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

DANUBE WATER PROGRAM

Smart policies, strong utilities, sustainable services

WATER AND WASTEWATER SERVICES IN THE DANUBE REGION

A STATE OF THE SECTOR 2018 UPDATE

Report | June 2019

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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
FAO	Food and Agriculture Organization
GDP	gross domestic product
HBS	Household Budget Survey
IAWD	International Association of Water Service 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
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
RBMP	River Basin Management Plan
SDG	Sustainable Development Goal
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
WASCO	Water Services Sustainability Assessment
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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The report also draws extensively on other recent World Bank research and analytical work carried out in the past three years by different World Bank teams led by authors Susanna Smets and Stjepan Gabric, as a direct response to the knowledge gaps identified in the first edition of the State of the Sector Report in 2015.

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All material is available electronically at sos2018.DANUBIS.org and at the Danube Water Program's website (www.danube-water-program.org). Further resources on water and wastewater services, utilities, and policies in the Danube Region are available under DANUBIS.org

The Danube Water Program in brief

The Danube Water Program supports policy dialogue and capacity development to achieve ***smart policies, strong utilities, and sustainable services*** in the water supply and wastewater sector of the Danube region. The program started a new third phase in January 2019 which includes a new component focusing on Water Security. The program is run in partnership with the World Bank and the International Association of Water Service Companies in the Danube River Catchment Area (IAWD), with financing from the Government of Austria.
See www.danube-water-program.org for more details.

FOREWORD

Jennifer J. Sara,

SENIOR DIRECTOR, WATER GLOBAL PRACTICE, THE WORLD BANK GROUP

Dear Colleagues,

In 2015, the World Bank launched the Regional State of the Water and Wastewater Sector Review, which has grown to be a flagship product of the Danube Water Program. The report highlighted the double challenge faced by the countries in the Danube River Basin at that moment - first, providing quality and sustainable water and sanitation services to their citizens; and, second, doing so while meeting EU water acquis communautaire.

This 2018 Update of the State of the Sector Report reveals a collision of trends that make that double challenge a triple challenge today. Not only do countries still need to achieve both of those goals, they need to do so in the context of a changing climate, decreasing populations, disruptive technology and economies with uncertain prospects Since that first Review was launched, so too were the Sustainable Development Goals. The SDG for Water (SDG 6) sets major goals in terms of access to safely and adequately managed services, water quality, water efficiency, integrated water management, and the protection and restoration of water-related ecosystems. The SDGs also called on the water and sanitation community to expand cooperation and capacity building support, and to strengthen the participation of local communities.

As the world's largest multilateral source of financing for water in developing countries, the World Bank envisions "A Water-Secure World for All". Under this vision, everybody should be able to share this limited resource and have access to safe and sustainable water and sanitation services to live productive and healthy lives. In this world, water can make a major contribution to how we mitigate and adapt to the effects of climate change – after all, the impacts of climate change are channeled through the hydrological cycle and propelled by water through economies, societies and the environment and used more efficiently if future demand is to be met.

With this context in mind, I am pleased to present this updated State of the Sector report outlining the main trends in the water and sanitation sector in the Danube Region. Since the last review, countries in the Danube region have made important strides in increasing access to quality and efficient services to its population, but significant challenges remain. First, rural areas and minority groups still suffer from the lowest access levels. Second, as cost recovery and investment levels increase, affordability of services is becoming an emerging issue. And, third, many countries still lack appropriate wastewater management. Many other trends and challenges are discussed herein – and just as importantly, so are proposals to tackle them. I hope this report will continue to be a platform for important exchanges on policy development and a place to highlight solutions that can help build improved lives for the people in this region. Within the next few years, countries everywhere in the world will need to step up their efforts to provide safe, equitable and affordable services to all their citizens. So, it is essential to have sound data and analysis inform decision-making, enable tracking of progress, and help illuminate potential solutions. I hope this report offers the information and inspiration for this.

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 Service 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 to this report in particular. I look forward to continuing this partnership to ensure sustainable services for all in the Danube region and hope the insights presented in this report help all involved succeed in that shared vision.

Jennifer J. Sara

Senior Director
Water Global Practice
The World Bank Group

Walter Kling

IAWD PRESIDENT

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 joint effort of these two 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. The program has been managed in a shared manner, focused on synergy between the expertise and networks of the respective organizations.

The first state of the sector study in 2015 was a product of that joint activity, where the World Bank has taken the lead in bringing its worldwide experience and analytical skills to produce this regional study of water services. IAWD played a supportive role in the data collection and providing some informational inputs and even more played a strong role using this study to stimulate actions and to improve services.

The World Bank team has done an important effort to create an update of this report about the water sector by the year 2018. We are confident that this study will help to continue the support of a high-level debate on key policy questions, 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 updated sector report helps to continue the work where deficits exist to achieve the goals set in the Danube Water Program.

IAWD looks forward to continuing its active role in understanding and using the information presented in this highly informative study. The 2018 updated study will help to work with the community of people active in the water sector to deepen the messages and lessons from the 2015 study, to jointly work on ensuring smart policies, strong utilities, and sustainable services in the Danube region.

Walter Kling

President
International Association
of Water Service Companies
in the Danube River Catchment Area

EXECUTIVE SUMMARY

This report analyzes the progress and challenges of 16 countries in the Danube River basin[1] in delivering sustainable water and wastewater services to all, including meeting the European Union (EU) environmental acquis communautaire, since a first State of the Sector (SoS) report was published in 2015. The State of the Sector report 2015 (SoS 2015) describes in detail the historical and political context and the organization of services in the Danube region, as well the specific background in each country in individual country notes, whereas this State of the Sector report 2018 update (SoS 2018) focuses on presenting the progress made by the different countries and at regional level, and understanding the emerging trends in the four dimensions that comprise the Sector Sustainability Assessment (WASCO)[2]. These four dimensions are: the level of access to water supply and sanitation (WSS) services, the quality of services provided (and customer satisfaction with it), the performance and efficiency of service providers, and the financing of services. The report zooms into some of the WASCO dimensions to identify three cross-cutting key agendas for the sector's future in the development region; the "last mile delivery" for water supply; the sanitation and wastewater management agenda, with social inclusion aspects and EU compliance in the background, and potential for more benefits with the use of "from-waste-to-resource" and "watershed approaches"; and the operational improvements and utility efficiency agenda. The report includes a separate chapter on water resources management and climate change, given the growing relevance of the topic for the countries in the region and at the global level, with climate change showing itself on the planet mostly through its effects on water cycles. On this critical area, the report focuses on identifying areas for attention as well as knowledge gaps where more information would be needed for countries to properly manage water resources and water-related risks in this changing context. The report concludes with a call-for-action for countries to further invest in developing policies, people, and partnerships, aided by faster-than-ever developing technology, to make these agendas move forward for a more water secure Danube region and more inclusive, reliable and resilient water and sanitation and wastewater management services.

Water Resources and Climate Change

The Danube River basin is the second-largest river basin in Europe and one of the most international rivers of the world, covering more than 800,000 square kilometers (km²), with a total population of more than 133 million people in 19 countries, a diverse landscape, and significant differences in water resources quality, quantity, and climate throughout the basin. The Danube connects with 27 large and more than 300 small tributary water flows, 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 availability of renewable water resources within the Danube basin has remained stable overall for the past few years, with no country considered water scarce except the Czech Republic and some countries (Ukraine, Moldova) approaching physical water scarcity[3]. In terms of quality, since 2009, the surface water bodies in the Danube region reaching good ecological or potential good status and good chemical status[4] have continued to improve, thanks to instruments like the Water Framework Directive, the related Danube River Basin Management Plan and improvement in data and information quality and availability (significantly improved even from the date of the original SoS 2015). However, water bodies in the Danube River basin continue to include an excess of organic matter and highsignificant levels of nutrients, particularly affecting groundwater bodies of basin wide importance. For most countries in the region, groundwater remains the major source for drinking water production.

From a perspective of water resource management, the EU water legislation is a powerful driver for candidate and potential candidate countries to harmonize their water policies. Water management in the basin is driven by the principles of the EU Water Framework Directive (WFD) internationally coordinated via the International

1 These are Austria, Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Kosovo, Hungary, Montenegro, Moldova, North Macedonia, Romania, Slovakia, Slovenia, Serbia and Ukraine which are referred to as "the region" in this report

2 This index proposed by the Authors in the original SoS 2015 is based on a total of twelve variables (three variables under each of the four dimensions). See methodological notes for further details on the WASCO calculation.

3 The Czech Republic, with a total renewable water availability of approx. 1240 m³/cap/year, also reports a drought for the last 5 years

4 As defined in EU water related legislation

Commission for the Protection of the Danube River (ICPDR). Nowadays, 15 out of 16 countries in the region are following the WFD principles, have established basin management authorities, and are preparing River Basin Management Plans (RBMP), compared to 11 countries in 2015. In almost all countries of the region, water extraction rights and wastewater discharge permits are being used to collect resources and are systematically charged and paid (compared to three years ago).

From 2021 to 2050, an increase in annual mean temperature between 1.3 °C in the upper and middle parts of the Danube River basin and up to 1.7 °C in the lower parts are projected, and further increases between 4 °C and 5 °C are projected for 2071 to 2100, based ondata collected by the ICPDR. Not to mention the transformation that almost all sectors will need to undergo if the region wants to stay only at 1.3°C warmer, with regards to water an increased temperature will imply overall precipitation changes with uneven (and to a degree, uncertain) consequences in the different countries. Even if the mean annual precipitation were expected to remain almost constant overall, the changes in temperature and precipitation would likely cause a reduction in water availability with changes in the seasonal runoff pattern, mainly triggered by reduced snow storage and strong seasonality of precipitation. In addition to the climate change measures included in RBMPs, most countries in the region have adopted national climate change strategies; however, the specific impact of these strategies in the water supply and wastewater sector have yet to be defined and implemented. Most WSS utilities still need to integrate climate considerations and in their regular planning.

To better manage the resource and adapt to and mitigate climate change impact, countries in the basin will have to start producing accurate water balances at the appropriate spatial and temporal scales, considering current and future demands from different users and sectors of economy, development trajectories, ecological needs, and climate projections, among others, to guide water policy making and serve the best outcomes for society, the environment, and the economy in the entire territory of the region.

Context and Organization of Services

Many of the countries in the Danube River catchment area share a common historical trajectory marked by the political and economic transition from a centralized government and socialist economy to a social liberalism model endorsing a regulated free market economy and the expansion of civil and political rights. The EU integration agenda is the other common more recent historical and political process present in almost all the countries of the region. Major political and cultural differences among the countries exist, but overall, there is a convergence toward European standards occurring. However, differences in gross domestic product (GDP) per capita are still significant across the countries within the Danube watershed, and about 2.5 million people within the Danube region live on less than $2.50 a day (purchasing power parity [PPP]), which represents a slight increase in measured poverty since SoS 2015.

There is a continued declining trend of population (from 135.2 million in 2015 to 133.7 million in 2018) within the Danube, due to a combination of low natural population growth and outward migration in some countries, particularly from recent EU members or candidate countries, where young talent is looking to the EU and beyond in search for better economic prospects. This continues to be a concern for many countries in the region which are trying to move forward in the jobs and growth agenda. At the same time, the region is experiencing incoming migration from citizens fleeing from conflict in their countries. High volume of internal (and external) migration flows and seasonability will also affect infrastructure planning. Everywhere in the region there are true jewels of nature and culture with great potential for eco-friendly and sustainable tourism, as well as emerging and consolidated tourist centers and which see their populations multiply by as many as 10-fold during specific times of the year, which poses a challenge for the design on water supply and wastewater management systems and infrastructure.

Accession to the EU by seven of the Danube region's countries in the first decade of the twenty-first century has driven much of the remarkable development in the water sector in the different countries. The key drivers have been financing (with significant grant funding from the EU's structural cohesion funds targeting the achievement of compliance with EU water-related directives) and the alignment of national legislation to EU directives (through introduction of key policy principles such as cost recovery, polluter-pays, efficiency of use, and quality and environmental sustainability of water and water bodies). However, many recent EU member countries

are struggling to reach compliance within the periods for harmonization agreed upon during the negotiations of chapter 27 on environment (including water) during the EU accession process, reflecting that these may have been overambitious or may not have sufficiently considered the many challenges posed by underdeveloped institutional and technical capacities, governance models, and poorly maintained and insufficient infrastructure.

In the six EU candidate or potential candidate countries in the region, the EU pre-accession process has also significantly fostered water sector development and financing, with the countries accessing grant pre-accession funds (Instrument for Pre-Accession [IPA]) and allocating them to financing infrastructure investments in the water and sanitation sector. The prospect of EU membership is also influencing sector planning and future development of WSS services. For the two countries in Eastern Europe within the catchment area (Moldova and Ukraine), the EU WFD is also a reference; however, the influence of the future accession process, both in terms of current financing and penetration of policy principles, is less significant. The water sector overall in the countries in the region has also been affected by territorial and administrative reform processes, institutional reorganizations, establishment of new sector policy and regulatory entities, and national/subnational governance frameworks driven by the individual country political and social realities, as well as other bilateral and international relations coexisting with the prospect of EU accession.

The proportion of the population receiving public water supply (that is, from a formal service provider) has increased to 82 percent — an 8 percent increase compared to the situation three years ago — which reflects a regional trend toward expansion of formal services and regionalization. As a result, fewer people are relying on self-provision or informal providers. The proportion of people served by private service providers has also increased, with public-private partnership (PPP) contracts signed and in force for WSS service provision in seven countries of the region. In rural areas, water services are normally organized through a nearby utility, community-based organizations, or self-provision. Going forward, it will be important for countries to develop policies which contemplate a menu of options of delivery models which can ensure safe and adequate delivery of services to move forward in the access agenda.

Several countries in the region have considered aggregation to improve efficiency and performance and to extend coverage to rural areas, with various level of success and mixed results. Successful regionalization processes to integrate rural areas were characterized by a deliberate equity objective and a clear mandate, dedicated measures to support integration of rural systems, and targeted investments and technical assistance to local governments and service providers to handle complexity. In order to successfully reach rural areas, multiple management models may need support, including the regional utility model, but also the small-scale municipal enterprises or community organized models, as well as those relying on self-supply.

Different models of economic regulation continue to coexist for water and sanitation services in the Danube region, but there is a trend toward increased central level regulation, with Macedonia and Montenegro adding water sector competencies to their national energy regulatory agencies in 2016. The number of water specific regulators has also increased from three to six between 2015 and 2018, but they vary greatly in their effectiveness and independence.

Efforts to track utility performance and benchmark it against their peers and international good practices are increasing, with several regulatory agencies and utility associations using different data collection management systems (including the utility based three-tier platform DANUBIS DCM developed by the DWP), more than 50 utilities participating in the Danube Learning Partnership's Utility Benchmarking Program, and in multiple other performance monitoring and improvement tools, and many of these stakeholders (as well as individual utilities throughout the ECA region) sharing data with the publicly available Ib-net of the World Bank and DANUBIS.org website, which shows an increased transparency approach.

Access to Services

In 2015, countries at the global level adopted the 2030 Agenda for Sustainable Development, which sets new definitions and targets for achieving better (that is, universal, equitable, safe, and affordable) and more sustainable water and sanitation services. According to these new indicators, half of the countries in the region provide at least 90

percent of their inhabitants with safely managed drinking water services[5], while only five countries in the region are reported to provide more than 75 percent of their population with safely managed sanitation services (three countries provide safely managed sanitation to less than 25 percent of their population).

