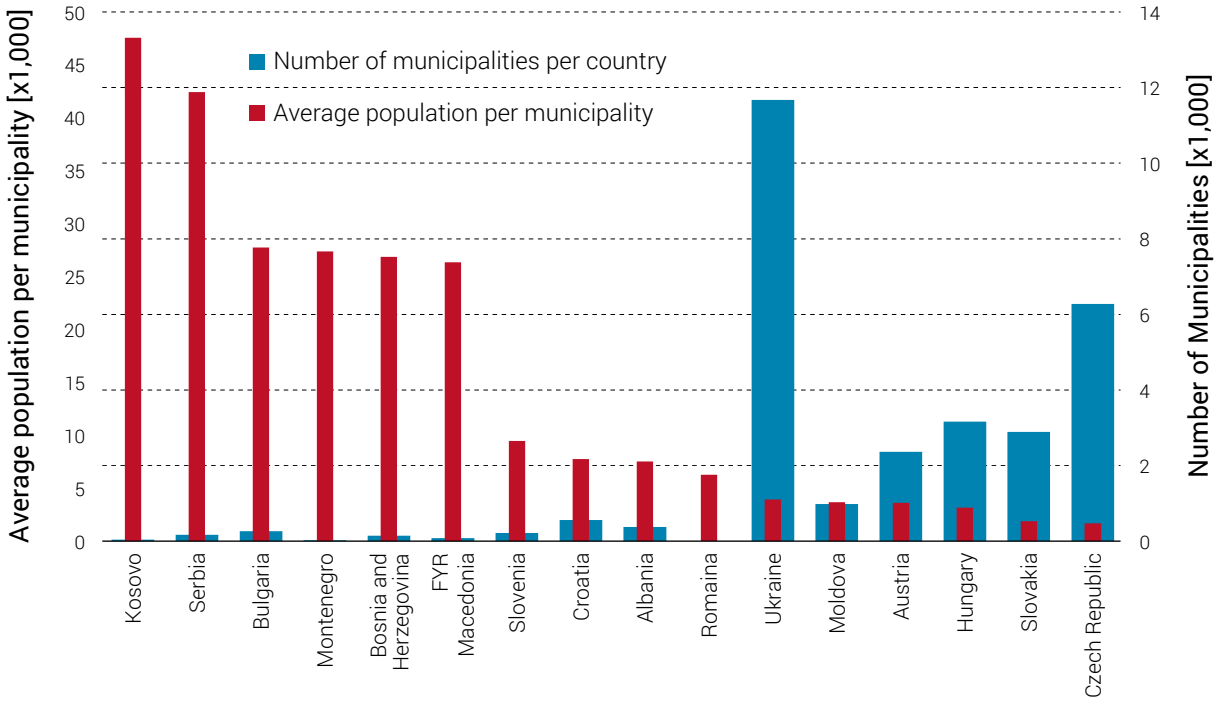
C. Administrative Organization

18. **Administrative arrangements in all countries of the region show similarities, but with country specifics that often have their origin in historical developments.** All countries in the region are centralized countries (with the exceptions of Austria, which is a federal country, and Bosnia and Herzegovina, which has a specific two-entity structure), and key decision-making powers are often centralized at the highest level. Most of the countries in the region have three levels of governance—national, regional (county), and municipal. However, three countries (FYR Macedonia, Montenegro, and Slovenia) have only two (national and municipal) levels, and three countries (Austria, Slovakia and Ukraine) have an additional fourth level of government between the regional and municipal levels.

19. **In most cases, the national government retains overall policy-making authority over public services, but service delivery responsibility is delegated to local levels of governance.** The most common distribution of responsibilities in the region is that the national level has the responsibility for defining and adopting the sector legal framework, and responsibility for management of the national budget and resources (usually implemented through a number of designated line ministries), while lower administrative levels such as regions and municipalities are usually given authorities related to local development, including provision of municipal utility services (with partial exception in Bulgaria, Hungary, and Kosovo, where the local utility service provision sector is partially owned by the central state).

20. **There are large differences among countries in terms of fragmentation of municipal governance.** The number of municipalities, as the lowest level of governance in individual countries, varies considerably among countries, and ranges from 11,625 in Ukraine to only 23 in Montenegro. Central European countries such as Austria, the Czech Republic, Hungary, and Slovakia, with long traditions of local self-government, all have a large number of small municipalities, while relatively new countries where municipal borders were drawn recently (such as Kosovo and Montenegro) have a smaller number of relatively larger municipalities. A comparison of the number of municipalities among different countries (Figure 9) shows that they not only differ greatly in territorial size (average size of municipality ranges from 12 square kilometers [km^2] in the Czech Republic to 611 km^2 in Montenegro), but also in population size (average population of municipalities ranges from 1,681 in Czech Republic to 48,000 in Kosovo).

FIGURE 9: NUMBER OF MUNICIPALITIES AND AVERAGE POPULATION NUMBER PER MUNICIPALITY PER COUNTRY

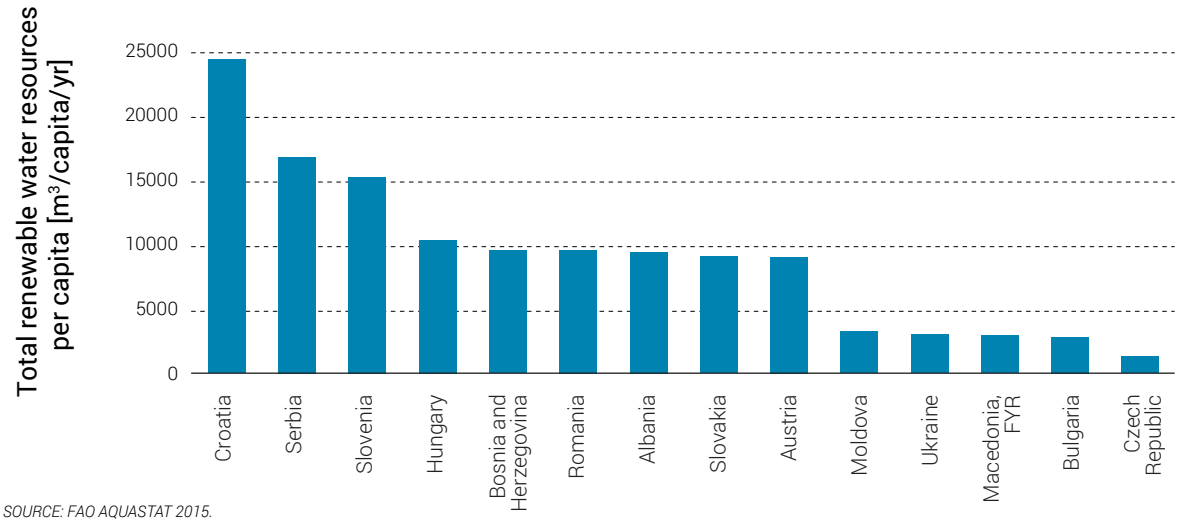


SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION, WORLD BANK 2015.

D. Water Resources and Climate Change

21. **The Danube River basin is relatively rich in water resources, but this richness is not evenly spread, and there are significant differences among different parts of the basin.** The Danube River basin is the second-largest river basin in Europe, covering 801,463 km^2, with a total of 81 million people in 19 countries. Sixteen of the 19 countries are covered in this report (Germany, Italy, and Switzerland are excluded because they are not typically associated with the Danube region countries, as such). Due to its large breadth from west to east, and diverse landscape, the Danube River basin evidences great differences in water resources and climate. The Danube connects with 27 large and over 300 small tributaries from its spring in the Black Forest in Germany to the Black Sea in Romania, and as such is the largest water basin in the EU. The region is rich with renewable water resources, but there are still major differences in availability of these resources in different parts of the region, ranging from more than 24,000 m^3 per capita per year in Croatia, to 1,250 m^3 per capita per year in the Czech Republic (Figure 10).

FIGURE 10: RENEWABLE FRESHWATER RESOURCES PER CAPITA PER DANUBE RIVER BASIN COUNTRY



SOURCE: FAO AQUASTAT 2015.
NOTE: DATA FOR KOSOVO AND MONTENEGRO UNAVAILABLE.

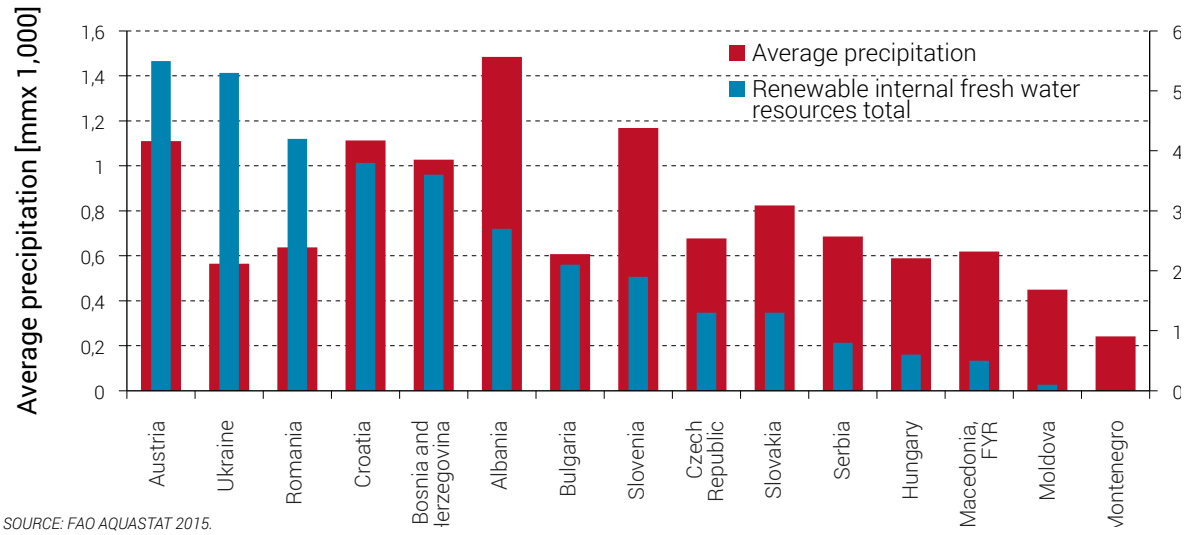
22. **Only one country in the basin, the Czech Republic, can be qualified as water stressed.** The most widely used measure for scarcity of water is the Falkenmark indicator or Water Stress Index (Falkenmark, Lundqvist and Widstrand 2009), which uses 1,700 m^3 of renewable water resources per capita per year as the threshold (based on estimates of water requirements in the household and in the agricultural, industrial, and energy sectors). Measured by that indicator, of all the countries in the Danube River basin, only the Czech Republic can be qualified as water stressed. At the same time, no country in the Danube River basin falls below the "water scarcity" threshold of 1,000m^3, again emphasizing the solid availability of renewable water resources in the region compared to other parts of the world.

23. **Rainfall in the region is only moderately seasonal and dependent on predominant climatic conditions.** The regional rainfall distribution shows a strong influence of different climates, which change from Continental to Mediterranean depending on the part of the basin, and range from less than 300 millimeters (mm) to more than 1,400 mm per year. This has a major impact on the variation of renewable freshwater resources[6], as seen in Figure 11.

24. **The impact of climate change in the region is visible through changes in the hydrological cycle, leading to an increasing occurrence of extreme weather conditions, from droughts to high waters and rainfalls.** Since the Danube region has mostly moderate climate, with a relatively balanced variation of rainfalls, the adverse effects of climate change have so far been only moderate. Based on findings of the Climate Change Adaptation study (LMU 2012) for the International Commission for the Protection of the Danube River (ICPDR), the main impacts on water-related

6 Renewable internal freshwater resources flows refer to internal river flows and groundwater from rainfall in the country, and are defined as renewable water resources generated from endogenous precipitation at the territory of individual country, as opposed to renewable freshwater resources that include all transboundary freshwater flows in the country.

FIGURE 11: RAINFALL PER COUNTRY / INTERNAL FRESHWATER RESOURCES PER COUNTRY



SOURCE: FAO AQUASTAT 2015.
NOTE: DATA FOR KOSOVO UNAVAILABLE.

sectors are triggered by temperature and precipitation changes, including (a) an increase in air temperature with a gradient from northwest to southeast, particularly in summer in the southeastern Danube region; (b) overall small annual precipitation changes for the whole basin on average, but major seasonal changes in the Danube River basin; (c) changes in the seasonal runoff pattern, triggered by changes in rainfall distribution and reduced snow storage; (d) the likelihood that droughts, low flow situations, and water scarcity will become longer, more intense, and more frequent; and (e) an increase in water temperature and increased pressures on water quality (Figure 12 and Figure 13).

FIGURE 12: ANNUAL MEAN TEMPERATURE CHANGE, 2021-2050

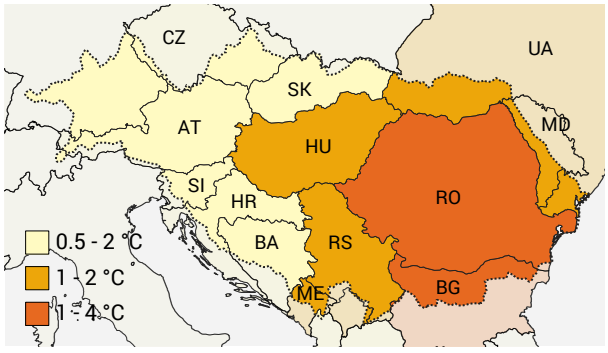
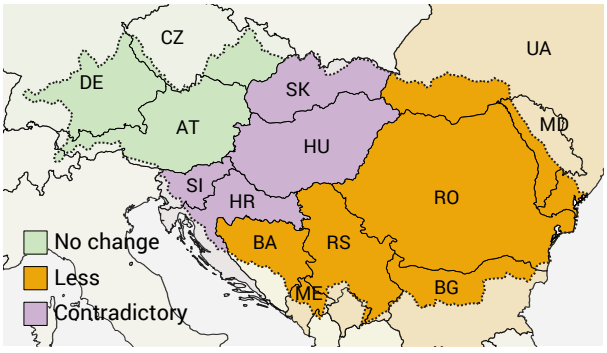


FIGURE 13: SUMMER MEAN PRECIPITATION CHANGE, 2021-2050



SOURCE: LMU 2012.

25. **Potential damage to water sector provision due to climate change ranges from damage to infrastructure to revenue loss.** Due to their dependence on regular, expected rainfalls, and temperature-dependent consumption, water services are sensitive to climate change, droughts, and lower groundwater tables, and potential drinking water shortages are sensitive to extreme rainfalls and floods. Resulting from the above-mentioned negative impacts of climate change, the major vulnerabilities of water supply and sanitation (WSS) are expected to include (a) drinking water shortages due to droughts and groundwater table lowering, (b) water quality issues due to extreme droughts or rainfalls, and (c) damage to residential and industrial WSS infrastructure due to extreme weather events. The damage assessment following the May 2014 floods in the Sava catchment area illustrates the destructive force of floods on man-made infrastructure, but also the relative resilience of water supply and sanitation infrastructure, since most of the systems were back in operation in few weeks' time.

26. **While almost all countries in the region have made progress preparing climate change response strategies and adaptation activities, implementation of concrete adaptation measures is still lacking in most of the countries.** Most countries have prepared and adopted national climate change strategies that are analyzing potential impacts, and considering possible mitigation measures. Of the 16 countries analyzed for this report, 9 have adopted water strategies that deal with or include climate change impacts, 6 are preparing such documents, and only 1 (Bosnia and Herzegovina) has not yet started preparing a climate change impact assessment (SoS data collection). This indicates a relatively high level of climate change awareness in the Danube region. However, almost all countries in the region are still focusing their activities on analysis and preparation of strategic documents, while transposition of adoption measures into different water standards, or introduction of climate change into future development projections and plans, is still pending.

Bosnia and Herzegovina 2014 floods

The water services sector sensitivity toward climate change became evident following extreme rainfalls and large floods in parts of the region during May and August 2014, which resulted in loss of life and widespread damage in the Sava River basin, including damage to water supply and sanitation infrastructure (around 1 million people were left without access to drinking water for several days). However, a damage assessment done after the event also showed that basic water services were mostly restored after two to three weeks, and that water sector damage accounted for just 0.7 percent of total damage.

FIGURE 14: ECOLOGICAL STATUS OF RIVER WATER BODIES IN THE DANUBE RIVER BASIN (LENGTH IN RELATION TO TOTAL LENGTH)

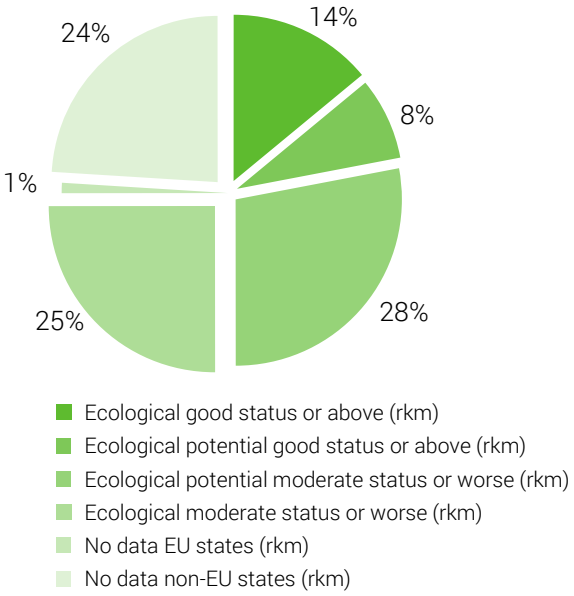
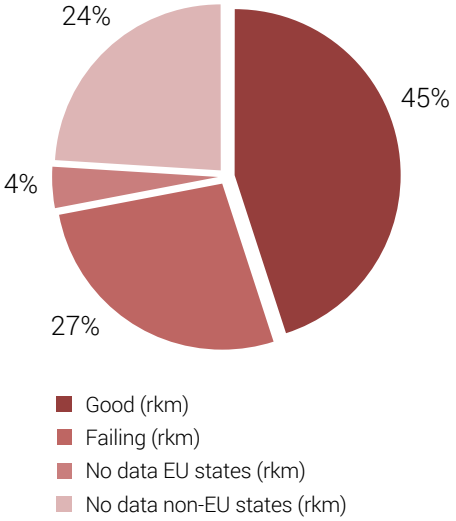


FIGURE 15: CHEMICAL STATUS OF RIVER WATER BODIES IN THE DANUBE RIVER BASIN (LENGTH IN RELATION TO TOTAL LENGTH)



SOURCE: ICPDR 2009.
NOTE: RKM = RIVER KILOMETERS.

27. **The quality of surface waters has remained the focus of activities over the last few decades, and while improvement is visible, overall good water status has not yet been achieved in significant parts of the basin.** Industrial activities and large population concentrations are responsible for the relatively high level of organic pollutants and nutrients (nitrogen and phosphorus) discharged into the waters of Danube River basin. The loads of organic pollution in surface waters are still high in some parts of Danube and in most of the Danube River tributaries (results for the whole Danube River basin area are presented in Figure 14 and Figure 15). This is the consequence of still considerable discharge of untreated or insufficiently treated wastewater from municipal, industrial, and agricultural sources, in particular in the lower part of the basin, where there are new or non-EU countries located. The analysis prepared under the ICPDR shows that in the last two decades, there have been considerable improvements in water quality in the Danube River basin. This could be attributed to the high level of investments in wastewater treatment, made mostly under the EU accession agenda, and a significant decline of industry and agricultural activities in the post-socialist period. However, the main nutrient pollution sources in the Danube River basin remain agriculture (50 percent), followed by municipal wastewater (25 percent) and industry (25 percent) (ICPDR 2009).

28. **Groundwater is the dominant source for water supply in large parts of the region.** While both surface and groundwater are well represented as sources of water supply, groundwater is the dominant source of drinking water

(Figure 16). Seventy-two percent of the drinking water in the region is produced from groundwater. However, the share of groundwater used for drinking water purposes is very different among countries of the region and ranges from 30 percent to 50 percent in the southeast part of the region, to close to 100 percent in the northwest part (Figure 16).

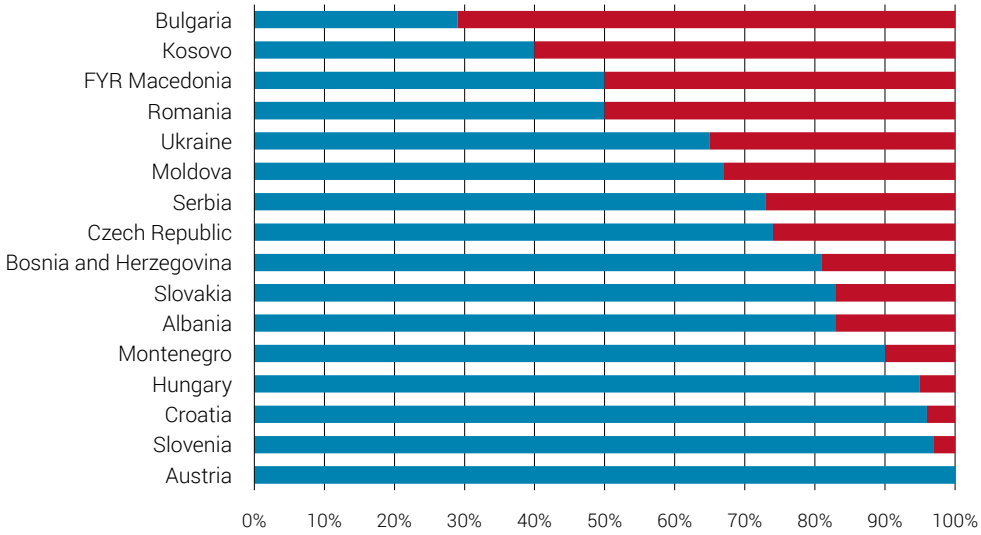
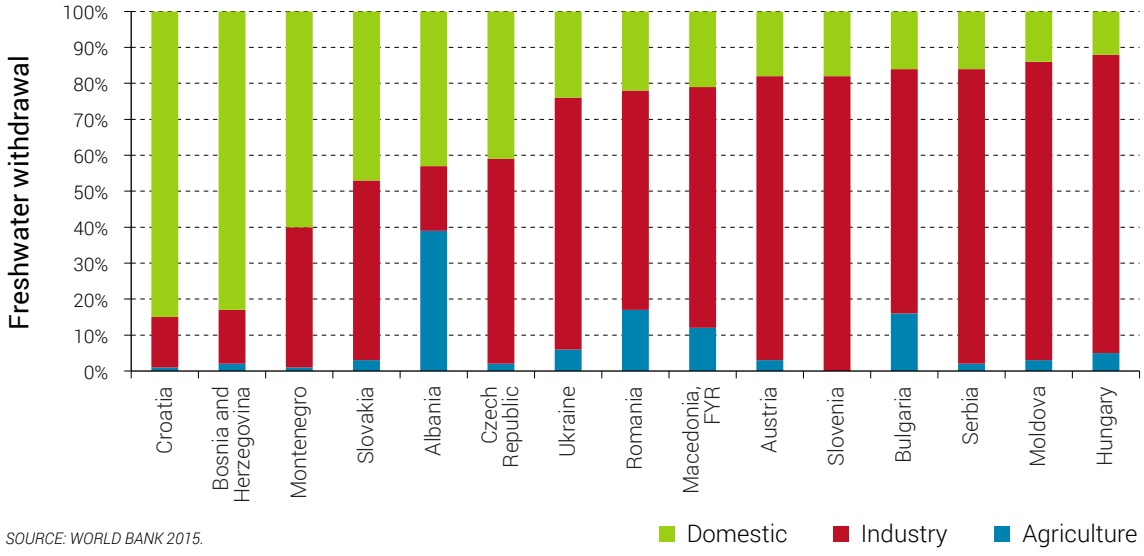


FIGURE 16: RATIO BETWEEN GROUNDWATER AND SURFACE WATER AS DRINKING WATER SOURCE

SOURCES: ICPDR 2013; SOS DATA COLLECTION FOR ALBANIA, FYR MACEDONIA, KOSOVO, AND MONTENEGRO.

29. **Industrial and domestic use of renewable freshwater resources dominates in the region, even after the decline in industrial output during the last 20 years.** Water withdrawn for human use is shared among domestic, industrial, and agricultural use. A comparison of different categories gives a clear indication of the form of economy that exists in individual countries (Figure 17), with mostly agricultural use in Albania, mostly industrial use in Austria, and mostly domestic use in countries that have developed neither industrial nor agricultural use (Bosnia and Herzegovina, Croatia).

FIGURE 17: FRESHWATER WITHDRAWAL DISTRIBUTION PER USAGE



SOURCE: WORLD BANK 2015.

30. **Water management in the Danube River basin is driven by the principles of the EU Water Framework Directive (WFD) under the auspices of the ICPDR.** The ICPDR was established in 1998 on the basis of the Danube River Protection Convention, the major legal instrument for cooperation and transboundary water management in the Danube River basin, and the platform for implementation of all transboundary aspects of the EU WFD. With support from the ICPDR, the 19 countries of the Danube watershed have elaborated a Danube River Basin Management Plan in conformity with the WFD. The plan was first adopted in 2009 and is being updated jointly by all countries in 2015, in conformity with the WFD's six-year timeline. Its purpose is to establish a framework for the protection and enhancement of the status of inland surface and groundwater, and to ensure sustainable use of water resources, and aims to ensure that all waters meet "good status," which is the ultimate objective of the WFD.

III. ORGANIZATION OF SERVICES

31. **The organization of water services in the Danube region is similar in its structure and distribution of responsibilities to other regions of Europe, but with some specifics that originate from the region's historic background and development.** Decentralization of service provision and ownership at the municipal level is currently the dominant form of organization, while private sector involvement remains largely limited. Driven by the EU accession process, some of the recent trends include the aggregation and corporatization of service providers and the establishment of independent regulatory authorities.

32. This chapter reviews how the main functions necessary in a well-structured water services sector—service provision, policy making, regulation, resource management, and sector monitoring—are distributed across national and local governments in the different countries. The chapter describes the size, ownership, and management of service providers; looks at policy-making responsibilities and at the relevance of the EU water directive for organization and service provision; and presents recent trends in sector regulation and monitoring.

33. The data and information in this chapter are largely derived from publicly available sources at the country and EU levels, and from a country-by-country review done by local experts of the sector's governance and policies, which is referred to as "SoS data collection" in the text. Numerical values are referenced in full in the Country Pages at the end of the report.

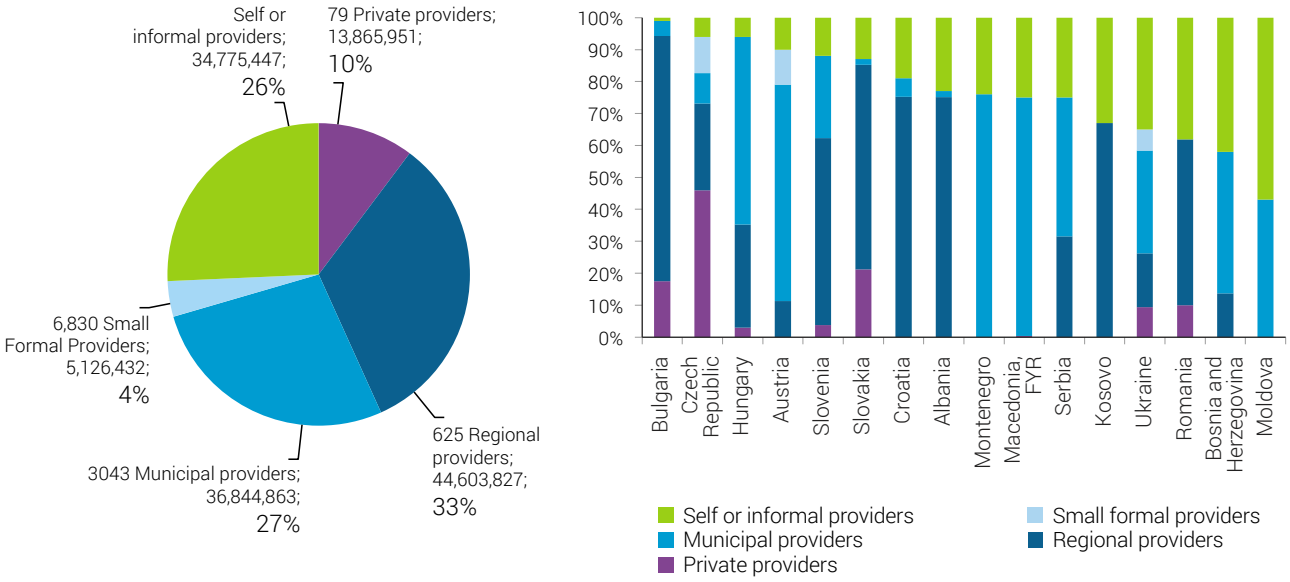
A. Service Provision

34. **About three-quarters of the region's population receive public service from a formal utility,[7] and one-quarter, representing households and communities, rely on self-provision or informal providers.** Figure 18 shows the main types of water service providers in the region and the share of the region's population they provide service to. Larger, regional utilities (whether public or private) already serve close to half the population. As the following paragraphs show, the share is expected to continue to grow, given the ongoing push toward regionalization of smaller, municipal or village-level service providers, which currently still serve about one-third of the population. Despite a few high-profile recent re-municipalization cases, such as in Budapest, privately managed utility companies continue to serve about 10 percent of the region's population, mostly in larger cities (Bucharest, Sofia) and in selected countries (the Czech Republic, Slovakia).

35. **There are over 10,000 formal service providers in the region, with wide variation in size of population served among and within countries, but just 700 serve more than half of the connected population.** Austria has the largest number of, and the smallest utilities in, the region, serving, on average, only about 1,400 customers, followed by the Czech Republic, where water utilities serve, on average, a little over 4,000 customers. The small size is expected given the large number of service providers (and municipalities; see Chapter II, Section C) in the Austrian and Czech water sectors. In contrast, Slovakia, where only 17 water companies provide services to over 6 million people, has the largest average size of utilities. The water sector reorganization process that Hungary and Kosovo went through in recent years also resulted in few large companies serving, on average, around 200,000 people; and in Bulgaria, where decentralization never fully took place, the average size remains relatively larger at 130,000. The average size of utilities in the remaining countries ranges from about 20,000 to 50,000 customers (Figure 19).

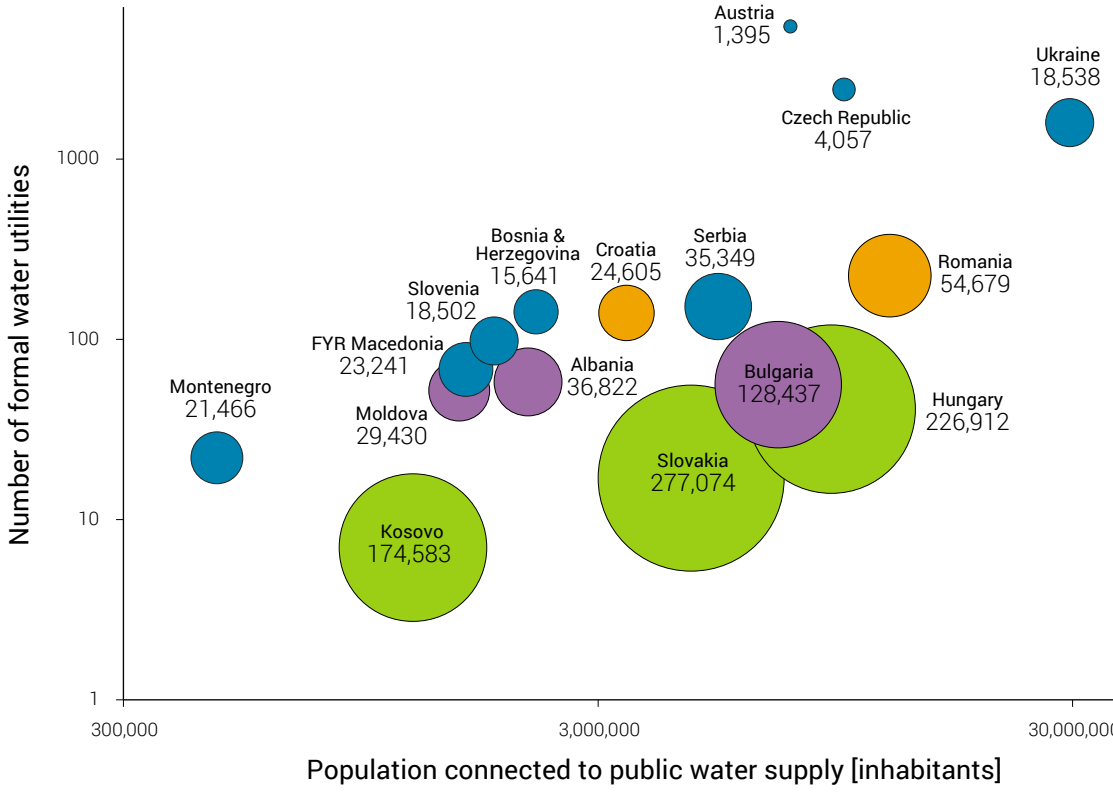
7 In this report and throughout the Danube region, the term "public supply" is used to indicate the provision of public services by a formal utility service provider, as opposed to informal, locally managed cooperatives or self-provision. The use of the term public does not refer to the ownership of the utility provider, nor its management, which might be public or private.

FIGURE 18: WATER SERVICE PROVIDERS AND POPULATION SERVED IN THE REGION AND IN EACH COUNTRY



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

FIGURE 19: NUMBER AND AVERAGE SIZE OF WATER UTILITIES IN THE DANUBE REGION



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.
NOTE: SIZE OF BUBBLE REPRESENTS AN AVERAGE UTILITY SIZE. COUNTRIES HIGHLIGHTED IN GREEN HAVE COMPLETED A UTILITY AGGREGATION EFFORT; IN COUNTRIES HIGHLIGHTED IN ORANGE, AGGREGATION IS ONGOING; AND IN COUNTRIES HIGHLIGHTED IN VIOLET, AGGREGATION IS UNDER DISCUSSION.

36. **Unsurprisingly, private providers serve on average the largest customer base followed by regional companies, municipal companies, and small formal providers.** As Table 1 shows, the few privately managed utility companies in the region tend to have the largest size, at around 175,000 customers served. The more than 600 regional companies, defined as those that serve more than one municipality, serve an average of 70,000 customers, and dominate in countries such as Albania, Bulgaria, Croatia, Kosovo, Romania, Slovakia, and Slovenia. The more than 3,000 municipal utilities serve on average around 12,000 customers and are most prevalent in Austria, Bosnia and Herzegovina, FYR Macedonia, Moldova, and Montenegro. Finally, there are close to 7,000 small formal providers almost exclusively in Austria, the Czech Republic, and Ukraine, with an average size of about 800 customers served.

TABLE 1: TYPE, NUMBER, AND AVERAGE SIZE OF UTILITIES IN THE DANUBE REGION

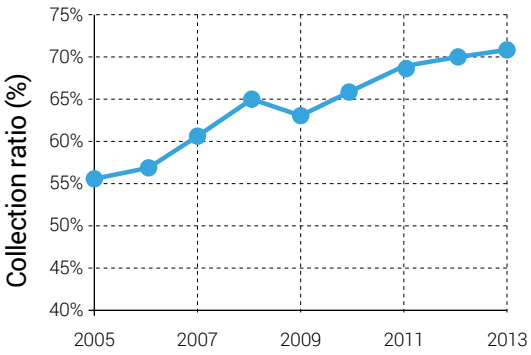
Type of public service provider	Number	Average size	Market share
Private providers	79	175,518	10%
Regional providers	625	71,366	33%
Municipal providers	3043	12,108	27%
Small formal providers	6830	751	4%
Total/average	10577	9,496	74%

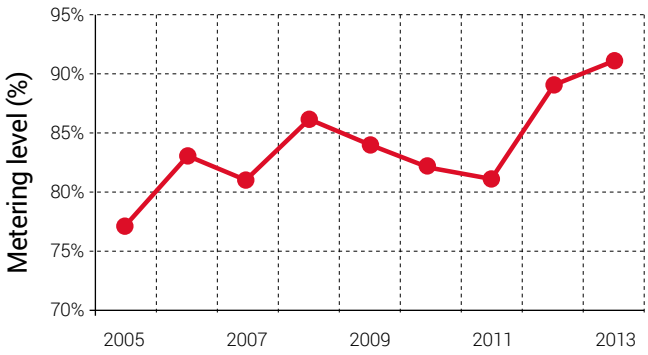
SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION.

Kosovo Utility Regionalization, 2002–2007

The main motive behind the Kosovo utility regionalization effort was to transform small and fragmented municipal companies into self-sustaining business organizations with clear customer orientation and to create an environment conducive to attaining socioeconomic goals for the Kosovar population. The reform of the utility sector took place in the context of the authorities' EU integration agenda, which implied transposition of the relevant EC framework and adoption of prudent management principles and practices such as river basin management, integrated water resources management, and the like. Prior to sector reform, there were 35 municipal companies in operation offering water supply and wastewater collection together with other municipal services. The reform process was carried out in three phases:

Consolidation of the service providers also had a positive effect on the performance side. The key performance indicators since then have been making steady improvement. For example, the billing and collection ratio and the metering level have increased steadily, allowing better measurement of water consumption, thereby generating more revenue. The staffing level and the operating ratio remained stable, with modest improvements. Yet, NRW fluctuated over the same period, showing limited efficiency gains.



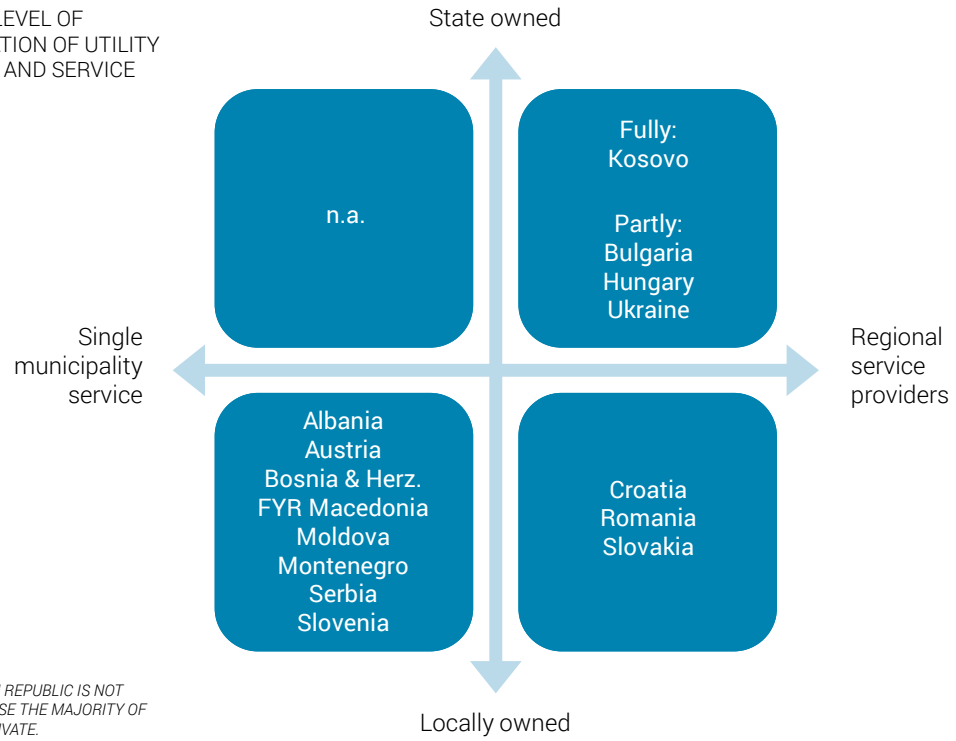


37. **In an effort to benefit from economies of scale, establish cross-subsidies, and facilitate absorption of EU funds, several countries are promoting or imposing the aggregation of small providers into regional utilities.** Countries like Kosovo and Romania had already embarked on such reforms in the mid-2000s, while other countries, such as Croatia or Hungary, started more recently. These reforms, among other things, set a minimum size requirement, thus necessitating utilities that do not meet this requirement to merge or absorb smaller municipalities, and limit access to state or EU funds to compliant utility providers. The regionalization process in Croatia and Romania is ongoing, with the expectation that it will result in a smaller number of large regional providers. A number of other countries in the region, including Albania, Moldova, and Ukraine, have also identified consolidation of water services as a sector priority, but have not yet adopted a regionalization agenda at the national level (Figure 19). A more detailed discussion of the outcome of those aggregation processes is provided in Section C of Chapter V.

38. **Wastewater services management is often provided by the same utility companies, except in a few countries where they are managed by separate companies in larger towns.** Historical reasons have led larger cities in the former Austro-Hungarian area (Austria, Hungary) to have different companies for water and wastewater. In fact, in Austria, of about 6,000 utilities, only 150 provide integrated services. This historical separation has also encouraged somewhat more innovative governance models on the wastewater side: Budapest wastewater management is managed by a private company even though the water supply has been re-municipalized; the wastewater treatment plant in Zagreb is operated under a build-operate-transfer (BOT) scheme; in Austria, special-purpose districts (Gemeindeverband) have been set up by nearby municipalities to share the investment and operation costs of wastewater management and treatment facilities. In most of the rest of the region though, wastewater services are operated by the water utility companies.