Access to piped water supply and sewerage services has generally increased in the period; about 17 percent of the population in the region (more than 22 million people) still lacks access to piped water supply since the last SoS review. Overall, lack of proper access is prevalent in rural or less densely populated settlements, which are often not prioritized in political agendas and typically lack the economies of scale to cost-effectively provide network services through piped network infrastructure. Even more than piped water supply, access to safely managed sanitation is lagging. Lack of adequate sanitation services is also most prevalent in rural areas or areas with low population density, and about 5.5 million people, or 4 percent of the region's population, have access to only unimproved sanitation service[6]. Most of the population with unimproved sanitation is in rural areas, and two-thirds are in Romania.

The share of population connected to wastewater treatment has evolved differently across the Danube region, and remains an underinvested agenda in candidate and non-EU countries. Some EU member states (Czech Republic, Hungary, and Bulgaria) have managed to increase the connection to more than 70 percent with two-thirds of the connected population receiving tertiary treatment. Other EU member countries are lagging (e.g. Romania), or their wastewater connection rate has stagnated over the past five years (e.g. Slovenia and Croatia). In candidate countries, little progress has been made as wastewater is predominantly collected without being treated, except for Albania, and some developments in BiH. The main challenges include funding constrains and weak capacities, which results in capacity investment needs exceeding available funds, difficulties with maintaining and operating existing wastewater systems, high financial costs possibly beyond the affordable, and (lack of) availability of funds for renewal of infrastructure.

Increasing access to the three services (water, sanitation and wastewater management/collection and treatment) remains a challenge for all the countries in the region, especially in less densely populated areas. Closing the rural-urban services gap is still an important challenge that will require countries to elaborate specific strategies to expand services to rural areas and work on the enabling environment to recognize and support the different service delivery models available to address specific needs of rural areas (including self-supply mechanisms), while looking at the opportunities offered by thriving technology (particularly in sanitation regarding decentralized and on-site systems) and innovative financing mechanisms (involving the private sector). Although regional and urban utilities may be able to reach a substantial share of the rural population, in some countries, parallel local operator models might continue to bring services to villagers. In addition, for dispersed and remote populations, though shrinking in size, a piped public water supply networked system may not be feasible and self-supply is the only viable alternative, whereas decentralized off-network systems (or on-site solutions with regulated emptying) might be the most appropriate model for wastewater, particularly looking at nature-based solutions which may generate additional benefits contributing to a circular economy model.

Performance of Services

Overall, service quality, in terms of continuity and compliance with water quality standards (in those instances where water quality is being monitored) and wastewater discharge standards has improved in the region since the 2015 review. Overall, a greater share of the population in the region now receives continuous 24/7 service compared to three years ago, though at the individual level, continuity has deteriorated or stalled in some countries. Metering of consumption has also increased at the regional level, which seems to be proving successful as a demand management tool, with consumption decreasing significantly in seven of the countries under study, though higher tariffs in those countries might have also played a role in bringing down average consumption. Customer satisfaction has remained stable or improved generally and, counter-intuitively, seems to be higher in rural areas even though service levels are not necessarily better in these areas, which shows there might be benefits in supporting the self-supply model in some cases with adequate oversight. There has been little progress, however, on improving customer protection mechanisms.

5 These numbers also include self-supply services where people have piped water into their yard or dwelling (with assumption being made that this water is free of contamination). Therefore, safely managed does not necessarily mean "regulated" and provided by a service provider.

6 An unimproved facility is one which does not effectively separate waste from human contact. The SDG definition for hygiene aspects of sanitation also includes that there are nearby handwashing facilities.

With regard to the efficiency of service providers, there are also positive trends. Nonrevenue water (NRW) has followed quite a diverse evolution across the region over the past few years, with half of the Danube countries making improvements in the reported NRW figures or keeping it stable and the other half reporting increases in NRW. More data is needed to draw conclusions on service providers'/countries' performance regarding energy efficiency; however, the analysis shows a decrease in energy costs per cubic meter (m^3) of water produced, which could point to more efficient energy use though it is likely that the cost reductions are driven by reducing energy costs. Staff efficiency has been maintained or improved, with five countries improving their staff productivity since the original SoS 2015. The commercial efficiency of utilities in the region is generally solid and improving, with four new countries managing to improve their collection ratios above 90 percent since SoS 2015.

Utility performance in the Danube region has increased since 2013 as measured by the Water Utility Performance Index (WUPI[7]). Overall, the increase for all utilities under study was 4.2 points, accounting for the fact that the underlying sample of utilities has changed over the years. Albeit some diverging trends within countries, WUPI scores at the country level have all improved or remained stable in virtually all countries since the first SoS in 2015.

While positive trends are identified with regards to service provision quality and efficiency, also much room remains to continue to improve quality of services delivered to the entire population of the Danube basin and the operational and financial performance of service providers, and significant monetary savings could be generated by continuing to focus on policy actions for improved performance and on supporting improved cost-efficiency by service providers.

Financing of Services

Sector financing will have to be increased dramatically in non-EU countries for the region's countries to converge to similar levels of spending in the sector (which in turn has a strong correlation with sector sustainability assessment). The level of sector financing varies widely and has followed different trends in each of the region's countries in the last three years. Although average per capita financing has overall increased by 20 percent since the first SoS, this overall increase masks an enormous difference in the funding available for the sector between EU, candidate and non-EU countries (eight times less that of EU member states). Many of the low- and middle-income countries of the region (mostly the candidate and non-EU countries) are also in the lower range of the generally accepted value for overall sector financing as a share of GDP.

Although the cost recovery principle is gradually progressing in most countries, EU funds (grants) still represent a large source of funding in the region, especially for investments linked to the Urban Wastewater Treatment Directive (UWWTD) implementation. An important proportion of the UWWTD related investment costs have so far been covered by transfers from EU cohesion funds for new EU member states (which account for more than 40 percent of sector investment funding in some countries).

In about two-thirds of the countries, WSS direct operating costs are covered by revenues from tariffs. Three years ago, only half of the countries could reach an operating cost coverage above one. To maintain service quality in the long run, utilities will need be able to recover their O&M costs, as well as those necessary for asset management as well as the renewal of infrastructure. This will need to be funded from their own revenues (using appropriate financing schemes), or be supported by adequate tax allocations from public budgets.

Although tariffs have increased over the past decade, current levels are still affordable for the average consumer. Real tariffs have increased by 5 to 10 percent per year, on average, over the past decade, but 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, with the highest shares observed in Ukraine and Romania (4.4 and 4.2 percent respectively). Estimations of the expenditure share for the bottom 40 percent show a slight increase, but affordability constraints are prevalent only in Ukraine. However, the

7 The Water Utility Performance Index (WUPI) is a specific performance index calculated by the author team (see box 8) to measure the overall performance of utilities (in terms of service coverage, service quality, and management) against various parameters.

inclusion of full cost recovery tariffs (to reflect the cost of renewing the infrastructure in the future to maintain present service standards) might pose affordability challenges to a few of the countries in the region in the near future, depending on socio-economic groups. Only Croatia, Hungary, North Macedonia, Slovenia and Ukraine report having formal subsidy schemes to ensure affordability for low-income earners.

Conclusions

Overall, there are several reasons to be optimistic about the sector's development in the region since the last SOS review. The proportion of the population receiving water supply by a formal utility service provider (as opposed to informal, locally managed cooperatives or self-provision) has notably increased; the quality of both the services and utility performance is showing positive trends in most countries; overall sector financing has increased and is flowing to the sector, albeit not at the required amounts; and cost recovery levels are generally increasing. The factors behind these heartening developments could be attributed to many drivers. Chief among them are the increased uptake of more evidence-based government policies and programs benefitting from strong leadership, significant investment in improved capacities at utility and institutional levels, improved knowledge and information systems, and technical and financial support from the EU and other development partners.

Despite this good news, two challenging – and important – agendas are highlighted in this report.

- **First, the access to services agenda and ensuring "last-mile" delivery to reach universal access to the three services (water, sanitation and wastewater management/collection and treatment), particularly in rural areas.** The "no-one left behind" agenda will include addressing remaining challenges in the context of increased standards by the SDGs on water, sanitation and hygiene (WASH). Access by the population to piped water supply is advancing at a very low rate. All too many people in the region's rural areas still lack safe access to safe water supply. This poses equity issues and health risks for what is often the poorest or most vulnerable parts of the population. Poor water quality monitoring in the areas where low public and piped water access is prevalent threatens to further exacerbate this problem. Global and regional evidence point to an increasing recognition that self-supply will remain part of the service delivery mix to reach universal safely managed services, and proper support will need to be factored in. With regards to sanitation and wastewater management, overall low levels of access to improved sanitation and sewer-based wastewater collection in some countries, in rural areas particularly, mean that a fundamental shift of approach is needed to achieve quality of life and environmental goals. Here too, people are self-supplying through their own septic tanks/soakpits, while emptying services (or self-emptying), and also the correct installation of adequate technical solutions is largely unregulated. Delivery models will also need to reflect the different sanitation solutions, beyond sewerage (decentralized systems, on-site systems with regulated emptying, etc.), which are also recognized under the UWWTD (Individual Appropriate Sanitation). For wastewater treatment, exploring the potential for wastewater reuse and for shifting to a new paradigm of "from waste to resource", has the potential to transform a burdensome problem into an opportunity for a circular economy model. Summing up, to advance in the access agenda, countries will need to: i) adopt a "portfolio approach" to water supply services, supporting multiple solutions for universal access, supporting self-supply schemes; ii) ramp-up sanitation investments in the rural areas, including household self-investments and individual solutions; and iii) adopt new technical, institutional and financing approaches to wastewater management.

- **Secondly, WSS utilities are not always well run, performing satisfactorily nor operating on a financially viable basis** – a pre-requisite if any of the above challenges are to be met, and good quality services provided to the citizens. Countries must focus their efforts on improvements in these areas if the progress achieved is not to be stalled – or, worse, reversed. Improved utility performance and efficiency will enable service providers to further improve financial viability and bring in the additional financing required to expand coverage and continue to sustain and improve service delivery. Hence, a longer-term approach is needed to create a virtuous cycle in those countries to focus on improving their utility financial viability and creditworthiness, through promoting efficiency improvements which will gradually reduce the needs for overall financing. Stronger financial sustainability will also improve the chances of attracting much-needed commercial financing towards the sector. Doing so will help not only help deliver the access and sustainability SDG agenda, but also reduce the burden on limited fiscal budgets.

The above agendas will need to be addressed against the backdrop of a changing social context and shifting population trends. Total population in the region is decreasing, and people are migrating both out of the region and within it in search for different opportunities. At the same time, inward migration towards the EU overall is increasing (in 2015 and 2016 alone, more than 1 million people entered the European region, mostly fleeing nearby conflict areas). Humanitarian and targeted social inclusion policies for service delivery will need to be further developed, not only to deal with migration aspects, but to address the great disparities in poverty levels – across socioeconomic and ethnic groups and across urban population centers and rural or more dispersed areas. These contrasts exist across most of the countries in the region and indeed is reflected in the level of access to the services by these groups. Seasonality should also to be factored-in for future WSS services sector development. This is because increasing tourism flows will be affecting the planning of WSS services in the future, and the appropriate dimensioning of systems and infrastructure is already an issue in many growing touristic towns across South and Eastern Europe.

Climate patterns are also changing, and increasingly warming temperatures are a reality. Building resilience (both in infrastructure and in institutions) to climate and water-related risks will become critical for countries to continue to effectively and efficiently deliver water and wastewater services. Improved data and knowledge, human talent and new technologies must all be harnessed to do this. Water policies will be required to be climate informed, and WSS utilities from the region – and their staff and management - will need to operate these services and plan for infrastructure development under conditions of higher uncertainty. They will have to learn to do water safety planning in line with their own spatial development and basin planning mechanisms and introduce the use of climate and water availability scenarios modelling to prioritize and execute investments considering the basin level context, under a water security approach.

Finally, stewarding the 21st century WSS sector for improved services in the regional context will require governments in the region to use evidence-based policies, invest in people, and foster partnerships. Government´s will be able to steer much of the sector's development using "smart" policies that factor in the changing context and set the right incentives for key sector stakeholders to do their part. Digitalization of the water industry and new technology will likely continue to provide plenty of tools to improve practices and operations, which "strong" (and smart) utilities will be able to use depending on their specific business needs and priorities. But success will not be possible without investing in people. Skilled and motivated professionals will be needed and in high demand in the region in different fronts in the sector, including scientific investigation and technological innovation, policy making, regulation, utility management and technical operation of the services. At the same time, these professionals will be called to interact effectively amongst them and with other stakeholders at different levels, including regionally, nationally and between central and local levels of sector authorities, as well as with other agents in the basin - including basin authorities, service providers, farmers, industries, and citizens generally. Countries could use opportunities offered by different regional initiatives and platforms to further strengthen their policies and build the capacities of their people and sector professionals. Greater citizen engagement and stronger local, regional and international partnerships, public and private, can nurture and thrive in these strengthened capacities to expand the possibilities for progress and provide a path not only to more sustainable WSS services, but to increased water security for all in the region.

I. INTRODUCTION

1. **In 2015, the World Bank, under the umbrella of the Danube Water Program, undertook a comprehensive review of the water and wastewater services in 16 countries of the Danube region** (Figure 1). These 16 countries represent a great diversity of socioeconomic, development, and geographic realities. They share a joint resource, the Danube; an intertwined history; and a common trajectory toward European integration. The review was captured in a regional report and 16 country notes and was published in May 2015 as A State of the Sector Report (available at https://sos.danubis.org/) and referred to in this report as SoS 2015.

2. **SoS 2015, through a country by country sustainability assessment, shows where improvement opportunities exist in terms of access, quality, efficiency, and financing of water supply and sanitation services.** The report highlights that despite the overall high level of access to services in the region and focus on wastewater collection and management, around 22.5 million people were without access to piped water on their premises and 28 million lacked flush toilets, out of 135 million people in the region. In 2015, countries globally adopted the 2030 Agenda for Sustainable Development and achievement of the Sustainable Development Goal (SDGs), which set new definitions and targets for achieving better and more sustainable water supply and sanitation services (see Chapter IV). The SDGs for water (SDG 6[8]) raise the standard in targets for water supply and sanitation to "universal and equitable access to safe and affordable drinking water for all (6.1)," to be monitored by the proportion of the population using safely managed drinking water services (located on premises, available when needed, free from contamination) and "adequate and equitable sanitation and hygiene for all …" (not shared with other households, where waste is treated and disposed of in situ or transported and treated off-site, with hand-washing facility in the premises).

FIGURE 1: COUNTRIES IN ORIGINAL 2015 STATE OF THE SECTOR REPORT AND IN 2018 UPDATE

SOURCE: WORLD BANK

3. **The State of the Sector Report 2018 update (SoS 2018) presents the state of knowledge on water supply and sanitation (WSS) challenges and opportunities in the Danube region according to the latest available data (from 2015–18) following the same approach and methodology as the SoS 2015, and it identifies trends and sector progress since the 2014–15 review**. As in the first edition, the analysis assumes that the delivery of sustainable services depends on four main dimensions: (i) access to properly built and maintained infrastructure; (ii) the quality of services provided (and customer satisfaction with it); (iii) the efficiency and performance of the service providers

8 See the United Nations website, https://sustainabledevelopment.un.org/sdg6.

that operate and maintain the infrastructure and deliver the services; and (iv) financing mechanisms to expand and maintain the operation of the services to all citizens in the long term.

4. **In addition, the report brings together results and policy recommendations from other World Bank analytical work carried out in the past three years, as a direct response to the knowledge gaps identified in the first edition.** These include a global study on utility aggregation (including case studies from the Danube region) completed under the report Joining Forces for Better Services? When, Why, and How Water and Sanitation Utilities Can Benefit from Working Together (World Bank 2017); a multicountry review on serving those beyond utilities' reach (namely in rural areas), compiled in Beyond Utility Reach? How to Close the Urban-Rural Access Gap: A Review of Rural Water and Sanitation in Seven Countries of the Danube Region (World Bank 2018a); and a review of the situation of wastewater management in the Danube region under the European Union (EU) sphere of influence, condensed in Is the UWWTD Implementation Delivering Results for the People, the Economy, and the Environment of the Danube Region? A Wastewater Management Assessment Based on the World Bank's Engagement (World Bank 2018b). Further, the original Water Utility Performance Index (WUPI) used to analyze the efficiency of service providers in the region has been complemented with key conclusions from a fourth piece of research undertaken under the Danube Water Program (DWP): *Econometric Analysis of the Cost-Efficiency of Water Utilities vs Their Cost Efficiency Frontier*[9] (Mundaca 2019) to quantify potential savings resulting from cost efficiency gains. Finally, 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 Danube Water Program**
> The DWP (www.danube-water-program.org), is a regional technical assistance program supporting smart policies, strong utilities, and sustainable services in the Danube region by partnering with regional, national, and local stakeholders. It is implemented by the World Bank and the International Association of Water Service Companies in the Danube River Catchment Area (IAWD), and funded by a three-phased, €13 million grant from the Government of Austria to develop policy and regulatory instruments and capacity development in the WSS sector in the region's countries. The grant also supports the Third Phase, which kicked off in January 2019, in the broader water sector beyond WSS services, with the aim of establishing a water security platform for the Danube region. The activities supported by the Program fall under four broad categories: (i) analytical and advisory work, by means of new research or consolidation of existing ones in order to improve the overall understanding of the situation and challenges of the sector in the region, and its use to inform evidence-based policies; (ii) knowledge sharing; (iii) capacity development activities; and (iv) a competitive grant window to finance local utility-led initiatives. The DWP's SoS 2015 is its flagship product.

5. **SoS 2018 is organized in a similar way to that of SoS 2015, updating the current sector status and understanding the reasons behind emerging trends.** Chapter II focuses on the overall water resources framework and climate change considerations in the studied countries. Chapter III includes a few highlights and updates in the overall context, organization, and governance frameworks in the various countries for service delivery. Chapter IV describes the level of access to WSS services in the region and progress and trends since SoS 2015. Chapter V deals with the performance of service providers—service quality, efficiency, and overall performance— and progress made since SoS 2015. Chapter VI discusses the financing of services. Chapter VII presents conclusions. Several boxes provide additional information on good practices and key concepts. The report includes two appendixes: Appendix A offers a comprehensive, country-by-country list of indicators with updated data since the last review; Appendix B provides methodological details on the main sections of the report. The report includes a comprehensive list of sources for all data and information used throughout the document. Further information is available on the DANUBIS.org water platform, an online repository of resources for and about WSS services in the Danube region. In contrast to SoS 2015, this regional report is not accompanied by a set of 16 country notes given that the updated timeframe is relatively short (three to four years) to see meaningful developments at the country level. It is expected that a future edition of the SoS report at the end of the Danube Water Program's third phase would include updated country notes that investigate the situation of the broad water sector.

9 This new research piece may be published as a working paper in the future.

6. **This report draws largely from existing public data sources at the national and regional levels, presenting them into a coherent, regional narrative and analysis. In-country data collection (SoS data collection) was coordinated by Austria's Environmental Agency (UBA), which relied on a team of national experts in each of the countries covered by the report, and where possible was validated with key stakeholders in each country.** This report was hence made possible thanks to the 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 waterworks associations. Other data sources include publicly available household survey data in each country, the World Bank World Development Indicators (WDI) and the World Health Organization/United Nations Children's Fund (WHO/UNICEF) Joint Monitoring Programme (JMP), the European Environment Agency (EEA) Water Information System for Europe (WISE), the EU EUROSTAT, the Food and Agriculture Organization (FAO) AQUASTAT, and the International Benchmarking Network for Water and Sanitation Utilities (IBNET) DANUBIS.org database. Notwithstanding the efforts and care to ensure consistency and accuracy of the data and information and to seek their validation, the report includes assumptions and information by sector professionals, which could mean some deviation from official statistics. These or any of the data and information provided could be questioned, because the quality of information systems varies significantly among the countries. The team therefore welcomes comments and corrections and remains available for clarification of data sources and assumptions made.

7. **Given the limits of the data and analysis, policy makers and stakeholders should use these conclusions as a broader framework to critically examine what specific recommendations could be derived for their 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 better in some countries than in others. Some of the data sources might not be fully comparable. Specifically, the World Health Organization/Joint Monitoring Program (WHO/JMP) data on access goes as far back as 2015, and the utility data available for the different countries are not always comprehensive. National averages sometimes mask the significant heterogeneity within a country.

8. **The main aim of the report is to continue supporting an informed dialogue around the sector's challenges and progress since the SoS 2015, as well as around emerging trends and possible reasons behind them.** The methods of analysis include horizontal comparisons among countries at a given point in time and identification of trends within different groups of countries or regions over data from SoS 2015 to 2018. The aim of this report is not to provide a definitive or comprehensive set of policy recommendations applicable across the board, but rather to provide policy makers and other national sector stakeholders with solid information on current sector status, and well as on policy options arising from the analysis of recent progress and evidence from the World Bank's recent research on specific areas that the countries could adopt to address sector challenges and opportunities.

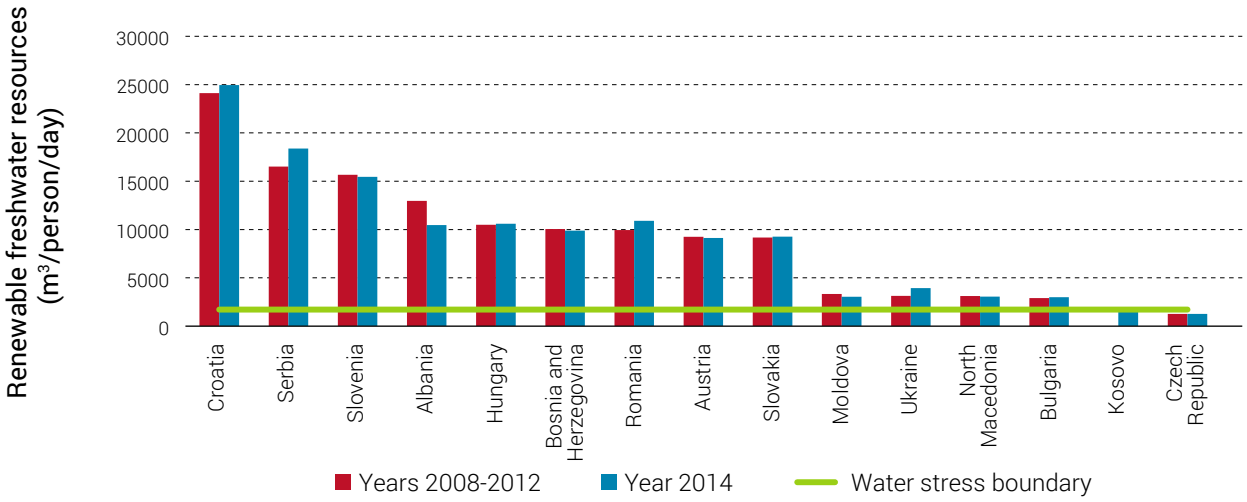
II. WATER RESOURCES AND CLIMATE CHANGE

9. **The Danube River Basin is the second-largest river basin in Europe, covering 801,463 square kilometers, with more than 133 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). 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 more than 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 European Union (EU).

A. Availability and Quality

10. **Availability of renewable water resources within the Danube Basin has remained stable for the past five years with no country considered water scarce[10].** The Danube River Basin continues to be relatively rich in water resources, but this richness is not evenly spread, and there are significant differences among different parts of the basin (Figure 2). The Czech Republic and Kosovo are the only countries in the region that can be qualified as water stressed countries, with a yearly renewable water resources per capita below the threshold of 1,700 cubic meters (Falkenmark, Lundqvist, and Widstrand 1989). Differences in the data reported between 2008 and 2012 and to 2014 may be a result of less water consumption due to declining populations (more available water per capita), yearly changes due to increased or decreased precipitation, or better water data availability.

FIGURE 2: RENEWABLE FRESHWATER RESOURCES PER CAPITA PER COUNTRY IN DANUBE REGION, 2008–12, 2014



SOURCES: DATA FOR KOSOVO FROM MINISTRY OF ENVIRONMENT AND SPATIAL PLANNING 2015; FAO 2018.
NOTE: DATA FOR MONTENEGRO UNAVAILABLE.

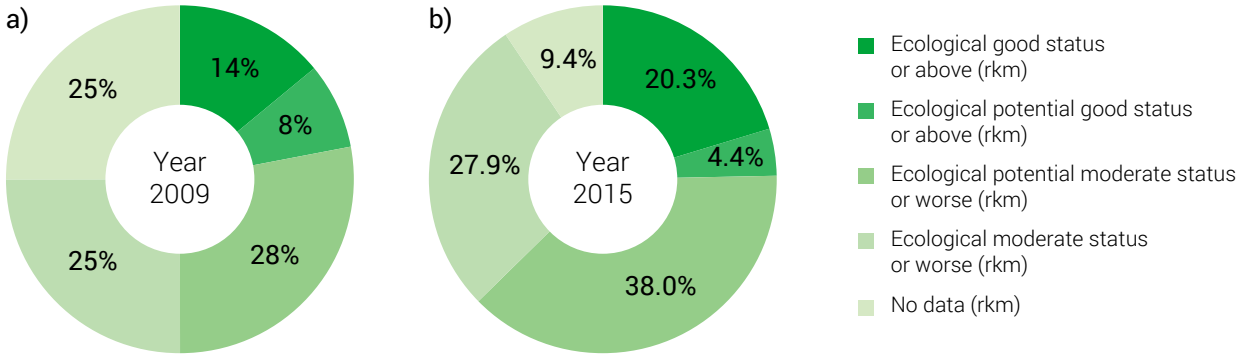
11. **Since 2009, the surface water bodies in the Danube region reaching good ecological[11] or potential good status and good chemical status have increased by 3 percent and 25 percent, respectively** (Figure 3, panels a and b, and Figure 4, panels a and b). This improvement in ecological status, a key element of the EU Water Framework Directive (WFD), could be attributed to the implementation of actions stemming from the 2009 Danube River

10 Threshold for water scarcity is set at less than 1,000 cubic meters of renewable resources per capita per day.

11 Ecological status is an assessment of the quality of the structure and functioning of surface water ecosystems. It shows the influence of pressures (e.g., pollution and habitat degradation) on the identified quality elements.

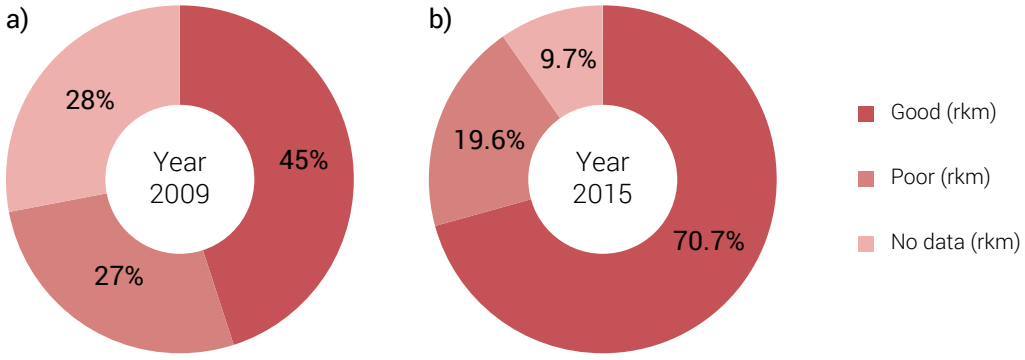
Basin Management Plan (RBMP), in which the basin experienced improvements in terms of pollution reduction or improved hydromorphology. At the same time, more data and information have been gathered on the quality of rivers, transitional waters, and coastal waters, thus closing knowledge gaps. This has resulted in the reduction of the share of water bodies displaying "no data" from 25 percent in 2012 to 9.4 percent in 2015. The information on chemical status is based on the analysis of priority substances in water and does not include data on mercury in biota (except in the Czech Republic). This parameter is a decisive element in evaluating the chemical status of surface water bodies, and not including it may lead to biased reporting.

FIGURE 3: ECOLOGICAL STATUS OF RIVERS IN DANUBE RIVER BASIN, 2009 AND 2015



SOURCE: INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE DANUBE RIVER 2015.
NOTE: PERCENTAGES REFLECT LENGTH IN RELATION TO TOTAL LENGTH.

FIGURE 4: FIGURE 4 CHEMICAL STATUS OF RIVERS IN DANUBE RIVER BASIN, 2009 AND 2015

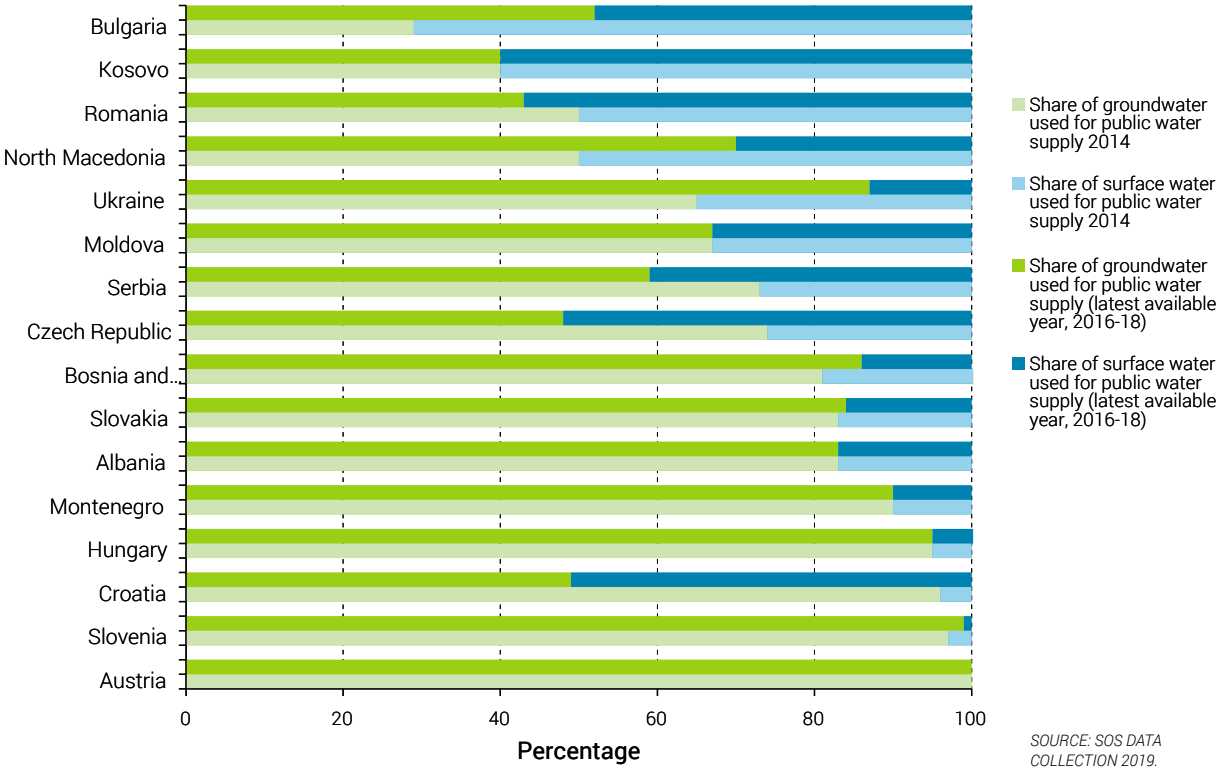


SOURCE: INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE DANUBE RIVER 2015.
NOTE: PERCENTAGES REFLECT LENGTH IN RELATION TO TOTAL LENGTH.