39. **In some countries, municipal utility companies provide more than water and wastewater services.** In Slovenia, for example, the type of a utility depends on its size; larger utilities tend to provide water supply and wastewater services only, while smaller ones may also include gas, district heating, and solid waste management, among other municipal services. FYR Macedonia is the only country in the region where multisector is the most common type of utility; Macedonian utilities normally provide all communal services to their customers. This was also the case in Croatia until recently, when a new act led municipalities to split water and wastewater services away from their communal enterprises.

FIGURE 20: LEVEL OF CENTRALIZATION OF UTILITY OWNERSHIP AND SERVICE PROVISION



NOTE: THE CZECH REPUBLIC IS NOT INCLUDED BECAUSE THE MAJORITY OF UTILITIES ARE PRIVATE.

40. **Most service providers in the region are controlled by local governments and went through a process of corporatization.** As a result of a widespread decentralization effort in the 1990s, in almost all countries local governments are responsible for public service provision, and own the service providers, with limited exceptions in Bulgaria, Hungary, and Kosovo (Figure 20). In a review of a dozen well-performing public utilities, World Bank staff identified shared characteristics of those utilities (see box). Legally at least, utility governance in many countries of the region match the first characteristic of external autonomy: the legal personality, accounts, and staff of public utility companies have been separated from the controlling jurisdiction that retains a sole or majority ownership of a corporation's stock. In most utilities, the shareholding ministries or municipalities appoint the board of directors,

Characteristics of well-performing public utilities

External Autonomy

- Although utilities do not have complete authority to set their tariffs, they are able to put forward proposals that are consistent with their overall revenue requirements.
- Public procurement rules, though considered intrusive, were followed without a significant impact on performance.
- Although most utility managers do not have total control of setting staff salary scales, they are able to hire and retain qualified staff.
- Most public utilities rely on government to source investment financing.
- Board members are generally appointed by the government to represent the interests of owners.

External Accountability

- All utilities are subject to well-defined performance targets.
- Performance contracts are useful tools for sharing information but have limitations for enforcing performance.
- The use of external auditors to enhance fiduciary responsibilities is almost universal.
- Most public utilities require authorization to secure external financing.
- External groups can be represented in utility advisory or management oversight bodies.
- Independent regulatory arrangements are the exception rather than the norm, because most utilities are regulated by their owners.

Internal Accountability for Results

- Senior management systematically reports to their boards on performance.
- Incentive-based systems for top management are common.
- Staff members are also subject to rewards and penalties to achieve well-defined performance targets.
- Most public utilities have focused on training for improving staff skills.

Market Orientation

- Utilities outsource mostly noncore functions and retain core functions.
- Although benchmarking exercises are becoming common, there are no clear-cut paradigms for using data collected for improving performance.
- Most utilities are not involved in market testing.

Customer Orientation

- Public water utilities have developed billing and collection systems that best overcome specific constraints faced by various groups of customers.
- Public utilities actively survey their customers to learn their opinions and views.
- Customers have the opportunity to express their preferences regarding service options.
- Customers are informed about service changes or interruptions.
- Utilities have developed effective complaint mechanisms.

Corporate Culture

- Well-defined mission statements provide an internal indicator of good corporate culture.
- Performance is the basis for salary increases in most utilities.
- Utilities provide ample career opportunities to their staff and experience low turnover.
- Water utilities have training programs for their staff as part of their annual performance agreements.
- Staff members are informed of management decisions on a need-to-know basis.

SOURCE: BAIETTI, KINGDOM AND VAN GINNEKEN 2006.

with the exception of FYR Macedonia, where nongovernmental representatives can also be members of the board. Utility management is appointed either by the board of directors or directly by the government. In some cases, the relationship between the utility and the government is formalized in a performance agreement (Table 2). In practice though, the spirit of an arm's-length relationship between corporatized utility companies and their controlling jurisdiction is not always respected, and local governments and mayors often maintain tight control over managerial and staffing decisions in their utilities. The characteristics of external accountability, market orientation, customer orientation, and corporate culture, are far less often observed.

TABLE 2: UTILITY GOVERNANCE IN COUNTRIES OF THE REGION

Country	Type of utility	Controlling jurisdiction	Dominant type of provider	Asset owner	Board/governing body for utilities	Management appointment	Performance agreement
Albania	Water and sanitation	Local government	Joint-stock company	Utility itself	Yes, board named by controlling jurisdiction	Utility's board	No
Austria	Water or sanitation	Local government	Municipality owned enterprise	Utility itself	Yes, board named by controlling jurisdiction	Utility's board	Sometimes
Bosnia and Herzegovina	Water and sanitation	Local government	Public Utility Company	Utility itself	Yes, board named by controlling jurisdiction	Controlling jurisdiction	Sometimes
Bulgaria	Water and sanitation	National and local government	State-owned enterprise	Utility itself[8]	No, controlled by controlling jurisdiction	Controlling jurisdiction	Yes
Croatia	Water and sanitation	Local government	Public Utility Company	Utility itself	Yes, board named controlling jurisdiction	Controlling jurisdiction	Yes, by law
Czech Republic	Water and sanitation	Local government	Privately owned company	Controlling jurisdiction	Yes, board named by controlling jurisdiction	Utility's board	Yes, by law
Hungary	Water and sanitation	National and local government	Municipality owned enterprise	Controlling jurisdiction	Yes, board named by controlling jurisdiction	Controlling jurisdiction	Yes, by law
Kosovo	Water and sanitation	National government	Regional Water Company	Controlling jurisdiction	Yes, board named by controlling jurisdiction	Utility's board	Yes, by law
FRY Macedonia	Municipal services	Local government	Municipal public enterprise	Unclear	Yes, board with noncontrolling jurisdiction participation	Controlling jurisdiction	Sometimes
Moldova	Water and sanitation	Local government	Municipal public enterprise	Controlling jurisdiction	No, control by controlling jurisdiction	Controlling jurisdiction	Sometimes
Montenegro	Water and sanitation	Local government	Municipal public enterprise	Controlling jurisdiction	Yes, board named by controlling jurisdiction	Utility's board	No
Romania	Water and Sanitation	Local government	Regional operator	Controlling jurisdiction	Yes, board named by controlling jurisdiction	Controlling jurisdiction	Yes
Serbia	Size-dependent	Local government	State-owned enterprise	National Government	Yes, board named by controlling jurisdiction	Utility's board	No
Slovakia	Water and Sanitation	Local government	Joint-stock company	Controlling jurisdiction	Yes, board named by controlling jurisdiction	Utility's board	Yes
Slovenia	Size-dependent	Local government	Municipal Public Enterprise	Controlling jurisdiction	Yes, board named by controlling jurisdiction	Controlling jurisdiction	Sometimes
Ukraine	Water and sanitation	Local government	Communal enterprise	Controlling jurisdiction	No, control by controlling jurisdiction	Controlling jurisdiction	No

SOURCE: SOS DATA COLLECTION.

8 This is about to change. The 2009 changes in the Water Act require that all WSS infrastructure assets become public state or public municipal property (depending on their territorial and functional characteristics).

41. **Most countries in the region did not embark on significant private involvement in the provision of water and wastewater services.** In the late 1990s and early 2000s, several countries experimented with PPPs for their larger cities, leading to concession contracts being signed for cities such as Bucharest, Budapest, and Sofia, as well as a large share of the population in the Czech Republic and Slovakia. A management contract was also attempted in Gjakovë-Rahovecare in Kosovo. More recently, Ukraine has developed a number of notable public-private partnership (PPP) schemes, such as the long-term lease agreement between the City of Odessa and the privately owned company Infoxvodokanal, and a large scale concession contract between Luhansk Oblast and the Russian private operator Rosvodokanal. At present, though, few of the countries continue to actively pursue the traditional concession model, with services in Budapest, for example, being re-municipalized. A number of softer PPP models are emerging, however, for the management of specific facilities (BOTs in Zagreb, Serbia, and Kosovo) and for the delivery of outsourced services, sometimes on a performance basis.

TABLE 3: OVERVIEW OF WATERWORKS ASSOCIATIONS IN THE REGION AND SERVICES THEY OFFER

Country	Name [9]	Scope	Year of creation	Full-time staff	Services offered					
					Training	Technical assistance	Knowledge exchange	Lobbying & advocacy	Public relations	Standards setting
Albania	SHUKALB	Water and wastewater	2000	5	✓		✓	✓	✓	
Austria	ÖVGW	Water	1881	15	✓	✓	✓	✓	✓	✓
	ÖWAV	Wastewater	1909	8	✓	✓	✓	✓	✓	✓
Bosnia and Herzegovina	VRS	Republika Srpska	2001	3	✓	✓	✓	✓	✓	
	UPKP	FBiH / utility services	1999	1	✓	✓	✓	✓	✓	
Bulgaria	BWA	Water and wastewater	2001	5			✓	✓	✓	
Croatia	GVIK	Water and wastewater	1972	–	✓	✓	✓	✓		
Czech Republic	SOVAK	Water and wastewater	1989	5	✓	✓	✓	✓	✓	
Hungary	MAVIZ	Water and wastewater	1990	10	✓		✓	✓	✓	
Kosovo	SHUKOS	Water and wastewater	2001	3	✓		✓	✓		
FYR Macedonia	ADKOM	Municipal services	2004	2	✓		✓	✓	✓	
Moldova	AMAC	Water and wastewater	2000	10	✓	✓	✓	✓	✓	✓
Montenegro	UVCG	Water and wastewater	1999	1	✓	✓	✓	✓	✓	✓
Romania	ARA	Water and wastewater	1995	25	✓	✓	✓	✓	✓	✓
Serbia	WSAS	Water and wastewater	2011	–	✓	✓	✓		✓	✓
	UTVSI	Water Professionals	1960	5	✓	✓	✓	✓	✓	✓
Slovakia	AVS	Water and wastewater	2004	2	✓	✓	✓	✓	✓	
Slovenia	CCIS	Chamber of commerce	1851	2			✓	✓	✓	
Ukraine	UWA	Water and wastewater	1995	9	✓	✓	✓	✓	✓	✓

SOURCE: SOS DATA COLLECTION.

9 SHUKALB: Water Supply and Sewerage Association of Albania; ÖVGW: Austrian Association for Gas and Water; ÖWAV: Austrian Water and Waste Management Association; VRS: Association of Waterworks of Republika Srpska; UPKP: Association of the Employers of Utility Companies; BWA: Bulgarian Water Association; GVIK: Water and Sewage Association; SOVAK: Water Supply and Sewerage Association of the Czech Republic; MAVIZ: Hungarian Water Utility Association; SHUKOS: Water and Wastewater Association of Kosovo; ADKOM: Association of Utility Service Providers of Macedonia; AMAC: Moldova National Association of Water and Sanitation Utilities; UVCG: Waterworks Association of Montenegro; ARA: Romanian Water Association; WSAS: Waterworks and Sewerage Association of Serbia; UTVSI: Association for Water Technology and Sanitary Engineering; AVS: Association of Water Companies; CCIS: Chamber of Commerce and Industry of Slovenia; UWA: Ukrainian Association of Water Utilities.

42. **Every country in the region has a utility association, and sometimes more than one.** Strong waterworks associations exist in most of the EU members, led, for example, by ÖVGW in Austria, MAVIZ in Hungary, and ARA in Romania. In most countries of the Former Yugoslavia though, the creation of such associations is more recent, and their human and financial capacity more limited. Knowledge exchange activities such as conferences, workshops, and journals are the most popular services provided by associations to their members, followed by association lobbying and advocacy work. Seven associations in the region draft and set technical standards and guidelines as part of their service offerings (Table 3).

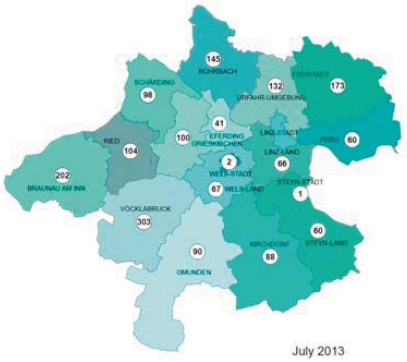
43. **In rural areas, water services are normally organized through a nearby utility, community-based organizations, or self-provision.** Overall, self-provision and community-operated systems account for about 26 percent of the population. Little is known about the informal service providers, which are normally beyond policy and regulatory reach and thus pose particular challenges for the sector due to their small size, limited technical and financial capacity, and large numbers. Many countries in the region consider the aggregation or integration of such smaller providers into regional utilities as the most viable option to improve the quality and sustainability of services. However, such solutions might entail significant additional costs for public utility companies, and countries that traditionally have had to deal with such situations, such as Austria, have developed alternative mechanisms to provide support to those service providers, as the experience of Upper Austria Water shows (see Box).

Upper Austria Water, an association of rural cooperatives

Founded in 1946, Upper Austria Water is an autonomous, self-reliant, nonprofit association of more than 1,700 cooperatives located in the Federal State of Upper Austria. Chaired by a board of seven directors, it manages water-related activities, especially in rural areas, and is in charge of decentralized, small-scale water supply and sewerage installations and flood protection and irrigation.

Water cooperatives aim at securing sufficient, high-quality, and cost-efficient drinking water supply through the construction and operation of autonomous installations. The personal involvement and honorary services of members make this collective quality-controlled water supply an economical method of supply. The association provides support to its members on technical, legal, financial, and organizational issues. It supplies operational and maintenance services (technical assistance, emergency supply, mobile technical equipment), pooling programs (for water meter purchase and water analyses, for example), and measurement services (such as leak detection, pipe and valve location, flow rates and pressure, and aquifer tests). It also proposes education and training sessions and conducts networking activities and information exchange opportunities for its members.
For more information, see http://www.ooewasser.at/de/english.html.

Federal State of Upper Austria
more than 1,700 water cooperatives



OÖ WASSER
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B. Policy Making

44. **Water services sector policy-making responsibilities remain with central government authorities, but are usually shared among different ministries, sometimes creating coordination challenges.** Defining strategies and policies of water services in the region remains the responsibility of the central government and its different ministries in almost all countries of the region (the only exception being Bosnia and Herzegovina - Federation of Bosnia and Herzegovina Entity, where water services policies are the responsibility of regional authorities). The tradition of a strong central government is still present in some countries (Ukraine), while others are experiencing extensive decentralization (Bosnia and Herzegovina). Policy-making responsibility for water service provision is commonly shared among different government ministries and is broadly follows a similar pattern where (a) water resource management is mostly the responsibility of the Ministry of Agriculture (but in some countries also of the Ministry of Environment), (b) water utility affairs and infrastructure development are the responsibility of the Ministry of Agriculture or the Ministry of Regional Development (or other ministries dealing with local self-governments), (c) wastewater treatment standards are mostly the responsibility of the Ministry of Environment, and (d) drinking water standards are mostly the responsibility of the Ministry of Health. The multiplication of water-services-related ministries sometimes creates confusion or leads to a lack of ownership for any utility reform agenda. To alleviate this challenge, some countries have resorted to the creation of coordination bodies (the Inter-ministerial Council for Water in Kosovo and the National Water Council in Albania, for example). In other cases, the waterworks association (Romania) or the regulatory authority (Hungary) have taken active policy coordination or advocacy roles. In only a few countries (such as Austria, Croatia, and Slovenia) all aspects of water service provision are concentrated in a single ministry (usually the Ministry of Agriculture), but even in those cases, the Ministries of Environment and Health retain significant monitoring and environmental protection responsibilities.

The Water Framework Directive

The Water Framework Directive (WFD, Directive 2000/60/EC) has introduced into EU legislation a new objective to protect aquatic ecosystems in a more holistic way, while considering the use of water for life and human development. The WFD has introduced a number of key principles into the management and protection of aquatic resources, including an integrated planning process at the scale of river basins, comprehensive assessment of impacts, economic analysis of the measures proposed or taken, and integrated water resources management principles encompassing targeting environmental objectives with water management and related policy objectives. The key tool for the implementation of the WFD is the River Basin Management Plans and the accompanying Programs of Measures to improve water status. The directive aims to achieve good water status in all natural surface waters and groundwater. For surface waters, the definition of "good" is based on a new concept of "ecological quality," taking into account biology, chemistry, and their physical features. The WFD provides for a number of deadlines by which Member States must fulfill particular obligations. Furthermore, the WFD introduces the requirement of cost recovery for water services, as well as public information and consultation in water management.

45. **Even though EU water directives do not explicitly mandate specific governance or regulatory frameworks for water services, they implicitly drive sectorial changes in the region, not only in member countries, but also in the membership-aspiring countries.** EU water directives (primarily the WFD, the Urban Waste Water Treatment Directive [UWWTD], and the Drinking Water Directive [DWD]—see boxes), are mostly concerned with the protection of water resources, the environment and human health, and the sustainable use of water resources. In contrast to directives in other sectors, they do not explicitly mandate specific governance or regulatory frameworks for the provision of water services, and in fact, among EU member states in the Danube region and beyond, a wide diversity of organizational structure can be observed. Their main direct impact on water services is through the definition of requirements for drinking water quality, wastewater collection and treatment requirements (part of the EU acquis communautaire), and the overall requirement for recovery of costs in accordance with the polluter pays principle. However, some stakeholders in the region have derived further implicit or perceived policy recommendations, such as the need to consolidate water utilities to facilitate the absorption of EU funds and the development of cost-effective investment packages; or the demand for a stronger regulatory framework to ensure compliance with the cost recovery requirements. At any rate, all EU member countries have completed the formal transposition of relevant EU water directives, and candidate or potential candidate countries are in the process of aligning their water policies with requirements of the EU acquis and relevant EU directives.

46. **EU directives compliance deadlines for each new EU country are defined in the Accession Treaties, and are set on the basis of the size of agglomeration, percentage of load and/or individual agglomeration, and sensitivity of receiving waters.** While some EU countries in the region have reached full compliance with the directives, the transition deadlines for certain categories have still not arrived for Croatia, Hungary, Romania, Slovakia, and Slovenia (see Chapter IV, Section C for an overview of current compliance rates). Notably, several potential candidate countries have started the transposition of EU directives into their national systems, even before obtaining formal candidate status, demonstrating early commitment to EU directive objectives.

47. **The large majority of countries in the region have prepared water strategies that define sector strategic objectives.** The preparation of a solid water sector strategy is seen as a foundation of sector development in most of the countries of the region, and such documents were recently prepared and adopted in 12 countries of the region (Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, FYR Macedonia, Montenegro, Romania, Slovakia, Slovenia, and Serbia), while a further two countries (Kosovo and Moldova) have drafts prepared. Only two countries (Hungary and Ukraine) do not have a designated water sector strategy, but cover the water-related issues through a number of different sectorial strategies or government programs. Adopted national water strategies commonly provide strategic objectives, and determine resources and actions needed to achieve sectorial goals. The water supply and sanitation sector is mainly focused on (a) increased water supply and sanitation coverage, (b) improved protection of waters from point source pollution, and (c) achieving cost recovery and sustainability of operation within 10 to 25 years. In EU member and candidate countries, all recently prepared strategies have a strong EU compliance dimension, and objectives that are aligned with transposition of EU water directives (aiming for full compliance by the end of the agreed individual transition period). The only exception is Austria, which is already in compliance with the EU directives, so its focus has shifted to maintenance and climate change adaptation as the next level of challenge in the water sector.

The Urban Waste Water Treatment Directive

The Urban Waste Water Treatment Directive (UWWTD, Directive 91/271/EEC) is an emission-control-oriented directive and one of the major water policy tools in Europe. Its objective is to protect the water environment from the adverse effects of discharges of urban wastewater from settlement areas and from industrial wastewater from the agrofood sector. The directive applies to agglomerations with more than 2,000 population equivalent (p.e.), and requires the appropriate collection of sewage and regulates discharges of wastewater by specifying the minimum type of treatment to be provided and setting maximum emission limit values on the major pollutants (organic load and nutrients). The directive requires the collection and treatment of wastewater in agglomerations with a p.e. of over 2,000, and more advanced treatment in agglomerations with a p.e. greater than 10,000 in sensitive areas. It is widely considered to be the most expensive piece of legislation of the acquis communautaire.

The Drinking Water Directive

The Drinking Water Directive (DWD, Directive 98/83/EC) concerns the quality of water intended for human consumption and defines the essential drinking water quality standards at EU level. Its objective is to protect human health from the adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean. The directive applies primarily to systems providing drinking water to more than 50 people or 10m^3/day.

48. **Even among countries with significant Roma minorities, few perceive this as a water service provision issue or have specific service provision schemes for such groups.** While a number of countries in the region, including Bulgaria, Romania, and Slovakia, have large concentrations of Roma (see Chapter II, Section B), only in FYR Macedonia and Bosnia and Herzegovina do some utilities have a special approach to marginalized groups (consisting mostly of the free provision of a basic quantity of water or discounts on the water tariff). All other countries state that they have the same approach to all customers regardless of their ethnicity or social status. The issue of the position of marginalized groups is commonly defined in national strategy (in some cases in legislation) for such groups, but assistance for populations with adverse social and economic conditions is usually provided by a combination of state and municipal support, with very few cases also including direct subsidies for water or other municipal services (see Chapter VI, Section D for more details).

49. **Gender is not perceived as an issue in the water services sector, even with disproportionately low representation of women in water utility staff.** Gender imbalance is not perceived as an issue in the water sector in any of the 16 countries of the region (SoS data collection), and is as such not covered under existing sector strategies. However, expert opinions also confirm that there is a general gender imbalance among water utility staff, particularly at the decision-making/management level. Underrepresentation of women among utility staff is usually explained by experts as being due to the physically demanding work requirements, although this does not explain the underrepresentation of women at the management level.

C. Resource Management

50. **Water resources management mostly follows an Integrated Water Resources Management approach.** The Development of River Basins Management Plans in EU member countries, and adoption of the Integrated Water Resources Management (IWRM) approach to water resources management and flood protection dominates throughout the region, consistent with WFD requirements. Preparation and implementation of those plans are generally under the responsibility of the line ministry responsible for water management (which is in most of the countries the Ministry of Agriculture, but in some countries also the Ministry of Environment). A few countries, such as Croatia, Bosnia and Herzegovina, Hungary, and Serbia, have established national state water agencies with significant water resources management responsibilities. As mentioned in Chapter II, Section D, those plans are then made consistent with the Danube River Basin Management Plan under coordination of the ICPDR.

TABLE 4: WATER RESOURCES FEES

Country	Water extraction fee	Amount per year collected from extraction fee (Euro)	Wastewater discharge permit fee	Amount per year collected from water discharge fee (Euro)	Collected fees paid to	Total fee collected in year (Euro per person per year)
Albania	Yes, but is not charged systematically	230,000	No	n.a.	State budget	0.08
Austria	Yes	No charge	Yes	No charge	n.a.	n.a.
Bosnia and Herzegovina	Yes	5,400,000	Yes	15,800,000	State budget	5.58
Bulgaria	Yes, but is not charged systematically	9,300,000	Yes	2,000,000	State budget	1.55
Czech Republic	Yes	147,000,000	Yes	7,500,000	Designated water fund	14.71
Croatia	Yes	40,000,000	Yes	29,000,000	Designated water fund	16.05
Hungary	Yes	43,000,000	Yes	10,000,000	State budget	5.35
Kosovo	Yes, but is not charged systematically	190,000	Yes, but not charged systematically	190,000	State budget	0.21
FYR Macedonia	Yes, but is not charged systematically	1,600,000	Yes, but not charged systematically	16,000	State budget	0.77
Moldova	Yes	Charged together with wastewater fee	Yes	150,000	Designated water fund	0.04
Montenegro	Yes, but not charged systematically	660,000	Yes, but not charged systematically	210,000	State budget	1.45
Romania	Yes	No data	Yes	No data	State budget	No data
Serbia	Yes	37,000,000	Yes	No data*	State budget	5.21
Slovakia	Yes	37,000,000	Yes	7,000,000	Designated water fund	8.15
Slovenia	Yes, but not charged systematically	No data	Yes	No data	State budget	No data
Ukraine	Yes	No data	Yes	No data	State budget	No data

SOURCE: SOS DATA COLLECTION.
*NOTE: *THE VALUE FOR EXTRACTION FEE ALSO INCLUDES DISCHARGE FEE, WHICH IS NOT PROVIDED SEPARATELY.*

51. **While legal, the actual use of water extraction and wastewater discharge fees is not commonly an effective resource regulation instrument.** The concept of water extraction and wastewater discharge licenses and fees exists in all countries of the region, but some countries do not charge extraction fees, while others do not fully enforce them. Funds collected from such fees are in most cases income of the central state budget (with the exception of Croatia, the Czech Republic, Moldova, and Slovakia, where they are channeled into a designated water fund), from which they are distributed according to government needs. The amounts collected range from mostly symbolic in Albania to relatively significant in Croatia and the Czech Republic, but remain very small on the regional level (the regional average is only €4 per person per year) and do not exceed €20 per person per year in any country in the region (Table 4).

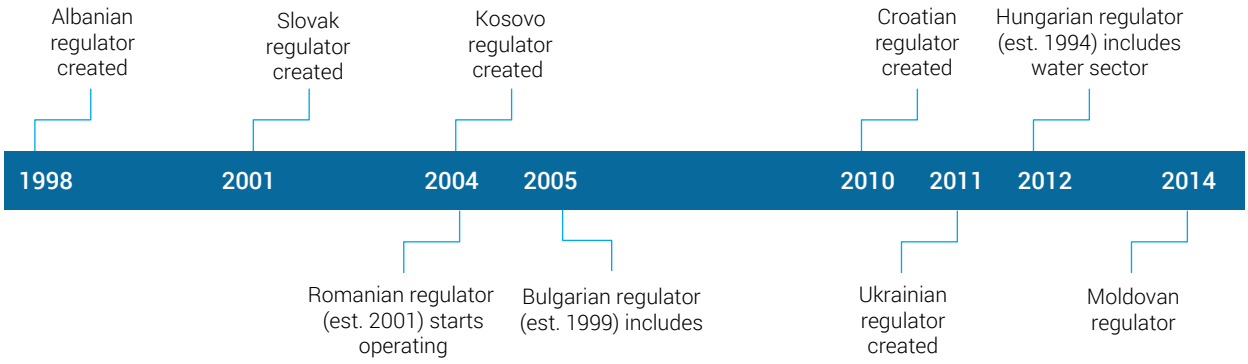
National water agencies

Only four countries (Bosnia and Herzegovina, Croatia, Moldova, and Serbia) have independent state water agencies with a certain level of responsibility for water supply and sanitation provision services, and only in Croatia does this agency (Croatian Waters) have substantive responsibility and an adequate budget for all aspects of the water sector. The budget of Croatian Waters (€310 million or €70 per capita in 2014) is mainly generated from different fees collected from all water users in Croatia, and receives little or no financial support from the state budget.

D. Regulation

52. **In the last 15 years, countries in the Danube region have been part of a trend toward greater independent regulation of water and wastewater service provision, especially in counties with larger or regional utilities.** Of the 16 countries included in this report, 9 have an independent regulatory authority that oversees the water services sector: Albania, Bulgaria, Croatia, Hungary, Kosovo, Moldova, Romania, Slovakia, and Ukraine. Of these regulatory agencies, only the Albanian Water Regulatory Authority started operating before 2000. Others were established or assumed regulatory functions over water services in the last 15 years (Figure 21), often in parallel with or as a prerequisite to a utility sector restructuring or regionalization effort (Croatia, Kosovo, Romania). In addition, there are ongoing discussions and studies being conducted to evaluate the possible formalization of regulatory frameworks in three additional countries (Bosnia and Herzegovina, FYR Macedonia, and Montenegro).

FIGURE 21: TIMELINE OF REGULATORY AGENCIES ESTABLISHED IN THE DANUBE REGION



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

53. **Of the nine independent regulatory authorities in the region, only three are water-sector specific: Albania, Croatia, and Kosovo.** The remaining six authorities are multisector, also regulating the electricity, district heating, and gas sectors, among others. One of the arguments in favor of a multisector regulator instead of a dedicated one is to allow the transfer of regulatory knowledge and expertise from one sector to another. Furthermore, a multisector model, at least theoretically, would increase independence of the regulator by not allowing a single sector to dominate the agenda and make the agency financially dependent on any sector or large utility. Yet, this may not be the case in practice. In a regulatory workshop organized by the Danube Water Program, two multisector regulators said that the water sector often takes a lesser regulatory priority than the electricity sector in their agencies, sometimes resulting in postponed decision making when it comes to the water sector.

54. **All regulatory authorities in the region play a formal role in tariff setting and approval, often alongside local government authorities.** Of all regulators, only the Hungarian one has an advisory role in the tariff-setting process (the formal decision rests with the line ministry). The remaining regulators have a direct responsibility for determining tariffs, either by formally setting them or by reviewing and clearing proposed tariffs, often after they have been previously approved by local government councils. In countries that have no dedicated economic regulator, regulatory functions such as tariff setting and service quality monitoring are generally performed by local governments, sometimes with the involvement of a national government control mechanism (FYR Macedonia, Serbia).

55. **Tariff-setting methodologies vary across countries, but a revenue cap is most widely used.** Four countries in the region—FYR Macedonia, Kosovo, Romania, and Ukraine—use the rate-of-return approach. Hungary, Montenegro, and Serbia do not have a developed methodology for determining tariffs in place. In practice, however, since utility companies in the region are largely owned by local governments, which largely prioritize lower tariffs rather than higher profits, tariff setting is not as effective a regulatory instrument as it would be in a private, profit-driven context.

TABLE 5: PRACTICES OF ECONOMIC REGULATION IN THE COUNTRIES OF THE DANUBE REGION

Country	Tariff-setting methodology	Basis for tariff setting	Tariff-setting process	Tariffs set at levels as defined by regulation	Regulated tariff levels ensured	Minimal frequency of tariff reviews
Albania	Yes, in application	Revenue cap	Regulator sets tariffs	Quite systematically	No, tariff review requests are up to utilities	No, tariff review requests are up to utilities
Austria	Yes, in application	Revenue cap	Utilities set tariffs in consultation with local authorities	Quite systematically	Yes, through fines or withdrawal of funding	Yes, through prescribed tariff review frequency and indexation
Bosnia and Herzegovina	No	n.a.	Utilities set tariffs in consultation with local authorities	Only when local authorities and utility management reach agreement	Yes, regulator can set tariffs unilaterally	No, tariff review requests are up to utilities
Bulgaria	Yes, in application	Price cap	Regulator sets tariffs	Infrequently	Regulator approves the max tariff level Utility can charge less	Yes, through automatic indexation
Croatia	Yes, in application	Price cap	Regulator reviews and clears tariffs	Quite systematically	Yes, regulator can set tariffs unilaterally	Yes, through prescribed tariff review frequency
Czech Republic	Yes, in application	Revenue cap	Utilities set tariffs in consultation with local authorities	Quite systematically	Yes, regulator can set tariffs unilaterally	Yes, through prescribed tariff review frequency
Hungary	No, but under development	n.a.	Regulator recommends tariffs to national ministry	Rarely, but annual tariff setting is expected once the tariff regulation is passed	Yes, through fines or withdrawal of funding	Not at present, but possibly once the tariff regulation is passed
Kosovo	Yes, in application	Rate of return	Regulator reviews and clears tariffs	Quite systematically	Yes, regulator can set tariffs unilaterally	Yes, through prescribed tariff review frequency
FYR Macedonia	Yes, but not applied systematically	Rate of return	Utilities set tariffs in consultation with local authorities	Only when local authorities and utility management reach agreement	Not if no tariff review is presented	No, tariff review requests are up to utilities
Moldova	Yes, in application	Revenue cap	Regulator reviews and clears tariffs	Only when local authorities and utility management reach agreement	Not if no tariff review is presented	No, tariff review requests are up to utilities
Montenegro	No	n.a.	Utilities set tariffs in consultation with local authorities	Only when local authorities and utility management reach agreement	Not if no tariff review is presented	No, tariff review requests are up to utilities
Romania	Yes, in application	Rate of return	Regulator sets tariffs	Quite systematically	Yes	No, tariff review requests are up to utilities

Country	Tariff-setting methodology	Basis for tariff setting	Tariff-setting process	Tariffs set at levels as defined by regulation	Regulated tariff levels ensured	Minimal frequency of tariff reviews
Serbia	No	n.a.	Utilities set tariffs in consultation with local authorities	Only when local authorities and utility management reach agreement	Yes, through fines or withdrawal of funding	No, tariff review requests are up to utilities
Slovakia	Yes, in application	Price cap	Regulator reviews and clears tariffs	Quite systematically	Yes, regulator can set tariffs unilaterally	Yes, through prescribed tariff review frequency
Slovenia	Yes, in application	Revenue cap	Utilities set tariffs in consultation with local authorities	Quite systematically	No information	Yes, through prescribed tariff review frequency
Ukraine	Yes, in application	Rate of return	Regulator sets tariffs	Rarely	Yes, regulator can set tariffs unilaterally	No, tariff review requests are up to utilities

SOURCE: SOS DATA COLLECTION.

56. **Regulatory agencies in the region vary widely in their independence, governance, and financial and human resources.** Although all agencies are nominally independent, in about half of the cases they depend on the state budget for their operation, and their management is appointed by the executive branch, as opposed to the parliament. Furthermore, overall staffing and budget vary significantly, although some trends can be observed. Regulatory agencies that regulate mostly municipal utilities tend to have a ratio of around one staff for each three to four utilities regulated, while agencies that regulate large regional operators (Hungary, Kosovo, Romania) tend to have around two staff for each utility; Croatia, where the regulatory framework is still incipient, is an exception, with only one technical staff for the whole country (Table 6).

TABLE 6: MAIN CHARACTERISTICS OF REGULATORY AGENCIES IN THE DANUBE REGION

	Albania	Bulgaria	Croatia	Hungary	Kosovo	Moldova	Romania	Slovakia	Ukraine
Name [10]	ERRU	EWRC [11]	Council for water services	HEA	WWRO	ANRE	ANRSC	URSO	NEURC
Based on?	Regulatory law	Water regulatory law	Water Law	Water law, Legal status law	Regulatory law	Water law	Water law	Regulatory law	Decree and law
Regulates tariffs?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Licenses operators?	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Handles customer complaints?	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Annual budget	€350,000	€2.0M	€160,000	€15 million (incl. all sectors)	€300,000	€1.5 million			€2,175,000
Sources of funds	Regulatory fee	Regulatory fee, fines through State budget	State budget	Regulatory fee, fines, other charges	Regulatory fee	Regulatory fee	State Budget	State Budget	State budget
Scope	WSS	Multisector	WSS	Multisector	WSS	Multisector	All local services	Multisector	Multisector

10 ERRU: Albanian Regulatory Authority of the Water Supply and Waste Water Disposal and Treatment Sector; EWRC: Energy and Water Regulatory Commission; HEA: Hungarian Energy and Public Utility Regulatory Authority; WWRO: Water and Wastewater Regulatory Office; ANRE: National Agency for Energy Regulation; ANRSC: Regulatory Authority for Local Public Services; URSO: Regulatory Office for Network Industries; NEURC: National Commission for State Energy and Public Utilities Regulation.

11 EWRC is in the process of being restructured, under the Law on the Energy Sector, passed in March 2015; the information in the table refers to the new governance structure, but includes the current staff and budget.

	Albania	Bulgaria	Croatia	Hungary	Kosovo	Moldova	Romania	Slovakia	Ukraine
Water utilities regulated	58	64	157	41	7	40	42	14	147
Staff	5 commis-sioners	128 total (2 + 15 employees for WSS)	9 members (part time) 1 technical	65	11 technical	60 people (7 for WSS)	96 people	6 people	Water: 71 Total: 600
Appoint-ment by?	Prime Minister based on a short-list	Parliament	Parliament	Prime Minister	Parliament (on govern. proposal)	Parliament		President	President
Mandate	2 × 5-year	2 × 5-year	1 × 5-year	2 × 7 year	1 × 4-year	6-year		6-year	2 ×6-year
Reporting to?	Parliament and Prime Minister	Parliament	Parliament	Parliament	Parliament	Parliament	Ministry of Reg. Develop.	Parliament	President, parliament

SOURCE: SOS DATA COLLECTION.

57. **Service quality regulation is normally the responsibility of a public health ministry or agency, while environmental regulation is the responsibility of an environmental ministry or agency in each country.** None of the countries in the region have concentrated all regulatory activities under a single agency; in fact, in a number of cases the regulatory agencies have been established on top of existing structures, leading to complementary or sometimes conflicting roles vis-à-vis local governments and line ministries.

E. Sector Monitoring and Benchmarking

58. **Sector information is not consolidated in single institutions in any of the countries of the region.** Section B highlighted the high level of atomization of policy-making responsibilities, and the absence of a single line ministry in most cases. Logically, this situation reflects on the availability of sector information, which is seldom consolidated at the sector level. In most cases, water resources management information is available from Ministries of Agriculture or Environment, drinking water quality information is available from the Ministry of Health, utility information (when available) from the regulatory authority, and sector financing is sometimes available from Ministries of Regional Development (investments). EU members fare somewhat better since they have to report in a structured way on the progress toward compliance with the Water Framework Directive and daughter directives, meaning that some of the information is consolidated using internationally defined standards, but even then it is largely limited to country-level indicators. River Basin Management Plans, a core tenet of the WFD, often give scarce attention to water and wastewater services beyond their direct relation to the plans in terms of use of water, pollution potential, and investment needs. Some of the more established regulatory authorities in the region, such as the one in Albania, have also started to develop bilateral information exchange agreements with other actors such as the Ministry of Health and the Ministry of Finance.

Regional sector information resources: IBNET and DANUBIS.org

IBNET (International Benchmarking Network for Water and Sanitation Utilities) (www.IB-Net.org) is the world's largest database for water and sanitation utilities performance data. Supported by the World Bank's Water and Sanitation Program, it has over the years accumulated a wealth of data from utilities in the Danube region, which have been used in Chapter V. Building on this invaluable resource, the Danube Water Program has launched DANUBIS.org, an online repository of resources for and about water and sanitation utilities in the Danube region. DANUBIS.org works in partnership with national stakeholders in most countries of the region and aims at consolidating information available from national sources, the IBNET, and this report.

59. **Most countries in the region have some mechanism to monitor the performance of utilities in the sector, but it is seldom made publicly available.** Table 7 presents an overview of institutionalized utility performance information systems and other benchmarking schemes in all countries of the region. In all countries with an established regulatory agency, the institution has taken the lead in developing at least a limited utility information system. Practices with regard to whether the information is processed into a formal regulatory ranking or performance revaluation, and whether it is made publicly available, vary, however. Only two

countries, Albania and Kosovo, regularly publish an annual regulatory benchmarking report. In countries where no such institution exists, waterworks associations have often developed voluntary utility benchmarking schemes to help their members improve their performance, and in some cases to allow for more effective lobbying for greater support to the sector.

TABLE 7: INSTITUTIONALIZED UTILITY PERFORMANCE INFORMATION SYSTEMS AND BENCHMARKING SCHEMES IN THE REGION

Country	Proponent	Scope[12]			Participation	Publicly available?	System coverage
		Information only	Reg. Benchmarking	Utility Benchmarking			
Albania	Line ministry / regulator	✓	✓		Mandatory	Yes	All utilities
Austria	Waterworks Association			✓	Voluntary	At aggregate level	Some utilities
Bosnia and Herzegovina	n.a.						
Bulgaria	Regulatory Authority	✓			Mandatory	Indirectly	All utilities
Croatia	Regulatory Authority	✓			Mandatory	No	Most utilities, being developed
Czech Republic	n.a.						
Hungary	Regulatory Authority	✓			Mandatory	Undefined	Under development
Kosovo	Regulatory Authority	✓	✓		Mandatory	Yes	All utilities
FYR Macedonia	Waterworks Association	✓		✓	Voluntary	Indirectly	Some utilities
Moldova	Waterworks Association	✓			Voluntary	Yes	Most utilities
Montenegro	n.a.						
Romania	Regulatory Authority	✓			Mandatory	At aggregate level	All utilities
	Waterworks Association	✓		✓	Voluntary	Indirectly	Many utilities
Serbia	Waterworks Association	✓		✓	Voluntary	Indirectly	Some utilities
Slovakia	Regulatory Authority	✓			Mandatory	At aggregate level	All utilities
Slovenia	n.a.						
Ukraine	Regulatory Authority	✓			Mandatory	At aggregate level	Only large utilities

SOURCE: SOS DATA COLLECTION.

12 Information only: Information-providing system only; Reg. Benchmarking: Regulatory benchmarking focused on ranking and grading utilities; Utility Benchmarking: utility benchmarking focused on identifying performance gaps and improvement potential.

IV. ACCESS TO SERVICES

60. **Access to water and sanitation services in the Danube region is high compared to the rest of the world.** The collection and treatment of wastewater is lagging behind the generally high access to piped water and private flush toilets, especially with respect to EU standards that most countries in the Danube watershed aim to comply with. However, when computing access by lower-income or minority groups or across subnational regions, service gaps become visible that would need to be addressed through targeted policies or investments.

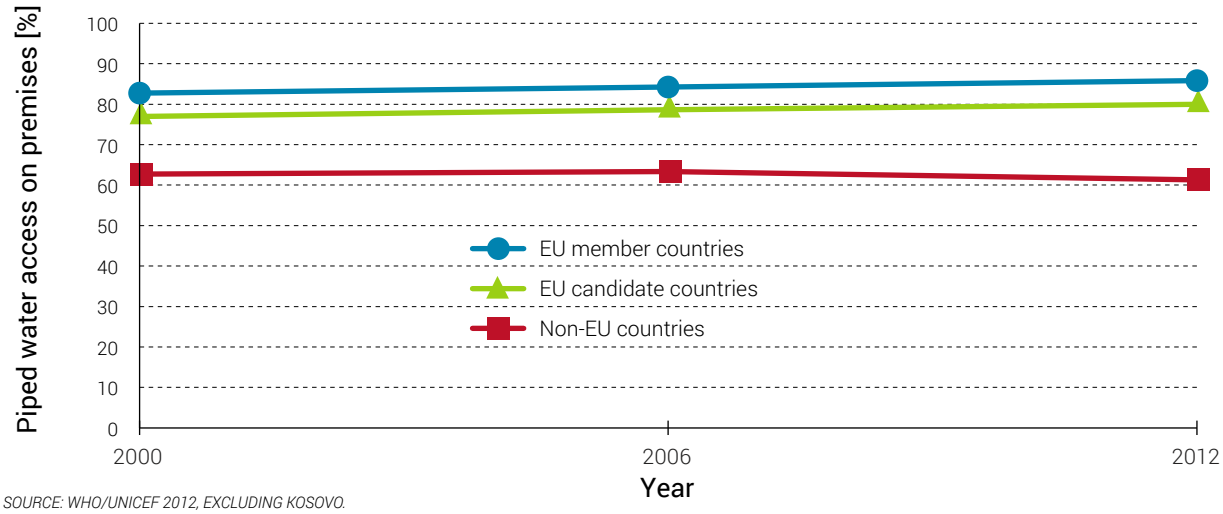
61. This chapter provides an overview of the access situation in all countries. The statistics are estimated from household survey data and have been compared with similar statistics reported by the Joint Monitoring Program, a WHO/UNICEF-managed database with statistics on water and sanitation access. Apart from national household surveys, the EU Survey on Income and Living Conditions (EU-SILC) was applied where national budget survey data were not available.

62. Estimating the statistics outlined in this section from the original surveys, whether national or EU-SILC, provides an opportunity to compute access by different income groups, ethnicity, and region, which is not otherwise available. Methodological Note A at the end of this document lists the different surveys, the variables informing income, and the questions posed in the surveys to estimate access to services.

A. Water

63. **Household coverage with piped water has remained consistently high in countries within the Danube watershed since the beginning of the millennium.** EU Member States and candidate countries have witnessed a small but significant increase in service coverage, which is mirrored by a small but significant decline by non-EU countries, including Moldova and Ukraine.[13] Figure 22 also shows the persistent and slowly widening gap between EU member and candidate countries and their less-EU-integrated peers in the East.

FIGURE 22: PIPED WATER COVERAGE, 2000–12



SOURCE: WHO/UNICEF 2012, EXCLUDING KOSOVO.

64. **On average and based on household survey statistics, 83 percent of the population in countries within the Danube watershed have access to piped water in their dwelling.** However, not all households receive their water supply from public utilities, since average coverage through formal public networks is reported to be only 74 percent.[14]

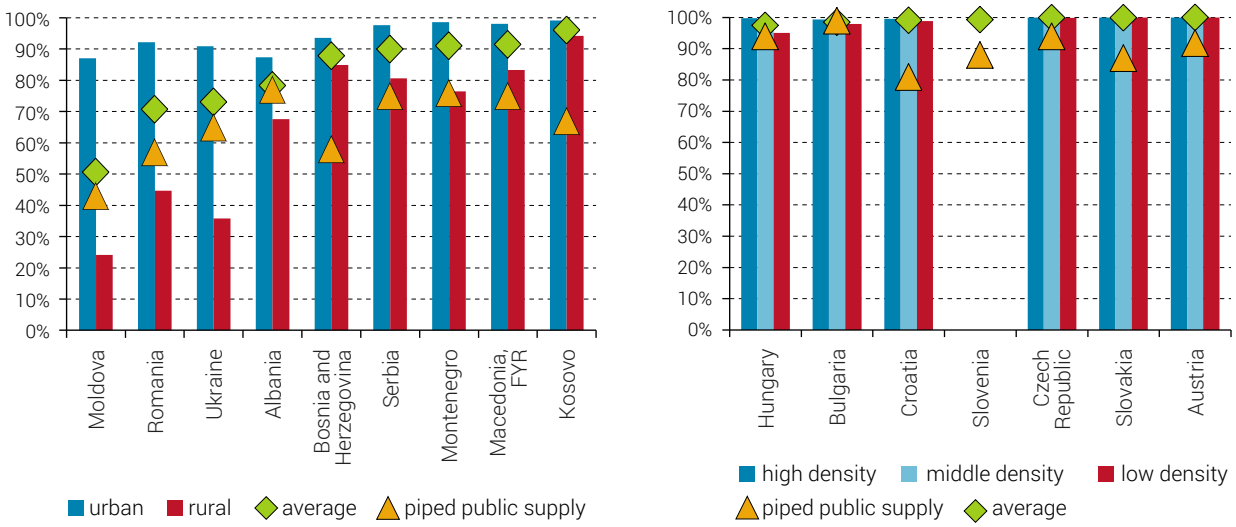
13 This trend analysis is based on data collected by WHO/UNICEF 2012. Average access to piped water by the population in the Danube watershed countries, excluding Kosovo, was 75 percent in 2012, which is slightly lower than the average statistics of 83 percent estimated from the most recent household surveys, largely because the WHO/UNICEF numbers were not updated after the latest round of household surveys became available.

14 This statistic is reported by each country and constitutes the "known" provision of piped water by public utilities. It also includes coverage of

The difference of about 10 percent can cautiously be attributed to alternative water providers, which could range from small communal systems, prevalent in less densely populated rural areas, or makeshift connections established by the household and unknown to the utilities. As Figure 23 shows, the largest gap between public utility and alternative provision is in Bosnia and Herzegovina and Kosovo, at 28 and 29 percent, respectively.

65. **Spatial differences in access within countries explain why some countries are lagging behind.** Most EU countries exhibit near-100 percent piped water access irrespective of location (see Figure 23 on the right), and even poorer countries like Bosnia and Herzegovina and Kosovo show a low access gap between rural and urban residents, though with perhaps higher reliance on providers other than public utilities. Yet, access to piped water by rural residents is half or less of urban coverage in Moldova, Romania, and Ukraine, which are also the countries with the lowest average access to piped water.

FIGURE 23: PERCENT OF POPULATION WITH PIPED WATER BY LOCATION AND TYPE OF PROVISION



SOURCES: SPATIAL AND AVERAGE ACCESS IS COMPUTED FROM VARIOUS HOUSEHOLD SURVEYS (2010–2012); PIPED PUBLIC SUPPLY IS DERIVED FROM VARIOUS SOURCES COMPILED THROUGH THE SOS DATA COLLECTION AND REPORTED IN THE STATISTICAL ANNEX BY COUNTRY.

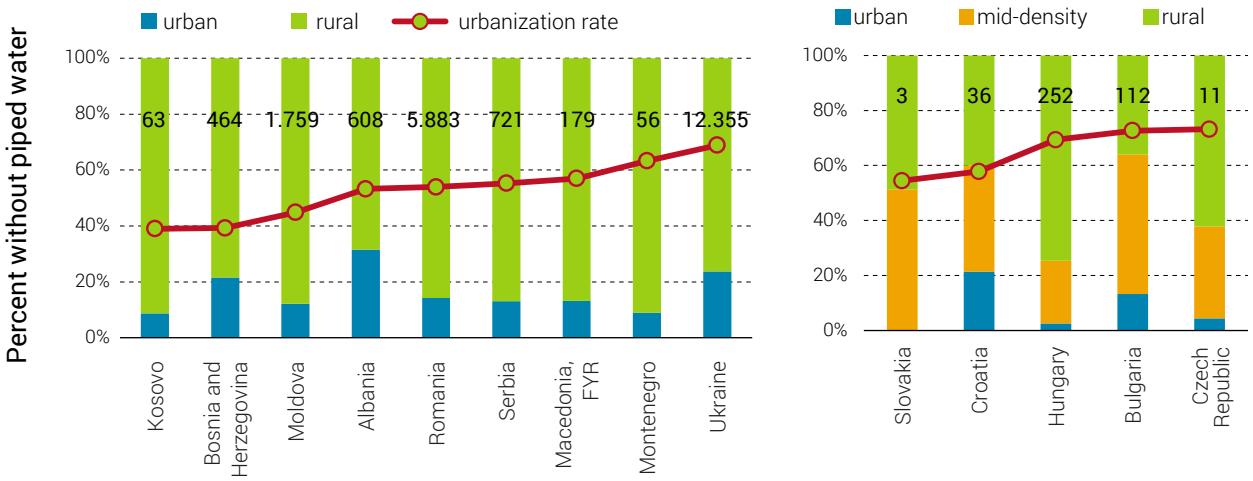
66. **About 22.5 million people, or 17 percent of the region's population, have no piped water supply in their dwelling.** Half of the population without piped water is located in Ukraine (12.4 million) and another quarter is located in Romania (5.8 million), mostly in rural areas but also with large populations without piped water in urban spaces. Overall, lack of piped water access is largely a phenomenon of rural or less densely populated settlements, which typically lack the economies of scale to cost-effectively provide network services through modern infrastructure (figure 24). However, it is important to bear in mind that almost all people (99 percent, excluding Kosovo) are reported by the Joint Monitoring Program to have access to improved water sources, including protected wells, springs, and other onsite solutions, to meet their water supply demands (WHO/UNICEF 2012), so the challenge in European countries and their neighbors is more about service standards than basic needs.

67. **Access to piped water by poorer segments of the population can be only partly explained by differences in the wealth of a country.** Richer or more mature EU countries (Austria, Croatia, the Czech Republic, Hungary, Slovakia, and Slovenia) managed quite successfully to include poorer segments of the population (that is, the bottom 40 percent and those living on less than $2.50 a day PPP per capita), as shown in Figure 25. Yet, some of the poorest countries, notably Kosovo with the second-lowest per capita GDP among the Danube countries (US$8,700 PPP in 2013), also managed to ensure high access for the bottom 40 percent (93 percent) and the poorest (84 percent). In contrast, Romania's GDP per capita is slightly higher compared to Bulgaria's (US$18,600 versus US$15,900 PPP), yet, average access to piped water is lower in Romania (71 percent versus 98 percent in

households that share a water tap, which is why the piped public water supply could exceed the piped supply received by households in their dwelling, as reported in the household surveys.

Bulgaria), and significantly so for the bottom 40 percent (54 percent versus 96 percent) and those living on less than $2.50 a day PPP (32 percent versus 76 percent).

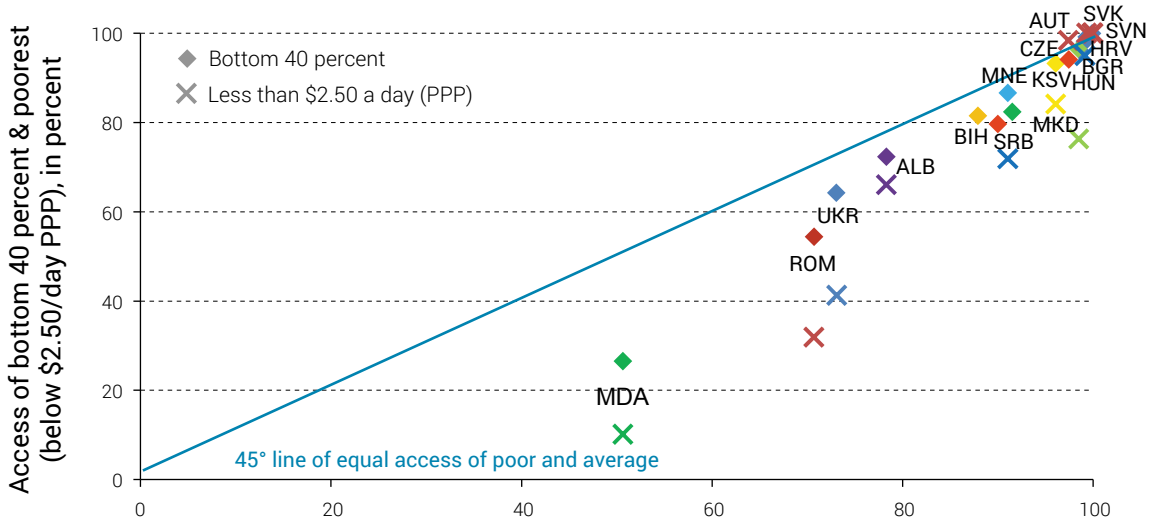
FIGURE 24: LOCATION OF POPULATION WITHOUT PIPED WATER IN DWELLING



SOURCES: COMPUTED FROM VARIOUS HOUSEHOLD SURVEYS (2010–2012); URBANIZATION RATE IS DRAWN FROM WORLD BANK 2015.

68. **Compared to their non-Roma neighbors, Roma generally have lower access to water and sanitation in most countries of the Danube watershed.** Informality or remoteness of Roma settlements, discrimination, outstanding utility bills, and lack of financial resources to pay connection fees interact together but differently in each locality to explain limited access. Results from a survey of the largest Roma settlements in Bulgaria, the Czech Republic, Hungary, Romania, and Slovakia reveal significant differences in access to improved water and sanitation by Roma compared to their non-Roma neighbors (see Figure 26). While these estimates do not reflect country-level statistics,[15] they are important because they compare households living in the same neighborhood (thereby controlling for remoteness) but coming from different ethnic backgrounds.

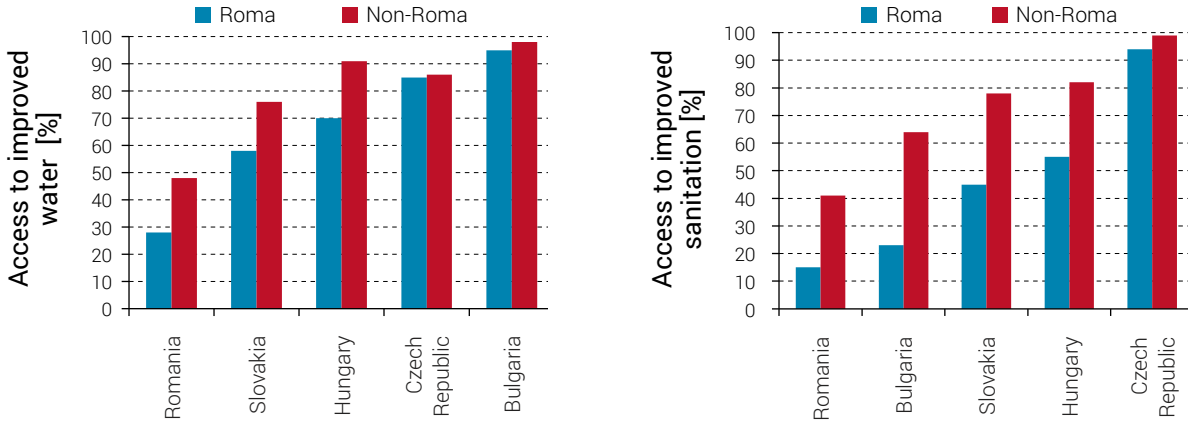
FIGURE 25: ACCESS TO PIPED WATER – TOTAL POPULATION, THE BOTTOM 40 PERCENT, AND THE POOREST



SOURCES: AUTHORS' COMPUTATIONS FROM VARIOUS HOUSEHOLD SURVEYS (2010–2012) AND SORTED ON AVERAGE ACCESS.
NOTE: BOSNIA AND HERZEGOVINA, FYR MACEDONIA, AND SERBIA BASED ON MULTIPLE INDICATOR CLUSTER SURVEYS WITH NO REPORTING OF EXTREME POVERTY.

15 National statistics by ethnicity are reported only for Romania, and these show access to piped water within household by the Roma population of 47 percent compared to the national average of 71 percent. Access to improved water sources is expected to be significantly higher because the statistics include shared piped water services and other water sources that are considered safe for consumption.

FIGURE 26: ACCESS OF ROMA AND THEIR NON-ROMA NEIGHBORS TO WATER AND SANITATION SERVICES

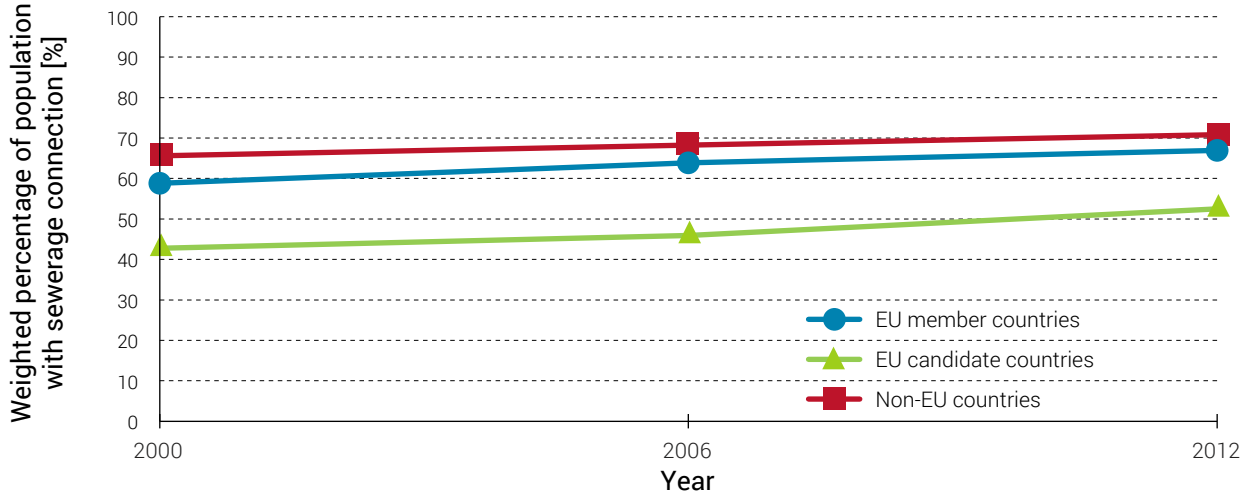


SOURCE: ADAPTED FROM WORLD BANK 2014, 154.

B. Sanitation and Sewerage

69. **Almost 80 percent of the population in Danube watershed countries report using a flush toilet in their dwelling, yet only 66 percent are connected to public sewer networks.** Although progress has been made in the region since 2000 in increasing the coverage of the population with connection to sewers, changes are mostly visible among EU and EU-candidate countries (Figure 27). For Moldova and Ukraine, access to public sewers was already high 15 years ago due to the importance devoted to wastewater collection in the Former Soviet Union, but has been stagnating since.

FIGURE 27: SEWERAGE COVERAGE, 2000–12

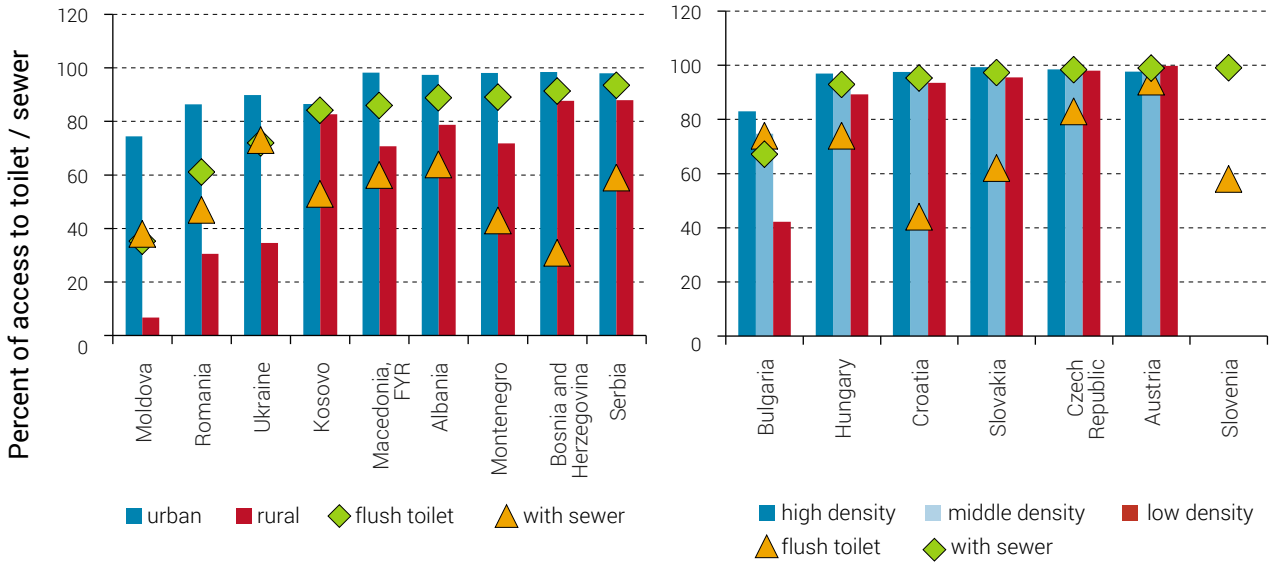


SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

70. **The difference between access to flush toilets and public sewers is largest in Bosnia and Herzegovina, Croatia, and Montenegro** (see Figure 28). Comparisons between access to flush toilets and sewers need to be made with the caveat that statistics on access to flush toilets are derived from household survey data and include only those with a private toilet in their dwelling, and statistics on access to public sewers are reported by national authorities and include households that share a toilet, while excluding those that have other safe means of excreta disposal, such as septic tanks.

71. **Even more than piped water supply, lack of access to private toilets is most prevalent in rural areas or areas with low population density.** Moldova has the lowest reported coverage of private toilets by the rural population (7 percent), but Bulgaria, Romania, and Ukraine also report rural access statistics below or just above 40 percent. In terms of absolute numbers, most of the population without access to private toilets is located in rural areas; only in

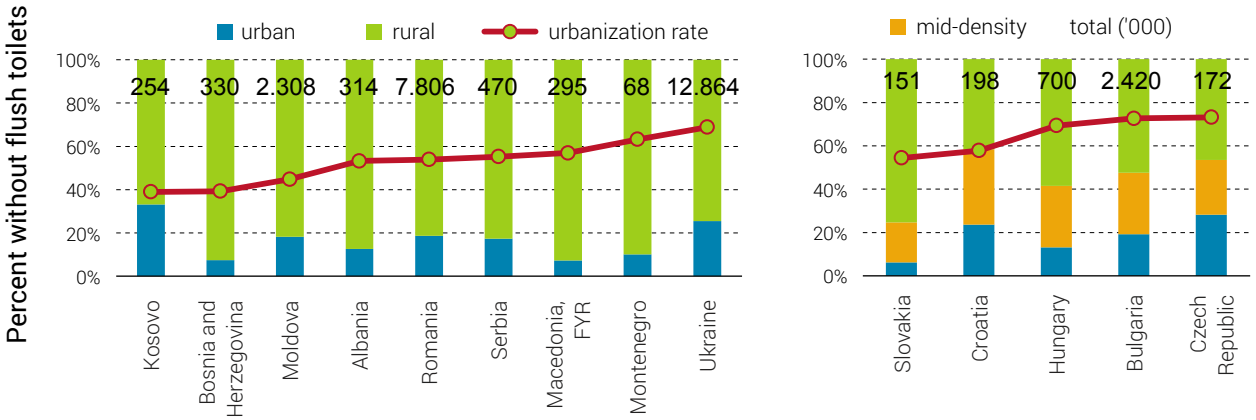
FIGURE 28: PERCENT OF POPULATION WITH PRIVATE FLUSH TOILET AND SEWER CONNECTIONS, BY LOCATION



SOURCES: SPATIAL AND AVERAGE ACCESS IS COMPUTED FROM VARIOUS HOUSEHOLD SURVEYS; ACCESS TO SEWERS IS FROM SOS DATA COLLECTION.

Croatia and Kosovo are those without access distributed in almost equal proportion, as shown in Figure 29. In terms of sheer numbers, rural Moldova and Ukraine together account for slightly more than half of the population that does not have access to private toilets within the countries of the Danube watershed (51 percent). With the addition of Romania, almost 80 percent of the total number of residents without access to private toilets can be found in these three countries. Also, Bulgaria's rural population is largely uncovered, contributing more than 5 percent to the total percent of those not covered with private toilets in countries of the Danube watershed.

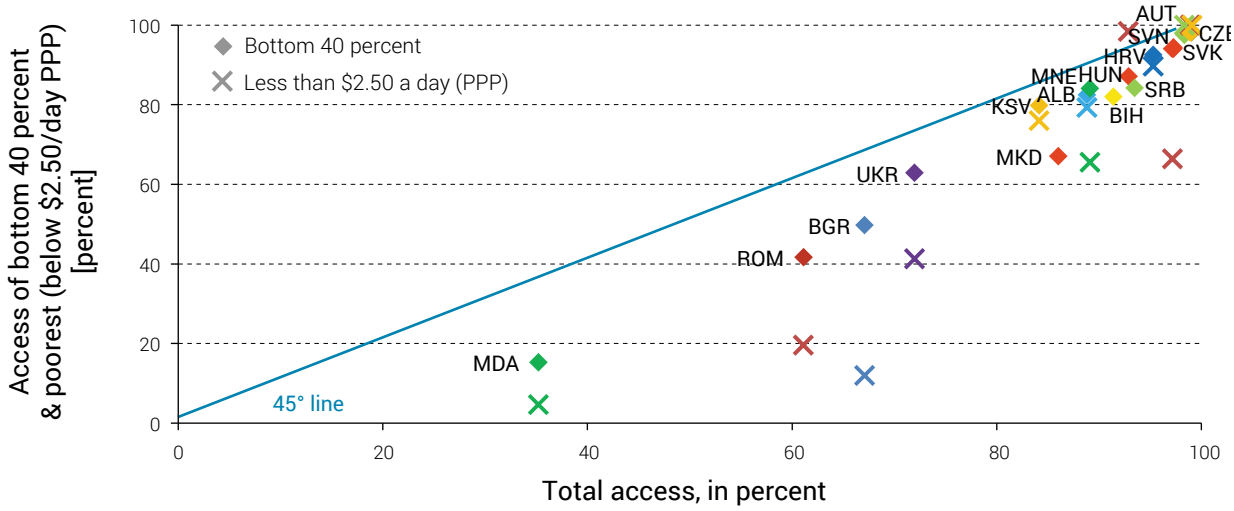
FIGURE 29: LOCATION OF POPULATION WITHOUT ACCESS TO PRIVATE FLUSH TOILETS



SOURCES: COMPUTED FROM VARIOUS HOUSEHOLD SURVEYS (2010–2012); URBANIZATION RATE IS DRAWN FROM WORLD BANK 2015.

72. **Less than 20 percent of the poorest and less than half of the bottom 40 percent have access to a private toilet in Bulgaria, Moldova, and Romania.** The low access—on average and for poorer segments of the population—is particularly striking in Bulgaria, which performed significantly better on piped water and is much more urbanized compared to the other two countries (73 percent compared to 45 percent in Moldova and 54 percent in Romania) (Figure 30). Low access by the poor in Bulgaria is also mirrored by the low access to improved sanitation by Roma, outlined in Figure 26, above.

FIGURE 30: ACCESS TO PRIVATE FLUSH TOILETS – TOTAL POPULATION, THE BOTTOM 40 PERCENT, AND THE POOREST



SOURCES: AUTHORS' COMPUTATIONS FROM VARIOUS HOUSEHOLD SURVEYS (2010–2012) AND SORTED BY AVERAGE ACCESS
NOTE: BOSNIA AND HERZEGOVINA, FYR MACEDONIA, AND SERBIA BASED ON MULTIPLE INDICATOR CLUSTER SURVEYS, WITH NO REPORTING OF EXTREME POVERTY.

C. Wastewater Treatment

73. **Wastewater treatment coverage shows significant improvement over the last 15 years (particularly in EU member countries), but still remains the least developed aspect of water service provision.** At the beginning of the EU expansion process in the region, wastewater treatment was significantly less developed than other aspects of water services provision, with about 35 percent of the total population in the region connected to any level of treatment in 2000 (Figure 32). The situation has been gradually improving following EU expansion in the region and large investments that have followed in EU member countries, but the region is still significantly behind other parts of Europe in the area of wastewater treatment.

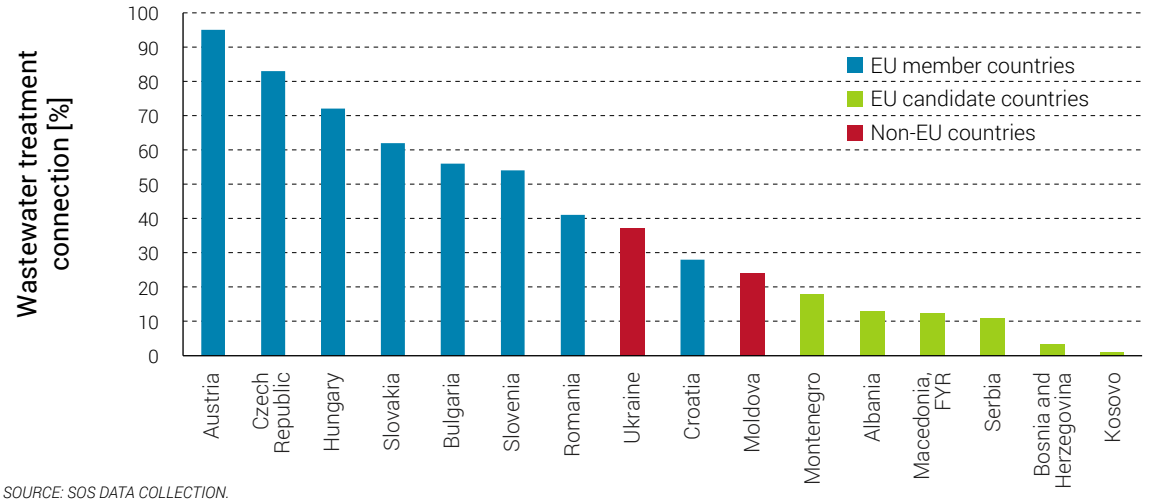
74. **There are large differences in level of wastewater treatment provision in the region, and while progress is being made, the region as a whole is still behind other parts of Europe.** At present, 45 percent of the total population in the region is connected to wastewater treatment plants, but there are major differences in the percentage of population in individual countries connected to wastewater treatment, ranging from 97 percent in Austria to 2 percent in Kosovo (Figure 31). The share of population with wastewater treatment has been steadily increasing in all countries of the region over the last decade. However, there is a noticeable difference in coverage increase among EU member countries, and non-EU member countries (Figure 32), which indicates a major impact of EU structural fund investments in wastewater treatment infrastructure. At the same time, data also show only limited progress has been made in the Balkan countries that have not yet started the accession process (Bosnia and Herzegovina, FYR Macedonia, Kosovo, and Serbia). The relatively high initial level of wastewater treatment in non-EU countries (Moldova and Ukraine) can be explained by the higher level of attention to treatment of wastewater in the Former Soviet Union compared to Former Yugoslavia.

75. **With all the progress made, the Danube basin region is still substantially behind other parts of the EU, particularly in relation to tertiary treatment.** Almost 20 years after the adoption of the UWWT Directive, wastewater treatment is high in the EU15, with 97 percent

Nutrient removal requirement in the Danube basin

If receiving waters are particularly sensitive waters, such as those already suffering from eutrophication, stronger reduction of nutrients (phosphorus and nitrogen) from wastewater effluent is required (so-called tertiary wastewater treatment). Due to the need to protect the Danube delta and the coastal waters of the Black Sea from eutrophication, a significant part of the Danube River basin population is required to have tertiary-level treatment. Deadlines for compliance with the UWWT Directive vary, and for the EU15 (the original EU Member States) it was December 31, 2005. For the new Member States in Central and Eastern Europe, staged transitional periods have been set within the individual Accession Treaties. In principle, however, these transitional periods do not exceed 2015 (except in Romania, where agglomerations with less than 10,000 p.e. must comply with the directive by the end of 2018; and Croatia, which as a recent EU member, has deadlines between 2018 and 2023).

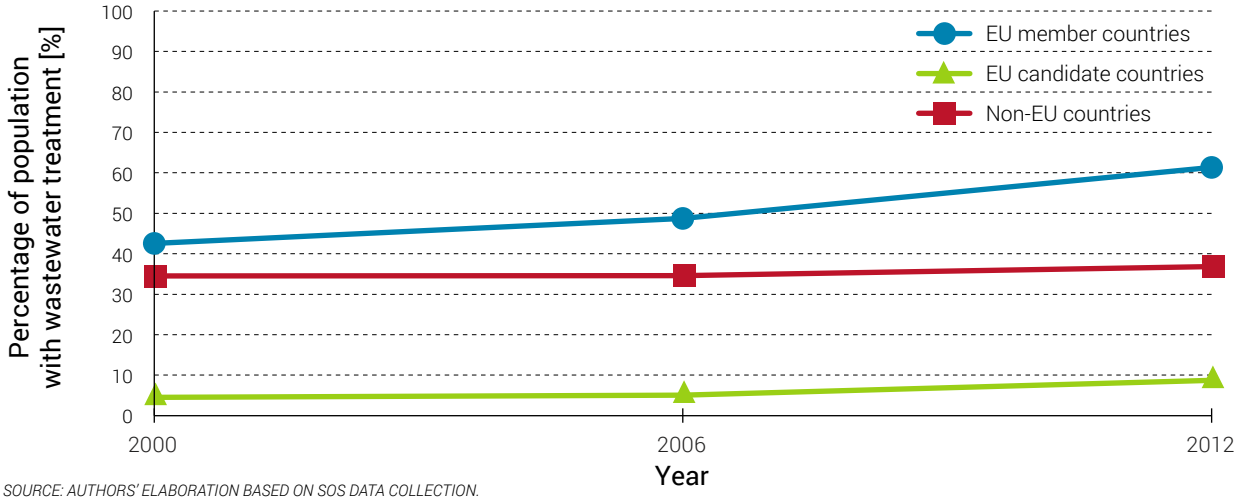
FIGURE 31: WASTEWATER TREATMENT COVERAGE IN THE REGION, 2012



SOURCE: SOS DATA COLLECTION.

of the population in Central European countries and 84 percent of the population in Northern European countries connected to a wastewater treatment plant compared to only 67 percent of the population in the EU countries of Eastern Europe. Due to much focus on nutrient removal from wastewater, tertiary treatment of wastewater has seen a very significant increase over the last decade throughout the EU. Currently, about 50 percent of the population in the new Eastern European member countries has tertiary level of treatment, which is still much lower than the EU average but which represents a 30 percent increase compared to 10 years ago. There are major differences in tertiary treatment in the region, with about 90 percent of the population in Austria, 60 percent in the Czech Republic, and 20 percent in Slovakia (SoS Data collection and EEA 2015) connected to tertiary treatment, while tertiary treatment remains nonexistent in the southern part of the region (including Bosnia and Herzegovina, Kosovo, FYR Macedonia, Montenegro, and Serbia)

FIGURE 32: COMPARISON OF WASTEWATER TREATMENT COVERAGE CHANGE AMONG EU MEMBER COUNTRIES, EU CANDIDATE COUNTRIES, AND NON-EU COUNTRIES



SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION.

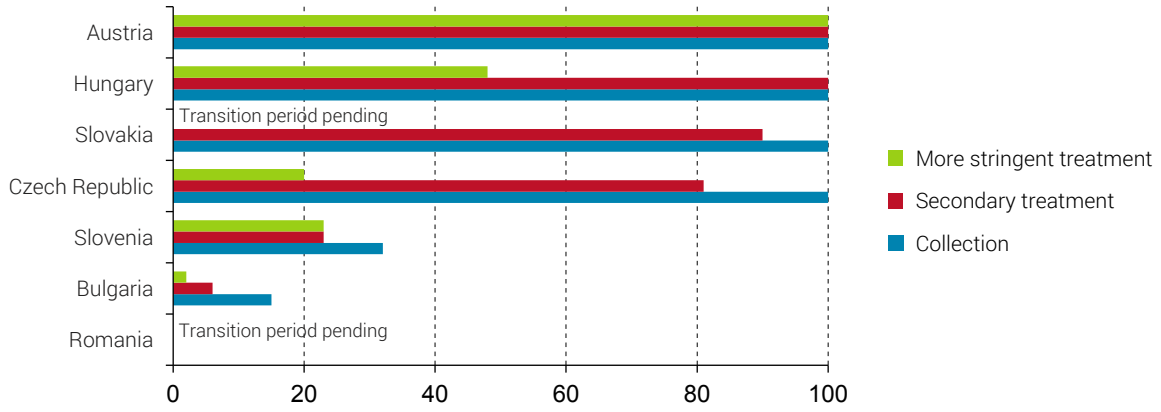
76. **EU countries have committed themselves to comply with wastewater collection targets, and face different deadlines to reach full compliance.** EU directives, as mentioned, require wastewater collection for all settlements with population above 2,000, although sewage treatment requirements vary by settlement size and sensitivity of the area. Among the EU countries in the Danube watershed, Bulgaria's and Slovenia's compliance rates with respect to wastewater collection are only 15 and 32 percent, respectively, while Romania is still "in transition" and will need to make significant efforts to meet future compliance deadlines (EC 2013, 2, Annex). Both Bulgaria and Slovenia are

expected to meet compliance with wastewater collection in settlements with populations above 2,000 by 2015 (SoS data collection). Croatia still has a grace period, but needs to start working on closing the gap, since only 44 percent of its residents are connected to a public sewer system.

Technical standards in the Danube region

Technical requirements for design and construction of water supply and sanitation structures in all countries of the region are defined by national legislation (usually consisting of construction law and associated secondary legislation), and existing national technical standards, while those that are EU members are in compliance with EU design and construction requirements. Several countries in the region have traditionally relied on German DIN (Deutsches Institut für Normung) standards (Croatia, Slovenia), or the Former Yugoslavia JUS (Jugoslovenski Standard) standards (Bosnia and Herzegovina, Serbia), while some still use their nationally developed technical standards with the tendency to gradually adopt them to those used in EU countries. Former Soviet-era technical and construction standards (that are solid on technical grounds but often not concerned with economy of operation) still apply in countries that were part of the Former Soviet Union (Moldova and Ukraine). In newly created countries like Kosovo, development of technical standards and water supply and wastewater norms is an ongoing process, but the objective is development of standards based on EU requirements, while in the transitional phase, they are mainly using DIN standards as ready-made and widely respected technical norms.

FIGURE 33: COMPLIANCE RATES WITH URBAN WASTE WATER DIRECTIVE REQUIREMENTS: COLLECTION, SECONDARY TREATMENT, AND MORE STRINGENT TREATMENT



SOURCE: EC 2013, 2, ANNEX.

Service standards and cost-effective solutions under EU directives

Neither the Drinking Water Directive (DWD) nor the Urban Waste Water Treatment Directive (UWWTD) includes specific service standards or requirements at the household level. However, throughout Europe, piped water and flush toilets on the premises, which go beyond the JMP definition of improved services, represent the most commonly accepted service level. Both the DWD and the UWWTD impose quality standards, however, and in the case of UWWTD, collection standards if water and wastewater are produced, which evokes the question of how to address in a cost-effective way those requirements, in particular in cases where there is no public infrastructure in place.

The UWWTD establishes the conventional wastewater collection and treatment systems as standard for agglomerations above 2,000 population equivalent, but also provides the option of individual or other appropriate systems, where a centralized system would produce no environmental benefit or because it would involve excessive costs. However, in such cases, those systems must achieve the same level of environmental protection, which in court cases (Case C-119/2002 Commission v. Greece) has been confirmed to mean discharges to the soil must be treated to the same level as discharges to water bodies, thus limiting the use of this clause. Recent Commission guidance generally limits the use of such systems to 2 percent of a given agglomeration. Furthermore, in smaller settlements, centralized low-cost systems such as wastewater ponds and constructed wetland systems are extensive wastewater treatment options that are simple to operate, have a low energy demand, and can meet the requirements of the EU Urban Waste Water Treatment Directive for settlements below 10,000 population equivalent, even for sensitive areas. In addition, increasing attention has recently been given to modern onsite, decentralized, or semi-centralized wastewater management concepts that are already applied in several of the most advanced European countries (Germany, Holland, Sweden), particularly in rural and semi-urban areas. These concepts comprise collection, treatment, and disposal or reuse of wastewater from small communities (from individual homes to portions of existing communities) using many small sanitation/wastewater treatment facilities designed and built locally, that are more flexible, sustainable, and cost-effective (WECF 2010).