12. **The significant water management issues identified for the Danube River Basin continue to include organic matter excess and high levels of nutrients, particularly affecting groundwater bodies of basinwide importance.** Nitrogen and phosphorus from untreated and inadequately treated wastewater; agricultural and industrial activities; humanmade chemicals; metals; oil and its compounds; organic micropollutants; pesticides; medications from wastewater, industry, and urban stormwater run-off; and combined sewer overflows—including from agriculture—remain major risks (ICPDR 2015). Many countries are struggling with the compliance with EU directives, especially with the Urban Waste Water Treatment Directive (UWWTD); hence, progress in the reduction of nutrients entering water bodies is slow. UWWTD agglomerations are responsible for only a part of total nutrients entering water bodies. Point sources and urban run-off account for 26 percent and 51 percent of total nitrogen and phosphorus emitted into the Danube River Basin, respectively (World Bank 2018b). Diffuse pollution represents the most important pollution pressure in the Danube River Basin, and its better management represents an important area for improving the ecological status of river basins.

13. **For most countries in the region, groundwater remains the major source for drinking water production, with some country-level changes regarding the proportion between groundwater and surface water use compared to 2015.** For example, in the Czech Republic and Serbia groundwater use for drinking water production has decreased, while Ukraine and Bulgaria present an opposite trend (Figure 5). In Serbia, this evolution may result from the decrease in existing wells capacities and from low maintenance of existing source fields. Moreover, new water intakes and associated facilities are mainly built using surface water. In Bulgaria, the opposite trend has been observed. Urban areas, which benefited from large amounts of asset investments, are mainly supplied by surface water. On the contrary, rural areas are supplied with groundwater and have suffered from underinvestment, resulting in increasing water losses, which induces a higher consumption of groundwater.

FIGURE 5: RATIO BETWEEN GROUND AND SURFACE WATER AS WATER SUPPLY SOURCE IN DANUBE REGION, 2015 AND, VARYING, 2016–18



SOURCE: SOS DATA COLLECTION 2019.

B. Resource Management

14. **Water management in the Danube River basin is driven by the principles of the EU WFD under the auspices of the International Convention for the Protection of the Danube River (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 RBMP in conformity with the WFD. The plan was first adopted in 2009 and was 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. It aims to ensure that all waters meet "good status," which is the ultimate objective of the WFD.

15. **All countries except Montenegro have set up basin management authorities and prepared RBMPs, primarily driven by ambition to comply with the WFD requirements.** This represents an important increase compared to 2015, where only-two thirds of the countries had installed effective basin authorities and half of the countries had elaborated RBMPs. Following WFD requirements, all EU member states have completed and approved RBMPs. Non-

EU member states follow a similar trend. For example, Bosnia and Herzegovina has prepared RBMPs for all its river basins while Albania, Moldova, and Serbia have done so in most of their river basins. Furthermore, management plans are under preparation in Kosovo, North Macedonia, Montenegro, and Ukraine. These findings emphasize that EU water legislation is a powerful driver for candidate and potential candidate countries to formalize their water policies.

16. **In almost all countries of the region, water extraction rights and wastewater discharge permits are implemented and are used to collect resources.** Compared to three years ago, these fees are systematically charged and perceived, except in Kosovo. Nevertheless, for most countries, the funds collected are not necessarily assigned to the water supply sector spending, thus not complying with "water pays for water" policy principle. In addition, the allocation of financial resources is largely done on arbitrary or political basis in almost all countries, and the provenance and use of the funds are not made public, underlining a lack of transparency. Table 1 summarizes the main characteristics of water resources management in the reviewed countries.

TABLE 1: MAIN CHARACTERISTICS OF WATER RESOURCES MANAGEMENT IN DANUBE REGION (2017)

Country	Status of basin management plans	Enforcement and charging for water extraction rights	Assignment and enforcement of wastewater discharge permits	Usage of resources from rights and permits	Basis for allocation of funds	Transparency over funds usage
Albania	Completed in most basins	Yes	Contemplated but not enforced	General budget, from which funds are assigned	Largely done on arbitrary or political basis	Provenance and use of funds not made public
Austria	Completed in all basins and approved	Yes	Yes	No financial resources are collected	No dedicated financing instrument	No dedicated financing instrument
Bosnia and Herzegovina	Completed in all basins and approved	Yes	Yes	Dedicated fund	Largely done on arbitrary or political basis	Provenance and use of funds are made public
Bulgaria	Completed in all basins and approved	Yes	Yes	General budget, from which funds are assigned	Largely done on arbitrary or political basis	Provenance and use of funds not made public
Croatia	Completed in all basins and approved	Yes	Yes	Dedicated fund	Largely done on arbitrary or political basis	Provenance and use of funds are made public
Czech Republic	Completed in all basins and approved	Yes	Yes	Dedicated fund	Largely done on arbitrary or political basis	Provenance and use of funds are made public
Hungary	Completed in all basins and approved	Yes	Yes	General budget, from which funds are assigned	No dedicated financing instrument	No dedicated financing instrument
Kosovo	In preparation in some basins	Yes, but not systematically	Yes, but not systematically	General budget, from which funds are assigned	No dedicated financing instrument	No dedicated financing instrument
Moldova	Completed in most basins	Yes	Yes	Dedicated fund	Largely done on arbitrary or political basis	Provenance and use of funds not made public
Montenegro	In preparation in some basins	–	–	Dedicated fund	Largely done on arbitrary or political basis	Provenance and use of funds are made public
North Macedonia	In preparation in some basins	–	–	–	–	–
Romania	Completed in all basins and approved	Yes	Yes	General budget, from which funds are assigned	Largely done on arbitrary or political basis	Provenance and use of funds not made public
Serbia	Completed in most basins	Yes	Yes	General budget, from which funds are assigned	Largely done on arbitrary or political basis	Provenance and use of funds not made public

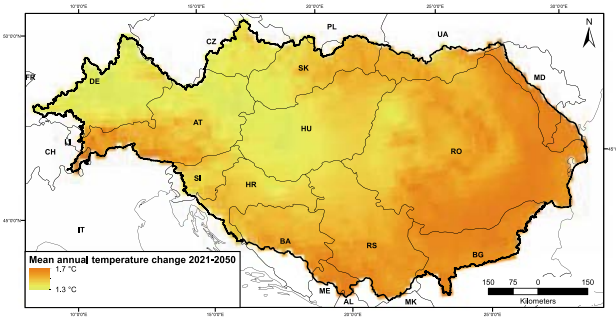
Country	Status of basin management plans	Enforcement and charging for water extraction rights	Assignment and enforcement of wastewater discharge permits	Usage of resources from rights and permits	Basis for allocation of funds	Transparency over funds usage
Slovakia	Completed in all basins and approved	Yes	Yes	Dedicated fund	Largely done on technical grounds	Provenance and use of funds are made public
Slovenia	Completed in all basins and approved	Yes	Yes	Dedicated fund	Largely done on arbitrary or political basis	Provenance and use of funds are made public
Ukraine	In preparation in some basins	Yes	Yes	General budget, from which funds are assigned	Largely done on arbitrary or political basis	Provenance and use of funds not made public

SOURCE: SOS DATA COLLECTION 2019.
NOTE: — = NOT AVAILABLE.

C. Climate Change

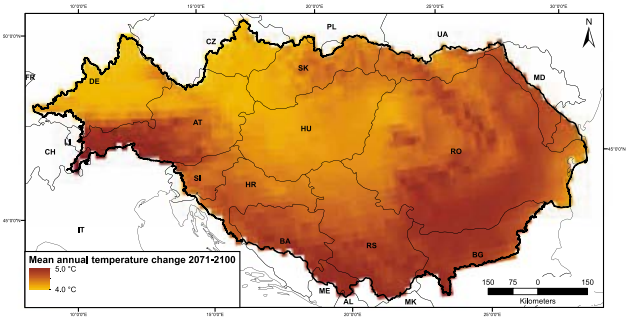
17. **For the period from 2021 to 2050, an increase in annual mean temperature between 1.3°C in the upper and middle parts of the Danube River Basin and up to 1.7°C in the lower parts are projected** (Figure 6). Furthermore, in the far future (2071 to 2100), an increase between 4°C and 5°C is projected (Figure 7) (ICPDR 2018). Compared to the first study, dated 2012, the new results, dated 2018, show significant temperatures increases from northwest to southeast, both annually and in all seasons.

FIGURE 6: ESTIMATED ANNUAL MEAN TEMPERATURE TRENDS IN DANUBE REGION, 2021–50



SOURCE: ICPDR 2018.

FIGURE 7: ESTIMATED ANNUAL MEAN TEMPERATURE TRENDS IN DANUBE REGION, 2071–2100



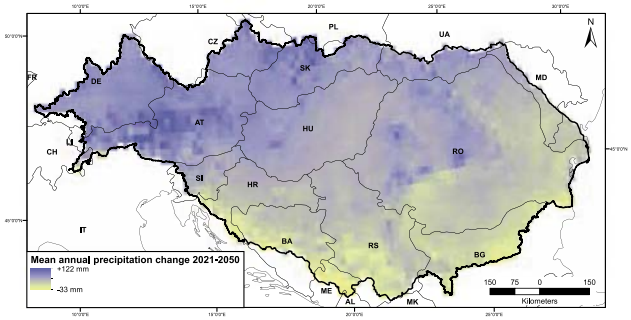
SOURCE: ICPDR 2018.

18. **Overall, small precipitation changes are expected, with the mean annual precipitation sum remaining almost constant.** This is due to the Danube Basin's location in a transition zone between increasing (Northern Europe) and decreasing (Southern Europe) future precipitation. See Figure 8 and Figure 9. However, in comparison to the first study in the SoS 2015, recent models show a much higher intensification of seasonal changes, with a strong decrease in summer precipitation and an increase in winter precipitation. Particularly in the southeastern parts a reduction of about 25 percent and 45 percent is shown in the scenario results.

19. **The above-mentioned changes in temperature and precipitation will likely cause a reduction in water availability,** with changes in the seasonal run-off pattern, mainly triggered by reduced snow storage, strong seasonality of precipitation, and increasing evapotranspiration. Droughts and low flow are likely to become more intense, frequent, and longer in the south and east of the Danube Basin, with a shift of the affected areas to the north (Ludwig Maximilians Universität Munich 2018). The updated climate change study also predicts an increase in floods due to an increase in heavy rain fall events with a high spatial variability; small and mountain catchments appearing to be the most affected areas.

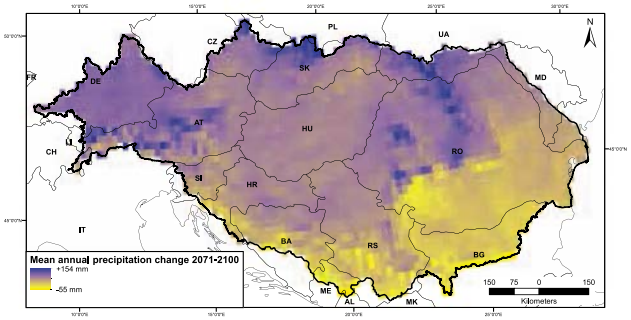
20. **A number of Danube countries are addressing climate change issues such as water scarcity and drought in their national RBMPs.** Furthermore, in 2010, the ICPDR was asked to develop a Climate Adaptation Strategy for the region. In December 2012, a Strategy on Adaptation to Climate Change was finalized and adopted. This document

FIGURE 8: ESTIMATED ANNUAL MEAN PRECIPITATION TRENDS IN DANUBE REGION, 2021–50



SOURCE: ICPDR 2018.

FIGURE 9: ESTIMATED ANNUAL MEAN PRECIPITATION TRENDS IN DANUBE REGION, 2071–2100



SOURCE: ICPDR 2018.

provides an outline of the climate change scenarios for the basin and the expected water-related impacts. It also provides an overview of potential adaptation measures, including "no-regret measures" and "win-win measures," which are to be implemented during the second RBM cycle (2015–21).

21. **In addition to the climate change measures included in RBMPs, most countries in the region have adopted national climate change strategies** (Table 2). These national documents are not specifically targeted toward the WSS sector, but encompass a wider scope. Nevertheless, they all address, to a certain extent, water-related issues. Support for the development of such strategies in a few candidate countries has been provided by the European Commission (EC) through the Instrument for Pre-Accession Assistance (IPA) (e.g., Serbia and Montenegro) or the United Nations Development Program (UNDP), the Austrian Development Agency (ADA), and other donor institutions in noncandidate countries (e.g., Kosovo and Moldova).