V. PERFORMANCE OF SERVICES

77. The overall performance of water and wastewater services, in terms of their quality and efficiency, varies widely in the region, but is generally below international good practices. In the last 20 years, however, positive trends have been registered on a number of dimensions, showing that utilities in the region are slowly converging toward international standards. The overall performance of utilities appears largely driven by the country's own level of development, with EU members generally leading the way. However, a more detailed analysis also sheds further light on the drivers of utility performance.

78. This chapter covers services provided by formal utility companies ("public supply"), which represent about three-quarters of the population in the region (see Chapter IV). Unfortunately, little information is available about the performance, quality, or even costs of informal providers (community or village systems and self-supplied households), which represent one-quarter of the population. Further work on understanding those services will be necessary in the future. However, whenever possible and meaningful, the figures in this chapter include the weighted average[16] for EU members (blue), EU candidate countries (green), and non-EU countries (red), as well as good practices (in green and taken as the 90 percent top percentile of best-performing utilities in the region).

79. Most of the information in this chapter is derived from two sources, a country-by-country effort conducted under this review to collect publicly available country-level data about service performance (cited as SoS data collection and referenced individually in the country tables at the end of the document), and the large dataset available from the International Benchmarking Network (IBNET) / DANUBIS database, which covers more than 450 utilities and close to 3,400 observations between 1995 and 2013. Both sources entail potential data challenges. Country-level data usually do not offer long time series, and present an average, rather than the entire spectrum of data. In addition, the quality of the data varies significantly, and is limited in those countries that do not have an independent regulatory agency collecting utility performance data. Furthermore, IBNET / DANUBIS data do not systematically include all utility companies (highest coverage is in Albania, Bulgaria, the Czech Republic, Kosovo, and Moldova); therefore, trends and averages might not be fully representative of the overall sector. Finally, as discussed in the last section, the country-level averages mask a high heterogeneity among companies within the same country. The exact sources and values of the indicators and data mentioned in the text are listed in full in the tables at the end of this document, and the methodological approach for this chapter's analysis is detailed in methodological notes also at the end of this document.

A. Service Quality and Customer Practices

80. **In many of the region's countries, water service is generally continuous, and drinking water meets national quality standards.** There are, however, exceptions, most notoriously in Albania, where many of the utilities do not provide continuous supply, and in Moldova, where drinking water quality is an ongoing challenge. Wastewater treatment plants, where operating, generally also fulfil the requirements issued in the licensing permit, except again in Albania and Moldova, and in Kosovo and Montenegro, where wastewater treatment has largely only recently been introduced. Table 8 and Figure 34 provide an overview of the situation in the different countries for which information is available.

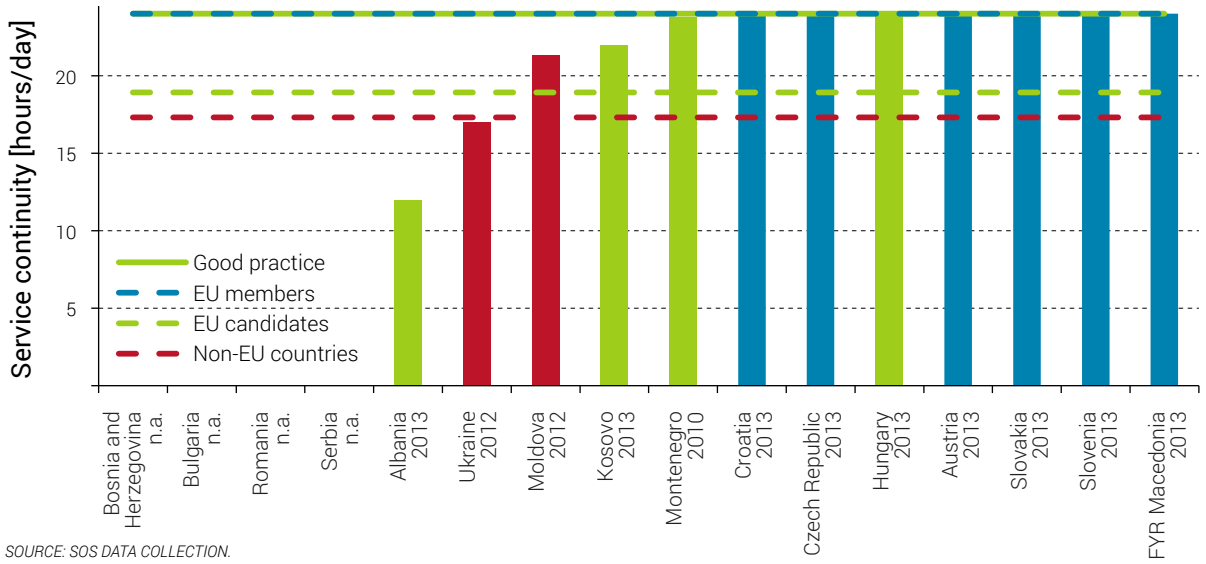
81. **Customer satisfaction is, unsurprisingly, higher where service quality is higher.** According to a 2013 Gallup poll, customer satisfaction with water and sanitation services in most countries of the Danube region is lower than the EU average, with EU members faring better than candidate countries and non-EU members (Figure 35). Perhaps not unsurprisingly, customer satisfaction is also relatively closely correlated with overall service performance as measured by the Water Utility Performance Index (see Section C in this chapter for more details).

82. **Customer protection mechanisms are somewhat underdeveloped in the region, particularly in countries without regulatory agencies.** In about half the countries in the region, the law mandates that utilities have an internal customer complaint redress mechanism; however, few utilities voluntarily conduct customer satisfaction surveys, with the exception of privately managed utilities in Bulgaria and the Czech Republic, for example. Those countries that do not have independent regulatory agencies generally do not offer an external institutional mechanism to address

16 Averages are generally weighted by country population.

complaints or evaluate customer satisfaction. Among those countries with an established independent regulator, almost all provide a formal customer complaint mechanism through the regulator, but few have more comprehensive customer protection practices. In fact, only Albania, where the regulator was established almost 20 years ago, reports the use of tools such as public hearings for tariff setting, as well as the signing of formal contract service agreements between utilities and their customers (Table 9).

FIGURE 34: SERVICE CONTINUITY IN COUNTRIES OF THE DANUBE REGION



SOURCE: SOS DATA COLLECTION.

TABLE 8: OVERVIEW OF SERVICE QUALITY IN THE REGION'S COUNTRIES

Country	Water services continuity			Drinking water qu Is water quality compliant?	Is wastewater treatment compliant?
	Is service continuous?	Value [hours/day]	Year		
Albania	In some cities	12	2013	In many cities	In some cities
Austria	Yes	24	2013	Yes	Yes
Bosnia and Herzegovina					
Bulgaria	Yes			Yes	In most cities
Croatia	Yes	24	2013	Yes	In most cities
Czech Republic	Yes	24	2013	Yes	Yes
Hungary	Yes	24	2013	Yes	Yes
Kosovo	In many cities	22	2013	In most cities	No
FYR Macedonia	Yes	24	2013	Yes	In some cities
Moldova	In many cities	21	2012	In some cities	In some cities
Montenegro	In many cities	24	2010	In most cities	No
Romania	Yes			Yes	Yes
Serbia	In many cities			Yes	Yes
Slovakia	Yes	24	2013	Yes	Yes
Slovenia		24	2013		
Ukraine	In many cities	17	2012	In many cities	In many cities
Regional Average		**20**			

SOURCE: SOS DATA COLLECTION.

Drinking water quality standards

Requirements for drinking water quality reflect transposed requirements from relevant EU directives (Directive 98/83/EC on quality of water intended for human consumption), and CEN (Comité Européen de Normalisation) standards are transposed into national legislation in all EU member countries, while non-EU countries that are aspiring to become EU members are gradually aligning their national norms and requirements with EU requirements (Albania, Macedonia, Montenegro). The only exceptions to this rule are Moldova and Ukraine, where national drinking and wastewater discharge requirements are defined by national legislation based on old Soviet Union standards.

Wastewater treatment quality standards

Requirements for wastewater treatment and discharge as prescribed by relevant EU requirements (Directive 86/280/EC, 86/278/EC and 91/271/EC) concerning urban wastewater treatment (UWWTD) have been transposed into national legislation in all EU member countries. Some countries, like Austria, have adopted national standards that are higher than EU or WHO requirements. As part of the accession process, individual EU countries have negotiated required wastewater treatment standards and transition periods for compliance, delaying agreed standards enforcement. EU candidate countries have effluent standards that are comparable to EU requirements, but generally have not defined sensitive areas and the related wastewater treatment requirements. Moldova and Ukraine are still mostly applying Former Soviet Union treatment standards, which are, nominally, not lower than EU requirements either.

TABLE 9: REGIONAL CUSTOMER PROTECTION PRACTICES

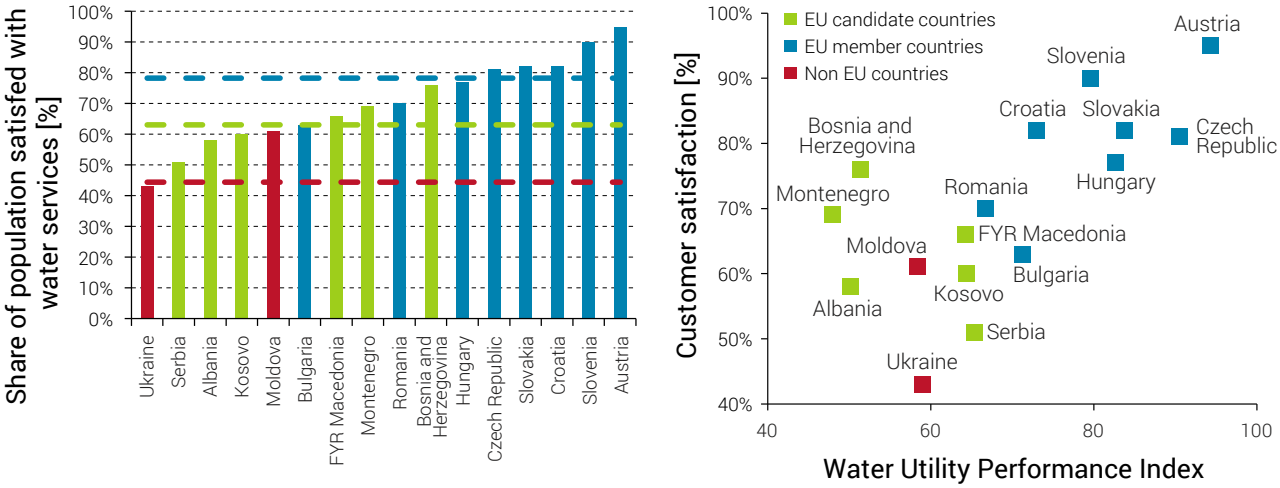
Country	Within utilities			Beyond utilities	
	Utility customer surveys	Customer complaint mechanism	Customer protection NGO	Customer complaint authority	External customer surveys
Albania	Sometimes	Frequently	No	Regulator	By regulator
Austria	Sometimes	Frequently	No	No	By national association
Bosnia and Herzegovina	Sometimes	By law	No	No	No
Bulgaria	Rarely	Rarely	No	Regulator	Ad hoc
Croatia	Sometimes	By law	No		Ad hoc
Czech Republic	Sometimes	By law	No	Ministry	
Hungary	Frequently	By law	No	Customer Prot. Agency	
Kosovo	By law	By law	No	Customer Committees	By Regulator
FYR Macedonia	No	By law	Yes		Ad hoc
Moldova	Sometimes	No	Yes	Regulator	No
Montenegro	No	Frequently	No	No	No
Romania	Frequently	By law	No	Regulator	By national association
Serbia	Sometimes	Frequently	No	No	No
Slovakia	Sometimes	By law	No	Regulator	No
Slovenia	Sometimes	Frequently	No	No	No
Ukraine	Sometimes	By law	No	Regulator	Ad hoc

SOURCE: SOS DATA COLLECTION.

83. **The level of customer metering, an important demand management tool, has been steadily increasing to near-universal coverage in many countries.** Although metering of individual customer's consumption was not an established commercial practice in most countries in the early 1990s, it has been established as an important component of effective demand management and a fair way of distributing costs among consumers. At the present stage, for those countries for which information is available, only Albania and to a lesser extent Ukraine do not

have metering levels above 80 percent, and in both countries metering efforts are underway to further increase the percentage of metered connections. A particular challenge in some countries of the region is the fact that metering, when present, is done at the building rather than the apartment level, so the metering rate is somewhat overestimated in the sense that it does not measure whether all end-users have a meter, but only whether the billing takes place on the basis of a meter reading—even if to be further split among apartments based on surface or number of residents.

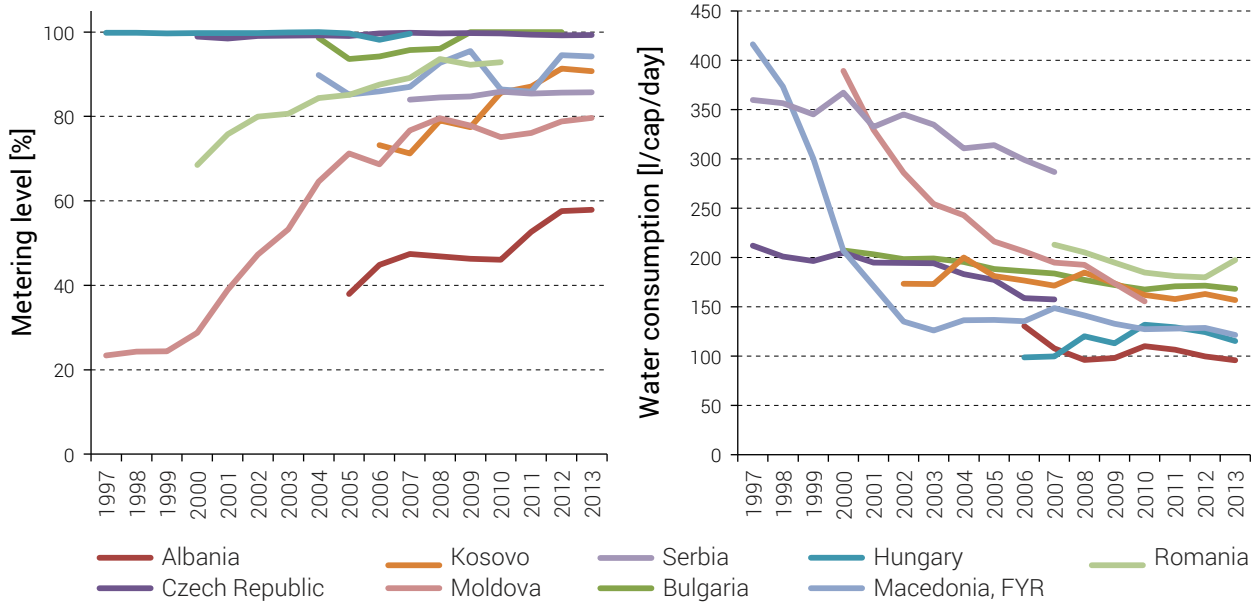
FIGURE 35: CUSTOMER SATISFACTION WITH WATER QUALITY IN 2013 AND COMPARED TO SERVICE PERFORMANCE[17]



SOURCES: GALLUP 2013; AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION.

84. **Conversely, individual consumption has followed a steady downward trend.** Due to the increase of individual metering, increasing tariffs, and the decrease in industrial activities throughout the region, overall consumption of water per person has decreased over the last 10 years and is stabilizing around EU-wide standards of 100 liters per capita per day to 120 liters per capita per day, with notable exceptions particularly among countries of former Yugoslavia, such as Bosnia and Herzegovina, FYR Macedonia, Montenegro, and Serbia (Figure 36 and Figure 37), where tariffs are also among the lowest (see Chapter VI). As tariffs continue to increase and apartment-level metering spreads further, it can be expected that individual consumption will continue to decrease in those countries where it is still relatively high.

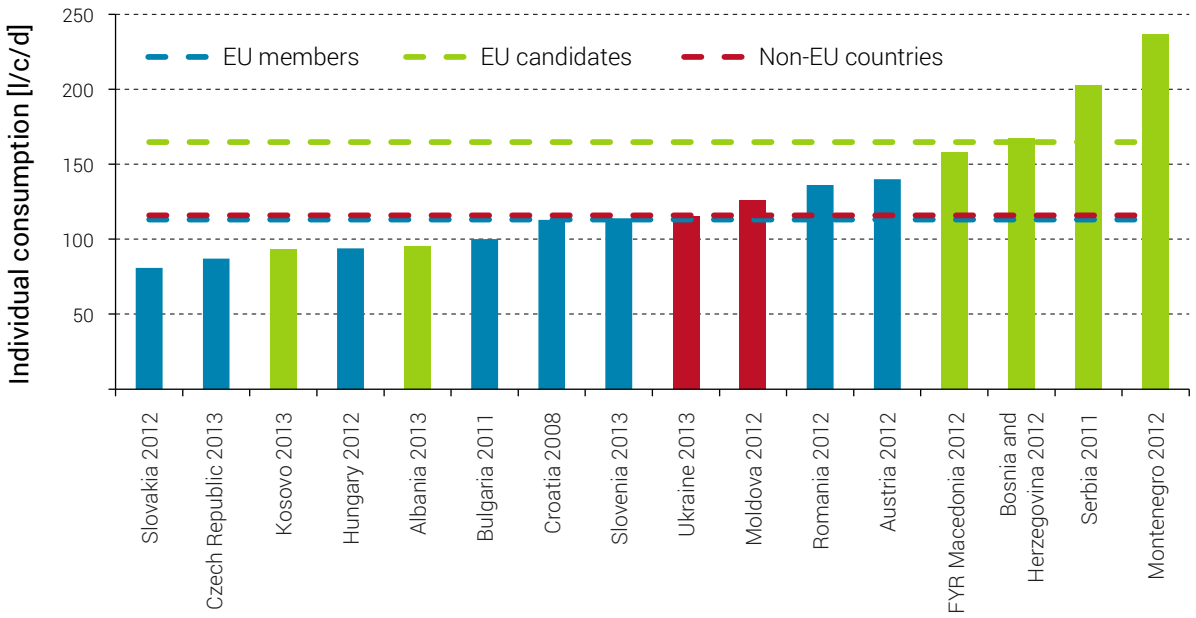
FIGURE 36: PARALLEL EVOLUTION OF METERED CONNECTIONS AND PER CAPITA CONSUMPTION IN SAMPLE UTILITIES FROM SELECTED COUNTRIES OF THE REGION



SOURCE: IBNET / DANUBIS.ORG DATA.

17 See Section C of this chapter for more details.

FIGURE 37: RESIDENTIAL WATER CONSUMPTION IN COUNTRIES OF THE REGION



SOURCE: SOS DATA COLLECTION.

B. Efficiency

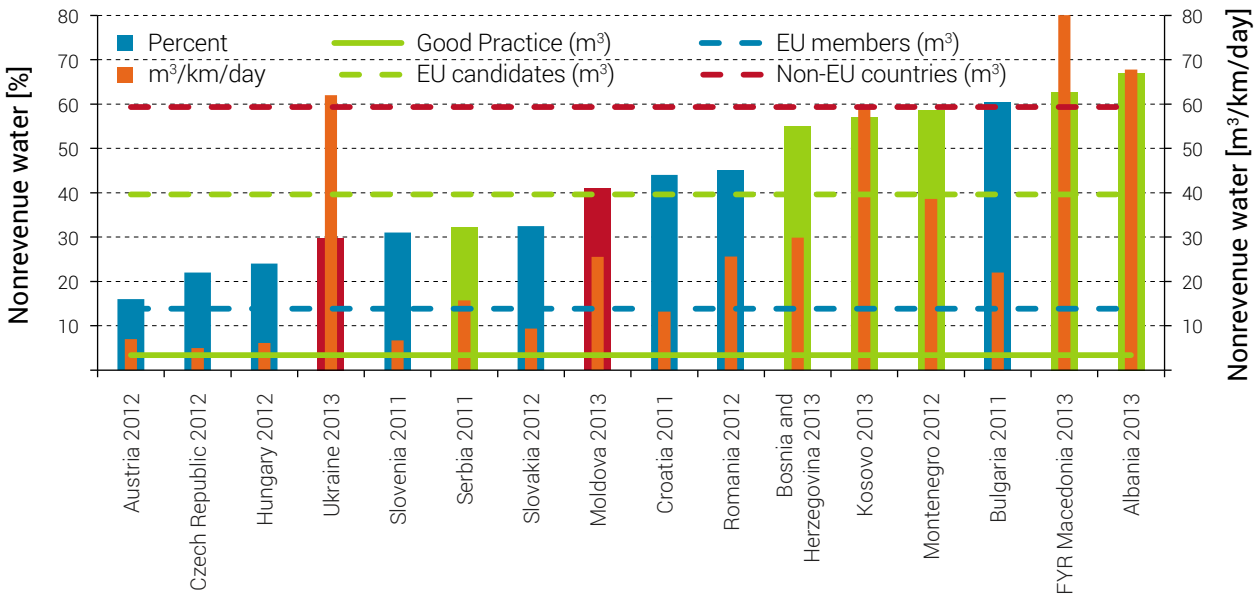
85. **Despite overall improvement and convergence, the efficiency of utilities in most countries is below international standards.** The performance of utilities in the first wave of EU members (the Czech Republic, Hungary, Slovakia, and Slovenia) was only modestly lower than international standards at the time of their accession and largely reached them in the meantime. However, the performance of utilities in the rest of the countries still lags significantly behind such practices despite marked improvements on some of the typical key performance indicators used to measure good practices, such as nonrevenue water levels and staffing efficiency. Overall, the region's utilities are on a positive trend toward better efficiency, but one that is also marked by significant differences among and within countries.

Nonrevenue water

Nonrevenue water is a measure of the ability of utility companies to turn their primary material into revenue. NRW consists mainly of water leaking from the system before it reaches the end consumer (technical or physical losses), and of water consumed without being properly billed, for example, through illegal connections or improper metering of consumption (commercial or apparent losses). While the former unnecessarily increases production costs (because more water than necessary must be produced), the latter means foregone revenues. Nonrevenue water is normally estimated based on the establishment of a balance of water inflows and outflows in the system. In 2000, the International Water Association task forces on water losses and performance indicators produced an international "best practice" standard approach for water balance calculation (see, for example, Farley and Trow 2003).

86. **Nonrevenue water (NRW) has been and continues to be a significant challenge.** Although the structure of NRW in the region is not well defined because of the lack of proper metering and water balancing in most utilities (see box), overall NRW generally stands much above good practice levels, with the exception of countries in the western part of the watershed (Figure 38). While NRW should not necessarily be minimized at all costs (there is an economically efficient level of NRW, which depends on the cost of further reducing NRW and on the opportunity cost of water produced and billed), current levels are much above those of even similar utilities and levels of development in other regions. Furthermore, a review of the evolution of NRW over the last 10 years shows no clear regional trend, with utilities in Bulgaria and FYR Macedonia showing increases in NRW, Bosnia and Herzegovina, Moldova, and Romania showing decreases, and most other countries remaining stable at a high level. Some of the data heterogeneity is likely to derive from better measurement of NRW today than 15 years ago because of the widespread adoption of systematic metering on the production and distribution side.

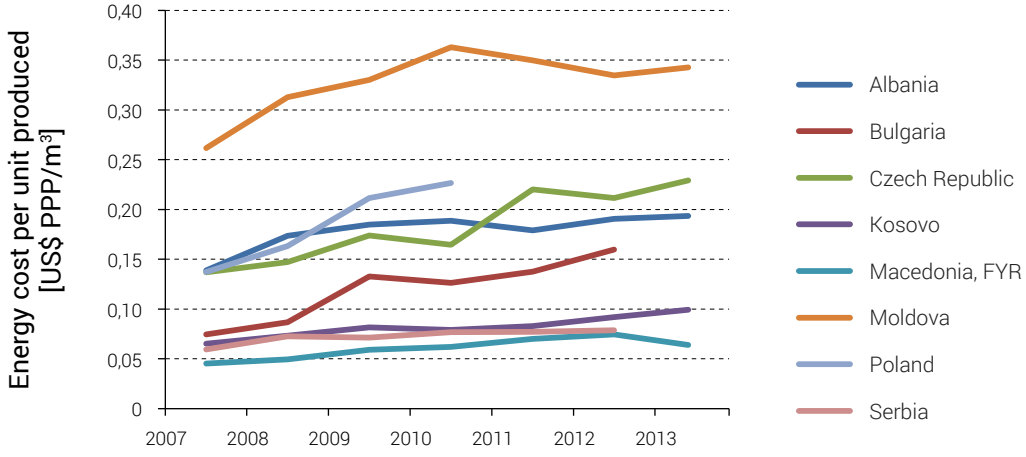
FIGURE 38: NONREVENUE WATER IN COUNTRIES OF THE REGION



SOURCE: SOS DATA COLLECTION.

87. **Energy efficiency is an important but less researched issue in the region, as well.** Although regional information is not systematically available, evidence from a limited sample of utilities appears to show that energy costs per cubic meter produced have been increasing in recent years (Figure 39), pointing to the need to focus further on energy efficiency measures. In fact, a review done in the context of the Danube Water Program of more than 30 treatment plants, pumping stations, and hydraulic systems in utility companies in Bosnia and Herzegovina, Montenegro, Romania, Serbia, and Ukraine demonstrated a potential for energy savings averaging 35 percent, with values higher in countries with a legacy of limited investments in maintenance, such as Ukraine (50 percent). Most of the investments needed to materialize those energy-saving potentials would have payback periods of only two to three years, but financing for such efforts is not easily accessible.[18]

FIGURE 39: EVOLUTION OF ENERGY COSTS PER M3 PRODUCED IN A SAMPLE OF UTILITIES IN THE REGION

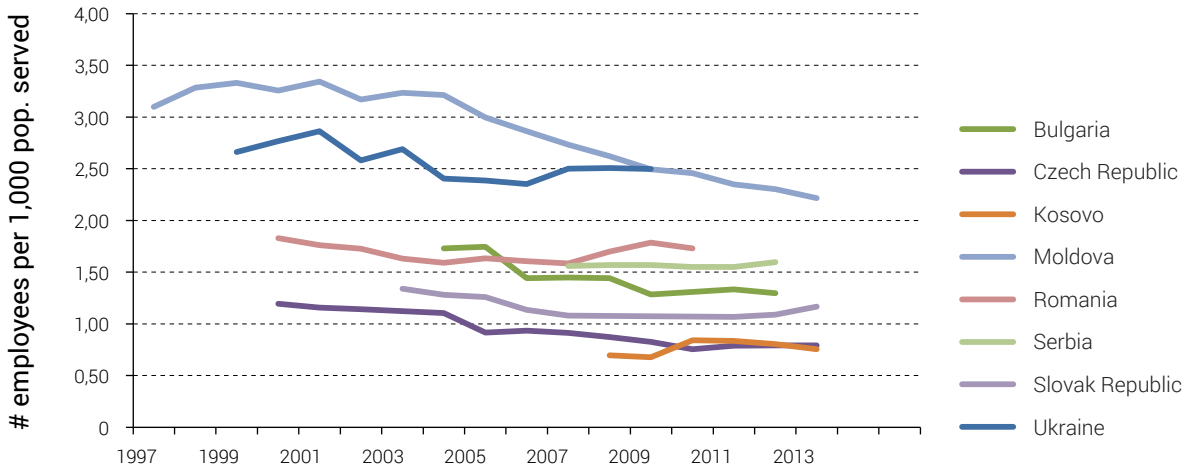


SOURCE: IBNET / DANUBIS.ORG DATA.

18 Source: Danube Water Program internal documents.

88. **Utilities in the region are commonly staffed at levels above regional good practices.** Overstaffing is a traditional issue of many locally owned public utility companies in the region. Trends in the region show, however, steady improvements in staff productivity (Figure 40), especially in those countries where initial staffing levels were significantly above international practices. However, in a number of countries the levels of staffing per 1,000 people served are still above international good practices of 1 employee per 1,000 people served,[19] even though the range of services provided is often lower than elsewhere (limited sewer coverage and wastewater treatment).

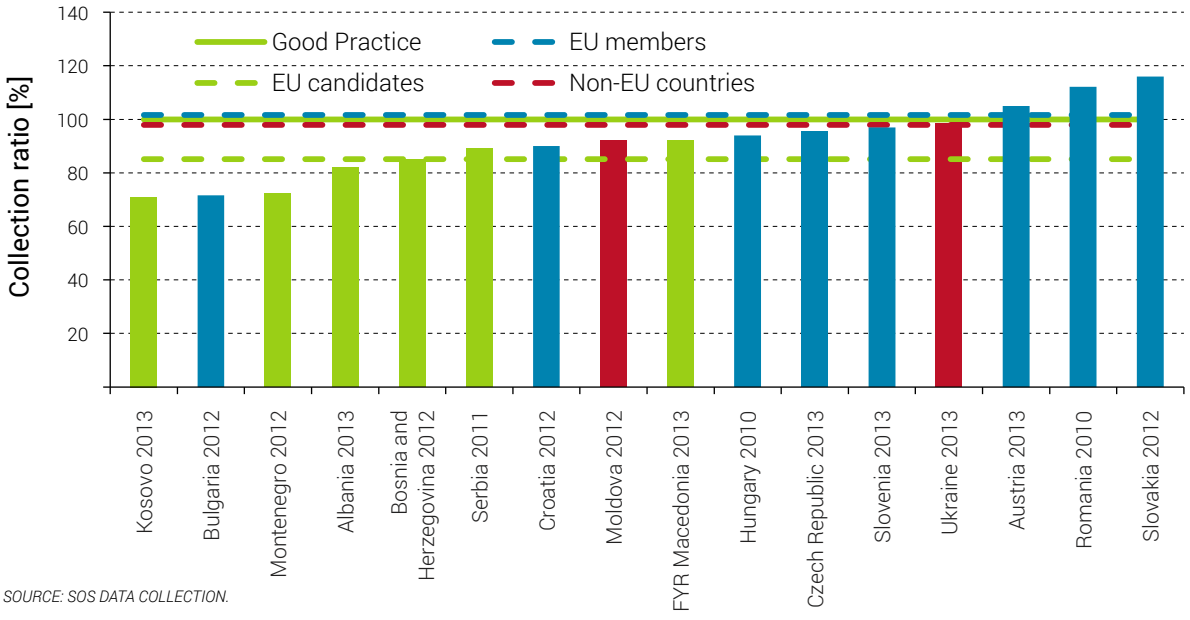
FIGURE 40: EVOLUTION OF STAFFING EFFICIENCY OVER TIME IN THE REGION (WATER AND WASTEWATER)



SOURCE: IBNET / DANUBIS.ORG DATA.

89. **The commercial efficiency of utility companies is generally solid, but varies widely throughout the region.** The collection ratio, that is, the ability of a utility company to collect billed revenue from its customer base, is often used as an important proxy for sound commercial practices. The region's performance in this respect is solid, with the average collection ratio of many countries above 90 percent, but with some important exceptions in Bulgaria, Kosovo, and Montenegro, for example (Figure 41). Payment morale in countries in the western part of the watershed is particularly high, as it is for countries of the Former Soviet Union. Collection rates in countries in the central and southern part of the watershed are lower.

FIGURE 41: COLLECTION RATIOS (CASH INCOME / BILLED REVENUE) IN COUNTRIES OF THE REGION



SOURCE: SOS DATA COLLECTION.

19 The number of people served per connection varies widely in the region because utilities in some countries still bill water consumption to building-level owner associations representing hundreds of end customers. Therefore, staffing efficiency is measured here per population served.

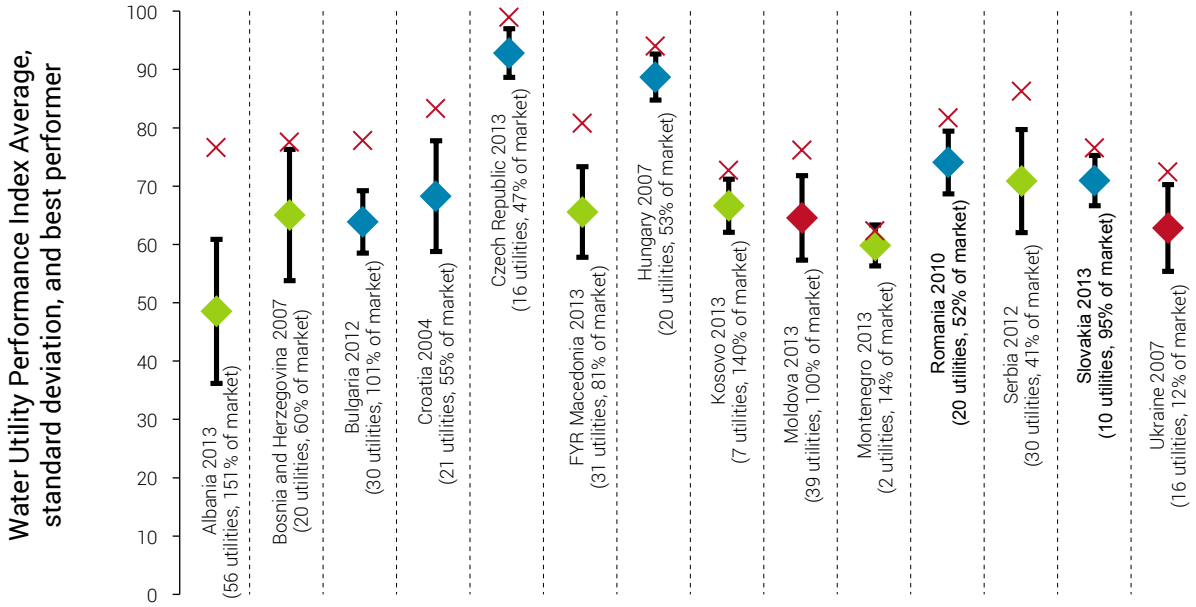
C. Overall Performance Trends and Drivers

90. **To complement the descriptive analysis of sector performance presented in the previous chapters, an econometric analysis of utility performance trends and drivers was performed.** Such an analysis makes it possible to analyze the data more rigorously and draw conclusions that are substantiated statistically. For that purpose, the full IBNET dataset available for the countries in the region was used. In addition, an aggregated performance index, the Water Utility Performance Index (WUPI), was defined (see box) to measure the overall performance of utilities (in terms of service coverage, service quality, and management) against various parameters. The IBNET dataset is, of course, not representative in all countries (Albania, the Czech Republic, Kosovo, and Moldova are the most complete, while Austria and Slovenia are entirely missing and data are outdated in Bosnia and Herzegovina, Croatia, and Ukraine, and very partial in Montenegro), and also reveals significant in-country deviations (Figure 42). However, by using advanced statistical methods, the robustness of the results presented can be confirmed, and the following paragraphs include only conclusions that have been thoroughly vetted. More details about the corresponding analysis can be obtained from an SoS supporting paper, Klien 2015, available from the SoS.danubis.org website.

The Water Utility Performance Index

The WUPI is a simple index measuring how closely a utility company operates to accepted good practices. The index is based on 10 dimensions generally accepted as key performance indicators in the industry and available from the IBNET dataset for most utility companies in the region. Those dimensions fall into three categories: coverage (water, sewer, and wastewater treatment); quality (service continuity and sewer blockage); and management (metering, NRW, staff productivity, collection rate, and operating cost recovery). For each dimension a score of 1 to 10 is computed measuring how close a given utility is to regional good practices. The sum of all scores gives the WUPI, with 100 (best practice on each dimension) being the best score. For more details, see Methodological Note B at the end of this report.

FIGURE 42: CHARACTERISTICS AND REPRESENTATIVENESS OF IBNET SAMPLE FOR WUPI CALCULATIONS



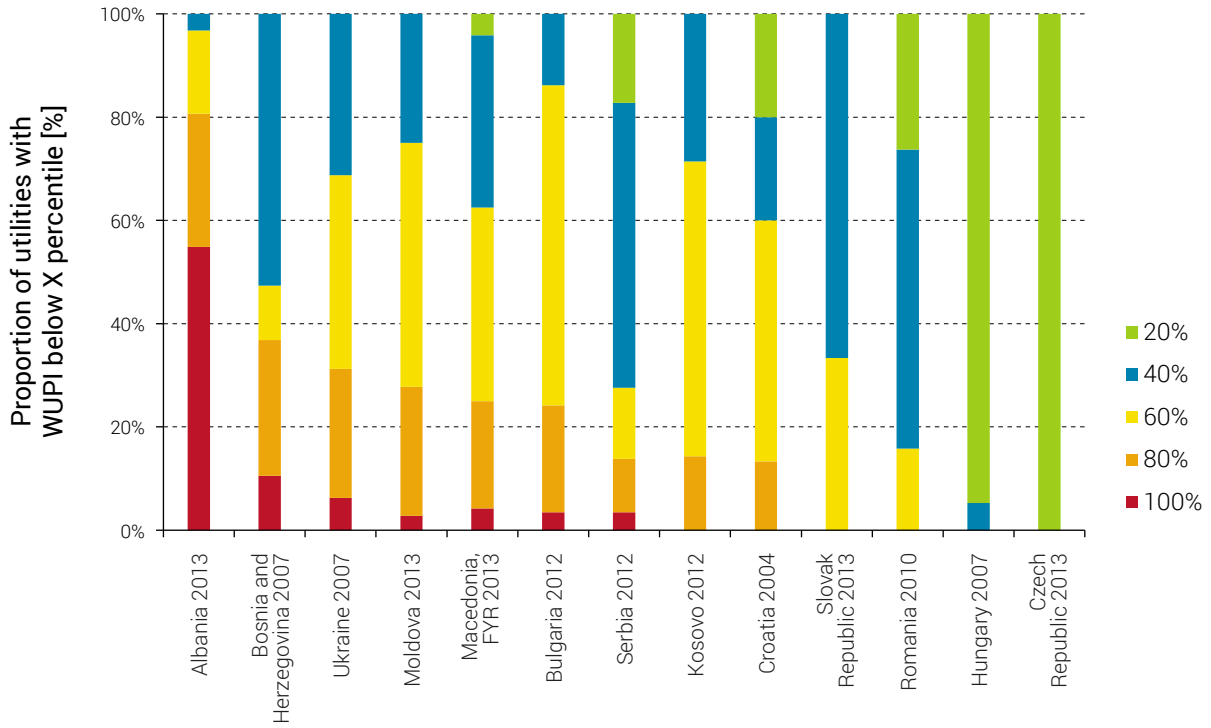
SOURCE: AUTHORS' ELABORATION FROM IBNET / DANUBIS.ORG DATA. [20]

91. **Perhaps not surprisingly, the performance of utilities varies widely within countries, but generally increases with the level of economic development of the country.** Figure 43 shows in which performance quintile utilities in each country fall. For example, 100 percent of the utilities in the Czech Republic were among

20 Market size based on publicly served population, as obtained in SoS data collection. Austria and Slovenia are entirely missing from the IBNET database, while for Albania and Kosovo, the data show that utilities overreport the population in their jurisdiction, since the combined market share reached more than 100 percent of the total population of the country.

the 20 percent of best performers in the region in 2013. Not surprisingly, utilities in the countries that were among the first to join the EU (the Czech Republic, Hungary, Slovakia) also perform particularly well, whereas countries that are farther away from joining the EU have a larger proportion of struggling utilities. Also, while in many countries the performance of utilities is relatively homogenous, in a few countries such as Albania, Bulgaria, and Serbia, there is much more dispersion of performance. This is particularly important because it indicates that in those countries, the enabling environment is such that it is possible to perform at a high level, yet many utilities do not do so.

FIGURE 43: PROPORTION OF UTILITIES WITH WATER UTILITY PERFORMANCE INDEX FALLING IN EACH 20% PERCENTILE SEGMENT

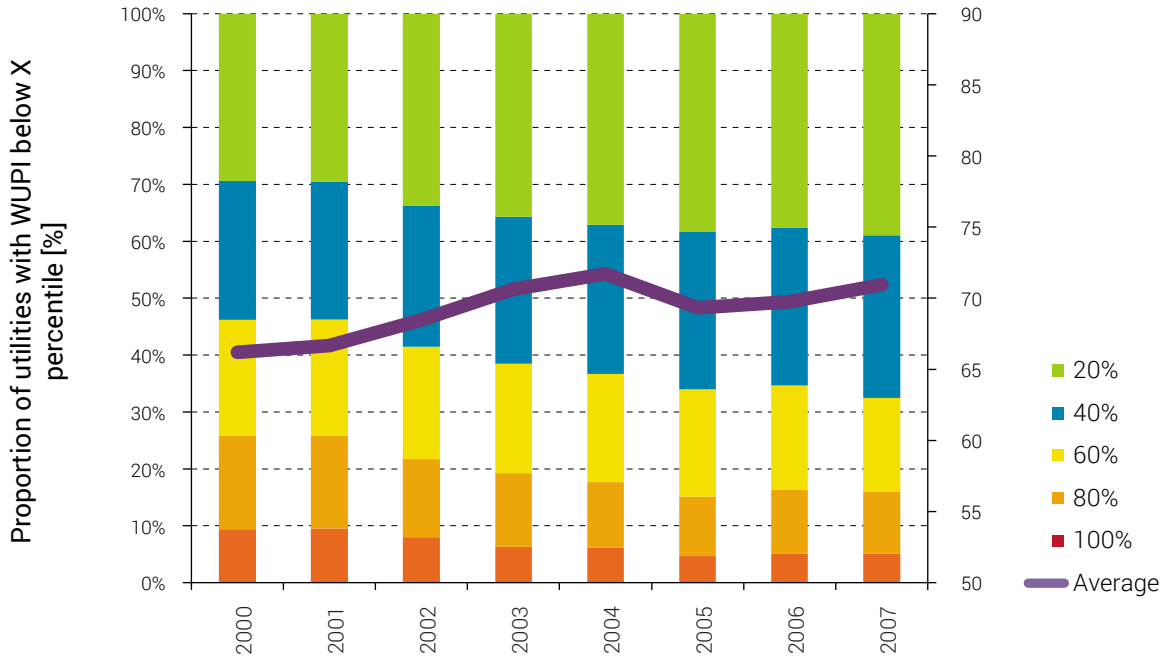


SOURCE: AUTHORS' ELABORATION FROM IBNET / DANUBIS.ORG DATA.

92. **Overall, the performance of water utilities has improved over the last 10 years.** The previous paragraphs and chapters have already shown positive trends in the region, particularly with regard to sewerage and wastewater treatment services coverage, as well as utility efficiency. Those trends can be confirmed by an aggregated analysis of the Water Utility Performance Index. Figure 44 shows, for example, the proportion of utilities in the overall sample that fall under each quintile of performance during 2000–2007, for which the sample is relatively consistent in terms of country participation. The share of worst performers decreased during this period from 10 percent to 5 percent of the sample, whereas the share of best performers increased from 28 percent to 40 percent. A similar trend can be observed for the average WUPI of the sample, which increased from 67 to 73 during the same period. The trend is further confirmed that in the overall sample, the WUPI of utilities in the last year they appear in the database is 3.7 points higher than the first year they appear (Klien 2015).

93. **The region's utilities also show a converging trend toward better practices.** The analysis shows that utilities that start with a lower score show higher improvements than utilities that already have a higher score at the beginning, hinting at a convergence of the overall performance of utilities in the region toward better practices (Figure 45). The detailed analysis also shows that most utilities perform relatively consistently over different dimensions, meaning that utilities that show a high level of service coverage or quality also tend to show better managerial indicators, for example.

FIGURE 44: PROPORTION OF UTILITIES WITH WATER UTILITY PERFORMANCE INDEX FALLING IN EACH 20% PERCENTILE PERFORMANCE SEGMENT OVER TIME[21]



SOURCE: AUTHORS' ELABORATION FROM IBNET / DANUBIS.ORG DATA.

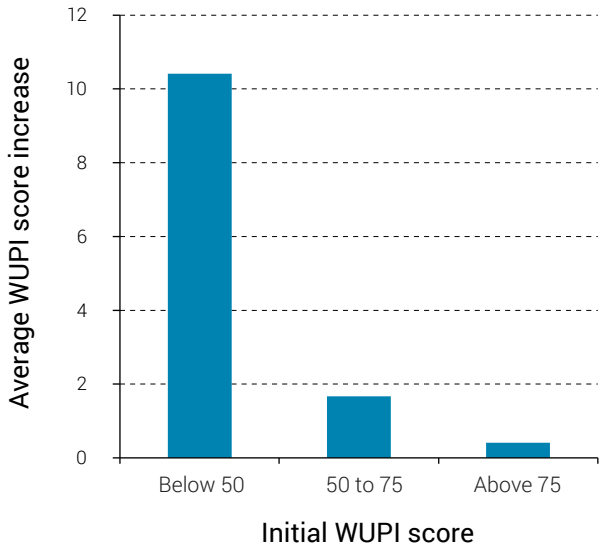


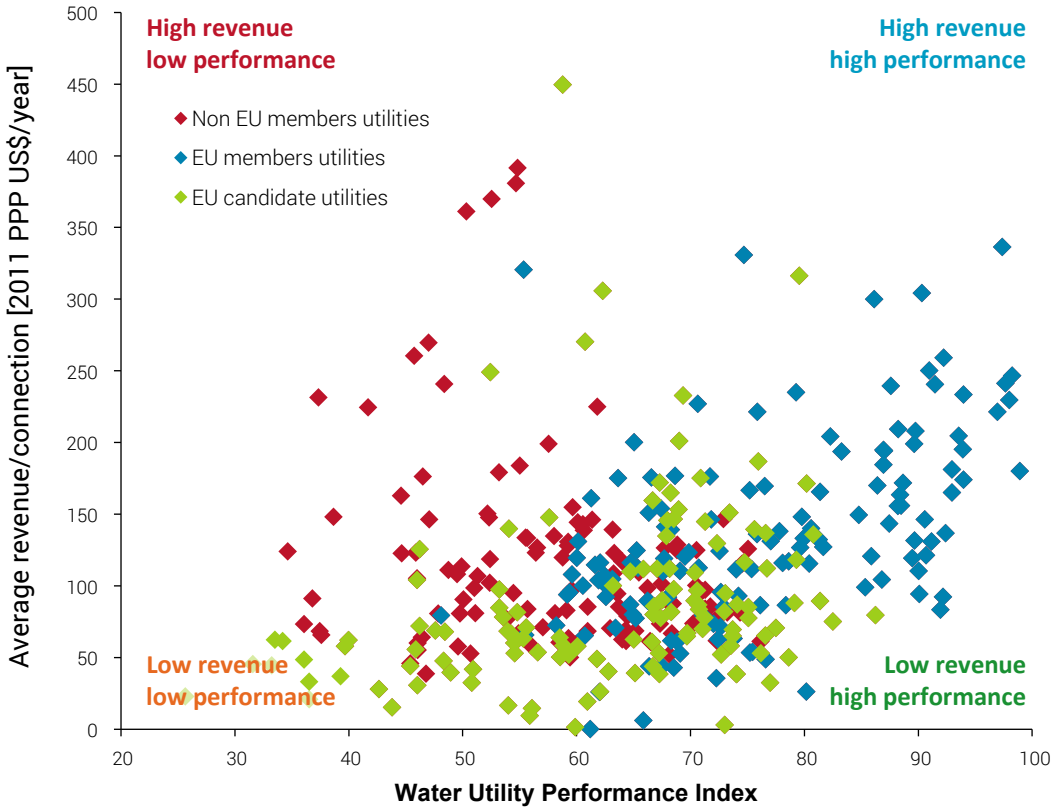
FIGURE 45: CONVERGENCE OF LOW- AND HIGH-PERFORMING UTILITIES OVER TIME

SOURCE: AUTHORS' ELABORATION FROM IBNET / DANUBIS.ORG DATA.

94. **Utilities displaying better performance also generally have higher tariffs.** A scatterplot of utility performance against average revenue per connection (taken as a proxy for average tariff) shows a wide dispersion (Figure 46), with EU member utilities having generally higher performance, and non-EU member utilities having a higher tariff income per connection (in PPP terms) than utilities from EU candidate countries. Overall, however, Figure 46 and underlying analysis show that utilities that display better performance also tend to have higher tariffs. In other words, quality has its cost, and it is particularly telling that no utility with high performance simultaneously offers low tariffs (bottom right corner of the figure). Conversely, though, there are many low-performing utilities with relatively high tariffs, which should engender questions from those holding

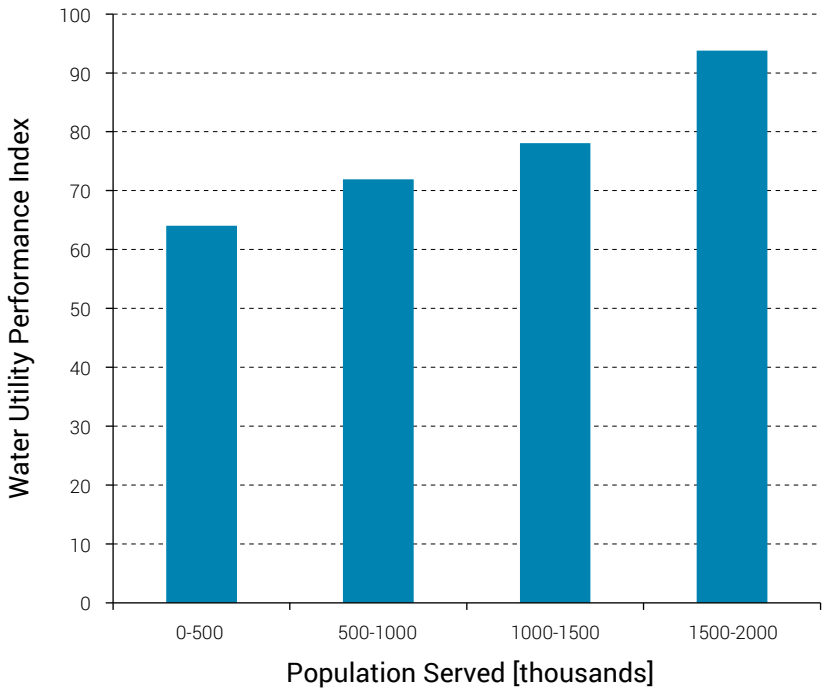
21 The figure covers only 2000–2007, because it is the period for which the most consistent dataset exists in IBNET / DANUBIS. Since no post-2007 data are available for Hungary and Ukraine, the regional-level results show a discontinuity at that point.

FIGURE 46: DANUBE REGION UTILITY PERFORMANCES AND THEIR RELATION TO TARIFF LEVEL



SOURCE: AUTHORS' ELABORATION FROM IBNET / DANUBIS.ORG DATA.

FIGURE 47: AVERAGE UTILITY PERFORMANCE BY UTILITY SIZE RANGE



SOURCE: AUTHORS' ELABORATION FROM IBNET / DANUBIS.ORG DATA.

them accountable.[22] A more detailed review of the data shows that utilities with higher service coverage and quality (the first two groups of WUPI dimensions) tend to have higher tariffs, while utilities with better managerial practices (the last WUPI group of dimensions) tend to have lower tariffs (Table 10). Unsurprisingly, though, the savings from improved management practices are not sufficient to compensate for the higher revenues needed to sustain the better services, and an overall improvement of 10 points in the WUPI score is associated with a tariff increase of 6.7 percent (Table 10).

95. **At the country level, the drivers for utility performance appear to be largely external to the sector.** A systematic econometric analysis of utility performance against a range of external drivers reveals mixed messages. Much of the variation in performance in the sample can be explained by country context—which is largely beyond the reach of sector policy makers. In other words, some countries (Austria, for example) simply offer better conditions for utilities to be successful than others. More specific policy changes, such as the establishment of a formal regulatory framework or the EU accession and membership process, cannot be shown from the dataset to demonstrate a clear short-term impact on utility performance. However, this is largely driven by constraints from the available data and cannot be taken as the basis for policy recommendations; anyway, such reforms take significantly longer to demonstrate impact than the time series available in the database.

TABLE 10: IMPACT OF PERFORMANCE INCREASES ON TARIFFS

10-point score increase for…	Leads to tariff change of…
Overall WUPI score	+ 6.7%
Service coverage	+ 5.6%
Service quality	+ 2.2%
Management effectiveness	- 2.2%

SOURCE: SOS DATA COLLECTION.

96. **At the utility level, however, some clear drivers of performance, such as size and density, emerge, but they are difficult to translate into concrete policy recommendations.** Utility governance models tend to be relatively similar for most utilities in a given country and within a given size range. The dataset, therefore, does not allow conclusions on which utility governance models might provide better results. The analysis confirms, however, that the water sector, like many others, is prone to economies of scale, and utilities that are larger and/or serve denser areas are more likely to have better performance and lower costs than their peers, everything else being equal (Figure 47). It is, however, important to consider that those benefits cannot easily be reaped by changes of sector policies. The density or size of a city are equally beyond the reach of sectorial policy makers, and the mere aggregation of several operators into larger ones does not produce the same clear outcome (see paragraph below).

97. **The impact of regionalization or aggregation processes on utility performance and cost is not unambiguously positive, and policy makers should carefully weigh the particular circumstances of their country before promoting such processes.** In an attempt to achieve economies of scale and ensure more professional and financially stable service providers, a number of countries are turning toward the aggregation or regionalization of service providers (see Section A in Chapter III for more details). The analysis of the dataset, based on a rigorous difference-in-differences approach (Klien 2015), does not allow general conclusions to be drawn, and each country should evaluate the pros and cons of a regionalization process. Contrary to generally held opinions with regard to the positive impact of regionalization or aggregation processes on overall performance and costs, the analysis offers a number of cautionary tales showing, for example, that:

- Aggregated utilities perform only marginally better, on average, than similar utilities that do not go through an aggregation process. The most positive impact occurs on managerial performance, while service quality is

22 The particular results for specific utilities can be obtained from DANUBIS.org using the utility performance report.

unaffected and coverage is negatively affected.[23] The actual overall impact depends on the characteristics of the merged utilities (size, performance) and on the merger process itself (number of merged utilities, overall increase in size).

- Aggregation processes involving fewer utilities and generating denser service areas provide positive benefits, whereas mergers with large numbers of utilities and limited gains in density or population served tend to return negative impact on overall performance and costs.
- Smaller utilities that merge or aggregate reap higher benefits (in terms of costs and performance) from aggregation than larger utilities, indicating that economies of scale are nonlinear and large utilities cannot expect to further improve their performance or reduce their costs by growing.
- The effects of aggregation processes are most marked in the first few years after the merger, and tend to dissipate over time.

23 This is likely because the additionally aggregated systems have lower levels of coverage than the incumbent's.

VI. FINANCING OF SERVICES

98. **Increasing costs have driven increases in tariffs throughout the region, to the point where services might become unaffordable for lower-income customers in some countries; yet the region is still far from putting the Water Framework Directive's (WFD's) principle of cost recovery into reality.** Countries in the region have adopted varied approaches to the financing of water and wastewater services; the cost structure and pricing approach also varies widely from country to country. However, common to most countries are above-inflation increases in both costs and tariffs, as well as significant levels of subsidies for investments and to a lesser extent operational costs.

99. This chapter describes the main trends with regard to source of financing and expenditures, cost recovery, and affordability of water and wastewater services across the region. On the sources of financing, it adopts the OECD Three Ts framework (see box). Consistent information about those factors is, however, scarce, and comparisons are challenging; therefore, the figures presented in this chapter should be viewed as indicative of the overall trends rather than exact information about the financing of the sector in each country. In addition, the figures track only the public side of service provision. Private investments by households or communities, and the tariffs paid to local informal providers, are neither tracked nor incorporated into the overall sector financing overview.

The OECD Three Ts Framework

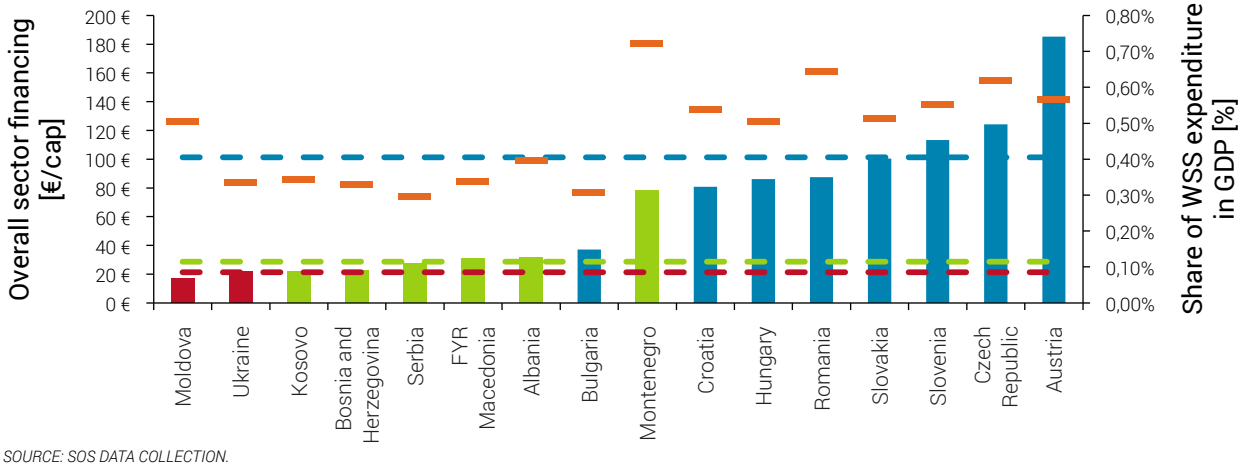
In 2009, in a contribution to the 5th World Water Forum, the OECD proposed an overall framework on how water services are financed (OECD 2009). This framework, which is used in this report, as well, establishes that "Effective financial planning for the water sector requires finding the right mix of revenues from the so-called '3Ts': tariffs, taxes and transfers (including official development assistance grants). These are the ultimate sources of revenue for the sector. […] Other sources of finance – such as loans (including ODA loans by bilateral donors and international financial institutions), bonds and private investors […] need to be repaid by some combination of the 3Ts."

100. Most of the information collected stems from a country-by-country effort conducted under this review to collect publicly available data about sector financing (mentioned as SoS data collection), which was then consolidated into a simplified sector financing model for each country. In addition, the affordability section draws from the household surveys used in Chapter IV to measure access. The methodology and assumptions necessary for this chapter are briefly described in Methodological Notes C (overall sector financing) and D (affordability calculations), at the end of the document.

A. Sources of Financing: Tariffs, Taxes, and Transfers

101. **The level of sector financing from tariffs, taxes, and transfers varies widely from country to country, with EU members showing the highest per capita financing.** Availability of data about sector financing is scarce in some countries, but an analysis of publicly available data from a variety of national and international sources indicates a wide

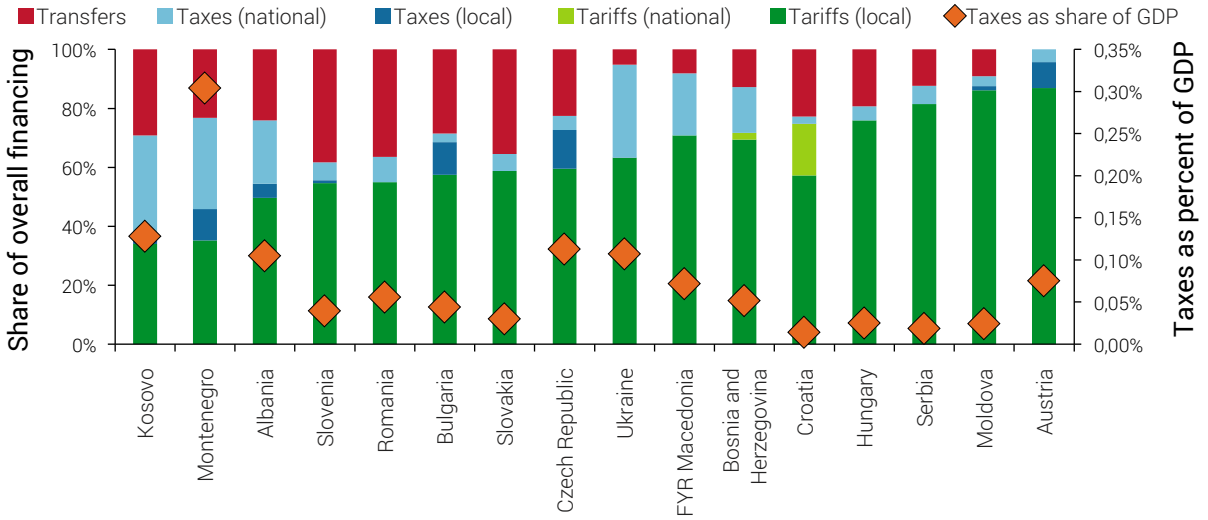
FIGURE 48: SECTOR FINANCING ACROSS COUNTRIES OF THE REGION IN PER CAPITA AND PERCENTAGE OF GDP



SOURCE: SOS DATA COLLECTION.

variation from country to country, with EU members showing by far the highest amounts of per capita financing, all sources included (Figure 48). Many of the countries are also in the lower range of the generally accepted value for overall sector financing as a share of GDP of around 0.35 percent to 1.20 percent (high-income countries), 0.54 percent to 2.60 percent of GDP (middle-income countries), or 0.70 percent to 6.30 percent of GDP (low-income countries) (OECD 2006).

FIGURE 49: PROPORTION OF SECTOR FINANCING FROM TARIFFS, TAXES, AND TRANSFERS IN THE COUNTRIES OF THE DANUBE REGION



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

102. **The structure of financing of services in the region varies widely from country to country, but investments are generally supported by public funds and external transfers, while operational expenditures are mostly covered from utilities' own tariff revenue.** The shares of overall sector financing stemming from transfers is generally higher for new EU members due to the strong financial impact of EU funds; conversely, for most of those, the share financed from tariffs is relatively low—an interesting finding in view of the WFD's cost recovery requirement (Figure 49). The share of financing coming from taxes—either through direct investment or operating subsidies, or through the reimbursement of IFI commitments and other loans—is relatively constant at between 10 percent and 20 percent across most countries, representing around 0.1 percent of GDP, with the notable exception of Montenegro and, to a lesser extent, Albania and Kosovo. Contrary to other regions, water sector expenditures do not represent a significant fiscal burden on most national governments, which rely instead on transfers when available (most often from the EU) and tariffs as the main instrument to recover sector costs. This finding is consistent with the strong role played by local governments in the provision of services, shown in Chapter III, and shows the limited leverage national governments have over the sector.

103. **Despite the widespread adoption of the cost recovery principle in national legislation, only two countries—the richest and the poorest—rely on tariffs to finance around 90 percent of the sector.** As shown in Table 11, the vast majority of the countries in the region have inscribed in their national legislation the principle of cost recovery. The reality, however, is quite different. In Austria and Moldova, the absence of EU funding and limited fiscal space mean that around 90 percent of sector financing comes from tariffs. In most other countries, taxes and transfers represent between 25 percent and 75 percent of the sector's overall financing, which as long as access and consumption is relatively even, means subsidies are spread evenly or are income neutral. However, that financial support becomes a regressive public expenditure when access to public services is not evenly shared, so that only those with public services are reaping the benefits from that public spending. Since richer households typically use more water (having more appliances, like washing machines or dishwashers), consumption is also rarely even, and public spending therefore disproportionately reaches households with higher water consumption. In contrast, when public spending is targeted to address existing access gaps or affordability constraints (as will be discussed later), such spending could become more progressive.

104. **Few countries have developed a dedicated water sector financing mechanism providing predictable funding.** In most countries, investments are financed from external transfers or ad-hoc IFI-supported loans repaid by state or local government budgets. While many countries partly finance the sector's investments from their national budget, about a third of the countries have a dedicated mechanism to finance investments (Table 11), guaranteeing more

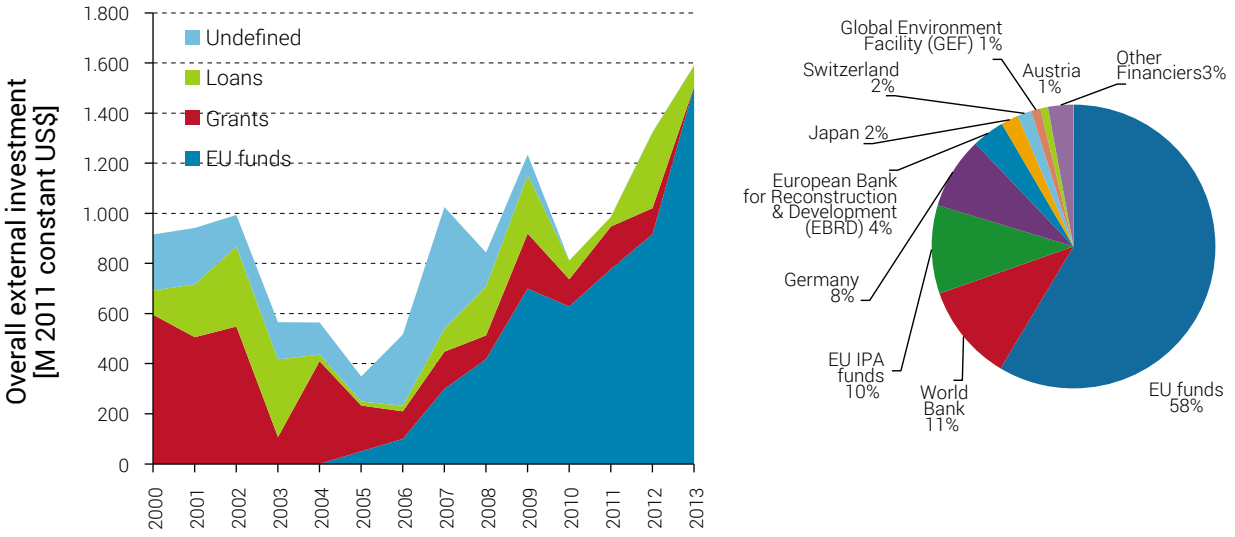
predictable funding. One such example is Croatia, where water extraction rights and wastewater discharge fees are managed by the national water agency and finance €70 million in annual investments (see Table 4 in Chapter III for more details). However, even in countries with such schemes, the decisions on the use of funds are often somewhat arbitrary and are not necessarily directly linked with the sector's policies and strategies. Not surprisingly, in all EU member countries and the more advanced candidate countries, EU-related funding (Cohesion Funds, regional policy funds, Instrument for Pre-Accession [IPA] funds) represent the majority of external financing to the sector, while in other countries, IFI and bilateral donors continue to play the main role.

TABLE 11: MAIN SECTOR FINANCING CHARACTERISTICS IN THE DANUBE REGION

	Cost recovery policy?	Investment targeting mechanism	Main national funding source	Main international funding sources
Albania	Yes	Needs & performance -based	National budget	Bilateral funds
Austria	Yes	Needs-based	Dedicated (tied) fund	n.a.
Bosnia and Herzegovina	No		Dedicated (tied) fund	IFI loans
Bulgaria	Yes	Ad hoc	Dedicated (tied) fund	EU-related funding
Croatia	Yes	Needs-based	Dedicated (tied) fund	EU-related funding
Czech Republic	Yes	Performance-based	Dedicated (tied) fund	EU-related funding
Hungary	Yes	Needs-based	National budget	EU-related funding
Kosovo	Yes	Needs-based	National budget	Bilateral funds
FYR Macedonia	Yes	Needs-based	National budget	IFI loans
Moldova	No	First come-first served	National budget	IFI grants / credits
Montenegro	No	Other	National budget	EU-related funding
Romania	Yes	First come-first served	National budget	EU-related funding
Serbia	No	Needs-based	National budget	n.a.
Slovakia	Yes		National budget	EU-related funding
Slovenia	Yes	Ad hoc	Dedicated (tied) fund	EU-related funding
Ukraine	Yes	Ad hoc	National budget	IFI loans

SOURCE: SOS DATA COLLECTION.

FIGURE 50: MAIN TRENDS AND SOURCES OF EXTERNAL FINANCING IN WATER AND WASTEWATER INVESTMENTS



SOURCES: AUTHORS' ELABORATION FROM OECD 2015; EC 2015.[24]

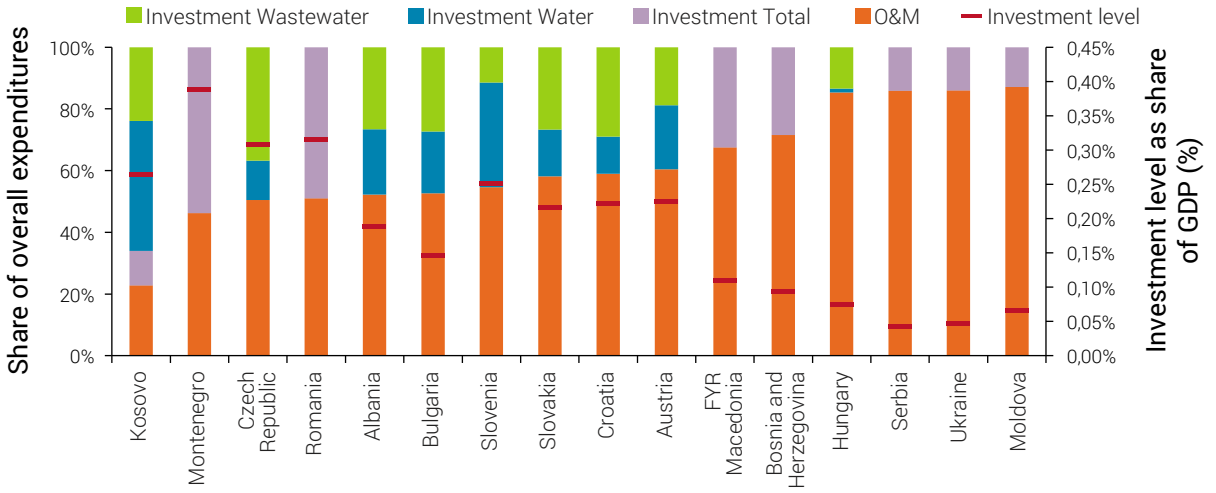
24 The absorption rate for water-specific EU funds has been assumed to follow the same trend as overall EU funds absorption in a given country, although anecdotal evidence shows absorption in the water sector is lower than average.

105. **EU Funds now represent a large majority of external financing in the region and have displaced other traditional lenders.** Although it is challenging to obtain an accurate overall picture of investment flows into the region, an analysis of OECD and EU data shows that overall external investment funding has grown in the last 15 years (Figure 50). Much of the growth is due to EU funds, which are limited to 8 of the region's 16 countries, and the funding has displaced to some extent traditional lenders such as IFIs and bilateral donors, which were providing high levels of funding particularly in the western Balkans following the conflicts in the 1990s, but gradually moved out as the EU funds and IPA funds became more important. A comparison of publicly available information about EU funds going toward the sector and actual investments shows, however, that in most of the EU countries, EU funds represent only a limited part of the overall investments, ranging from around 10 percent in the Czech Republic (where the private sector absorbs most of the needs) and 30 percent in Romania, to a much higher value of around 60 percent in Bulgaria.

B. Services Expenditures: Operating and Investment Costs

106. **On average, the sector directs about half of overall expenditures toward operating and maintaining (O&M) infrastructure, and half toward renewing or expanding it.** Figure 51 shows the proportion of overall costs going toward O&M and toward investments for countries in the region. There is an important variation among countries, with the share of overall costs going toward investments varying between one-third and two-thirds. The superimposition of levels of investment (as a percentage of GDP) on the same figure logically shows that countries that have a very high expenditure going toward O&M are those that also spend less on investment overall, raising potential concerns about long-term service sustainability. In those countries for which data are available, investments in wastewater are a priority, a reflection of the gaps in service levels compared to water supply (Chapter IV). Furthermore, the significant share of sector resources going toward investment shows the importance of carefully managing and developing assets, and applying the principles of efficiency not only to the operating of water utilities, but also to the planning and implementation of investment projects. In that respect, the particularly low levels of investment (as a share of GDP) in countries such as Moldova, Serbia, and Ukraine, and to a lesser extent Hungary, should raise questions about whether assets are properly managed and maintained in the long run or tariffs are maintained artificially low by living off assets, which will eventually result in reduced service quality.

FIGURE 51: SHARE OF OVERALL EXPENDITURES GOING TOWARD O&M AND INVESTMENTS



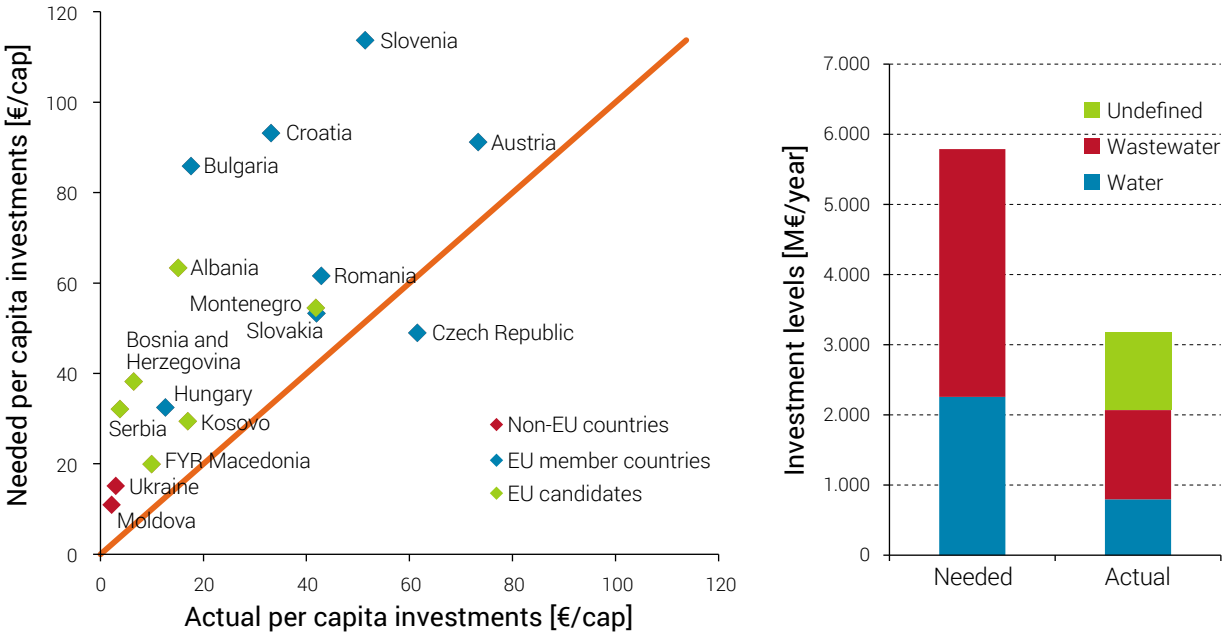
SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

107. **Total water and wastewater investments in the region are around €3.5 billion a year, significantly lower than the €5.5 billion estimated by the region's governments to be needed to achieve EU or national targets.** Governments or external financiers in most countries have estimated the amounts needed to achieve each country's own targets or to comply with the EU acquis, and the combined national estimates amount to €5.5 billion of necessary investment

annually. Actual investment levels are around 55 percent of this level, leaving a gap of more than €2 billion a year (Figure 52). Overall, about 40 percent of all investment needs are directed at water supply and compliance with the Drinking Water Directive, while 60 percent are for wastewater management and compliance with the Urban Waste Water Treatment Directive (see section B in Chapter III for more details on both directives, and Chapter IV for a discussion on the infrastructure gap). Furthermore, a country-by-country review of projected investment needs and current investments (Figure 52), shows that:

- Most countries project investment needs higher than their current levels of investment. Only the Czech Republic has investment levels generally at the level of its projected needs.
- EU members and candidate countries project higher investment needs than non-EU members; even Austria, where access to wastewater services is already high, projects significant investment needs largely because of the need to renew assets built in the first wave of wastewater investments, around 30 years ago.
- More recent EU members—Bulgaria, in particular—are still struggling to absorb EU funds efficiently and show significant funding gaps.
- Most countries outside the EU have significantly lower investment levels and generally do not currently cover their needs.

FIGURE 52: ACTUAL COMPARED TO NEEDED PER CAPITA INVESTMENT COSTS IN COUNTRIES OF THE REGION



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

C. Cost Recovery: Cost and Tariff Trends

108. **The costs of providing services varies widely from country to country but have grown significantly over the last 20 years, leading to parallel tariff increases.** The chapters on access to services (Chapter IV) and utility overall performance (Chapter V) have demonstrated how the sector's overall performance has improved, in terms of coverage and quality of services, in the last 20 years. The necessary investments, in particular for the extension of wastewater collection and treatment, have been matched by significant increases in overall operating expenses. Figure 53 shows the evolution of operating costs in a sample of water and sewerage utilities, with increases in many countries, particularly EU members, going beyond 100 percent in constant PPP. Figure 54 shows how utilities have had to grow their revenues in a similar fashion, largely through tariff increases. Despite decreasing consumption, per-connection revenues grew at an annual rate of more than 10 percent (in real terms) in utilities of new EU members

such as the Czech Republic and Romania, and to a lesser extent, Hungary. Even in non-EU members such as Kosovo, Moldova, and Ukraine, utility revenue increases averaging 5 percent per year in real terms were observed over sustained periods of time. Such steady increases, in the absence of sustained and broad-based economic growth, can lead to serious affordability constraints, as will be discussed in Section D of this chapter.

FIGURE 53: EVOLUTION OF WATER AND SEWERAGE UNIT OPERATING COSTS IN SELECTED UTILITIES / COUNTRIES

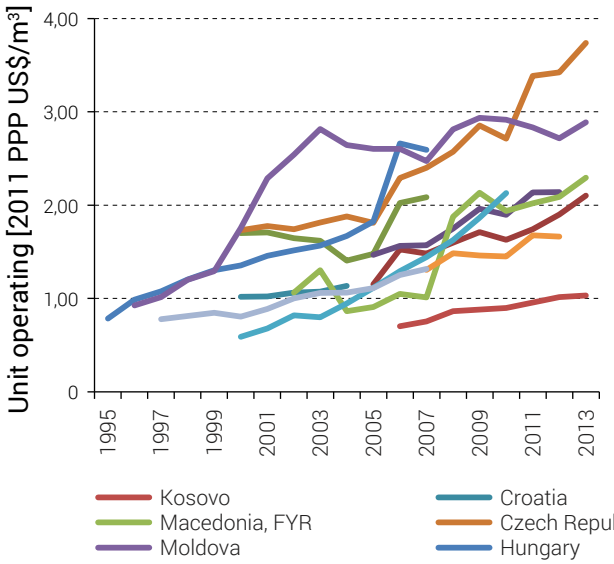
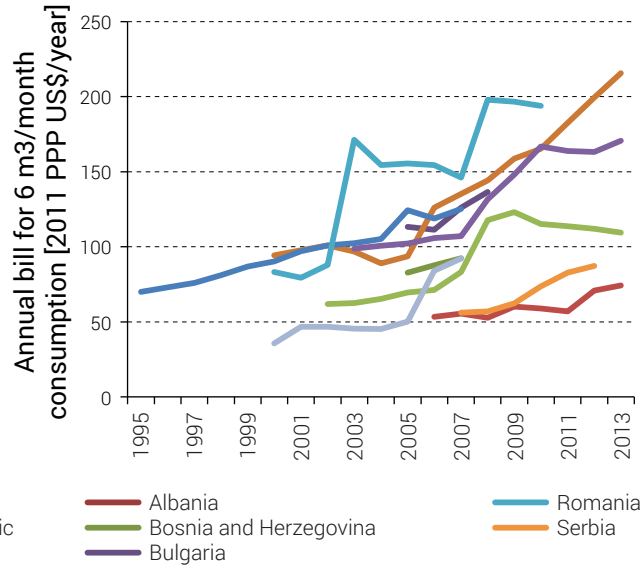


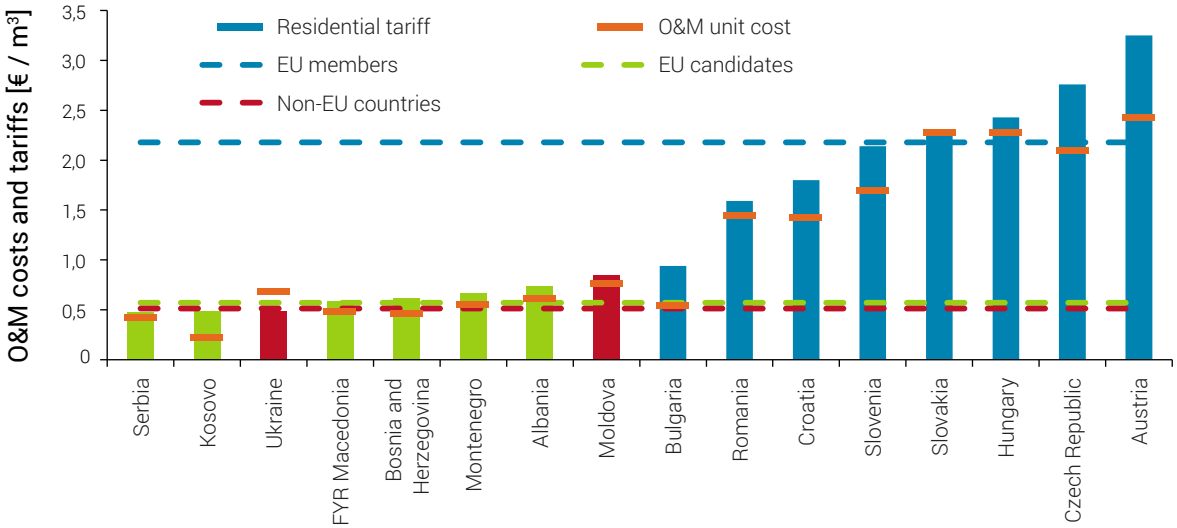
FIGURE 54: EVOLUTION OF WATER AND SEWERAGE UNIT AVERAGE BILL IN SELECTED UTILITIES / COUNTRIES



SOURCE: IBNET / DANUBIS.ORG DATA.