TABLE 2: CLIMATE CHANGE ACTIONS PER COUNTRY IN DANUBE REGION

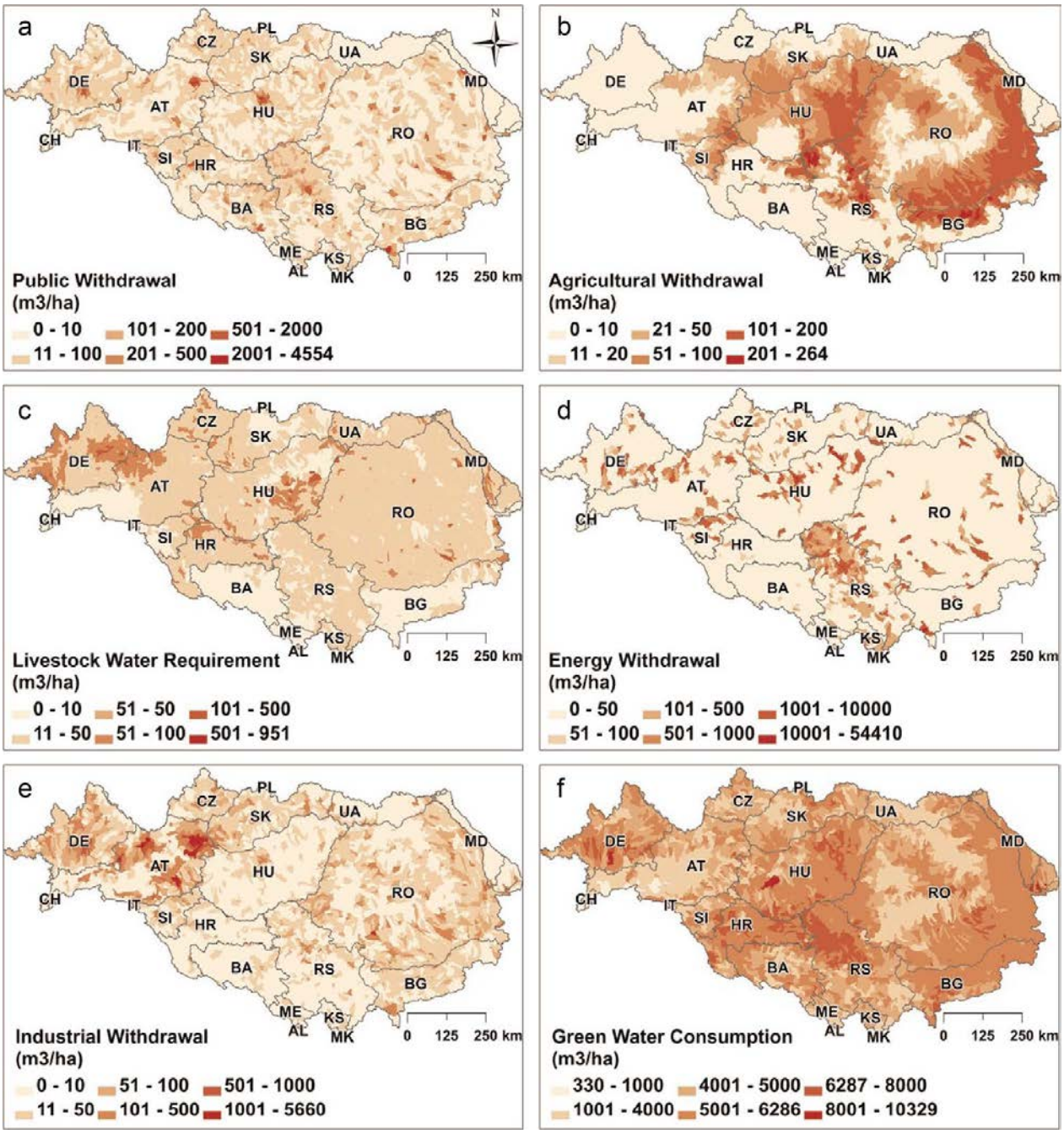
Country	National climate change plan or strategy
Albania	National Appropriate Mitigation Actions (until 2030), National Climate Change Adaptation Planning, National Climate Change Strategy, and the climate change related legislation (2016)
Austria	Austrian Strategy for the Adaptation to Climate Change (update 2017)
Bosnia and Herzegovina	Adaptation strategies for climate change and low-emission (2013)
Bulgaria	Third action plan on climate change 2013–20 (2012)
Croatia	Climate Change Adaptation Strategy with Action Plan (2017)
Czech Republic	Strategy on Adaptation to Climate Change (2017)
Hungary	Second Climate Change programme (2017)
Kosovo	Climate Change Strategy 2019–28 and Action Plan on Climate Change 2019–21 (2018)
Montenegro	National Strategy in the Field of Climate Change (2015)
Moldova	Climate Change Adaptation Strategy (2014)
North Macedonia	Macedonian Climate Change Communication and Action Plan (2013)
Romania	National Climate Change Strategy for the period 2013–20 (2012)
Serbia	Under preparation with support from the EU: Climate Strategy and Action Plan Strategy
Slovak Republic	Adaptation Strategy of the Slovak Republic on the Adverse Effects of Climate Change (2014)
Slovenia	Strategic Framework for Climate Change Adaptation (2016)
Ukraine	Concept for the Implementation of the State Policy in the Field of Climate Change for the Period until 2030 (2016)

SOURCE: SOS DATA COLLECTION 2019.

22. **Sustaining the multiple uses of water in the Danube region will require governments to adopt a water security approach for its management.** As shown in Figure 10, panels a–f, water withdrawals in the region support public

water service provision, agricultural, livestock, industrial production, as well as the maintenance of ecological flows for ecosystem services. Water security is understood as the overarching goal of water management, delivering water services to meet the needs of communities, sustaining and leveraging water resources within the means of the basins, and mitigating water risks. This includes leveraging productive aspects of water for human well-being, livelihoods, environment, and socioeconomic development, and the management of destructive impacts of water such as floods, droughts, and pollution. Danube region governments should focus on producing accurate water balances at the appropriate spatial and temporal scales, considering current and future demands, socioeconomic development trajectories, ecological needs, and climate projections, among others, to guide policy making serving the best outcomes for society, the environment, and the economy.

FIGURE 10: WATER WITHDRAWALS BASED ON USES IN DANUBE REGION



SOURCE: ALOE KARABULUT ET AL. 2015.

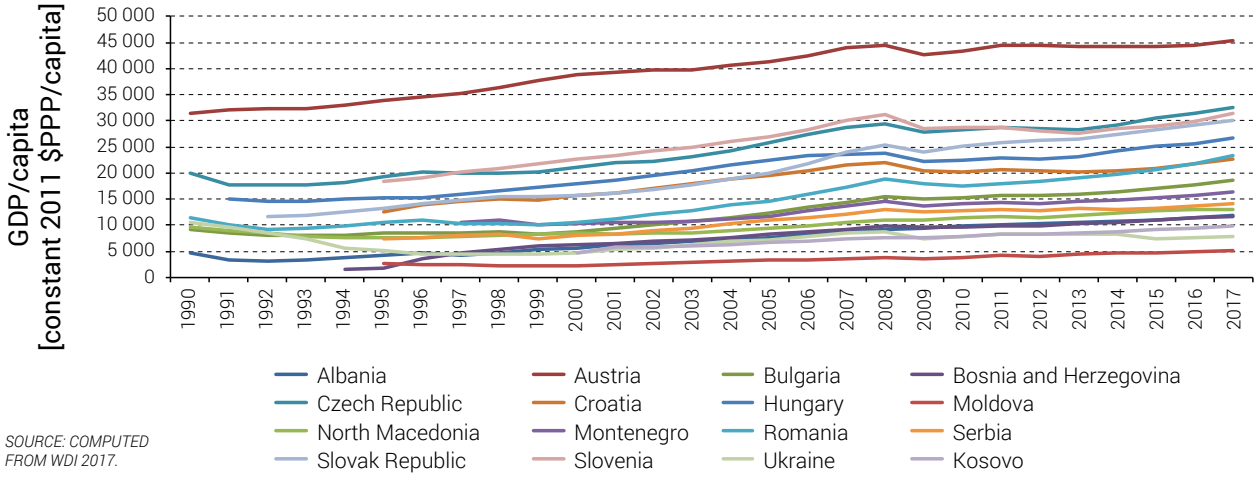
III. CONTEXT AND ORGANIZATION OF SERVICES

23. This chapter includes key highlights and extracts from the original SOS 2015 in terms of the historical perspective, socioeconomic situation, and administrative organization, as well as on the policy, institutional, and regulatory frameworks for service provision in the different countries of the region, and any recent relevant developments that occurred in these areas from 2015 to 2018. For those readers that would like to have further detail and information on the context and organization of the services, the authors strongly recommend reading Chapters II and III of the SoS 2015, which provide a more comprehensive picture and might help to deepen the understanding of current trends, given that water services are strongly dependent on the political, socioeconomic, and natural context in which they are being delivered.

A. Socioeconomic Context

24. **Differences in gross domestic product (GDP) per capita are still significant across the countries within the Danube watershed. In 2017, the average GDP per capita in the region was US$20,055 PPP, ranging from US$5,190 PPP in Moldova to US$45,437 PPP in Austria** (Figure 11). The economic crisis of 2008 resulted in economic recessions for the years 2009 to 2012 and has slowed down the economic catching up process with the western part of the European Union (EU). Over the past 10 years, Moldova, Kosovo, and Albania have witnessed the highest increase in their GDP per capita, which rose by 30 percent or more (in the period). On the contrary, over the same period of time, Austria, Croatia, and Slovenia have seen their GDP per capita progress by only 3 percent or less. In the meantime, Ukraine GDP per capita decreased by 10 percent mainly because of the political situation the country has faced since 2014. Although GDP growth seems to be common to all countries, the GDP per capita spread remains high. As a result, one of the challenges of the region is to improve economic convergence between countries.

FIGURE 11: GDP PER CAPITA IN DANUBE REGION, 1990–2017

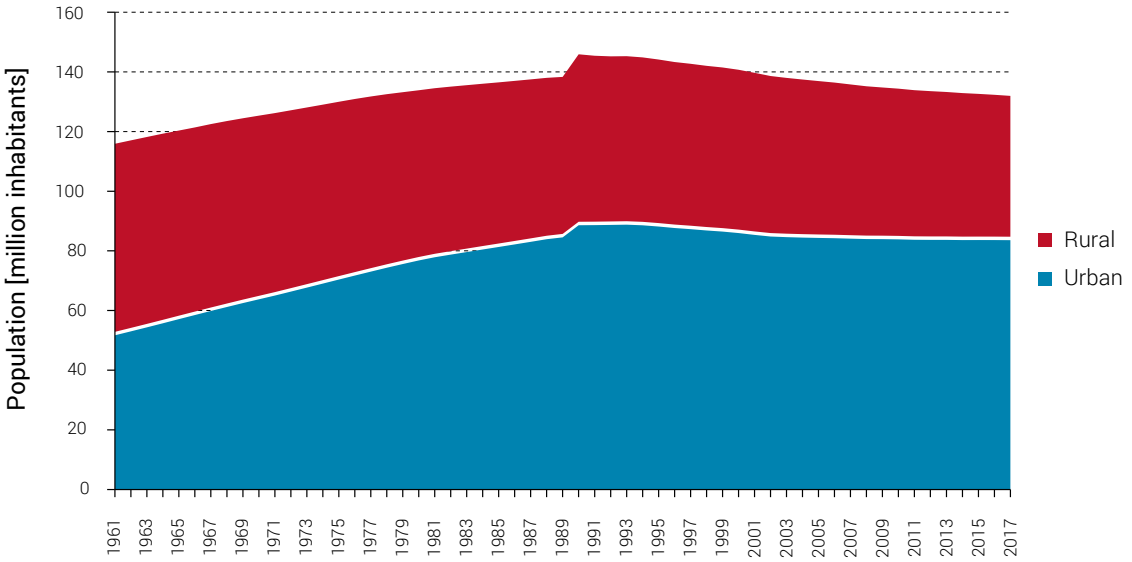


SOURCE: COMPUTED FROM WDI 2017.

25. **The continued declining trend of population (from 132.6 million in 2015 to 131.9 million in 2017) in countries within the Danube watershed is due to a combination of low natural population growth and outward migration, which continues to be a concern for some countries in the region.** Although five countries in the region (Austria, Czech Republic, Kosovo, Montenegro, and Slovenia) present increasing population trends (albeit at slow rate), the overall population of the basin is expected to continue decreasing in the coming years (Figure 12). In some countries (Bulgaria, Macedonia, Ukraine), the decline could reach -6 percent or -7 percent (ICPDR 2015). However, over the past five years, the pace of depopulation in the overall region has slightly slowed down compared to previous years, stabilizing at a yearly level of -0.24 percent. Since the end of the Soviet era in 1990, the split between urban and rural populations has remained relatively unchanged or has shown a slow urbanization rate, with rural inhabitants

representing 39 percent of the watershed's total population in 1990 and 37 percent in 2017. In 2017, Bosnia and Herzegovina, Kosovo, and Moldova were the only countries of the region where the rural population exceeded the urban one. Although mostly rural areas are depopulating, some urban areas have also declined, 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 12: POPULATION TRENDS OF COUNTRIES IN THE DANUBE WATERSHED, 1961–2017

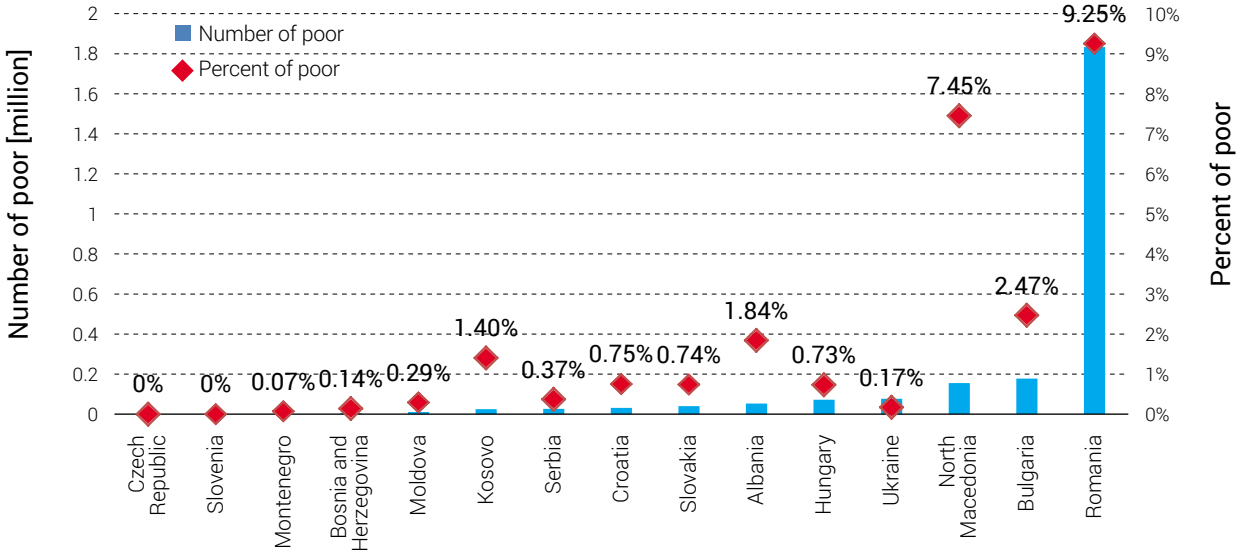


SOURCE: WORLD DEVELOPMENT INDICATORS 2017.

NOTE: KOSOVO AND SERBIA MISSING FROM OVERALL DATA.

26. **About 2.5 million people within the Danube water region live on less than US$2.50 per day (PPP), which represents a slight increase in measured poverty since the last SoS report.** On average, this means that about 1.7 percent of the total population in the area is poor. As Figure 13 shows, by far the largest incidence of poverty is in Romania with 9.5 percent of the population living under US$2.50 per day, which in absolute numbers represents about 1.8 million people.

FIGURE 13: NUMBER AND SHARE OF POOR POPULATION IN DANUBE REGION



SOURCE: WORLD BANK POVCALNET DATABASE 2018.

NOTE: CATEGORY OF POOR MEANS PEOPLE WHO CONSUME LESS THAN US$2.50 PER DAY, PPP. DATA ARE REPORTED FOR DIFFERENT YEARS, TAKING 2015 AS THE LATEST AVAILABLE REFERENCE YEAR.

B. EU Integration as a Driver

27. **There have not been official changes in the EU membership status of the Danube River Basin countries since the last report in 2015, but actions toward EU integration have been intensified and prioritized in most of the countries.** Out of 16 countries in the region, eight are EU member states (Austria, the Czech Republic, Slovakia, Slovenia, Hungary, Romania, Bulgaria and Croatia); four have formal EU candidate status (Serbia, North Macedonia, Albania, and Montenegro) and are in different levels of accession process (Table 3). Bosnia and Herzegovina and Kosovo, which were granted the status of potential candidate, have signed a Stabilization and Association Agreement (SAA) with the EU that entered in force, respectively, in 2015 and 2016. Two countries (Moldova and Ukraine) have not yet defined formal EU accession steps, although they both ratified Association Agreements with the EU that became effective in 2016 and 2017, respectively. Specific actions taken since 2015 are shown in Table 3.