109. **Both O&M costs and residential tariffs generally follow the level of economic development of countries, with costs and tariffs highest in EU member countries.** As Figure 55 shows, there is a relatively close relationship between O&M costs and residential tariff levels. Austria clearly shows the highest costs and tariffs, followed by all EU members except Bulgaria, where costs and tariff levels are significantly lower than those in the other EU member countries. In contrast, most countries of the Western Balkans have tariff levels far below the regional average, despite the fact that affordability is not generally a constraint, as will be discussed in Section D of this chapter.

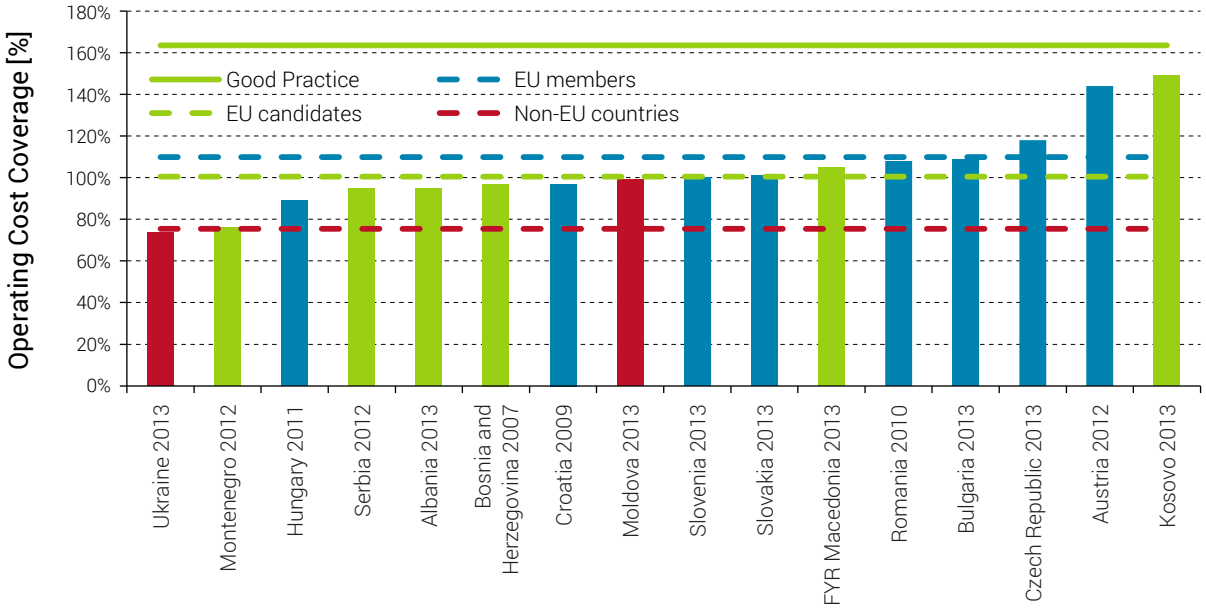
FIGURE 55: O&M COSTS AND RESIDENTIAL TARIFFS (WATER AND WASTEWATER) IN THE COUNTRIES OF THE REGION



SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION.

110. **Full cost recovery from tariffs does not appear to be a priority in any country, and many utilities in the region do not even cover their operating costs from billed revenues.** To maintain service quality in the long run, utilities should be able to recover their operating and regular maintenance costs, as well as those necessary for asset management and renewal, from their own revenues. Figure 56 displays the average operating cost coverage of utilities in the region, measured as the net billed sales over operating expenses, including depreciation; utilities should have an operating cost coverage above 1 to be financially self-sufficient in terms of O&M. As the figure shows, only in a minority of countries do utilities recover all of their operating expenses from own revenues. While the average for EU member countries is above one, even some EU member countries such as Bulgaria, Hungary (where strong tariff controls are in place), and Romania, which formally fall under the EU WFD requirement of cost recovery, do not appear to fully comply. The overall situation is not particularly positive, especially considering that utilities in a number of countries fail to collect a significant share of billed revenues (see Figure 41), and therefore the actual ability of utilities to finance themselves is even lower (provisions are seldom made for accounts receivable write-offs).

FIGURE 56: OPERATING COST COVERAGE IN COUNTRIES OF THE REGION (BILLED OPERATIONAL REVENUE/OPERATING COSTS)



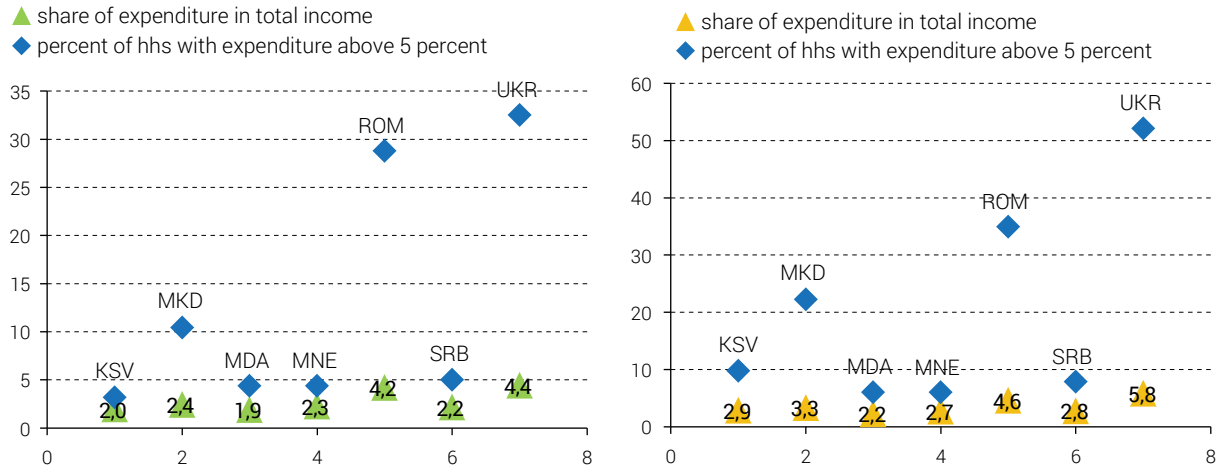
SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.
NOTE: THE APPARENTLY VERY HIGH VALUE FOR KOSOVO SHOULD BE LOOKED AT KEEPING IN MIND THAT KOSOVO HAS ONE OF THE LOWEST COLLECTION RATIOS IN THE REGION, AND THEREFORE COLLECTED REVENUE IS SIGNIFICANTLY BELOW BILLED REVENUE, WHICH IS USED TO COMPUTE THIS INDICATOR.

D. Addressing Affordability

111. **Although tariffs have increased over the last decade, current levels are still affordable for the average consumer.** As outlined in section C of this chapter, real tariffs have increased by 5 percent to 10 percent per year, on average, over the last decade, but clearly so have disposable incomes among residents. Computing reported expenditure on water and wastewater as a share of income for different income groups reveals that the average expenditure is well below the 5 percent threshold,[25] with the highest shares of 4.4 percent and 4.2 percent observed in Ukraine and Romania, respectively. Both countries also show the highest share of households that have water and wastewater expenditure above 5 percent (28.8 percent for Romania and 32.5 percent for Ukraine).

25 Different donor institutions have applied different thresholds for assessing affordability constraints of utility services, including electricity, heating, water, and wastewater. An excellent overview of these thresholds is provided in Fankhauser and Tepic 2005, 5. For water and wastewater, 3 to 5 percent of total income is the typically applied benchmark to assess an affordability constraints.

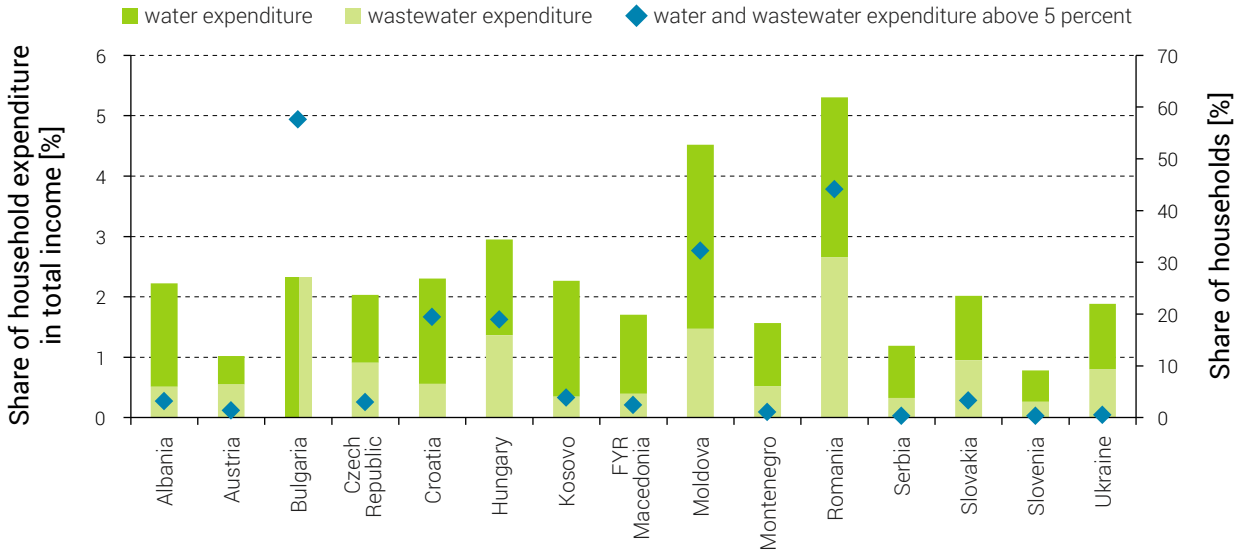
FIGURE 57: CURRENT AFFORDABILITY OF WATER AND WASTEWATER TARIFFS BY DIFFERENT INCOME GROUPS: AVERAGE (LEFT PANEL) AND BOTTOM 40 (RIGHT PANEL)



SOURCE: AUTHORS' ELABORATION FROM VARIOUS HOUSEHOLD SURVEYS.
NOTE: SHARES FOR FYR MACEDONIA AND MONTENEGRO INCLUDE REPORTED WATER SUPPLY EXPENDITURE ONLY.
HHS = HOUSEHOLDS.

112. **Estimations of the expenditure share for the bottom 40 percent show a slight increase, but affordability constraints are prevalent only in Ukraine.** There, more than half of households among the bottom 40 percent face a water and wastewater bill above 5 percent of their income, and people within that income group pay 5.8 percent, on average, for water and wastewater services. Computing the expenditure share of the extreme poor (that is, those living on less than $2.50 a day PPP) shows only Romania having viable statistics (that is, a sufficiently large sample size), according to which the poorest pay 5.1 percent of their income for water and wastewater services. Not all countries have household surveys that report water and wastewater expenditure separately from other utility or rental expenditures, but those that do are reported here and in Figure 57.

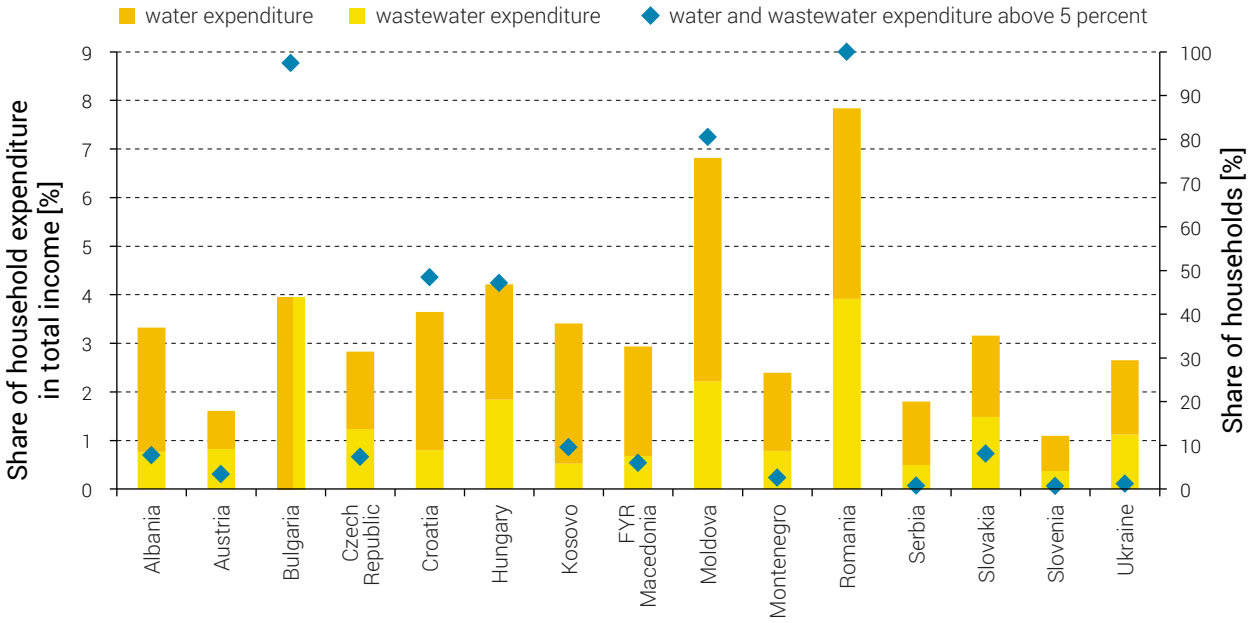
FIGURE 58: POTENTIAL AFFORDABILITY CONSTRAINTS FOR AVERAGE INCOMES



SOURCE: AUTHORS' ELABORATION FROM VARIOUS HOUSEHOLD SURVEYS, USING ASSUMPTIONS ON AVERAGE CONSUMPTION AND AVERAGE TARIFF PROVIDED BY SOS DATA COLLECTION.
NOTE: BULGARIA REPORTS A COMBINED WATER AND WASTEWATER TARIFF. UKRAINE'S MUCH LOWER INCIDENCE OF HOUSEHOLDS WITH POTENTIAL WATER EXPENDITURE ABOVE 5 PERCENT CAN ONLY BE EXPLAINED BY DIFFERENCE IN SAMPLES OR LOWER HYPOTHESIZED CONSUMPTION.

113. **When assuming that the entire population would be connected to piped water and sewage services at a minimum consumption level and prevailing tariffs, affordability constraints emerge in Moldova and Romania.** Using reported country statistics on average tariffs and assuming a minimum but sufficient consumption of 100 liters per capita per day,[26] expenditure for water and wastewater collection and treatment were computed for each household, taking into consideration the size of household and income as reported in the household surveys. The share of the computed expenditure in total household income was subsequently calculated, to understand whether average expenditure on water and sewage—at income levels reported in the household surveys—would exceed recommended thresholds. Under these assumptions, Moldova and Romania both show expenditure for water and sewage services above 4 or 5 percent of income for the average citizen, and near 7 and 8 percent for the bottom 40 percent of income distribution. Moreover, 32 percent of households in Moldova and nearly 45 percent in Romania would incur expenditures above 5 percent, and 100 percent in Romania and more than 80 percent in Moldova belonging to the bottom 40 percent would face expenditures for water and wastewater above 5 percent. This implies that connecting the largely rural populations in Moldova and Romania to piped water and sewage systems would, at current tariff levels, not be affordable for large segments of the population. Although combined water and wastewater expenditure, at 2.3 percent of income, appears to be affordable to the average Bulgarian citizen, almost 60 percent of households incur charges above 5 percent, which can be explained by a significant portion of very low incomes in the country's income distribution (Figure 58 and Figure 59).

FIGURE 59: POTENTIAL AFFORDABILITY CONSTRAINTS FOR THE BOTTOM 40%



SOURCE: AUTHORS' ELABORATION FROM VARIOUS HOUSEHOLD SURVEYS, USING ASSUMPTIONS ON AVERAGE CONSUMPTION AND AVERAGE TARIFF PROVIDED BY SOS DATA COLLECTION.
NOTE: BULGARIA REPORTS COMBINED WATER AND WASTEWATER TARIFF.

114. **Several countries have defined thresholds to identify affordability constraints at much lower levels than 5 percent.** For example, Bulgaria sets an affordability limit of water and sewage expenditure at 4 percent of the average disposable household income and if the entire population were covered under the outlined assumptions, Bulgaria's bottom 40 percent of households would hit that limit. Croatia uses 2.5 percent of median disposable household income, and the Czech Republic designates 2 percent of the average net household income as the threshold. Under given scenarios, the Czech Republic would exceed that threshold slightly for the average income earner and more so for the bottom 40 percent; yet, current average consumption in the Czech Republic is also lower (88 liters per capita per day) compared to what has been assumed as basic but sufficient consumption. Both FYR Macedonia and Montenegro use 5 percent as the threshold and would face no affordability constraints for

26 Howard and Bartram 2003 distinguish in their table S1 different service level scenarios, with optimal access starting with a consumption of 100 liters per capita per day.

either the average income recipient or for the bottom 40 percent. Bulgaria and the Czech Republic also define what constitutes minimum consumption, which, respectively, is 90 and 80 liters per capita per day.

115. **Only Croatia, Hungary, FYR Macedonia, Slovenia, and Ukraine report having formal subsidy schemes to ensure affordability for low-income earners.** In Ukraine, different subsidy schemes (general low-income family, and housing and utility programs) are available for households, administered at the central level and with resources coming from central budgets. Hungary's subsidy is administered centrally, but other than in Ukraine, the subsidy is targeted to utilities that, although run efficiently, face higher cost of service provision (due to location, economies of scale, or other factors), and is passed on to consumers through lower tariffs. In Croatia, cross-subsidies among different consumer groups is commonly applied, combined with the identification of low-income households that are entitled to a lower tariff on the first block of an increasing block tariff to ensure minimum consumption. Minimum consumption at subsidized rates is also enabled for low-income groups in FYR Macedonia and is administered at the municipal level. Similar provisions are available in Slovenia, though they are rarely applied. As shown in Section A of this chapter, in practice, governments in most Danube water countries subsidize their local water and sanitation services from a combination of taxes and transfers, if needed, even if such arrangements are not formalized or targeted.

Performance of subsidies

How well a subsidy scheme performs is typically evaluated on the following criteria:

- Coverage, which is the extent to which the poor are being reached
- Targeting, which is the share of the subsidy that goes to the poor
- Predictability of the benefit for the poor
- The extent of pricing distortions and other unintended side effects due to the subsidy
- Administrative simplicity.

SOURCE: WORLD BANK 2000.

116. **The performance of subsidy schemes ultimately depends on what percentage of the subsidy reaches households in need of such subsidy.** By definition, subsidies delivered by charging tariffs below cost or through transfer from local government to utility budgets are not targeted, and one would expect a large part of the subsidy to be leaked to households that are not poor (the so-called "errors of inclusion"). Means-tested programs, often applied in combination with other social protection efforts, have a higher chance of reaching the poor, but only when the criteria to identify poor households are rigidly applied. The example of the low-income family allowance in Ukraine demonstrates that the targeting performance of this means-tested program is relatively high—with the lowest 20 percent earners receiving 78 percent of the subsidy—but the coverage performance is low, since the program does not reach 97 percent of the poorest households (the so-called "error of exclusion"). In contrast, Ukraine's housing and utility allowance is not allocated based only on income, and its targeting performance is poor, with only 32 percent of the total subsidy reaching poor households (Betliy, Movchan and Pugachov 2013).

VII. CONCLUSIONS

117. **In their quest to achieve sustainable services for all, countries across the Danube region show very different levels of progress, with the level of progress generally mirroring the level of economic development of the country.** In many ways, the sector is today in a better position than it was 15 years ago, but governments in the region will need to continue aligning policies, institutions, and financing mechanisms to ensure that service coverage, quality, and efficiency continue to improve while managing affordability constraints. Particular attention is needed to support the most vulnerable, the poor, minorities, and the rural population in obtaining access to affordable, quality services, as well. In this regard, the EU accession process represents a tremendous opportunity to influence the sector's trajectory—but one that could easily be squandered if governments focus only on EU funds absorption and pure compliance, or push reforms without carefully looking at how the reforms address their specific challenges and the broader services sustainability agenda.

118. **The report analyzes the capacity of countries to deliver sustainable water and wastewater services for all across four main dimensions: access** to services (Chapter IV), **quality** of services (Chapter V), **efficiency** of services (Chapter V), and **financing** of services (Chapter VI). In this concluding chapter, those dimensions are consolidated into an overall services sustainability assessment with the aim of pointing to areas of particular challenge in each country. Each of the four dimensions is measured through three simple and objective indicators, drawing from the rest of this report (Figure 60). For each indicator, best practice values are established by looking at the best performers in the region. Countries closest to the best performers are deemed to have more sustainable water services.[27] The region's main challenges are also discussed, as are the opportunities presented by the current situation. The chapter also highlights areas of insufficient information and future work.

FIGURE 60: ASSESSING THE SECTOR'S PROGRESS IN PROVIDING SUSTAINABLE SERVICES TO ALL

SOURCE: AUTHORS' ELABORATION.

27 A more complete description of the methodology used to assess the sector sustainability is included in Methodological Note E at the end of this document.

119. **Given the limits of the data and analysis, policy makers and stakeholders should use these conclusions in a broader dialogue to critically examine what specific recommendations could be derived for their particular context.** Although every effort has been made to validate the information presented, an exercise involving 16 countries and hundreds of sources of information is inherently challenging. There are information gaps, and only limited times series, and the quality of information is much better in some countries than in others. Some of the data sources might not be fully comparable. While the household-level analysis is representative at the country level, the utility data are not always comprehensive. National averages sometimes mask the significant heterogeneity within a country. Therefore, the report and its conclusions are meant to inform the policy dialogue in each country around priorities and areas of further work, rather than provide definitive recommendations. In parallel, this chapter also identifies a number of areas where more work is needed to understand the situation of the sector and put forward sound conclusions.

A. Sustainability of the Water and Wastewater Services across the Region

120. **The water sector has been strongly impacted by the region's overall trajectory over the last 30 years, from the socialist period, to the transition period, into the EU accession process.** While countries throughout the region are at different stages of their own development, most share a similar trajectory toward European integration, which conditions, indirectly and directly, the development of the water services sector. Table 12 summarizes the main components of this evolution in terms of the external context and the main policy and service performance trends, which helps provide context for the overall conclusions presented in this chapter.

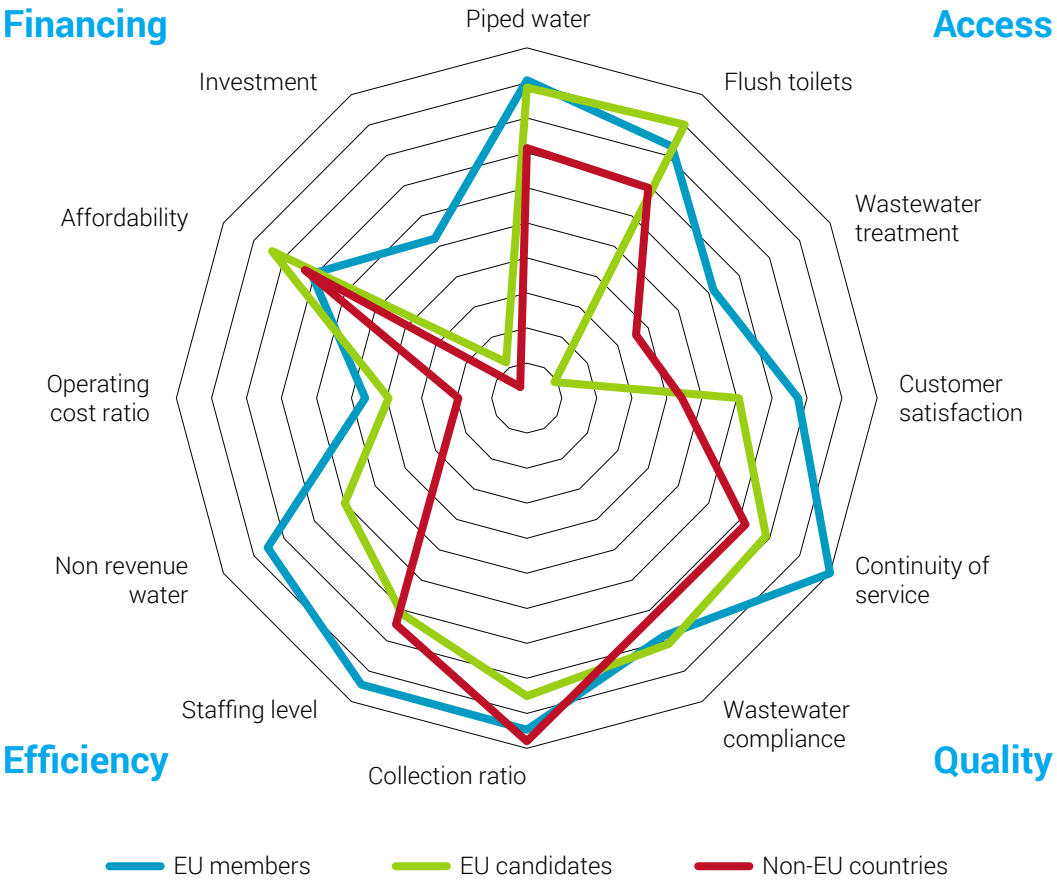
TABLE 12: WATER SERVICE PROVISION EVOLUTION

	Socialist period	Pre-EU period	EU period
External context	Socialist, state-run economy. Single-party political system.	Early stage of capitalist, western-style economy. Democratic, multiparty political system.	More developed economy, open EU market. Democratic, multiparty political system. Adoption and transposition of EU acquis.
Main policy trends	State-owned/governed enterprises. Mostly centralized companies. No private sector involvement.	Mostly municipally owned enterprises, decentralized service provision. Significant private sector involvement in some countries and capital cities.	Mostly municipal utilities, with tendency toward regionalization. Reduced involvement of private sector. Independent regulation of service provision. Adoption of cost recovery principle.
Main service performance trends	Low-cost service, without emphasis on service efficiency. Wastewater management lagging behind water supply. Maintenance and investment backlog.	Improvement of service efficiency and level of service provision. Increase in level of investments financed by IFIs and private sector. Increased cost of services and tariffs.	Large-scale investment financed by EU grants, with emphasis on wastewater. Continued improvement of service level and efficiency. Continued increase of water tariffs.

SOURCE: AUTHORS' ELABORATION.

121. **The overall services sustainability assessment shows there is a significant gap between EU levels and the performance of EU candidates and non-EU countries, which might require a different approach to their accession.** Figure 61 shows the results of the services sustainability assessment, combined for the following groups: EU members, EU candidate countries, and non-EU countries, for each of the four dimensions and 12 indicators of the assessment. It is clear from the rest of the report that there is a wide diversity of situations in the region, but the figure highlights once again the significant gaps existing between EU members, candidate countries, and non-EU countries. Those gaps, not just in access, but also in service quality, efficiency, and financing, appear to be much larger than the gaps the recent EU members faced when they joined. In the context of an overall EU accession effort, decision makers on all sides should reflect on whether the time and financial and normative frameworks that have helped recent EU

FIGURE 61: ASSESSMENT OF SERVICES SUSTAINABILITY IN THE REGION (HIGHER IS BETTER)



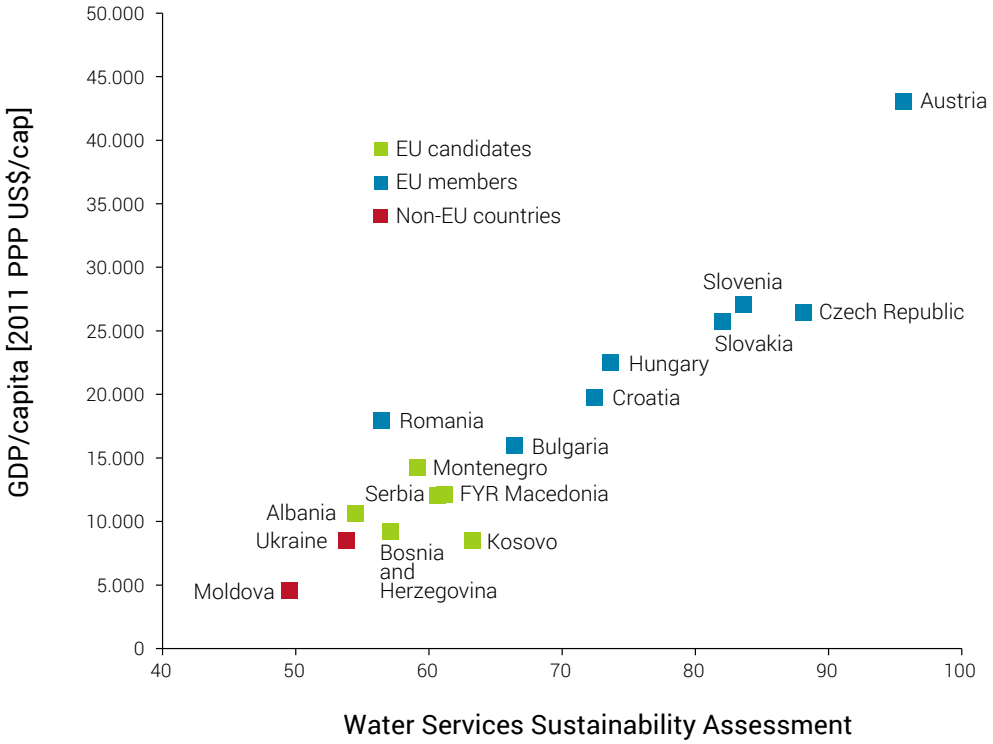
SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

members meet the requirements of their accession treaty are still the adequate ones for candidates with much larger gaps, or whether they should be rethought to take into account broader sector development needs.

122. **Beyond the EU accession framework, the assessment also shows that despite a general correlation between economic development and services sustainability, some countries appear to outperform their peers.** A plot of the services sustainability assessment for different countries against the level of GDP per capita (Figure 62) shows a clear correlation between economic development and water services sustainability assessment. EU members lead the region in services sustainability and economic development, with a few interesting exceptions. For example, the Czech Republic performs much better than Slovakia and Slovenia at the same level of GDP per capita; conversely Romania appears to face higher challenges than other countries at the same level of economic development, largely because of the much higher share of rural population in the country. The EU candidate countries present relatively similar levels of services sustainability, but Kosovo, for example, has the most sustainable sector among those despite having the lowest GDP per capita, possibly because of a clear and stable sector organizational framework (see Box in Chapter III). Finally, Moldova, the least economically developed country in the region, also faces the greatest gap in achieving universal, efficient, and sustainable services.

123. **Although each country is at a different stage, all have areas in which they can further improve.** Table 13 identifies, for each country, the overall score and qualitative outcome for each of the four dimensions of the assessment. As the table shows, most EU members do well providing access to services for all, and most countries in the region offer reasonably good service quality to those connected to public supply. The efficiency agenda is highly relevant for most of the recent and non-EU member countries. Sound sector financing remains an issue throughout the region, with some exceptions in older EU Member States.

FIGURE 62: SERVICES SUSTAINABILITY ASSESSMENT COMPARED TO GDP PER CAPITA IN COUNTRIES OF THE REGION



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

TABLE 13: COUNTRY-BY-COUNTRY SERVICES SUSTAINABILITY ASSESSMENT

Sustainability Dimension	Albania	Austria	Bulgaria	Bosnia and Herzegovina	Croatia	Czech Republic	Hungary	Kosovo	FYR Macedonia	Moldova	Montenegro	Romania	Serbia	Slovakia	Slovenia	Ukraine
Access																
Quality																
Efficiency																
Financing																
Overall	55	96	66	57	72	88	74	63	62	50	59	56	61	82	84	54

SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION.

B. Remaining Challenges

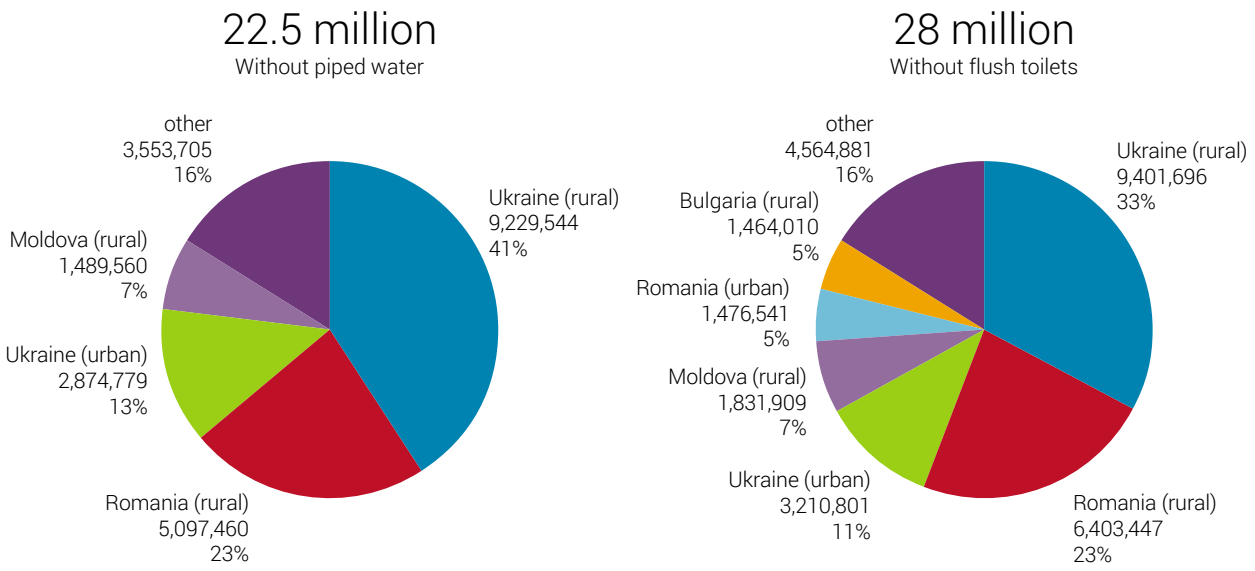
124. **With much of the region's attention focused on the EU accession process, a number of broader developmental challenges must be addressed to successfully move ahead, particularly among recent and future member states.** The review shows how EU members, especially those that joined before 2007, have benefited from a generally stable policy environment and a steady stream of EU funding. Access in particular to wastewater services

has increased, the performance of their utility companies is generally at par with international practices, and despite some concerns with regard to affordability, the financing of their services is sound, as well. However, some of the more recent EU members and candidates are facing a significantly different situation, with important basic services gaps especially among the most vulnerable, a focus on investment absorption rather than cost-effective solutions, service providers less prepared to assume the responsibility of developing and maintaining the necessary assets, underfunded services, and incomplete or unclear sector governance. The governments' attention is understandably focused on the transposition of EU legislation and development of wastewater management infrastructure. However governments should also address a series of broader, but related, sector challenges to ensure that all citizens benefit fully from the EU accession process. Below is a summary of the key regional challenges identified in this report. A more nuanced and detailed discussion of each country's specific challenges is included in the Country Notes that accompany this regional report and which are available on the SoS.danubis.org website.

- **While service provision remains a local government responsibility in most countries, policy reforms accompanying the EU accession process tend to subject those services to increased national regulatory and institutional oversight, creating the need for clearer accountability mechanisms.** After an initial wave of strong decentralization and local government empowerment in the 1990s, reforms explicitly or implicitly linked to the EU access process are increasingly reasserting the role of national governments, through the establishment of new national regulatory agencies in more than half of the countries in the last 15 years (led by Albania and Slovakia), and the various efforts to regionalize or aggregate service providers (led by Kosovo and Romania). In practice, though, implementation of those reforms has lagged. New regulators often struggle to extend their regulatory reach over large numbers of local public service providers and achieve meaningful regulatory outcomes. Sector financing strategies have not been developed upon adoption of the cost recovery principle. Utility companies and management continue to be largely driven by local interests. In many cases, those reforms have not yet borne fruit, and the analytical work done under the State of the Sector review shows that the long-term impact of such policies is still to emerge. While the EU accession offers a tempting opportunity (or excuse) to resort to regional recipes, governments would do well to look at the actual reasons that undermine the institutions' ability to deliver on their mandate, and address those by establishing a clear responsibility, accountability, and incentive framework for service providers and local governments, before attempting far-reaching reorganizations.

- **While wastewater management captures much of the public attention, there are 22.5 million people without piped water and 28 million without flush toilets in the Danube region; rural populations, the poor, and minorities are disproportionally represented among them** (Figure 63). The centralized collection and treatment of wastewater is a clear objective of the Urban Waste water Treatment Directive, and many governments are focused

FIGURE 63: WHERE ARE THOSE WITHOUT PIPED WATER OR FLUSH TOILETS IN THE DANUBE REGION?

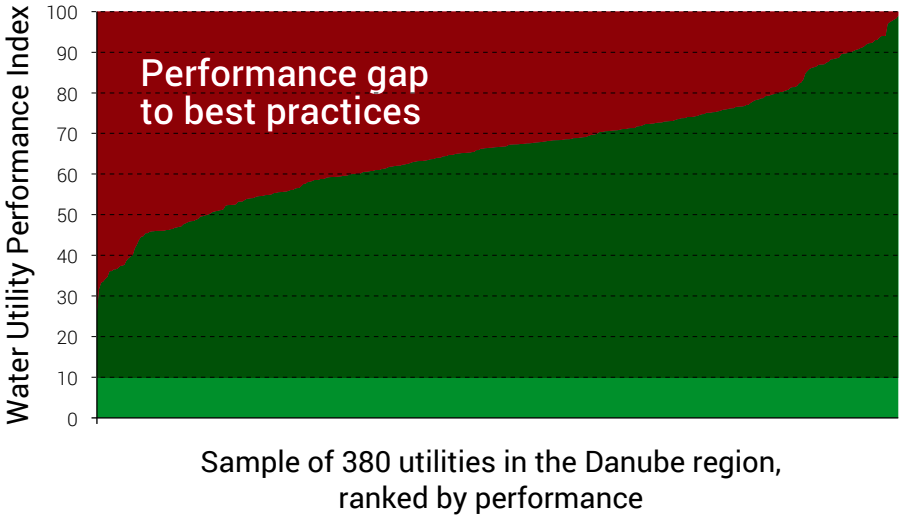


SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

on addressing it. However, as Figure 63 shows, although the overall level of access to water and sanitation services is high throughout the region, there are still important equity challenges in providing access to basic, good-quality services to all. For example, there are still 22.5 million people without piped water on their premises (the vast majority of whom use shared pipes, or have springs or wells in their backyards), and 28 million without flush toilets—with rural populations, poorer households, and minorities disproportionally represented. Even among those who have access to public services, the rapidly increasing tariffs have meant a particularly high burden on the bottom 40 percent and on the poorest share of the population, particularly in those countries where most unserved people live (Moldova, Romania). The unaffordability of tariffs could threaten the gains in extending access to all through infrastructure development, unless sound subsidy schemes are implemented.

- **The performance of many service providers in the region still trails regional and international best practices, threatening the long-term sustainability of ongoing investment programs.** While positive trends have been observed since the socialist period ended, progress appears to be stagnating in more recent years, and many utilities—the main actors ensuring sustainable services for all, at least in urban areas—remain short of operating at good practices levels (Figure 64). This report shows, however, that improved management practices can help mitigate the impact of increasing asset development and management costs, and that in most countries there are utilities that outperform their peers by a wide margin, independently of the sector's organization and structure. Failure to address the performance of utilities will threaten the sustainability of the large ongoing investments in infrastructure, particularly for wastewater management.

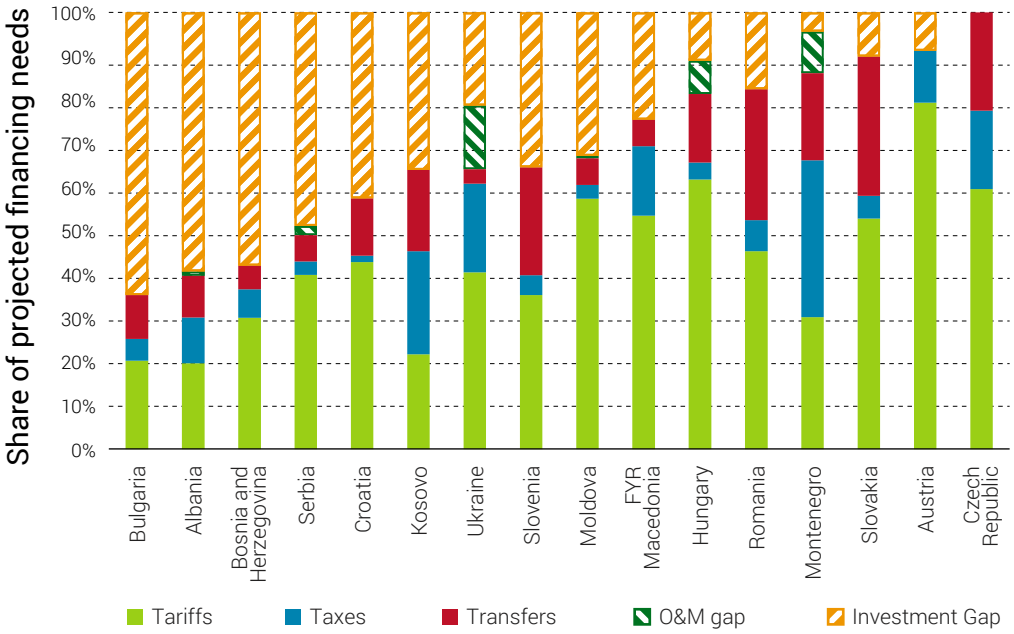
FIGURE 64: THE GAP TO INTERNATIONAL BEST PRACTICES FOR A SAMPLE OF UTILITIES IN THE REGION



SOURCE: AUTHORS' ELABORATION FROM IBNET / DANUBIS.ORG DATA.

- **The sector's overall financing framework does not guarantee universal, high-quality services in the long term.** The Water Framework Directive and sound sector policies have led to the widespread adoption of the cost recovery principle in national legislation; however, many utility companies are barely recovering their operating costs from tariffs, and tariffs are widely set with limited consideration of the established regulatory frameworks. At the same time, this report shows that in most countries, there is still significant space for tariff increases without creating affordability constraints for the average household. The financing of investments, including from EU funds, is done in an ad-hoc manner, with transfers distributed with limited attention to equity and cost-effectiveness of projects, and taxes providing untargeted subsidies (Figure 65). The significant taxes and transfers going toward the water sector represent a missed opportunity for national governments to provide the right set of incentives to service providers. The estimated investment gap is around €2.5 billion a year, and investment levels in a number of countries are below the levels necessary to maintain and manage assets in the long run. Costs are expected to continue to rise rapidly in the future. In the absence of a sector financing policy providing the proper efficiency incentives to service providers on both operation and investments, coupled with clear, well-targeted subsidies to address affordability concerns for the poor, service providers will not be able to provide universal, high-quality services in the long term.

FIGURE 65: O&M COST RECOVERY, AND INVESTMENT FINANCING GAPS IN THE REGION



SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION, ASSUMING COUNTRY-PROJECTED INVESTMENT NEEDS.

- **More and better publicly available data are necessary for sound policy making, utility performance improvement, and management accountability.** A recurrent challenge in many of the countries—surprisingly, particularly in more advanced economies including Austria or Slovenia, for example—is the lack of publicly available, structured, reliable, and representative data about the sector. In the absence of clear data and benchmarks, utility managers cannot assess whether their operation is on par with good practices. Without reliable sector financing information, policy makers lack a key instrument with which to promote sustainable services, and sector planners, in the absence of consistent data about access to services, cannot ensure that limited public funds go to those who need them most. Perhaps most important, given the significant amounts of public funds going to support water services, citizens, taxpayers, and their elected officials in many countries do not have access to transparent information to help them hold accountable sector decision makers at all levels.

C. Opportunities

125. **In responding to the challenges identified in the previous sections, the region can also build on a few important opportunities.** Compared to other regions of the world, the water services sector in the Danube region has a few important assets it can turn into opportunities to continue advancing its development, often by turning existing challenges around.

- **The EU integration process continues to present a tremendous policy and financing opportunity for many countries.** The EU accession process has proven, for many recent EU members, an important vehicle to build institutions and strengthen rule of law. The water sector is bound to benefit from such changes. More specifically to the sector, the process of negotiating and delivering accession commitments creates a higher scrutiny of sector financing and organization. Countries such as Bulgaria, Croatia, and Romania have used those processes to plan and implement far-reaching changes in the sector. In addition, EU funds, if used properly, can drive change for the sector and reduce inequity in service provision.

- **Recent history has shown that the water sector is open to change.** Despite their somewhat haphazard nature, the policy reforms that have occurred over the last 15 years—ranging from decentralization to public-private partnerships and from regionalization to regulation—show that the water and wastewater sector in the Danube

region is much more open to change than in other parts of the world. In fact, governments in at least a third of the countries of the region are currently considering one reform or another. If those reforms are based on a solid analysis of the underlying sector challenges and incremental improvements, they can continue to build positive momentum in the sector.

- **The widespread adoption of formal regulatory frameworks and utility corporatization reforms can help promote greater accountability.** The massive decentralization of waterworks to local governments in the early 1990s greatly empowered mayors and local governments, shortening the accountability lines. Recent changes in many countries to establish stronger regulatory frameworks, the progress of open information platforms and legislation, and more structured local utility governance forms (the corporatization process) can help establish proper checks and balances among the various actors at the national and local level.

- **Despite managerial shortcomings, the sector can count on a strong technical workforce.** The region has many excellent technical schools and universities, and utility staff and midlevel management are often technically highly qualified. With the proper managerial training and capacity building, those resources could contribute to turning around many of the sector's institutions. Waterworks associations such as ÖVGW in Austria, ARA in Romania, and SHUKALB in Albania, have recognized the important role they can play in promoting such professionalization, and are offering formal training curriculums and, when possible, are lobbying for staff accreditation schemes to be anchored in the legal framework of the sector. In fact, the International Association of Water Supply Companies in the Danube River Catchment Area (IAWD) itself is currently in discussions with waterworks associations around the region to set up a more formal regional training partnership.

D. Areas of Future Work

126. **In some cases, more work is needed to properly design and implement sound policies to respond to the challenges and opportunities above and provide sustainable services for all.** This first State of the Sector study consolidates a vast amount of information from which early trends can already be discerned, but it has also revealed areas in which more work is needed in order to be able to draw clear conclusions and inform public policies responding to some of the challenges identified above.

- **Population without piped or public water supply.** A significant number of people do not benefit from piped or public water services in the region, often because they lie outside of the services areas of utility companies. In the absence of better information on whom they receive service from, at what cost, and with what quality, and what would be the welfare and economic impact of providing them with higher levels of service, it is challenging to determine how governments can ensure that their entire population benefits from sustainable services. More work should also be done to understand what least-cost or cost-effective service provision technologies (see box in Chapter IV), models, or support mechanisms could be implemented to support those populations without necessarily overburdening existing utility companies by making them responsible for those.

- **Drivers of utility performance.** Improving utility performance is key to the sustainability of services provided to three-quarters of the population in the Danube region. Yet, little is understood about why some utilities thrive and others do not. Many countries are currently collecting some type of data on utility performance, and this report has presented some early analysis of utility performance drivers. However, the availability of more systematic data for longer time series should in the long run help decision makers better understand the trends and drivers of utility performance in their respective countries and draw informed policy conclusions.

- **Long-term affordability and subsidies.** Most countries are not yet facing significant tariff affordability problems. There are, however, some exceptions, and many countries expect to see continued increases in tariffs beyond inflation rates. Since few countries have set up targeted subsidy schemes to allow the cost recovery principle to be implemented without creating social problems, the proper design and implementation of such subsidy scheme should be further explored.

- **Wastewater management.** For most of the countries in the Danube watershed, managing wastewater and sludge remains an important challenge in the context of their EU accession process. The Urban Waste Water Treatment Directive mandates significantly higher levels of collection and treatment than currently available, and the new infrastructure that is being built or needs to be built creates financial and technical strains for utility providers. Operating costs and difficulties mean a number of plants are not functioning as intended, and alternative service delivery models, involving innovative financing models and institutional arrangements, should be developed.

127. **Most of these areas should be addressed at the national level in the countries where the corresponding challenges are most pressing, but further work at the regional level would also help document and inform policy work more broadly.** Academic institutions, think tanks, and development partners will all play a role in ensuring that those knowledge gaps are addressed. In addition, the authors hope that the Danube Water Program will be able to support work to address some of the above points in the coming years, together with interested governments and stakeholders.

128. **This report has presented the state of the sector and its main challenges and opportunities, but it does not provide policy recommendations.** If policy makers and utility managers take only one thing away from the report, it should be the importance for each government and each management to analyze their current challenges based on solid information, learn from others' successes and mistakes, and develop a way forward that will reflect their local realities and regional and international experience. Many of the challenges and opportunities highlighted above are current areas of work of the Danube Water Program, and the program will seek to work alongside its partners to continue filling the gaps revealed by the analysis. It has been an endeavor of the Danube Water Program to help inform such processes by documenting experiences throughout the region and fostering a dialogue across institutional and political boundaries. The authors hope this report will contribute toward the realization of **smart policies, strong utilities, and sustainable services** for all.

COUNTRY PAGES

The Country Pages that follow list the main indicators used throughout the report and the values collected through the SoS data collection effort, for each country, along with their year and source and a comparison with the average for countries at a similar EU accession stage, and the region's overall average (both weighted by population).

The spider graph at the beginning of each country page represents the results of the Sector Sustainability Assessment. The country's own results are marked in blue, while the region's best practices are in green and the average is in red.

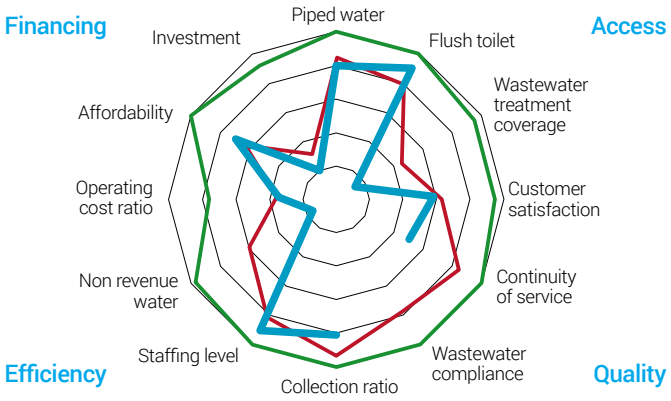
For further details on the methodological approach, consult the methodological notes at the end of this document.

ALBANIA

EU Candidate Country

Sector Sustainability Assessment

55



Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	2.774	3.053	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.74	-0.33	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	55	51	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	10,489	11,154	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2012	World Bank 2015	6.7	3.55	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	MSCV 2014	374 (to be 61)	85	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	7,416 (to be 45,469)	35,850	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	9,551	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	43	18	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	17	42	31	n.a.
Organization of Services						
Number of formal water service providers	2013	GDWSS 2013	58	75	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	36,822	28,963	9,496	n.a.
Dominant service provider type	Joint stock water and sewerage companies					
Service scope	Water and/or sanitation					
Ownership	Local governments					
Geographic scope	Mainly several local governments					
Water services law?	No					
Single line ministry?	Yes [Ministry of Transport and Infrastructure]					
Regulatory agency?	Yes [ERRU]					
Utility performance indicators publicly available?	Yes [www.erru.al]					
National utility association?	Yes [SHUKALB for water and wastewater]					
Private sector participation	Only through outsourcing					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	78	89	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	72	81	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	66	73	61	100
Including from public supply – average *[%]*	2013	GDWSS 2013	77	71	74	99

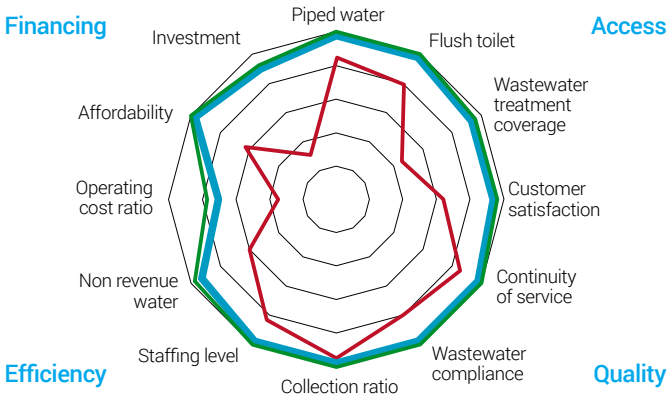
Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	89	90	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	82	81	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	79	76	54	100
Including with sewer – average *[%]*	2013	GDWSS 2013	64	53	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	Expert estimate	13	9	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	GDWSS 2013	95	165	122	n.a.
Water supply continuity *[hours/day]*	2013	GDWSS 2013	12	19	20	24
Drinking water quality *[% of samples in full compliance]*	2013	GDWSS 2013	98	83	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	2013	IBNet 2015	15.0	9.3	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	58	63	63	95
Efficiency						
Nonrevenue water *[%]*	2013	GDWSS 2013	67	50	35	16
Nonrevenue water *[m^3/km/day]*	2013	IBNet 2015	68	41	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	GDWSS 2013	5.6	11.5	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2013	IBNet 2015	1.4	2.4	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2013	GDWSS 2013	82	85	98	116
Metering level *[metered connections/connections] [%]*	2013	GDWSS 2013	59	81	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	51	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		32	29	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.39	0.34	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		50	67	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		26	17	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		24	16	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		48	32	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		15	9	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2012-2040	MPWT 2012	63	37	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		80	70	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2013	GDWSS 2013	0.74	0.57	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.62	0.45	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2013	GDWSS 2013	0.95	1.01	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2.2	1.6	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	3.3	2.5	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	3.1	1.6	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	55	59	64	96

AUSTRIA

EU Member State

Sector Sustainability Assessment

96



Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	8.474	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	0.43	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	66	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	44,149	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	–	–	–	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	Statistics Austria 2015	2,354	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,600	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	9,180	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	18	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	0	16	31	n.a.
Organization of Services						
Number of formal water service providers	2015	ÖVGW 2015	5,465	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	1,395	6,643	9,496	n.a.
Dominant service provider type	Local/ municipal utilities					
Service scope	Water and/or sanitation					
Ownership	Local municipalities/boards, cooperatives					
Geographic scope	Local/regional					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Agriculture, Forestry, Environment and Water Management]					
Regulatory agency?	No					
Utility performance indicators publicly available?	No					
National utility association?	Yes [ÖVGW for water & ÖWAV for wastewater]					
Private sector participation	No					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	100	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	100	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	100	77	61	100
Including from public supply – average *[%]*	2012	BMLFUW 2012	90	83	74	99

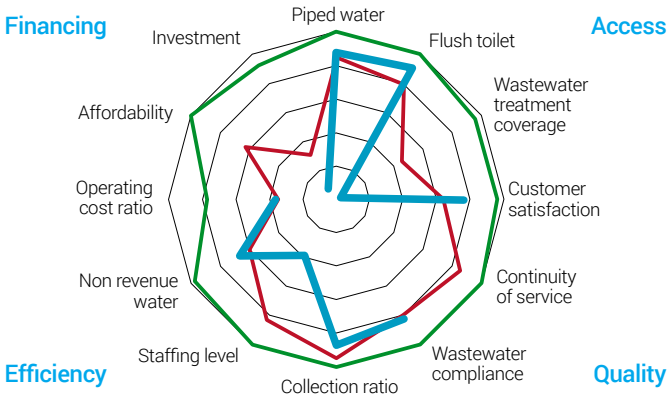
Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	99	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	98	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	100	63	54	100
Including with sewer – average *[%]*	2012	BMLFUW 2014	94	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	BMLFUW 2014	95	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	Expert estimate	140	113	122	n.a.
Water supply continuity *[hours/day]*	2013	Expert estimate	24	24	20	24
Drinking water quality *[% of samples in full compliance]*	2010	BMG 2015	99.9	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	2012	BMLFUW 2014	100	79	79	100
Sewer blockages *[number/km/year]*	–	–	–	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	95	78	63	95
Efficiency						
Nonrevenue water *[%]*	2012	ÖVGW 2015	16	34	35	16
Nonrevenue water *[m^3/km/day]*	2012	ÖVGW 2015	7	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	ÖVGW 2015	2.0	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2012	ÖVGW 2015	0.39	1.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2013	ÖVGW 2015	105	102	98	116
Metering level *[metered connections/connections] [%]*	2012	ÖVGW 2015	100	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	94	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		185	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.57	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		87	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		13	10	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		0	25	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		40	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		73	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2013-2021	KPC 2014	91	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		57	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	Expert estimate	3.25	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		2.43	1.77	1.20	1.20
Operating cost coverage *[billed revenue/operating expense]*	2012	Authors' elab.	1.44	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	1.0	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1.6	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	1.4	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	96	74	64	96

BOSNIA AND HERZEGOVINA

Potential EU Candidate Country

Sector Sustainability Assessment

57



Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	3.829	3.053	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.72	-0.33	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	39	51	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	9,632	11,154	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2007	World Bank 2015	0.40	3.55	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2009	UNDP 2009	142	85	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	26,967	35,850	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	9,781	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	–	–	–	18	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	19	42	31	n.a.
Organization of Services						
Number of formal water service providers	2014	UPKP 2015 & Gov. RS 2015	142	75	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	15,641	28,963	9,496	n.a.
Dominant service provider type	Municipal					
Service scope	Water and sanitation					
Ownership	Local government units					
Geographic scope	One to a few cities					
Water services law?	No					
Single line ministry?	Yes [FMPVS in FBiH & MSPCEE in RS]					
Regulatory agency?	No					
Utility performance indicators publicly available?	No					
National utility association?	Yes [UPKP for FBiH / utility services & VRS for RS]					
Private sector participation	Limited to a few small water services					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	88	89	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	81	81	76	100
Piped supply – below $2.50/day *[PPP] [%]*	–	–	–	73	61	100
Including from public supply – average *[%]*	2011	VM 2011	58	71	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	91	90	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	82	81	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	–	–	–	76	54	100
Including with sewer – average *[%]*	2012	BHAS 2013	31	53	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2011	FMOiT 2015	3	9	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	FZS 2015	168	165	122	n.a.
Water supply continuity *[hours/day]*	–	–	–	19	20	24
Drinking water quality *[% of samples in full compliance]*	2011	HEIS & PR 2011	79	83	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	–	–	–	9.3	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	76	63	63	95
Efficiency						
Nonrevenue water *[%]*	2013	FZS 2014 & RZS BiH 2014	55	50	35	16
Nonrevenue water *[m^3/km/day]*	2013	FZS 2014 & RZS BiH 2014	30	41	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2010	HEIS & PR 2011	15.8	11.5	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2010	Expert estimate	3.5	2.4	1.6	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2014	FZS 2015	85	85	98	116
Metering level *[metered connections/connections] [%]*	2011	HEIS & PR 2011	82	81	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	52	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		23	29	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.33	0.34	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		71	67	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		16	17	12	n.a.
Percentage of service cost financed from transfers	Authors' elab.		13	16	22	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		28	32	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		7	9	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2011-2035	VM 2011	40	37	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		62	70	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	Expert estimate	0.61	0.57	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.46	0.45	1.20	1.20
Operating cost coverage *[billed revenue/operating expense]*	2007	IBNet 2015	0.97	1.01	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	–	–	–	1.6	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	–	–	–	2.5	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	–	–	–	1.6	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	57	59	64	96

BULGARIA

EU Member State

Sector Sustainability Assessment

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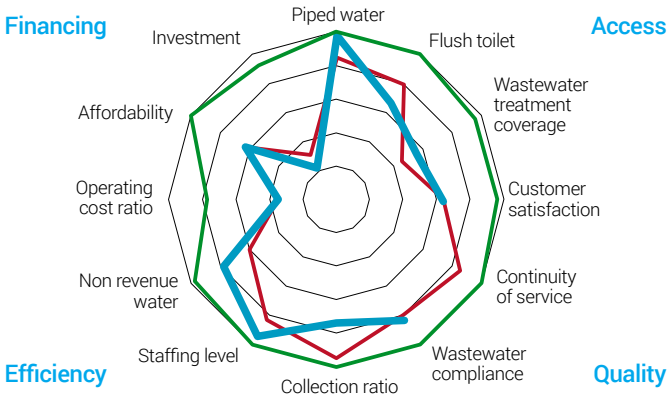

Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	7.265	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.79	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	73	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	15,941	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	5.40	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2013	NAMRB 2014	264	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	27,519	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	2,927	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	16	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	71	16	31	n.a.
Organization of Services						
Number of formal water service providers	2014	EWRC 2015	56	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	128,437	6,643	9,496	n.a.
Dominant service provider type	State and municipal					
Service scope	Water and/or sanitation					
Ownership	State or municipalities					
Geographic scope	One to a few cities					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Regional Development and Public Works]					
Regulatory agency?	Yes [EWRC]					
Utility performance indicators publicly available?	Yes [www.danubis.org]					
National utility association?	Yes [BWA for water and wastewater with limited influence]					
Private sector participation	Yes, in Sofia water service					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	98	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	96	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	76	77	61	100
Including from public supply – average *[%]*	2011	NSI 2015a	99	83	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	67	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	50	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	12	63	54	100
Including with sewer – average *[%]*	2011	NSI 2015a	74	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2011	NSI 2015a	56	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2011	NSI 2015b	100	113	122	n.a.
Water supply continuity *[hours/day]*	–	–	–	24	20	24
Drinking water quality *[% of samples in full compliance]*	2011	MoH 2015	97	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	2011	MoH 2015	81	79	79	100
Sewer blockages *[number/km/year]*	–	–	–	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	63	78	63	95
Efficiency						
Nonrevenue water *[%]*	2011	NSI 2015b	60	34	35	16
Nonrevenue water *[m^3/km/day]*	2013	EWRC 2015	22	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	IBNet 2015	6.2	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2012	IBNet 2015	1.2	1.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2012	IBNet 2015	72	102	98	116
Metering level *[metered connections/connections] [%]*	2012	IBNet 2015	100	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	77	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		37	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.31	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		57	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		14	10	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		29	25	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		47	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		18	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2014-2023	MRRB 2014	86	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		59	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2014	EWRC 2015	0.94	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.54	1.77	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2012	IBNet 2015	1.13	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2.7	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	4.6	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	57.6	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	66	74	64	96

CROATIA

EU Member State

Sector Sustainability Assessment

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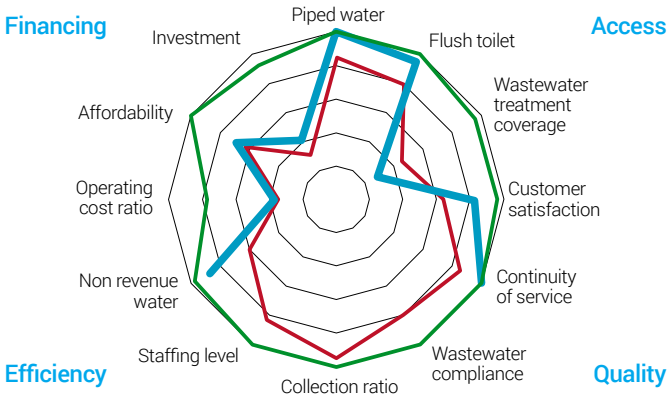

Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	4.253	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.51	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	58	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	20,904	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	0.11	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2011	DZS 2012	556	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	7,650	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	24,495	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	85	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	4	16	31	n.a.
Organization of Services						
Number of formal water service providers	2012	WB&DE 2012	140	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	24,605	6,643	9,496	n.a.
Dominant service provider type	Local / municipal utility companies					
Service scope	Water and/or sanitation					
Ownership	Local governments					
Geographic scope	One to a few cities					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Agriculture]					
Regulatory agency?	Yes [Council for water services]					
Utility performance indicators publicly available?	No					
National utility association?	Yes [GVIK for water and wastewater with limited role]					
Private sector participation	Limited to wastewater treatment plant construction and operation in Zagreb					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	99	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	98	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	95	77	61	100
Including from public supply – average *[%]*	2010	Voda 2010	81	83	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	95	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	93	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	90	63	54	100
Including with sewer – average *[%]*	2010	Voda 2010	44	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2007	DZS 2008	28	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2008	WB&DE 2012	113	113	122	n.a.
Water supply continuity *[hours/day]*	2014	Expert estimate	24	24	20	24
Drinking water quality *[% of samples in full compliance]*	2012	HZJZ 2013	85	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	79	79	100
Sewer blockages *[number/km/year]*	–	–	–	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	82	78	63	95
Efficiency						
Nonrevenue water *[%]*	2011	DZS 2012	44	34	35	16
Nonrevenue water *[m^3/km/day]*	2011	DZS 2012	14	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	WB&DE 2012	3	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	–	–	–	1.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2012	World Bank 2013a & World Bank 2013b	90	102	98	116
Metering level *[metered connections/connections] [%]*	2012	WB&DE 2012	100	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	73	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		81	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.54	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		57	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		20	10	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		23	25	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		41	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		33	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2014-2021	Voda 2010	93	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		73	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	WB&DE 2012	1.80	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		1.43	1.77	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2009	World Bank 2013a	0.97	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2.3	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	3.6	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	19.4	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	72	74	64	96

CZECH REPUBLIC

EU Member State

Sector Sustainability Assessment

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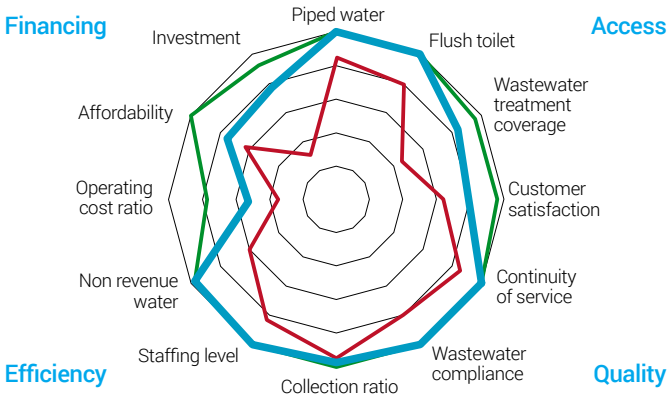

Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	10.512	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	0.08	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	73	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	27,344	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2008	World Bank 2015	0.05	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	CZSO 2015	6,253	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	1,681	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	1,234	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	42	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	26	16	31	n.a.
Organization of Services						
Number of formal water service providers	2013	Expert estimate	2,438	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	4,057	6,643	9,496	n.a.
Dominant service provider type	Private concession					
Service scope	Water/wastewater					
Ownership	Municipalities					
Geographic scope	Cities/regions					
Water services law?	Yes					
Single line ministry?	No					
Regulatory agency?	No					
Utility performance indicators publicly available?	No					
National utility association?	Yes [SOVAK for water and wastewater]					
Private sector participation	Yes / in mixed and separate model					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	100	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	100	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	100	77	61	100
Including from public supply – average *[%]*	2013	CZSO 2015	94	83	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	98	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	98	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	100	63	54	100
Including with sewer – average *[%]*	2012	MZe & MŽP 2013	83	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	MZe & MŽP 2013	83	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	CZSO 2015	87	113	122	n.a.
Water supply continuity *[hours/day]*	2013	IBNet 2015	24	24	20	24
Drinking water quality *[% of samples in full compliance]*	2013	SZU 2014	99,8	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	2013	Eurostat 2014	99	79	79	100
Sewer blockages *[number/km/year]*	2013	IBNet 2015	0.26	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	81	78	63	95
Efficiency						
Nonrevenue water *[%]*	2012	CZSO 2015	22	34	35	16
Nonrevenue water *[m^3/km/day]*	2012	CZSO 2015	5	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	IBNet 2015	5.2	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2013	IBNet 2015	0.8	1.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2013	IBNet 2015	95	102	98	116
Metering level *[metered connections/connections] [%]*	2013	IBNet 2015	100	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	91	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		124	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.62	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		60	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		18	10	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		22	25	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		50	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		62	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2015-2022	Expert estimate	49	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		78	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2013	MZe 2014	2.75	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		2.10	1.77	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2013	IBNet 2015	1.18	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2.0	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	2.8	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	3.0	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	88	74	64	96

HUNGARY

EU Member State

Sector Sustainability Assessment

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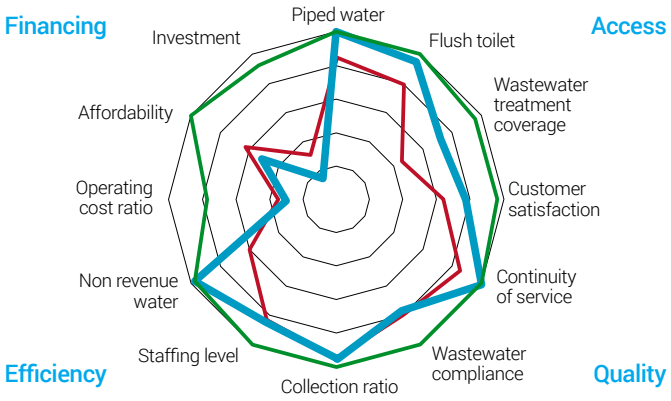

Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	9.897	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.20	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	70	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	22,877	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	0.35	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	Gov. HU 2015	3,152	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,140	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	10,425	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	12	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	5	16	31	n.a.
Organization of Services						
Number of formal water service providers	2014	Expert estimate	41	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	226,912	6,643	9,496	n.a.
Dominant service provider type	Municipal utilities					
Service scope	Water and wastewater					
Ownership	Municipal (51%), state (23%), mixed involving private operators (20%)					
Geographic scope	One to several hundred settlements					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of National Development]					
Regulatory agency?	Yes [HEA]					
Utility performance indicators publicly available?	No					
National utility association?	Yes [MAVIZ for water and wastewater]					
Private sector participation	Limited and declining due to regulatory restrictions					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	97	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	94	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	98	77	61	100
Including from public supply – average *[%]*	2012	KSH 2014	94	83	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	93	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	87	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	98	63	54	100
Including with sewer – average *[%]*	2012	KSH 2015	74	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	KSH 2015	72	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	KSH 2015	94	113	122	n.a.
Water supply continuity *[hours/day]*	2013	Expert estimate	24	24	20	24
Drinking water quality *[% of samples in full compliance]*	2011	EC 2014	95	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	2013	Eurostat 2014	75	79	79	100
Sewer blockages *[number/km/year]*	2007	IBNet 2015	7.41	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	77	78	63	95
Efficiency						
Nonrevenue water *[%]*	2012	KSH 2015	24	34	35	16
Nonrevenue water *[m^3/km/day]*	2012	KSH 2015	6.1	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	Expert estimate	3.5	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2007	IBNet 2015	1.7	1.0	1.6	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2010	KvVM 2010	94	102	98	116
Metering level *[metered connections/connections] [%]*	2012	Expert estimate	99.7	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	81	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		86	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.51	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		76	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		5	10	12	n.a.
Percentage of service cost financed from transfers	Authors' elab.		19	25	22	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		15	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		13	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2007-2013	KvVM 2010	32	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		70	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	KSH 2015	2.43	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		2.28	1.77	1.20	1.20
Operating cost coverage *[billed revenue/operating expense]*	2011	Expert estimate	0.89	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2.9	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	4.2	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	18.9	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	74	74	64	96

KOSOVO

Potential EU Candidate Country

Sector Sustainability Assessment

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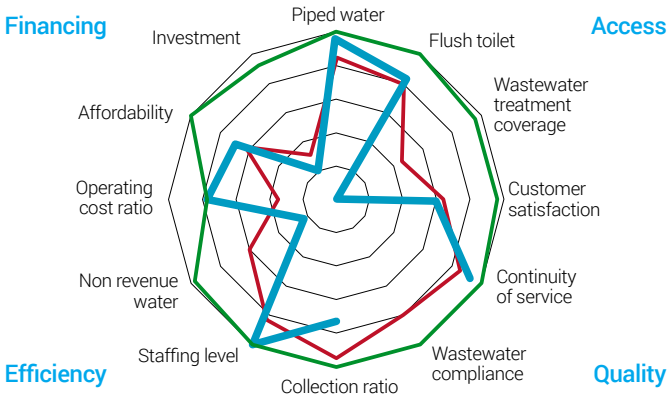

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	1,824	3.053	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	0.00	-0.33	-0.37	n.a.
Share of urban population *[%]*	2011	KAS 2011a	39	51	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	8,740	11,154	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2010	KAS 2011b	6.81	3.55	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2013	KAS 2014	38	85	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	48,000	35,850	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	–	–	–	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	–	–	–	18	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	60	42	31	n.a.
Organization of Services						
Number of formal water service providers	2012	WWRO 2013	7	75	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	174,583	28,963	9,496	n.a.
Dominant service provider type	Public, regional service providers					
Service scope	Water supply, wastewater collection, and treatment					
Ownership	Central government					
Geographic scope	Regional					
Water services law?	Yes					
Single line ministry?	No [but Inter-Ministerial Water Council]					
Regulatory agency?	Yes [WWRO]					
Utility performance indicators publicly available?	Yes [www.wwro-ks.org]					
National utility association?	Yes [SHUKOS for water and wastewater]					
Private sector participation	Marginal					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2010	Authors' elab.	96	89	83	100
Piped supply – bottom 40% *[%]*	2010	Authors' elab.	93	81	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2010	Authors' elab.	84	73	61	100
Including from public supply – average *[%]*	2011	KAS 2011a	67	71	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2010	Authors' elab.	84	90	79	99
Flush toilet – bottom 40%	2010	Authors' elab.	80	81	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2010	Authors' elab.	76	76	54	100
Including with sewer – average *[%]*	2011	KAS 2011a	53	53	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	Expert estimate	1	9	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	WWRO 2013	93	165	122	n.a.
Water supply continuity *[hours/day]*	2013	WWRO 2013	22	19	20	24
Drinking water quality *[% of samples in full compliance]*	2013	WWRO 2013	98	83	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	2013	IBNet 2015	5.0	9.3	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	60	63	63	95
Efficiency						
Nonrevenue water *[%]*	2013	WWRO 2013	57	50	35	16
Nonrevenue water *[m^3/km/day]*	2013	IBNet 2015	59	41	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	WWRO 2013	6.6	11.5	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2013	IBNet 2015	0.7	2.4	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2013	WWRO 2013	71	85	98	116
Metering level *[metered connections/connections] [%]*	2013	WWRO 2013	91	81	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	65	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		22	29	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.34	0.34	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		34	67	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		37	17	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		29	16	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		77	32	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		17	9	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2014-2034	Gov. KS 2014	29	37	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		69	70	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2013	WWRO 2013	0.48	0.57	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.22	0.45	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2013	WWRO 2013	1.49	1.01	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	2.3	1.6	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	3.4	2.5	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2010	Authors' elab.	3.8	1.6	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	63	59	64	96

FYR MACEDONIA

EU Candidate Country

Sector Sustainability Assessment

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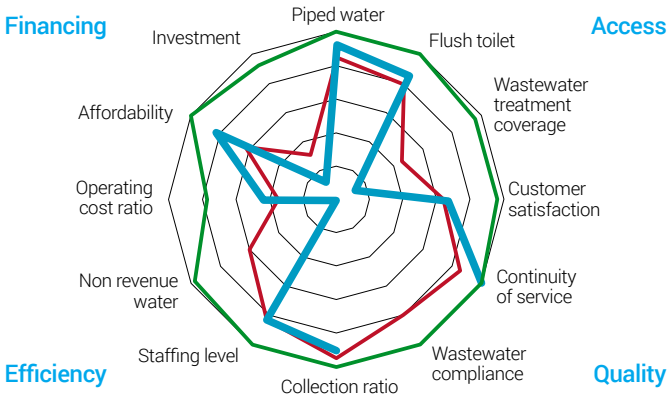

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	2.107	3.053	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	0.21	-0.33	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	57	51	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	11.802	11,154	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2008	World Bank 2015	9.00	3.55	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	SSO 2015	80	85	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	26,339	35,850	4,253	n.a.
Water Resources						
Total renewable water availability *[m³/cap/year]*	2008-2012	FAO Aquastat 2015	3,039	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	21	18	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	50	42	31	n.a.
Organization of Services						
Number of formal water service providers	2014	ADKOM 2014	68	75	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	23,241	28,963	9,496	n.a.
Dominant service provider type	Municipal Public Communal Enterprise					
Service scope	Water, sanitation, and communal waste					
Ownership	Local governments (City of Skopje)					
Geographic scope	Municipal (City of Skopje) administrative boundaries					
Water services law?	Yes					
Single line ministry?	No					
Regulatory agency?	No					
Utility performance indicators publicly available?	No					
National utility association?	Yes [ADKOM for municipal services]					
Private sector participation	Only one private operator					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	92	89	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	83	81	76	100
Piped supply – below $2.50/day *[PPP] [%]*	–	–	–	73	61	100
Including from public supply – average *[%]*	2012	Eptisa-Geing 2014	75	71	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	86	90	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	67	81	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	–	–	–	76	54	100
Including with sewer – average *[%]*	2011	SSO 2011	60	53	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	MoEPP 2011	13	9	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	IBNet 2015	158	165	122	n.a.
Water supply continuity *[hours/day]*	2013	IBNet 2015	24	19	20	24
Drinking water quality *[% of samples in full compliance]*	2009	IPH 2014	95	83	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	2013	IBNet 2015	5.5	9.3	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	66	63	63	95
Efficiency						
Nonrevenue water *[%]*	2013	IBNet 2015	63	50	35	16
Nonrevenue water *[m^3/km/day]*	2013	IBNet 2015	101	41	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	IBNet 2015	8.2	11.5	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2013	IBNet 2015	1.8	2.4	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2013	IBNet 2015	92	85	98	116
Metering level *[metered connections/connections] [%]*	2012	Expert estimate	84	81	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	62	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		31	29	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.34	0.34	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		71	67	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		21	17	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		8	16	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		33	32	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		10	9	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2014-2030	Eptisa-Geing 2014	20	37	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		70	70	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2013	ADKOM 2014	0.59	0.57	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.48	0.45	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2013	IBNet 2015	1.05	1.01	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2008	Authors' elab.	1.7	1.6	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2008	Authors' elab.	2.9	2.5	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2008	Authors' elab.	2.4	1.6	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	61	59	64	96

MOLDOVA

Non-EU Country

Sector Sustainability Assessment

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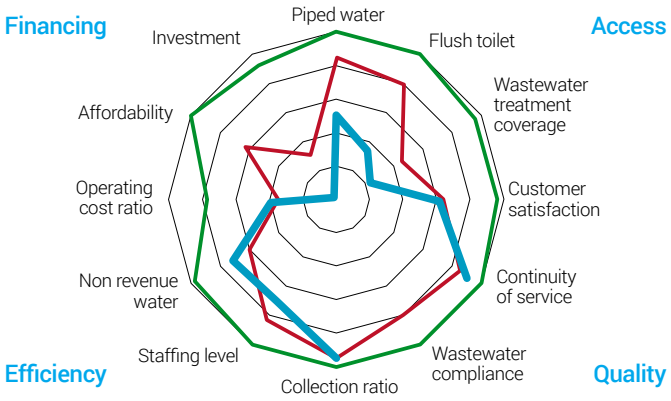

Indicator	Year	Source	Value	Non-EU average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	3.559	24.524	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.16	-0.54	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	45	67	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	4,669	8,489	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	7.07	0.64	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2011	IMF 2012	981	6,303	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,628	3,891	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	3,315	9,156	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	14	20	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	33	27	31	n.a.
Organization of Services						
Number of formal water service providers	2012	AMAC 2015	52	824	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	29,430	18,882	9,496	n.a.
Dominant service provider type	Joint-stock water and sanitation companies					
Service scope	Water and/or sanitation					
Ownership	State owned					
Geographic scope	Municipal					
Water services law?	Yes					
Single line ministry?	No					
Regulatory agency?	Yes [ANRE]					
Utility performance indicators publicly available?	Yes [www.amac.md]					
National utility association?	Yes [AMAC for water and wastewater with limited coverage]					
Private sector participation	No					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2010	Authors' elab.	51	71	83	100
Piped supply – bottom 40% *[%]*	2010	Authors' elab.	27	61	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2010	Authors' elab.	10	39	61	100
Including from public supply – average *[%]*	2010	BNS 2010	43	63	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2010	Authors' elab.	35	69	79	99
Flush toilet – bottom 40%	2010	Authors' elab.	15	60	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2010	Authors' elab.	5	38	54	100
Including with sewer – average *[%]*	2012	IBNet 2015	38	70	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	IBNet 2015	24	36	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	AMAC 2015	126	116	122	n.a.
Water supply continuity *[hours/day]*	2012	IBNet 2015	21	17	20	24
Drinking water quality *[% of samples in full compliance]*	2014	Mediu 2014	86	86	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	2013	IBNet 2015	12.1	12.1	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	61	44	63	95
Efficiency						
Nonrevenue water *[%]*	2013	IBNet 2015	41	31	35	16
Nonrevenue water *[m^3/km/day]*	2013	IBNet 2015	25.5	59	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	AMAC 2015	13.3	13.3	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2013	IBNet 2015	2.2	2.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2012	AMAC 2015	92	98	98	116
Metering level *[metered connections/connections] [%]*	2012	IBNet 2015	80	70	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	58	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		17	21	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.50	0.35	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		86	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		5	30	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		9	5	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		13	14	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		2	3	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2013-2017	Eptisa 2012	11	15	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		67	42	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	AMAC 2015	0.85	0.51	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.76	0.69	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2012	IBNet 2015	0.99	0.75	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	4.5	2.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	6.8	2.9	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2010	Authors' elab.	32.2	2.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	50	54	64	96

MONTENEGRO

EU Candidate Country

Sector Sustainability Assessment

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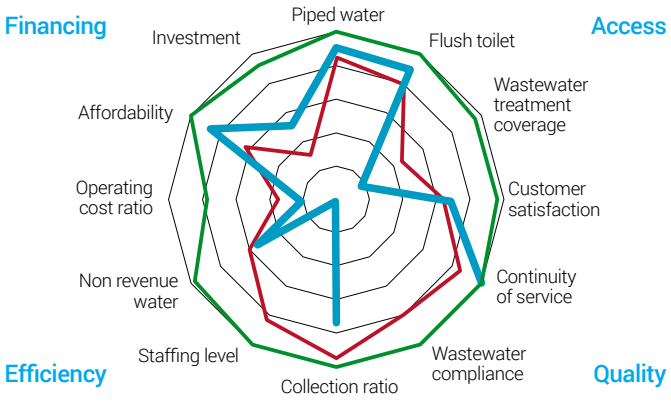