TABLE 3: PROGRESS OF DANUBE COUNTRIES TOWARD EU INTEGRATION SINCE 2015

Country	Year	EU status	Step forward
Albania	2014	Candidate	Further progress in the accession process will depend on achievements in some key areas such as fight against corruption and organized crime, reform of judicial system, and constructive and sustainable political dialogue between government and opposition. With regard to Chapter 27 on Environment, the Ministry of Infrastructure and Energy and Ministry of Environment have started a close cooperation with EU in the water sector, including an effective planning of screening, preparation of future negotiating position, and use of EU grants, and are currently undertaking a gap analysis with EU acquis (2019).
Bosnia and Herzegovina	2015	Potential candidate	SAA entered into force in 2015. In September 2016, the Council invited the Commission to present an Opinion on Bosnia and Herzegovina application. The Opinion is currently under preparation.
Kosovo	2016	Potential candidate	SAA entered into force in 2016.
Moldova	2016	Association Agreement ratified	In November 2018, the EU confirmed reduction of financial support due to deterioration of rule of law and democracy.
Montenegro	2010	Candidate	Accession negotiations opened in June 2012. Following the screening process, in December 2018 Montenegro opened accession negotiations for Chapter 27 on Environment and Climate Change.
North Macedonia	2005	Candidate	Following the resolution of the naming dispute with Greece in June 2018, whereby the name of Republic of North Macedonia was accepted, the EU approved the start of accession talks provided certain conditions are met.
Serbia	2012	Candidate	In January 2014, the first Intergovernmental Conference took place, triggering Serbia's accession negotiations. The screening exercise for Chapter 27—Environment took place in 2014, and the screening report was adopted by the Council in December 2016 without an opening benchmark. Serbia has been invited by the Presidency in December 2016 to submit its negotiating position for Chapter 27.
Ukraine	2017	Association Agreement ratified	In September 2017 Ukraine signed the Ukraine–European Union Association Agreement. After the elections of June 2018, Ukraine's new government has been characterized for prioritizing EU integration as one of its policies.

SOURCE: EC WEBSITE.

NOTE: EU = EUROPEAN UNION; SAA = STABILIZATION AND ASSOCIATION AGREEMENT.

28. **Regardless of Danube countries' EU membership status, EU accession and integration process has been one of the key drivers for WSS services' development and policies in the region for the past 20 years.** EU legislation, through the overarching Water Framework Directive (WFD) (2000/60/EG) and its subdirectives, such as the Drinking Water Directive (DWD) (98/83/EC) and the Urban Wastewater Treatment Directive (UWWTD) (91/271/EEC), governs the WSS sector in member countries. It is used to set directions, with time-bound targets, to accomplish full compliance. New EU member states are focusing their water policy objectives on reaching full compliance with EU water-related legislation. Candidates and potential candidates, as part of their preaccession stage and Association Agreements, commit to harmonizing their national legislation and prioritizing sector investments and policies toward compliance with the EU acquis.

29. **Most countries have developed national WSS sector development strategies that include alignment with EU standards** (Table 4). For instance, Albania and Kosovo have included convergence and harmonization with EU water legislation as core objectives in their respective national water strategies (see Box 1 for a focus on Albania's efforts). Official candidate status opens opportunities for governments to access the financial Instrument for Pre-Accession Assistance (IPA), and for member states to access the Cohesion Fund, both directed at compliance. The strong focus of most of those strategies on EU compliance has led to important sector agendas such as ensuring universal access to the neglected in favor of large wastewater infrastructure investments; some countries are starting on a low point with regard to meeting the water SDG 6 indicators of safe services for all.

Box 1 Albania WSS Sector Strategy and EU Commitments on Water and Wastewater Directives

In the perspective of the EU accession process, Albania has included in its National Strategy of Water Supply and Sewerage 2011-2017 the objective to move toward convergence of Albanian Law with the EU Water Directives. Such objectives include water-related legislation proposal for parliamentary approval to support the WFD, the DWD, and the UWWTD convergence, as well as cost recovery principle adoption. In the 2019–30 strategy, this effort is to be sustained through a phased approach that should lead to the opening and negotiating of Chapter 27. In the meantime, the Ministry of Infrastructure and Energy and Ministry of Environment have started a close cooperation with EU in the water sector, including an effective planning of screening, preparation of future negotiating position, and use of EU grants, and are undertaking a gap analysis with EU acquis with support from the Swedish Development Agency.

30. **The European Commission (EC) is undertaking a revision of the EU water legislation, with proposed changes, if adopted, expected to drive more inclusive water policy development in the Danube countries.** The Fitness Check will cover the performance of the WFD (including the Groundwater Directive and the Environmental Quality Standards Directive) and the Floods Directive, for which the public consultation period closed in March 2019. Running a little ahead is the evaluation of the UWWTD, which seeks to assess the effectiveness, efficiency, coherence, relevance, and EU added value of the Directive since its entry into force 25 years ago. The related consultation period ended in October 2018. In addition, the EC adopted in February 2018 a proposal for a revised Drinking Water Directive (DWD) to improve the quality of drinking water and provide greater access and information to citizens. The proposal for modernizing the 20-year-old DWD comes as a result of the REFIT evaluation, the implementation of the Commission's response to the European Citizens' initiative Right2Water and as a contribution to meeting the UN Sustainable Development Goals (SDGs). The proposal, which is in the process of being negotiated with the European Parliament, contains an obligation for EU countries to improve access to safe drinking water for all and to ensure access for vulnerable and marginalized groups.

TABLE 4: CHARACTERISTICS OF NATIONAL GOVERNANCE STRATEGIES IN DANUBE REGION

Country	National governance strategy	Time frame	Main targets
Albania	National Strategy of Water Supply and Sewerage (presently being updated)	2011–17 (update 2019–30)	• Increase WSS coverage, reduce NRW, improve continuity • Move toward convergence with EU water-related legislation • Improve governance and regulation in the sector
Austria	National plan for the management of waters	2015–21	• Maintenance and renewal of the assets • Resource protection from micropollutants and adaptation to climate change
Bosnia and Herzegovina	Water Management Strategy for the Federation of Bosnia and Herzegovina Integrated Water Management Strategy of the Republic of Srpska	2010–25 2014–44	• Development of wastewater treatment plants • Protection of water resources • Convergence with EU water legislation • Improving sustainability of investments
Bulgaria	Strategy for the Development and Management of the Water Supply and Sewerage	2014–23	Reach full compliance with EU water legislation
Croatia	Water Management Strategy	2008–23	Reach full compliance with EU water legislation

Country	National governance strategy	Time frame	Main targets
Czech Republic	Strategy of the Ministry of Agriculture of the Czech Republic with a view to 2030	2016–30	• Sustainable use of water resources • Strengthening of regulation and control over WSS systems through benchmarking • Feasibility study to establish a national water regulatory authority • Introduction of new subsidy scheme for WSS • Update of the WSS development plan taking into account climate change issues
Hungary	Drinking Water Quality Improvement Program Waste water Program	2014–27 2014–27	Reach full compliance with EU water legislation
Kosovo	National Water Strategy	2017–34	• Full water service coverage by 2034 • 75% to 80% sewerage service coverage by 2034 • Full cost recovery by 2026 • Convergence and harmonization with EU water legislation
Moldova	WSS Strategy	2013–27	• Achievement of the 2015 MDGs for safe water supply by the year 2020, for good wastewater system by 2025 • Reduction of water-borne diseases and related illnesses • Water Safety Plans and convergence with EU DWD requirement • Advancement in the implementation of the UWWTD • Develop continuous monitoring of WSS services' performance and update targets to achieve milestone objectives of the strategy • Improve cost recovery • Development of a subsidy scheme for vulnerable and poorer population segments in urban areas
Montenegro	National Strategy for Sustainable Development	2016-30	• Reduce water supply network losses in Montenegrin municipalities to 30% • Sewerage network expansion to 85% • Full compliance with UWWTD • Alignment with WFD and DWD
North Macedonia	National Water Strategy	–	• Increasing the level of drinking water supply of the population. • Introduction of the economic price of water. • Reducing water losses from public water supply systems. • Increase safety procedures for public water supply. • Increase the current level of connection rate to sewage system and wastewater treatment plants. • Contribution to sustainable water management with rational and sustainable use of water resources. • Alignment with EU water legislation.
Romania	National Strategy	2016-2021	Reach full compliance with EU water legislation
Serbia	Strategy for water management until 2034	2016-2034	• Increase continuity, WSS coverage, reduce NRW by 25% by 2034, • Regionalization of WSS services • Improvement of drinking water quality trough construction of water treatment plants • Development water distribution network and sewerage network • Constructions of WWTP for all settlements above 5,000 inhabitants • Introduce of pretreatment of industrial wastewater • Enhance the water sector institutional framework with clearly defined competencies across responsible administrative bodies at state level • Encourage aggregation of public water supply or public sewer operators

Country	National governance strategy	Time frame	Main targets
Slovak Republic	Orientation, principles, and priorities of the Slovak Republic's water policy until 2027	2015–27	• Achieve good status of water bodies • Efficient use of water resources • Protection from floods, drought, and water scarcity and adaptation to climate change
Slovenia	Water Supply Action Plan	2016–21	• Generic targets: safe and reliable drinking water supply, protection of water resources, and cost-effective water supply
	Urban wastewater collection and treatment action plan	2005–17	• Specific targets: rehabilitation of water supply systems and water loss reduction, restoration of old burdens (old dumping sites) on drinking water protection zones; development of emergency protocols for water supply; development of spare water resources
Ukraine	Draft	n.a.	n.a.

NOTE: DWD = DRINKING WATER DIRECTIVE; EU = EUROPEAN UNION; MDG = MILLENNIUM DEVELOPMENT GOAL; N.A. = NOT APPLICABLE;
NRW = NONREVENUE WATER; UWWTD = URBAN WASTEWATER TREATMENT DIRECTIVE; WSS = WATER SUPPLY AND SEWAGE; WWTP = WASTEWATER TREATMENT PLANT; — = NOT AVAILABLE.

31. **Most of the new member states in the region are struggling to reach EU water legislation compliance in due time, especially to comply with the UWWTD requirements** (World Bank 2018b). In fact, an infringement procedure has been opened against Bulgaria in July 2017 when the Commission sent a letter of formal notice. Romania is currently significantly delayed according to this schedule, with full compliance forecasted to be reached by 2027–30, far beyond the final deadlines of 2015 and 2018. The time allocated to new EU member states for transitioning toward UWWTD compliance was almost universally underestimated during negotiations, indicating unrealistic assessment of the magnitude of efforts required to achieve compliance. Deadlines for compliance with the UWWTD vary across countries: for EU-15 it was set to December 31, 2005, whereas for new member states from Central and Eastern Europe, staged transitional periods have been agreed upon within individual accession treaties. In principle, however, these transitional periods did not exceed 2015 (except for Romania, in which agglomerations with less than 10,000 PE must comply with the Directive by the end of 2018; and Croatia, which has deadlines between 2018 and 2023). Deadlines have already expired and implementation delays toward full compliance have occurred in all five observed older regional member states (the Czech Republic, the Slovak Republic, Hungary, Slovenia, and Bulgaria) of the Danube region. It should be also recognized that the original EU-15 had 14 years for compliance (the Directive was adopted in 1991 with a 2005 deadline for EU-15), while this period was 11 years for EU-13, except Romania, with 14 years maximum for less than 10,000 PE. Although pending deadlines still exist Croatia (2023), it is doubtful that it will achieve compliance in due time because of the current annual investment and rate of UWWTD compliance.

C. Service Provision and Regionalization Reforms

32. **The proportion of the population receiving public water supply[12] has increased to 82 percent, an 8 percent increase compared to the situation five years ago and reflecting regional trends toward expansion of formal services and regionalization.** Table 5 summarizes the evolution of the population connected to public supply. The most significant increases are observed in Kosovo, Moldova, North Macedonia, Croatia, Slovenia, and Serbia, where important investments have been made to connect more of the population to public water supply and to expand networks. Table 6, Figure 14, panels a and b, and Figure 15 showcase the type, size, proportion, and number of service providers in the region. Regional operators in 2018 provide services to 37 percent of the total Danube population, which represents an increase of 4 percent compared to five years ago. This evolution reflects an WSS aggregation trend going on in several countries of the region. Seemingly contradictorily, the number of municipal utilities and their average size has increased compared to five years ago, but in a context of overall population decrease in the region, their market share remains unchanged at 27 percent. As a result, fewer people are relying on self-provision or informal providers (18 percent) compared to five years ago (26 percent), underlining the efforts being made in several countries to connect rural population to regional and municipal utilities, and to a lesser extent to small formal providers (+2 percent).

12 In this report and throughout the Danube region, the term public supply indicates 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.

TABLE 5: EVOLUTION OF SHARE OF POPULATION CONNECTED TO PUBLIC SUPPLY IN DANUBE REGION

Country	Evolution of share of population connected to public supply (percentage)[13]	Country	Evolution of share of population connected to public supply (percentage)
Albania	5 ↗	Moldova	25 ↗↗
Austria	6 ↗	Montenegro	-1 ↘
Bosnia and Herzegovina	-5 ↘	North Macedonia	22 ↗↗
Bulgaria	-2 ↘	Romania	3 ↗
Croatia	11 ↗↗	Serbia	10 ↗↗
Czech Republic	1 ↗	Slovakia	3 ↗
Hungary	0 →	Slovenia	3 ↗
Kosovo	41 ↗↗	Ukraine	-8 ↘

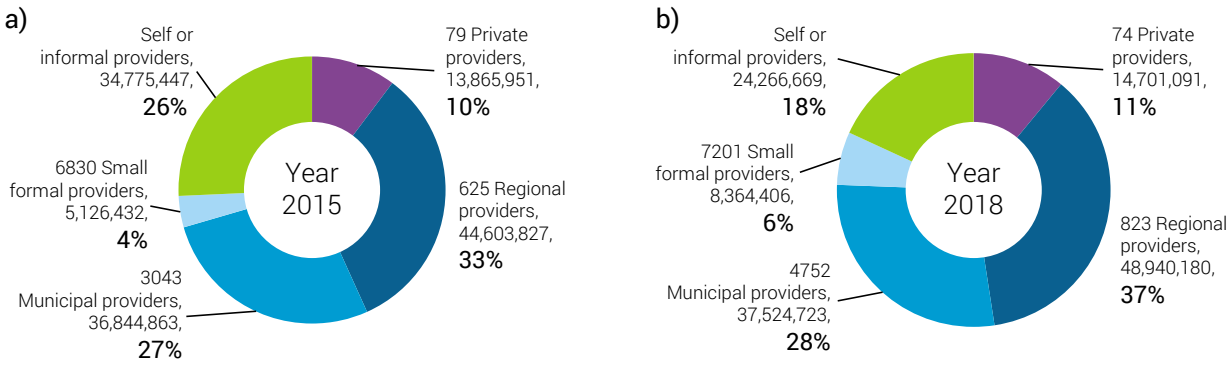
SOURCE: WORLD BANK ELABORATION BASED ON SOS DATA COLLECTION 2019.