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	0.621	3.053	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	0.05	-0.33	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	64	51	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	14,318	11,154	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	1.41	3.55	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	Monstat 2013	23	85	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	27,017	35,850	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	–	–	–	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	60	18	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	10	42	31	n.a.
Organization of Services						
Number of formal water service providers	2012	MRT 2012a	22	75	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	21,466	28,963	9,496	n.a.
Dominant service provider type	Local / municipal utility companies					
Service scope	Water and sanitation					
Ownership	Municipal					
Geographic scope	One to a few cities					
Water services law?	Yes					
Single line ministry?	No					
Regulatory agency?	No					
Utility performance indicators publicly available?	No					
National utility association?	Yes [UVCG for water and wastewater with extensive coverage]					
Private sector participation	No					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2011	Authors' elab.	91	89	83	100
Piped supply – bottom 40% *[%]*	2011	Authors' elab.	87	81	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2011	Authors' elab.	72	73	61	100
Including from public supply – average *[%]*	2012	Authors' elab.	76	71	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2011	Authors' elab.	89	90	79	99
Flush toilet – bottom 40%	2011	Authors' elab.	84	81	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2011	Authors' elab.	66	76	54	100
Including with sewer – average *[%]*	2012	Authors' elab.	43	53	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	MRT 2012a	18	9	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	MRT 2012a	237	165	122	n.a.
Water supply continuity *[hours/day]*	2010	MRT 2012a	23.8	19	20	24
Drinking water quality *[% of samples in full compliance]*	2012	MRT 2012a	86	83	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	–	–	–	9.3	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	69	63	63	95
Efficiency						
Nonrevenue water *[%]*	2012	MRT 2012a	59	50	35	16
Nonrevenue water *[m^3/km/day]*	2012	Authors' elab.	39	41	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	MRT 2012a	10.3	11.5	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2012	Expert estimate	7.3	2.4	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2012	MRT 2012a	72	85	98	116
Metering level *[metered connections/connections] [%]*	–	–	–	81	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	48	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		78	29	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.72	0.34	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		35	67	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		42	17	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		23	16	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		54	32	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		42	9	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2005-2028	MRT 2005	54	37	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		69	70	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	MRT 2012a	0.67	0.57	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.55	0.45	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2012	MRT 2012b	0.76	1.01	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2011	Authors' elab.	1.6	1.6	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2011	Authors' elab.	2.4	2.5	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2011	Authors' elab.	1.0	1.6	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	59	59	64	96

ROMANIA

EU Member State

Sector Sustainability Assessment

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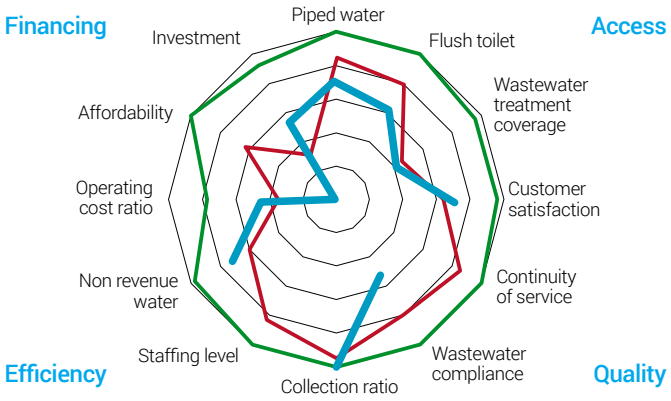

Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	19.964	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.65	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	54	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	18,635	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2012	World Bank 2015	3.96	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	INS 2015a	3,181	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	6,276	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	9,740	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	22	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	50	16	31	n.a.
Organization of Services						
Number of formal water service providers	2014	ANRSC 2015	226	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	54,679	6,643	9,496	n.a.
Dominant service provider type	Regional					
Service scope	Water and/or sanitation					
Ownership	Municipal and regional					
Geographic scope	Municipal and regional					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Environment and Climate Change]					
Regulatory agency?	Yes [ANRSC]					
Utility performance indicators publicly available?	No					
National utility association?	Yes [ARA for water and wastewater with extensive coverage]					
Private sector participation	Yes					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	71	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	54	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	32	77	61	100
Including from public supply – average *[%]*	2013	INS 2014b	62	83	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	61	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	42	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	20	63	54	100
Including with sewer – average *[%]*	2013	INS 2014a	47	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	INS 2015b	41	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	INS 2015a	136	113	122	n.a.
Water supply continuity *[hours/day]*	–	–	–	24	20	24
Drinking water quality *[% of samples in full compliance]*	2010	MS 2010	93	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	2013	Eurostat 2014	53	79	79	100
Sewer blockages *[number/km/year]*	–	–	–	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	70	78	63	95
Efficiency						
Nonrevenue water *[%]*	2012	ANRSC 2015 & ARA 2015	45	34	35	16
Nonrevenue water *[m^3/km/day]*	2013	INS 2014b	26	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	ANRSC 2015 & ARA 2015	18	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	–	–	–	1.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2010	IBNet 2015	112	102	98	116
Metering level *[metered connections/connections] [%]*	2012	INS 2015a	89	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	68	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		87	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.64	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		55	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		9	10	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		36	25	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		49	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		43	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2007-2013	GHK 2006a	62	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		56	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2013	Authors' elab.	1.60	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		1.45	1.77	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2010	IBNet 2015	1.08	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	5.3	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	7.8	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	44.1	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	56	74	64	96

SERBIA

EU Candidate Country

Sector Sustainability Assessment

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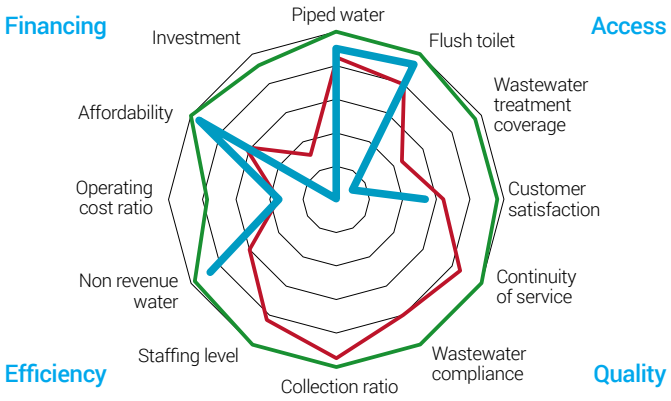

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	7.164	3.053	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.25	-0.33	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	55	51	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	12,374	11,154	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	1.77	3.55	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2013	RZS 2014	168	85	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	42,643	35,850	4,253	n.a.
Water Resources						
Total renewable water availability *[m³/cap/year]*	2008-2012	FAO Aquastat 2015	16,979	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	17	18	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	27	42	31	n.a.
Organization of Services						
Number of formal water service providers	2012	RZS 2012b	152	75	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	35,349	28,963	9,496	n.a.
Dominant service provider type	Local / municipal utility companies					
Service scope	Water and sanitation					
Ownership	State					
Geographic scope	One to a few municipalities					
Water services law?	Yes					
Single line ministry?	No					
Regulatory agency?	No					
Utility performance indicators publicly available?	No					
National utility association?	Yes [WSAS for water and wastewater & UTVSI for water professionals]					
Private sector participation	No					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	90	89	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	80	81	76	100
Piped supply – below $2.50/day *[PPP] [%]*	–	–	–	73	61	100
Including from public supply – average *[%]*	2011	RZS 2011	75	71	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	93	90	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	84	81	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	–	–	–	76	54	100
Including with sewer – average *[%]*	2012	RZS 2012b	59	53	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	RZS 2012b	11	9	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2011	RZS 2012a & RZS 2012b	203	165	122	n.a.
Water supply continuity *[hours/day]*	–	–	–	19	20	24
Drinking water quality *[% of samples in full compliance]*	2010	Batut 2010	73	83	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	–	–	–	9.3	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	51	63	63	95
Efficiency						
Nonrevenue water *[%]*	2011	RZS 2012a & RZS 2012b	32	50	35	16
Nonrevenue water *[m^3/km/day]*	2011	RZS 2012a & RZS 2012b	16	41	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2011	RZS 2012b	11.9	11.5	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	–	–	–	2.4	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2011	IPM 2015	89	85	98	116
Metering level *[metered connections/connections] [%]*	2011	RZS 2012a & RZS 2012b	84	81	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	65	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		27	29	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.30	0.34	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		82	67	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		6	17	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		12	16	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		14	32	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		4	9	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2011-2030	MEMSP 2011	32	37	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		72	70	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	PKS 2013	0.48	0.57	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.42	0.45	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2012	SBRA 2015	0.95	1.01	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	1.2	1.6	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	1.9	2.5	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2010	Authors' elab.	0.3	1.6	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	61	59	64	96

SLOVAKIA

EU Member State

Sector Sustainability Assessment

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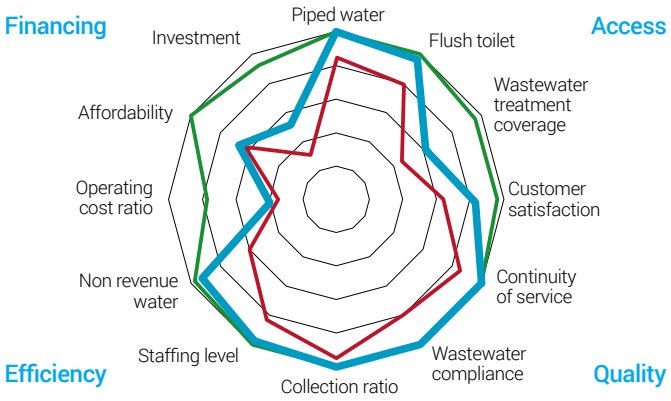


Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	5.414	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	0.09	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	54	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	26,114	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	0.67	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	MinV 2015	2,883	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	1,878	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	9,199	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	47	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	17	16	31	n.a.
Organization of Services						
Number of formal water service providers	2012	Expert estimate	17	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	277,074	6,643	9,496	n.a.
Dominant service provider type	Mixed capital companies					
Service scope	Water, wastewater					
Ownership	Municipalities					
Geographic scope	One to a few municipalities					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Environment]					
Regulatory agency?	Yes [URSO]					
Utility performance indicators publicly available?	No					
National utility association?	Yes [AVS for water and wastewater]					
Private sector participation	Yes, serving 23% of the population					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	100	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	100	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	100	77	61	100
Including from public supply – average *[%]*	2012	MINZP 2014	87	83	74	99

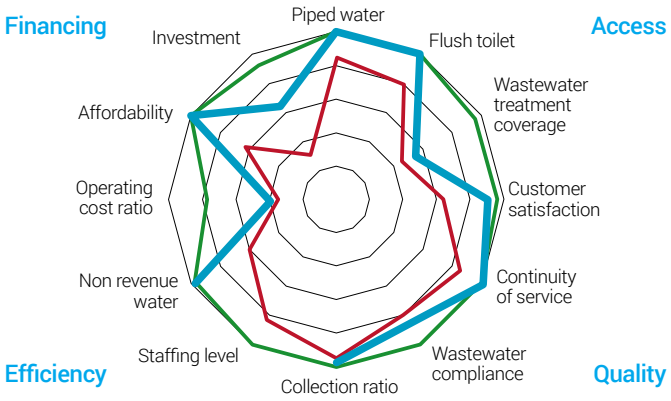
Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	97	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	94	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	66	63	54	100
Including with sewer – average *[%]*	2012	MINZP 2014	62	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	MINZP 2014	61	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	MINZP 2013	81	113	122	n.a.
Water supply continuity *[hours/day]*	2013	IBNet 2015	24	24	20	24
Drinking water quality *[% of samples in full compliance]*	2012	MINZP 2014	99	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	2013	Eurostat 2014	99	79	79	100
Sewer blockages *[number/km/year]*	2013	IBNet 2015	0.2	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	82	78	63	95
Efficiency						
Nonrevenue water *[%]*	2012	MINZP 2013	32	34	35	16
Nonrevenue water *[m^3/km/day]*	2012	MINZP 2013	9.3	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	IBNet 2015	7.65	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2013	IBNet 2015	1.17	1.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2012	IBNet 2015	116	102	98	116
Metering level *[metered connections/connections] [%]*	2012	MINZP 2013	100	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	84	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		100	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.51	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		59	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		6	10	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		36	25	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		42	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		42	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2014-2022	Expert estimate	53	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		58	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2012	MINZP 2013	2.29	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		2.27	1.77	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2013	IBNet 2015	1.01	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2.3	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	3.6	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	4.8	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	82	74	64	96

SLOVENIA

EU Member State

Sector Sustainability Assessment

84



Indicator	Year	Source	Value	EU MS average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	2.060	8.481	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	0.13	-0.26	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	50	63	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	28,298	24,535	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2011	World Bank 2015	0.01	1.86	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2014	SOS 2015	212	2,335	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	9,719	3,632	4,253	n.a.
Water Resources						
Total renewable water availability *[m³/cap/year]*	2008-2012	FAO Aquastat 2015	15,411	10,142	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	World Bank 2015	18	38	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	3	16	31	n.a.
Organization of Services						
Number of formal water service providers	2014	Expert estimate	98	1,060	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	18,502	6,643	9,496	n.a.
Dominant service provider type	Local / municipal utility companies					
Service scope	Water and sanitation					
Ownership	Municipality					
Geographic scope	One to a few municipalities					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Environment and Spatial Planning]					
Regulatory agency?	No					
Utility performance indicators publicly available?	Yes [www.ijsvo.si]					
National utility association?	Yes [CCIS Chamber of commerce with extensive coverage]					
Private sector participation	4 concessions					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	Authors' elab.	99	91	83	100
Piped supply – bottom 40% *[%]*	2012	Authors' elab.	99	85	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2012	Authors' elab.	100	77	61	100
Including from public supply – average *[%]*	2013	MOP 2015	88	83	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2012	Authors' elab.	99	83	79	99
Flush toilet – bottom 40%	2012	Authors' elab.	98	74	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2012	Authors' elab.	100	63	54	100
Including with sewer – average *[%]*	2012	SURS 2015	58	67	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	SURS 2015	54	62	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2014	SURS 2014	114	113	122	n.a.
Water supply continuity *[hours/day]*	24	Expert estimate	24	24	20	24
Drinking water quality *[% of samples in full compliance]*	2013	ARSO 2015	92	96	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	2011	Eurostat 2014	83	79	79	100
Sewer blockages *[number/km/year]*	–	–	–	3.0	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	90	78	63	95
Efficiency						
Nonrevenue water *[%]*	2011	SURS 2012	31	34	35	16
Nonrevenue water *[m^3/km/day]*	2011	SURS 2012	6.7	14	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	–	–	–	8.7	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	–	–	–	1.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2013	Expert estimate	97	102	98	116
Metering level *[metered connections/connections] [%]*	2013	Expert estimate	95	96	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	80	80	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		113	101	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.55	0.55	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		55	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		7	10	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		38	25	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		45	42	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		51	42	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2007-2013	GHK 2006b	114	65	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		72	64	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2013	Expert estimate	2.14	2.18	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		1.69	1.77	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2013	Expert estimate	1	1.10	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	0.8	3.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1.1	4.7	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2012	Authors' elab.	0.3	24.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	84	74	64	96

UKRAINE

Non-EU Country

Sector Sustainability Assessment

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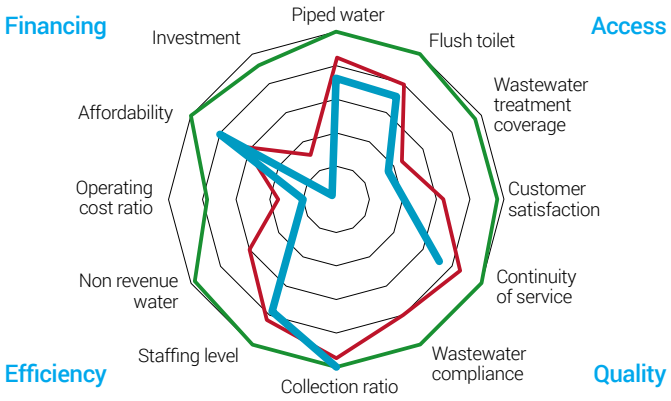

Indicator	Year	Source	Value	Non-EU average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	World Bank 2015	45.490	24.524	8.451	n.a.
Population growth *[compound growth rate 1990 – 2013] [%]*	1990-2013	World Bank 2015	-0.57	-0.54	-0.37	n.a.
Share of urban population *[%]*	2013	World Bank 2015	69	67	63	n.a.
GDP per capita, PPP *[current international $]*	2013	World Bank 2015	8,788	8,489	16,902	n.a.
Poverty headcount ratio *[$2.50 a day [PPP] [% of pop]]*	2010	World Bank 2015	0.14	0.64	1.65	n.a.
Administrative Organization						
No. of local government units *[municipalities]*	2015	Ukrstat 2015	11,625	6,303	1,987	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,913	3,891	4,253	n.a.
Water Resources						
Total renewable water availability *[m^3/cap/year]*	2008-2012	FAO Aquastat 2015	3,066	9,156	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*		World Bank 2015	24	20	26	n.a.
Share of surface water as drinking water source *[%]*	2014	ICPDR 2015	35	27	31	n.a.
Organization of Services						
Number of formal water service providers	2013	NKREKP 2013	1,595	824	661	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	18,538	18,882	9,496	n.a.
Dominant service provider type	Communal Unitary Enterprises					
Service scope	Water and sanitation					
Ownership	Private, state, communal form of ownership					
Geographic scope	One to a few cities, regions					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Regional Development]					
Regulatory agency?	Yes [NEURC]					
Utility performance indicators publicly available?	No					
National utility association?	Yes [UWA for water and wastewater					
Private sector participation	Few cases of public-private partnerships in water supply and wastewater disposal service provision					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2010	Authors' elab.	73	71	83	100
Piped supply – bottom 40% *[%]*	2010	Authors' elab.	64	61	76	100
Piped supply – below $2.50/day *[PPP] [%]*	2010	Authors' elab.	41	39	61	100
Including from public supply – average *[%]*	2000	COWI A/S 2015	65	63	74	99

Sanitation and Sewerage						
Flush toilet – average *[%]*	2010	Authors' elab.	72	69	79	99
Flush toilet – bottom 40%	2010	Authors' elab.	63	60	70	98
Flush toilet – below $2.50/day [PPP] *[%]*	2010	Authors' elab.	41	38	54	100
Including with sewer – average *[%]*	2012	Ukrstat 2015	73	70	66	94
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2000	COWI A/S 2015	37	36	45	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	NKREKP 2013	115	116	122	n.a.
Water supply continuity *[hours/day]*	2012	MinRegion 2013b	17	17	20	24
Drinking water quality *[% of samples in full compliance]*	2010	MinEnv 2010	87	86	93	99.9
Wastewater treatment quality *[% of samples in full BOD5 compliance]*	–	–	–	n.a.	79	100
Sewer blockages *[number/km/year]*	–	–	–	12.1	5.0	0.2
Customer satisfaction *[% of population satisfied with services]*	2013	Gallup 2013	43	44	63	95
Efficiency						
Nonrevenue water *[%]*	2013	Ukrstat 2013	30	31	35	16
Nonrevenue water *[m^3/km/day]*	2013	Ukrstat 2013	62	59	35	5
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	–	–	–	13.3	9.6	2.0
Staff productivity *[water and wastewater] [number of employees/1,000 inh. served]*	2013	Authors' elab.	2.0	2.0	1.7	0.4
Billing collection rate *[cash income/billed revenue] [%]*	2013	MinRegion 2013a	98	98	98	116
Metering level *[metered connections/connections] [%]*	2013	Ukrstat 2013	70	70	84	100
Water Utility Performance Index *[WUPI]*	n.a.	Authors' elab.	59	59	69	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	Authors' elab.		22	21	62	n.a.
Overall sector financing *[share of GDP] [%]*	Authors' elab.		0.33	0.35	0.45	n.a.
Percentage of service cost financed from tariffs	Authors' elab.		63	65	67	n.a.
Percentage of service cost financed from taxes	Authors' elab.		32	30	13	n.a.
Percentage of service cost financed from transfers	Authors' elab.		5	5	20	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	Authors' elab.		14	14	38	n.a.
Average annual investment *[€/capita/year]*	Authors' elab.		3	3	23	n.a.
Estimated investment needed to achieve targets *[€/capita/year]*	2006-2012	World Bank 2006	15	15	43	n.a.
Of which, share of wastewater management *[%]*	Authors' elab.		40	42	61	n.a.
Cost Recovery						
Average residential tariff *[incl. water and wastewater] [€/m^3]*	2013	MinRegion 2013a	0.48	0.51	1.32	n.a.
Operation and maintenance unit cost *[€/m^3]*	Authors' elab.		0.68	0.69	1.20	n.a.
Operating cost coverage *[billed revenue/operating expense]*	2013	MinRegion 2013a	0.74	0.75	0.96	1.49
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	1.9	2.1	2.6	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	2.6	2.9	3.8	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2010	Authors' elab.	0.5	2.7	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	n.a.	Authors' elab.	54	54	64	96

METHODOLOGICAL NOTES

A. Access data

129. Statistics reported on access are drawn from two sources: household survey data in the case of piped water and access to flush toilets, and country data collected by consultants in response to the Danube Water Program (DWP) country survey questionnaire on access to public piped water and access to sewers. The methodological discussion here refers to the estimation of statistics using household survey data, since these datasets are heterogeneous and require interpretation and definition.

130. **Income/wealth proxied by consumption expenditure, self-reported disposable income, or wealth index.** The household surveys used in this analysis report different variables that can proxy for income, which is necessary to sort households into quintiles or to compute shared prosperity indicators. While the Living Standards Measurement Survey (LSMS) applied in Albania and the Household Budget Survey (HBS) applied in non-EU countries and Romania, are similar in the way they estimate income/wealth (that is, from consumption or expenditure of households), the approach is very different and yields potentially different outcomes from self-reported income, as applied in the European Union Statistics on Income and Living Conditions (EU SILC) collected by EUROSTAT, or from an asset or wealth index, as estimated in the Multiple Indicator Cluster Surveys (MICS) collected by UNICEF. Moreover, a wealth index prepared in the MICS can only be used to sort households into quintiles, but does not give information on the distance of wealth between households and, since it does not include consumption/expenditure, cannot estimate statistics for the poorest households, as defined in this report as those living on less than $2.50 a day purchasing power parity (PPP).

131. **Measuring access to piped water and sanitation at the household level.** As outlined in table 14, each survey poses slightly different but often similar questions that are used to inform on access to services. Several questionnaires, especially the MICSs but also some of the HBSs, have even more detailed information on access to services that has been analyzed but not used in this report. The most dissimilar question is being posed in the EU SILC with respect to piped water, perhaps because it is implicitly assumed that households in EU countries mostly have piped water in their dwelling, so the question posed relates to the quality of that installation. Likewise, country surveys rarely specify whether household access to a flush toilet implies access to a sewer system, a septic tank, or nothing, and never do these surveys inform whether sewage collected is treated, since the household may not know the answer.

132. **Statistical significance.** When estimating access by income/wealth quintiles, ethnicity, region, or shared prosperity indicators, special attention was paid to whether the estimated indicator is statistically significant by checking both the standard errors of the estimate (that is, large standard errors relative to the mean are indicative of an estimation problem) and the design effect (deft), which shows how much the sample standard error varies by applying "cluster" sampling (typically applied in surveys) as opposed to simple random sampling. A well-designed sampling framework would typically generate a deft between 1 and 3, with 1 being associated with a lower standard error and reflecting equal standard errors between cluster and simple random sampling. On the basis of these two checks, two indicators for the affordability analysis (discussed under point 4 below) are not being reported.

133. **Data verification.** All statistics have been estimated using population weights to generate population estimates on access. Since the number of observations inflate from sample to total population size, one verification possibility entails whether population estimated from the survey is approximately equal to the population of the country in that particular year. The other verification method applied was to compare average estimates on income and access with other available data reported on these statistics. In the case of piped water access, estimated statistics were compared with the statistics prepared by the Joint Monitoring Program, and in the case of income, sources including from the OECD and poverty assessments prepared by the World Bank were consulted to draw comparisons. On all accounts, the estimated statistics are considered robust.

TABLE 14: HOUSEHOLD DATA SOURCES AND QUESTIONS

Country	Year	Data source	Consumption or expenditure aggregate	Reported equivalized disposable income	Wealth index	Housing module	Expenditure for water and/or sanitation	Questions posed to estimate piped water access inside the household	Questions posed to estimate access to private use by household of flush toilet
Albania	2012	Standardized and original LSMS	x			x	x	Running water inside dwelling or house	WC inside the house
Austria	2012	EU SILC		x		x		Adequate plumbing and water installations	Indoor flush toilet for sole use of the household
Bosnia and Herzegovina	2012	MISC4			x	x		Piped water inside dwelling	Private flush toilet, by type of sewage system
Bulgaria	2012	EU SILC		x		x		Adequate plumbing and water installations	Indoor flush toilet for sole use of the household
Croatia	2012	EU SILC		x		x		Adequate plumbing and water installations	Indoor flush toilet for sole use of the household
Czech Republic	2012	EU SILC		x		x		Adequate plumbing and water installations	Indoor flush toilet for sole use of the household
Hungary	2012	EU SILC		x		x		Adequate plumbing and water installations	Indoor flush toilet for sole use of the household
Kosovo	2010	Standardized and original HBS	x			x	x	Dwelling has indoor water tap(s)	Dwelling has flush toilet(s)
Macedonia	2008, 2012	Standardized HBS 2008, MICS4	x		x	x	x	Piped water inside dwelling	Private flush toilet, by type of sewage system
Moldova	2010	Standardized and original HBS	x			x	x	Piped water inside dwelling, by source	WC inside the dwelling, by type of sewage system
Montenegro	2011	Standardized and original HBS	x			x	x	Apartment has water supply installation	Apartment has sewage installation
Romania	2012	Standardized and original HBS	x			x	x	Piped water inside dwelling, by source	Toilet within place of residence, by type of sewage system
Serbia	2010, 2012	Standardized HBS 2010, MICS4	x		x	x	x	Piped water inside dwelling	Private flush toilet, by type of sewage system
Slovakia	2012	EU SILC		x		x		Adequate plumbing and water installations	Indoor flush toilet for sole use of the household
Slovenia	2012	EU SILC		x		x		Adequate plumbing and water installations	Indoor flush toilet for sole use of the household
Ukraine	2010	Standardized and original HBS	x			x	x	Presence of water pipeline	Presence of sewage pipeline

B. Water Utility Performance Index

134. As part of the utility performance analysis conducted under the State of the Sector study, there was a need to evaluate the overall performance of specific utilities. To do this, an aggregated performance index, called the Water Utility Performance Index (WUPI), has been elaborated. The WUPI seeks to emulate an expert opinion; it evaluates the performance of a single utility taking into account how closely the utility is performing to regional best practices on 10 common Key Performance Indicators. The WUPI is expressed by an aggregated score ranging from 0 (worst practice) to 100 (operating at best practice level on all indicators).

135. **WUPI construction.** The WUPI is constructed in a simple and robust manner. A set of 10 indicators, selected among the IBNET[28] indicators, is used to calculate the WUPI (Table 16). For each indicator, the regional best practice value (higher bound) has been defined by using expert opinion and an analysis of the existing database (see Table 15); the lowest bound has generally been defined as the lowest possible value. The performance of a particular utility is then evaluated on the basis of a linear relationship between this lower and higher bound. Each indicator is weighted equally (10 percent) in the overall index calculation. For water-only companies, seven water-related indicators are taken into account. For wastewater-only companies, six wastewater-related indicators are taken into account, as shown in Table 15. In such cases weights are adjusted to remain equal.

TABLE 15: WUPI INDICATORS, UNITS, AND BOUNDS

N°		Indicators	Water indicators	Wastewater indicators	Unit	Higher bound	Lower bound
I1	Coverage	Water coverage	X		%	100%	0%
I2		Sewerage coverage		X	%	100%	0%
I3		Wastewater treatment coverage		X	%	100%	0%
I4	Quality of Service	Continuity of service	X		hours/day	24 hours	0 hour
I5		Sewerage blockages		X	#/km	0.1	20
I6	Management efficiency	Metering	X		%	100%	0%
I7		Nonrevenue water	X		m^3/km/day	3	80
I8		Staffing level	X	X	#/1,000 water & wastewater population served	1	5
I9		Collection ratio	X	X	%	100%	0%
I10		Operating cost coverage	X	X	%	180%	50%

136. **WUPI calculation in case of missing data.** The overall utility dataset is not complete; therefore, the following adjustments are made to maximize the number of utilities for which a WUPI can be computed without compromising the validity of the value:

- If indicator I1 and I2 are missing, no WUPI is assessed.
- If indicator I3 (wastewater treatment) is missing, it is replaced by the value 0, hence allowing calculating the WUPI of the utility while assuming that the utility does not provide wastewater treatment.
- When up to three "noncoverage" indicators are missing (that is, I4 to I10), the average of all other noncoverage indicators is used to fill up the missing values. If the utility has more than three "noncoverage" indicators

28 IBNET is the International Benchmarking Network for water and sanitation utilities. It offers direct access to a database gathering water and sanitation utilities performance data.

missing, then the WUPI is not assessed. This calculation process and threshold have been elaborated based on correlation tests that show that WUPI scores remain robust when removing up to three indicators, since correlation is above 80 percent to 90 percent.

137. **WUPI robustness and validation.** Due to its construction, the WUPI is a best practice indicator (Table 16). For given cost/expenditures, higher values represent better performance. The indicator is therefore similar to the APGAR indicator by IBNET (van den Berg and Danilenko 2011), and is highly correlated to it (0.77). The overall WUPI rating for a subsample of utilities was also shared with experts from the region who did not detect significant inconsistencies with their own professional judgment. Furthermore, the correlation between the WUPI based on the full set and the WUPI where one, two, or three indicators are dropped is very high. In the case where one or two indicators are dropped, all correlations are above 0.90. Even in the case where three WUPI indicators are missing, only 1 out of 35 correlations with 0.88 is below the 0.90 threshold. These findings confirm that calculating the WUPI based on only a subset of the indicators does not introduce significant bias. A more detailed discussion of the construction and validation of the WUPI and its use throughout this report is included in Klien 2015.

TABLE 16: WUPI INDICATORS DEFINITION

IBNET No.	Indicator	Definition	Unit
1.1	Water coverage	Population with access to water services (either with direct service connection or within reach of a public water point) as a percentage of the total population under utility's nominal responsibility	%
1.2	Sewerage coverage	Population with sewerage services (direct service connection) as a percentage of the total population under utility's notional responsibility	%
[[(81d/2)+81e]/81a]*(70/30A)	Wastewater treatment coverage	[[(Wastewater treated w/primary treatment)/2 + Wastewater treated w/ secondary treatment]/Total Wastewater volume collected] × (Population under responsibility of the utility with sewerage services through house connections/Total population under notional responsibility of the utility for sewerage, irrespective of whether they receive service)[29]	%
15.1	Continuity of service	Average hours of service per day for water supply	Hours/day
10.1	Sewerage blockage	Total number of blockages per year expressed per km of sewers	#//km
7.1	Metering level	Total number of connections with operating meter/total number of connections	%
6.2	Nonrevenue water	Volume of water "lost" per km of water network per day	m^3/km/day
12.4	Staffing level	Total number of staff expressed as per 1,000 people served	#/1,000 water & wastewater population served
23.2	Collection ratio	Cash income/Billed revenue	%
24.1	Operating cost coverage	Total annual operational revenues/Total annual operating costs	%

29 A minimizing coefficient is associated with primary treatment of wastewater to grant a higher performance value to sanitation utilities that have implemented secondary treatment.

C. Sector financing

138. The sector financing calculations focus on the public water and wastewater sector. Expenditure made by the share of population using onsite water and sanitation facilities, whether piped or not, are not considered. The annual overall financing of public services in the water and wastewater sector was assessed using data from 2011, 2012, or 2013, depending on the available information for each. The methodology consisted of (a) assessing the yearly revenues from tariffs and the yearly operating costs of utilities; (b) using the data collected regarding investments, local and national taxes, and international transfers to consolidate total funding and total spending values; and (c) verifying the data to make sure that the overall assessed yearly funding, through tariffs, taxes, and transfers, would match overall annual spending composed of operation costs and investments.

139. **Assessment of utilities revenues coming from tariffs.** Revenues of water services coming from tariffs were estimated by multiplying the average water price expressed in €/m^3 (for sources, see the "Country Data Summary" section in the Annex) by the average water consumption expressed in liters per capita per day. Consumption values were reported in water surveys computed by local consultants. See the bibliography of each Country Note for a comprehensive source list of consumption appraisal. This amount was annualized to obtain the annual average water invoice per capita, which was then multiplied by the share of population connected to public water service (for sources, see the "Access Data" section in the Annex). This amount was then corrected by the billing collection ratio (for sources, see the "Country Data Summary" section in the Annex) to assess the cash income effectively perceived by water utilities. The billing collection ratio is defined as the ratio between cash income and billed revenues (IBNET indicator 23.2). Revenues of wastewater services coming from tariffs were estimated by multiplying the average wastewater price expressed in €/m^3 by the average water consumption expressed in liters per capita per day. This amount was annualized to obtain the annual average wastewater invoice per capita, which was then multiplied by the share of population connected to public sewage service. This amount was also corrected by the billing collection ratio in order to assess the cash income effectively perceived by wastewater utilities. As a result of this calculation, the yearly revenues effectively collected by water and wastewater utilities through tariffs were assessed.

140. **Assessment of utility operation and maintenance costs.** The operation and maintenance expenditure of utilities was appraised by dividing the sector revenues from tariffs calculated according to the above-mentioned methodology, by the operating cost coverage ratio (for sources, see the "Country Data Summary" section in the Annex). This ratio is defined as the total annual operational revenues divided by the total annual operating costs (IBNET indicator 24.1).

141. **Assessment of utility revenues coming from taxes and transfers.** Funding from transfers, expressed in euros, were assessed using official reference documents such as Sector Operational Programme (SOP), Operational Programme for Environment (OPE), and Instruments for Pre-Accession (IPA) reports, World Bank reports, OECD reports, and national reporting. See the bibliography of each Country Note for a comprehensive source list. When the transfer amounts were known for a several-year period, they were linearly annualized to allow a yearly calculation. Funding from national and local taxes, expressed in euros, was assessed using official reporting documents computed by local consultants in water surveys. See the bibliography of each Country Note for a comprehensive source list.

142. **Assessment of investment costs.** Investment costs, expressed in euros, have been assessed using official reference documents such as audits of the National Master Plan or National Water Strategy Program, data from the Statistical Yearbook, and reporting assessments on the spending of EU funds and IFI loans. See the bibliography of each Country Note for a comprehensive source list. When the investment amounts were known for a several-year period, they were linearly annualized to allow a yearly calculation.

143. **Data verification.** To ensure that yearly funding matches yearly spending, data verification was performed for each country. If a discrepancy was noticed between total funding and total spending in a specific country, an adjustment would be made mainly on transfers or investment values, since these data have been linearly annualized for the purpose of the yearly calculation. But they actually do vary from one year to the other.

D. Affordability calculation

144. **Affordability analysis, using existing expenditure on water and sanitation.** Expenditure for water and wastewater services are reported in some household surveys, as shown in Table 14, above. Other household surveys (EU SILC and most of the HBSs) report these expenditures together with other utility expenditure or rental costs. Subsequently, the share of these expenditures in total income was computed and compared to benchmarks (that is, 5 percent, 3 percent) commonly applied to assess affordability (as outlined in more detail in Fankhauser and Tepic as in 2005). Since some households did not respond to this question, and since the sample size for persons living on $2.50 a day PPP is already small, estimates with too few observations and corresponding large standard errors were not reported.

145. **Affordability analysis, using assumed minimum water consumption and average tariff, as collected through SoS data collection.** Using a potential minimum water consumption of 100 liters per capita per day and average tariff for water and wastewater collection, the average expenditure per person was calculated for each household, taking into consideration household size, and computed as share in total income, estimated from the household surveys. This scenario assumes that all households would be covered with public water and wastewater services in the country under equal conditions and without taking into consideration differences in price and income elasticities. This hypothetical scenario provides an upper benchmark of potential affordability constraints, should full coverage of services be pursued.

E. Water Services Sustainability Assessment

146. The State of the Sector study looks at many different dimensions of water and wastewater services; those are discussed in details in each of this report's chapters. In the concluding part of the report, the team consolidated those various dimensions into an overall services sustainability assessment to evaluate how close each country was to being able to provide sustainable services for all. In that context, sustainability was understood to include **access** to infrastructure, **quality** of services provided, their **efficiency**, and the **financing** framework in place to provide financially sound yet affordable services. The services sustainability assessment combines those four dimensions and the underlying numerical indicators into an overall value. It is based exclusively on sector outcome indicators and does not consider the way the sector is organized or structured.

147. **Services sustainability assessment construction.** The services sustainability assessment was constructed from four dimensions (access, quality, efficiency, and financing), each measured through three indicators (Table 18). For each indicator, the regional best practice value (higher bound) has been defined by using expert opinion and analysis of the existing data (see Table 17); the lowest bound has generally been defined as the lowest possible value. The sustainability of a particular country is then assessed on the basis of a linear relationship between this lower and higher bound. Each indicator is weighted equally in the overall index calculation and simply added to obtain the overall value.

148. **Assessment in case of missing information.** For some countries, not all 12 indicators are available. When a given indicator is missing, its value is assumed to be the average of all the other indicators. However, all countries have at least 75 percent of the necessary information available, and most have 100 percent.

149. **Assessment robustness and validation.** The water sector assessment is a simple aggregation of the sector outcomes along different dimensions. An extensive review of similar aggregated assessment initiatives, such as the World Bank's Doing Business, the Transparency International Corruption Perception Index, the Gallup Well-Being Index, or the Times' World University Rankings, was conducted prior to developing the proposed services sustainability assessment. Many if not most of those use simple additive aggregation methods and simple weights. As a consequence, the sustainability assessment is aligned with international practices, and its simple and transparent construction ensures easy understanding and replicability. At the same time, it is clear that any such effort will have limitations in terms of the comparability and oversimplification of policy messages; for example, countries facing significantly higher rural population, such as Moldova or Romania, are somewhat penalized because of the usually much lower level of piped water in rural areas.

TABLE 17: SERVICES SUSTAINABILITY ASSESSMENT INDICATORS, UNITS, AND BOUNDS

N°	Dimension	Indicators	Unit	Higher Bound	Lower Bound
I1	Access	Access to piped water	%	100%	0%
I2		Access to flush toilet	%	100%	0%
I3		Wastewater treatment coverage	%	100%	0%
I4	Quality	Continuity of service	Hours/day	24 hours	0 hours
I5		Satisfaction with water quality	%	100%	0%
I6		Wastewater compliance	%	100%	0%
I7	Efficiency	Collection ratio	%	100%	0%
I8		Staffing level	#/1,000 water & wastewater population served	1	5
I9		Nonrevenue water	m^3/km/day	3	80
I10	Financing	Operating cost coverage	%	180%	50%
I11		Affordability	%	1%	5%
I12		Investment	€/cap/year	80€	0€

TABLE 18: SERVICES SUSTAINABILITY ASSESSMENT INDICATOR DEFINITIONS

N°	Indicator	Definition	Unit
I1	Access to piped water supply	Population with access to piped water supply (into dwellings, plot, or yard) as a percentage of the total population	%
I2	Access to flush toilet	Population with access to flush toilet (direct service connection) as a percentage of the total population	%
I3	Wastewater treatment coverage	% of wastewater produced that is connected to secondary treatment or better	%
I4	Continuity of service	Average hours of service per day for water supply	Hours/day
I5	Satisfaction with water quality	% of population satisfied with the water quality	%
I6	Wastewater compliance	% of wastewater treated in accordance with effluent standards	%
I7	Collection ratio	Cash income/Billed revenue	%
I8	Staffing level	Total number of staff expressed as per 1,000 people served	#/1,000 water & wastewater population served
I9	Nonrevenue water	Volume of water "lost" per kilometer of water network per day	m^3/km/day
I10	Operating cost coverage	Total annual operational revenues/Total annual operating costs	%
I11	Affordability	Average water bill compared to household income	%
I12	Investments	Average for the last 5 years	€/capita/year

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WATER AND
WASTEWATER SERVICES
IN THE DANUBE REGION

A STATE OF THE SECTOR

WORLD BANK GROUP
Water

IAWD
International Association of Water Supply Companies in the Danube River Catchment Area

The World Bank / IAWD Danube Water Program supports smart policies, strong utilities, and sustainable water and wastewater services in the Danube Region by partnering with regional, national, and local stakeholders, promoting an informed policy dialogue around the sector's challenges and strengthening the technical and managerial capacity of the sector's utilities and institutions.

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Smart policies, strong utilities, sustainable services

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