TABLE 6: TYPE, NUMBER, AND AVERAGE SIZE OF UTILITIES IN DANUBE REGION, 2015 AND 2018

Type of public service provider	2015				2018			
	Number	Population served (millions)	Average size	Market share (%)	Number	Population served (millions)	Average size	Market share (%)
Private providers	79	13.9	175,518	10	74	14.7	198,663	11
Regional providers	625	44.6	71,366	33	823	48.9	59,466	37
Municipal providers	3,043	36.8	12,108	27	4,752	37.5	7,897	28
Small formal providers	6,830	5.1	751	4	7,201	8.3	1,162	6
Self or informal providers	—	34.8	—	26	—	24.3	—	18
Total/average	10,577	135.2	9,496	100	12,850	133.7	8,524	100

SOURCE: WORLD BANK ELABORATION BASED ON SOS DATA COLLECTION.
NOTE: — = NOT AVAILABLE.

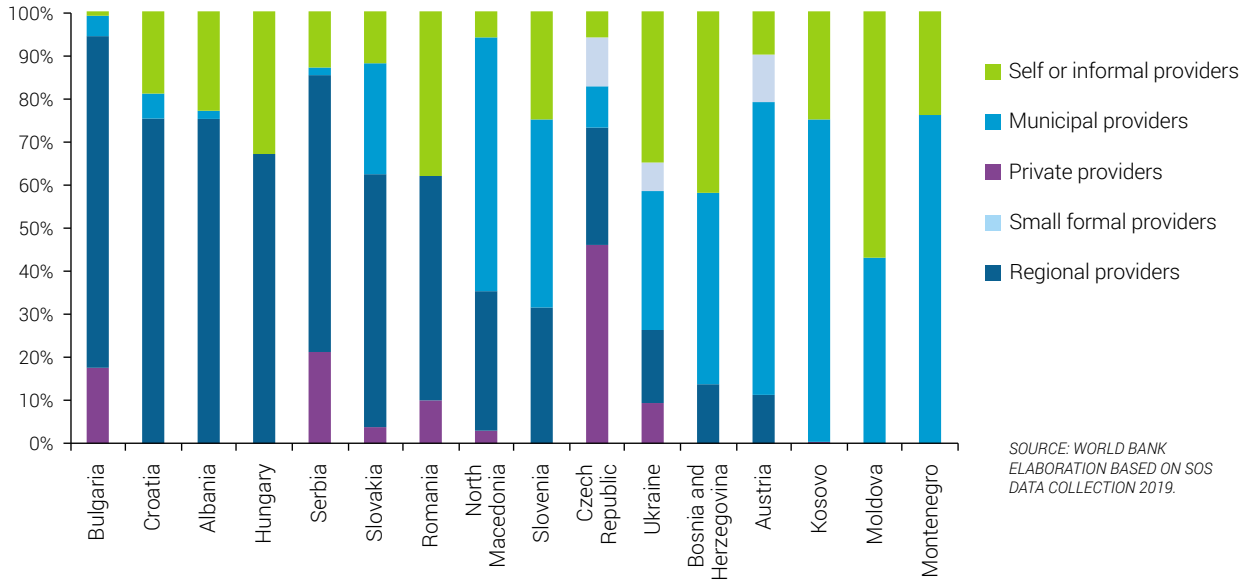
FIGURE 14: WATER SERVICE PROVIDERS' MARKET DISTRIBUTION IN DANUBE REGION, 2015 AND 2018



SOURCE: WORLD BANK ELABORATION BASED ON SOS DATA COLLECTION.

13 The decrease observed for Bulgaria is due to a general decrease in population as connection rate remains at 99 percent. For Ukraine, Joint Monitoring Programme (JMP) data show a real decrease in connection over time. For Bosnia and Herzegovina, the decrease may be linked to statistical issues.

FIGURE 15: WATER SERVICE PROVIDERS' DISTRIBUTION IN DANUBE REGION AND BY COUNTRY



SOURCE: WORLD BANK ELABORATION BASED ON SOS DATA COLLECTION 2019.

33. **Public-private partnership (PPP) contracts are signed and in force for WSS service provision in seven countries with increasing number of customers, and perception toward PPPs for WSS services has improved slightly.** Overall, 75 private operators are reported to serve close to 15 million people, thus retaining around 11 percent of the market share. These figures show that, over the past five years, although the number of PPP arrangements has decreased by 8 percent, the total number of PPP customers increased by 6 percent, underlining that private operators tend to expand services to additional customers rapidly, mostly in large and urban areas. In Albania and Moldova, where there are presently no PPP contracts in place, dedicated legal provisions have been made to support PPP introduction, because PPPs are perceived as positive drivers for change and improvement. In Croatia, where there are no PPPs, the law would have to be amended to introduce PPPs, because the current Water Act provides only for a public model of service provision. As reported for Austria, Bulgaria, the Czech Republic and Slovenia,[14] PPPs suffer from a negative perception, irrespective of their real efficiency and performance.

34. **The overall aggregation index[15] of the water sector in the region has slightly decreased from 75 percent to 72 percent over the past five years, telling a nuanced regionalization story in which the number of regional operators has increased but the number of municipal operators has also increased, bringing the overall index down.** The aggregation index of water utilities varies widely across the region, with Hungary showing a very concentrated sector with 40 utilities and 3,155 municipalities, and Austria displaying a quite atomized sector with 5,465 utilities and 2,098 municipalities. Montenegro, Albania, Serbia, North Macedonia, and Bosnia and Herzegovina tend to have as many utilities as municipalities (Table 7).

TABLE 7: AGGREGATION INDEX OF WSS SECTOR IN DANUBE REGION

Country	Aggregation index (2015)	Aggregation index (2018)	Evolution over the past five years
Hungary	99	99	→
Slovakia	99	95	↘
Moldova	95	95	→
Romania	93	93	→
Kosovo	84	84	→

14 In 2016, Slovenia passed a legislation adding drinking water as a fundamental human right in its Constitution, largely to prevent the commercialization of the country's water resources, in clear opposition to private sector involvement in water service provision.

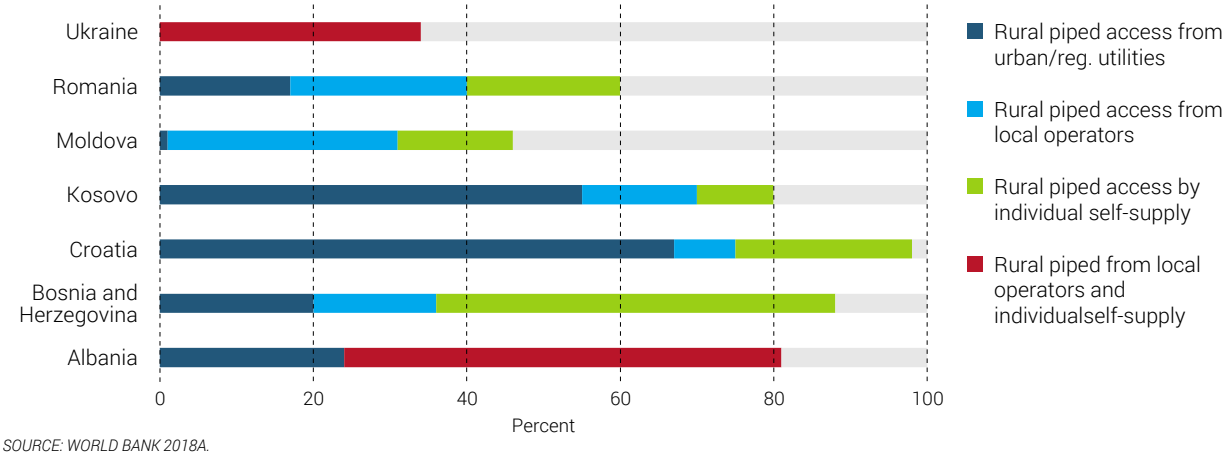
15 The aggregation index measures the level of fragmentation of service provision of the water sector in a given country through a simple normalized index based on the number of local governments and the number of service providers. The aggregation index ranges from 0 to 100, with a value of 0 indicating a fully atomized sector with many more utility companies than local governments, a value of 50 indicating the same number of utilities and local governments, and a value of 100 indicating a single national utility.

Country	Aggregation index (2015)	Aggregation index (2018)	Evolution over the past five years
Ukraine	88	81	↘
Bulgaria	83	81	↘
Croatia	80	78	↘
Czech Republic	72	68	↘
Slovenia	68	68	→
Bosnia and Herzegovina	50	54	↗
North Macedonia	54	52	↘
Albania	87	51	↘
Montenegro	50	50	→
Serbia	53	48	↘
Austria	30	28	↘

SOURCE: WORLD BANK ELABORATION BASED ON SOS DATA COLLECTION 2019.
NOTE: WSS = WATER SUPPLY AND SANITATION.

35. **In rural areas, water services are normally organized through a nearby utility, community-based organizations (CBOs) or self-provision. In 2015, a large knowledge gap was identified related to the state of rural service provision.** To address this, in 2017 the DWP launched a review of rural services in seven[16] countries of the Danube region. The study shows that local service provider models continue to play an important role in rural water supply in many countries, especially in Bosnia and Herzegovina, Moldova, Ukraine, and Romania. The reach of larger urban or regional utilities into rural areas has been most successful in Croatia, followed by Kosovo. For Moldova it is estimated that two-thirds of its rural systems are managed by local operators. In Romania, about half of those with piped access from a network are served by regional operating companies, and the other half, either by a municipal enterprise or directly by the local government. In Ukraine, rural service provision is the domain of more than 1,000 small municipal enterprises receiving licenses from regional administrations. Bosnia and Herzegovina's municipal utilities have not been very effective in reaching rural areas, with an estimated 20 percent access while others are served by an unknown number of local operators and through self-supply (piped). Models include systems operated by a village entity (a subunit of the municipality), community or citizen groups, and local private operators. In Albania, the exact number of local systems is not fully known in some jurisdictions, and these systems, typically operated by former communas or by community groups, are now being transferred to larger municipal utilities. In Kosovo, the inventory of local systems is almost complete, and 15 percent of the rural population is served by systems managed by community groups. Their rehabilitation and integration with the regional water companies is well-advanced, which will result in 70 percent coverage in rural areas and is expected to further increase to 90 percent in the medium term. In Croatia, the reach of public utilities—mostly multimunicipal—in rural areas is the most effective (67 percent), followed by individual piped self-supply (Figure 16 and Table 8).

FIGURE 16: SHARE OF ESTIMATED STRUCTURE OF SERVICE DELIVERY FOR PIPED ACCESS IN RURAL AREAS OF DANUBE REGION



SOURCE: WORLD BANK 2018A.

16 Albania, Bosnia and Herzegovina, Croatia, Kosovo, Moldova, Romania, and Ukraine.

TABLE 8: RURAL ACCESS TO WATER SUPPLY IN DANUBE REGION

Country	Rural population (millions)	Rural piped access on premises (%)	Rural piped access by utilities (%)	Rural piped access by local operators (%)	Rural piped access by self-supply (%)	Rural non-piped access by self-supply (%)
Albania	1.2	81	24	57, split not known		19
Bosnia and Herzegovina	2.1	88	20	16	52	12
Croatia	1.7	98	67	8	23	2
Kosovo	1.1	70	55	15	10	20
Moldova	1.9	46	1	30	15	54
Romania	8.9	60	17	23	20	40
Ukraine	13.5	34	0	34, split not known		66

SOURCE: WORLD BANK 2018A.

36. **Several countries in the region have considered aggregation to improve efficiency and performance and to extend coverage to rural areas, although with various levels of success and mixed results.** After Kosovo's and Romania's efforts, Hungary, Croatia, Albania, and Moldova set up WSS reforms targeting the aggregation of municipal utilities in regional companies. In Croatia, after the elections held in 2015, the aggregation process was first delayed and then lost political support following the change of the central government. In the meantime, it has made important strides toward connecting and delivering services to its rural population. In Moldova, since 2009, the process of creating regional WSS companies has remained limited and is currently centered on urban areas, while integration of rural areas has received little attention. As a result, the rural sector is still largely fragmented: there are more than 1,000 locally managed rural water systems. The national strategy had planned to set up three to six regional water utilities to improve service and expand to rural areas. Thus far, with support of several donors, nine regional companies with joint stock company status have been created. In addition, the regionalization path has not been unequivocally successful, since an attempt to merge six service providers into one utility company (Apa Nord) has stalled. In Kosovo, the regionalization process was accompanied by a 10-year, targeted investment program to improve performance and expand services to rural areas supported by a long-term partnership with the Swiss government. Although a proportion of the rural population is still served by local systems, regional water companies (RWCs) are expected to cover 90 percent of the total population by 2020. Based on a national inventory dated 2017, 55 percent of the rural population are already served by RWCs. In Romania, the regionalization has improved service performance, and eased absorption of EU funds. It was also intended to increase rural access to services. However, investments made by regional utilities have focused on improving wastewater services in cities and towns that are denser (and commercially more viable because poorer rural populations have more affordability constrains). This cherry picking has resulted in local governments' hesitation to join regional entities. Instead, they have chosen their own local service provider, so that around half of the rural households served by piped networks receive services from local operators. Nevertheless, recent data (ANRSC 2016) show that rural piped access has increased to 40 percent, indicating that both regional operating companies and local operators have contributed to this improvement (see Box 2). However, only one-third of rural communes benefited from access to investment and professionalized services from regional operating companies in 2017.

Box 2 Limiting Factors for Rural Water Access Progress in Regionalization Context in Romania

- Investment programs that focus on city and town wastewater collection and treatment infrastructure. Driven by EU compliance and pending infringement procedures (World Bank 2018) wastewater priorities diverting attention from basic rural water services.
- Cherry picking behavior (expansion in more commercially attractive areas) slowing down progress in rural areas; limited influence of rural communes on individual development account (IDA) and return of capital (ROC) investment decisions leading to several cases of communes' withdrawal from IDAs and ROCs.
- Widespread negative perceptions among local governments that expected benefits of joining IDAs and delegating services to ROCs do not outweigh the negative consequences, such as tariff increases, loss of autonomy, and delayed investments.
- The voluntary nature of regionalization, combined with local interests, allowing the pursuit of parallel service delivery models, and slowing down momentum for reform.
- Limited access to national funds for water supply investments at the municipal-level capacities of local governments not facilitating fast expansion by local service providers.

37. **To achieve the goal of universal access to safe services under the SDGs, most countries will need a portfolio approach that adopts different service delivery models for reaching different rural population groups.** It is recommended that countries analyze their service provision structure to determine the service delivery models that can most effectively achieve universal access. The enabling policies, legislative framework, and financing measures need to recognize this. When sectors have well-capacitated urban and regional utilities, well-established regionalization reforms, and strong incentives for rural service provision, hybrid approaches may not be necessary or desirable, such as in Kosovo and Croatia. However, reform support programs can help utilities cope quickly with expanded service obligations, as in Albania. Highly decentralized countries, such as Moldova and Ukraine, may naturally opt for a hybrid approach of combining regional and urban utilities and the local operator model. Regionalization in this context requires strong incentives for collaboration among local governments. Self-supply models are suitable for remote and dispersed settlements and have relevance for virtually all countries. For countries with declining rural populations and limited fiscal space to invest, supported self-supply will remain extremely relevant. Low-density rural areas may also require local operator models (Ukraine, Moldova).

D. Regulation

38. **Different models of economic regulation coexist for WSS services in the Danube region, but there is a continued trend toward increased central level regulation, with Macedonia and Montenegro recently adding in 2016 water sector competencies to their national energy regulatory agencies.** Austria, Slovenia, and Bosnia and Herzegovina continue to rely on self-regulation at local level, while the Czech Republic has resorted to regulation at the national level, embedded into the duties of several ministries. In Serbia, there is no economic regulation in place, whereas the remaining 11 countries in the region have all set up a national regulatory agency. Among the latter countries, there are six water specific regulators (Albania, Croatia, Hungary, Kosovo, Romania, Slovak Republic). In Moldova, Bulgaria, Macedonia, and Montenegro, the agency also regulates the energy sector, and in Ukraine it regulates other local public services. The Czech government is presently considering setting up a national regulatory agency for the WSS sector. This discussion is taking place at interministerial level and within the Ministry of Agriculture. Moreover, the Strategy of the Ministry of Agriculture of the Czech Republic with a View to 2030 (2016), includes the elaboration of a feasibility study to set up the national regulatory authority for WSS services. However, the high level of fragmentation of the Czech water sector might need to be addressed prior to establishing a national regulatory authority to ensure its future effectiveness. Presently, regulatory functions in the WSS sector are being performed by the Department of Supervision and Regulation of Water Sector of the Ministry of Agriculture.

39. **All regulatory authorities in the region oversee tariff regulation either through formal tariff setting or through tariff review and clearance.** The Hungarian regulator is the only regulator to solely have an advisory role in the tariff setting process. In countries with self-regulation, tariff setting is performed either by national or local governments. In addition, there are a diversity of enforcement processes to ensure that tariffs are set according to regulated levels. Two-thirds of the regulatory authorities are also in charge of licensing operators. Table 9 presents the main characteristics of water services sector regulation in the Danube region.

TABLE 9: MAIN CHARACTERISTICS OF WATER SECTOR REGULATION IN DANUBE REGION

Country	Regulator licenses operators	Regulator addresses customers' complaints	Tariff regulators	Tariff setting methodology	Tariffs set at regulated level	Frequency of tariff setting at regulated level	Minimal frequency of review
Albania	Yes	Yes, actively	Regulator formally sets tariffs	Revenue cap	Not if no tariff review is presented	Only when local authorities and utility management reach agreement	No, tariff review requests are up to utilities
Austria	n.a.	n.a.	Utilities set tariffs in consultation with local authorities	Revenue cap	Yes, through fines or withdrawal of funding	Quite systematically	Yes, through prescribed tariff review frequency and indexation

Country	Regulator licenses operators	Regulator addresses customers' complaints	Tariff regulators	Tariff setting methodology	Tariffs set at regulated level	Frequency of tariff setting at regulated level	Minimal frequency of review
Bosnia and Herzegovina	n.a.	n.a.	Utilities set tariffs in consultation with local authorities	No	No, tariff review requests are up to utilities	Only when local authorities and utility management reach agreement	No, tariff review requests are up to utilities
Bulgaria	No	Yes, actively	Regulator formally sets tariffs	Price cap	Regulator approves the max tariff level, but utility can charge less	Quite systematically	Yes, through automatic indexation
Croatia	No	No	Regulator reviews and clears tariffs	Price cap	Yes, through fines or withdrawal of funding	Quite systematically	Yes, through prescribed tariff review frequency
Czech Republic	n.a.	n.a.	Ministry of Finance establishes binding rules tariff calculation tariffs	Revenue cap	Yes, regulator can set tariffs unilaterally	Quite systematically	Yes, through prescribed tariff review frequency
Hungary	Yes	No	Regulator makes tariffs proposal to Minister	No, but under development	Yes, through fines or withdrawal of funding	Rarely	Not at present, but possibly once the tariff regulation is passed
Kosovo	Yes	Yes, actively	Regulator reviews and clears tariffs	Rate of return	Yes, regulator can set tariffs unilaterally	Quite systematically	Yes, through prescribed tariff review frequency
Moldova	No	Yes legally, but not actively playing that role	Regulator reviews and clears tariffs	Revenue cap	Not if no tariff review is presented	Only when local authorities and utility management reach agreement	No, tariff review requests are up to utilities
Montenegro	Yes	—	Regulator reviews and clears tariffs	Rate of return	—	—	—
North Macedonia	Yes	—	Regulator reviews and clears tariffs	Under development	—	—	—
Romania	Yes	Yes, actively	Regulator reviews and clears tariffs	Rate of return	Not if no tariff review is presented	Quite systematically	No, tariff review requests are up to utilities
Serbia	n.a.	n.a.	Utilities set tariffs in consultation with local authorities	No	Yes, through fines or withdrawal of funding	Only when local authorities and utility management reach agreement	No, tariff review requests are up to utilities
Slovak Republic	Yes	Yes legally, but not actively playing that role	Regulator reviews and clears tariffs	Price cap	Yes, regulator can set tariffs unilaterally	Quite systematically	Yes, through prescribed tariff review frequency
Slovenia	n.a.	n.a.	Utilities set tariffs in consultation with local authorities	Revenue cap	—	Quite systematically	Yes, through prescribed tariff review frequency
Ukraine	Yes	Yes legally, but not actively playing that role	Regulator formally sets tariffs	Rate of return	Yes, regulator can set tariffs unilaterally	Rarely	No, tariff review requests are up to utilities

SOURCE: DWP ELABORATION.

NOTE: N.A. = NOT APPLICABLE; — = NOT AVAILABLE.

40. **Among the 11 national regulatory authorities, nine are members of the European network of water regulators** (WAREG). Created in 2014, WAREG brings together 29 regulatory authorities to promote best practices, cooperation, and knowledge sharing. In this perspective, the network has recently produced three comparative reports on institutional regulatory frameworks, public consultation practices and affordability schemes among its members (see box 3).

Box 3 WAREG's Role in Water Supply Regulation

Water sector regulation in Europe encompasses a rich diversity of institutional frameworks and market conditions that differ from country to country. In a context of significant evolution toward the rationalization of the sector and the harmonization of practices and principles, national water sector regulators have identified the need for a joint effort to address common challenges for the sustainability of these services in Europe. WAREG was created in April 2014 by an initial group of 12 WSS regulators. The common objectives of the network include:

- Exchanging common practices, information, joint analysis, and comparisons of existing water supply sector regulatory models and performances of water utilities.
- Organizing specialized training, technical assistance, and exchange of know-how and experience.
- Promoting best practice and stable regulation of the water supply sector at European level for WSS services;
- Promoting cooperative activities aimed at analyzing the sustainability of the services, adequate infrastructure investment, proper service quality standards, and consumer protection.
- Conducting an open dialogue with other relevant regional and international organizations and national institutions with particular focus on European issues in the field of water services.

At present, WAREG is made up by 25 regulatory authorities with member status and four regulatory authorities with observer status.

41. **Drinking water quality is commonly regulated by the health ministry or agency in all countries, while environmental regulation regarding discharge permit or water resources use is the responsibility of an environmental ministry or agency.** In new EU member states, health and environmental standards are compliant with EU water-related legislation as transposition is completed in all countries. In Austria, some of the standards applied are more stringent than EU ones, especially for wastewater discharge. Candidate and potential candidate countries mainly rely on national standards with a view to move toward convergence with EU standards. Bosnia and Herzegovina is currently harmonizing discharge standards inherited from the Republic of Yugoslavia with EU and World Health Organization (WHO) norms. Kosovo reports to have transposed approximately 95 percent of the EU DWD.

E. Sector Monitoring and Benchmarking

42. **Half of the countries of the region set up a system to monitor performance of service providers or benchmarking processes for their water utilities around a decade ago** (Table 10). Eight countries display data and information on their WSS sector available for 10 years or more, thus allowing following the medium-term evolution of utilities' performance. However, in two-thirds of the countries with benchmarking, its employment is limited to an ad hoc use by willing utilities. Therefore, it is a tool to generate knowledge on internal processes and improve or turn around utility performance without any national monitoring. Moreover, about one-quarter of those countries do not seem to be using the data and information coming out of their benchmarking system. (See Figure 17, panels a and b.) Nevertheless, important developments are the creation of the Danube Utility Benchmarking and Information Sharing website,[17] which provides a platform for knowledge exchange and regional benchmarking (see box 4). In addition, the International Association of Water Service Companies in the Danube River Catchment Area (IAWD) has started, under the Danube Learning Partnership, a highly successful utility benchmarking program for WSS.[18]

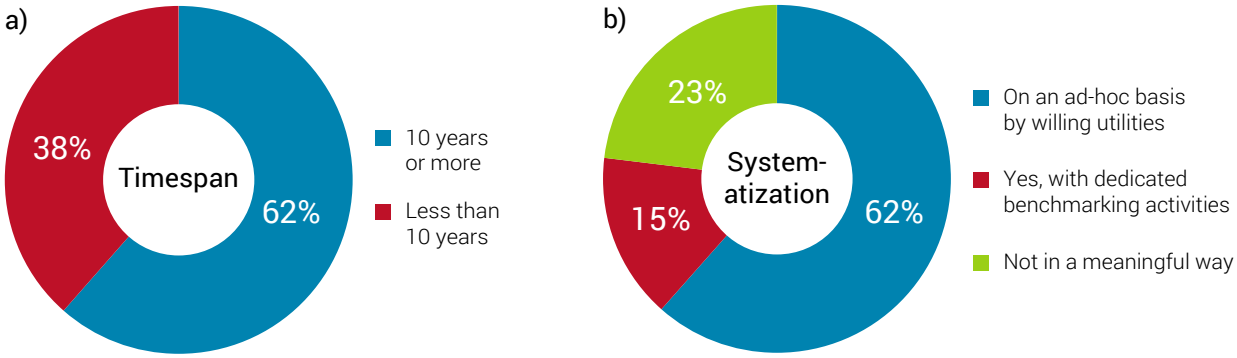
43. **Most benchmarking systems are making operational and commercial information collected publicly available predominantly at aggregated level.** But for about one-quarter of those systems, the operational and commercial data gathered are not displayed publicly. Nevertheless, public disclosure of financial information is the rule for almost all countries. (See Figure 18, panels a and b.) The information is mostly used in an informal way, such as for sector performance assessment by institutions, academia researchers, the press, or the public. For almost half of

17 See the DANUBIS website, DANUBIS.org.

18 See the D-LeaP website, https://www.d-leap.org/d-leap/the-programs/utility-benchmarking-program/.

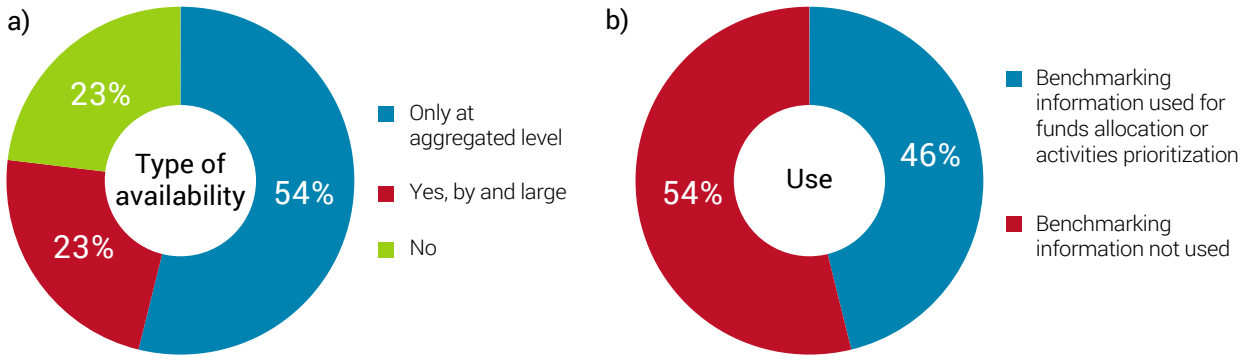
the benchmarking systems, the information is used in a formal way to prioritize funds allocation or activities, thus becoming a public water policy tool.

FIGURE 17: TIMESPAN OF BENCHMARKING INFORMATION AND ITS SYSTEMATIZATION IN DANUBE REGION



SOURCE: DWP ELABORATION 2019.

FIGURE 18: TYPE OF AVAILABILITY AND USE OF BENCHMARKING INFORMATION IN DANUBE REGION



SOURCE: DWP ELABORATION 2019.

Box 4 Danube Utility Benchmarking and Information Sharing

DANUBIS.org is an open online knowledge platform for everything about water supply and wastewater in the Danube region. Its core piece is a publicly available performance indicator database that allows for country and utility performance data comparison of WSS utilities in Southeast, Eastern, and Central Europe. At present, information about the following countries is included: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Kosovo, North Macedonia, Moldova, Montenegro, North Macedonia, Romania, Serbia, the Slovak Republic, and Ukraine.

In addition, the DANUBIS Data Collection and Management[a] (DANUBIS DCM) platform was launched in October 2016 to allow national institutions to easily collect, validate, manage, share, and publish utility performance data. The objectives of this online data collection and management platform are to:

- Allow utility companies to enter utility performance data in an amicable web interface.
- Help national institutions check the quality and consistency of the data provided and manage and safeguard the data in a secure manner.
- Provide utility managers with a simple scorecard of their performance over time and against targets.
- Ensure a linkage to DANUBIS.org data platform and the national country systems for reporting and further processing purpose.

Four national institutions use the platform in their country: the Association of Utility Service Providers of Macedonia, the Kosovo regulatory agency, the Montenegro waterworks associations, the Serbian water professionals' association, and the Ministry of Foreign Trade and Economic Relations in Bosnia and Herzegovina (in partnership with the Association of Cities and Towns of Federation and association of waterworks in Bosnia and Herzegovina. The same signed a Memorandum of Understanding with IAWD and the World Bank to define the roles and responsibilities of each institution with regards to the DANUBIS DCM platform.

[a] See the DANUBIS website, www.danubis-dcm.org

TABLE 10: INSTITUTIONALIZED UTILITY PERFORMANCE INFORMATION SYSTEMS AND BENCHMARKING SCHEMES IN DANUBE REGION

Country	Nature of mechanism	Info publicly available	First and most recent year info is available	Active employment of benchma-rking	Scope of the benchmarking system	Public disclosure of financial info	General public availability of financial info	Formal usage for sector performance info	Informal usage for sector performance info
Albania	Mandatory	Yes, by and large	2006 2017	Not in a meaningful way	Operational and commercial data, process benchmarking	No	No	Usage for prioritization of funds or activities	Information is widely cited and used by sector institutions and academia
Austria	Voluntary	Only at aggregated level	2004 2015	On an ad hoc basis by willing utilities	Operational and commercial data	Only for specific utilities	Yes, if the utilities' organizati-onal structure requires it	Usage for prioritization of funds or activities	No, demand for the information is limited
Bosnia and Herzegovina	Conditional	Only at aggregated level	2001 2011	On an ad hoc basis by willing utilities	Operational and commercial data, process benchmarking	Yes, for all utilities	Yes, but the information and data are aggregated	No	Information is widely cited and used by sector institutions and academia
Bulgaria	Mandatory	Only at aggregated level	2009 2016	Yes, with dedicated benchmarking activities	Operational and commercial data, process benchmarking	Yes, for all utilities	–	No	Information is widely cited and used in the public and press
Croatia	Mandatory	No	2011 2013	On an ad hoc basis by willing utilities	Operational and commercial data	Yes, for all utilities	–	Usage for prioritization of funds or activities	Information is widely cited and used by sector institutions and academia
Czech Republic	Mandatory	Only at aggregated level	2002 2017	Not in a meaningful way	Operational and commercial data	Yes, for all utilities	–	No	Information is widely cited and used in the public and press
Hungary	Mandatory	No	2013 2013	On an ad hoc basis by willing utilities	Operational and commercial data	Yes, for all utilities	Yes	No	Information is not publicly available
Kosovo	Conditional	Yes, by and large	2005 2013	Yes, with dedicated benchmarking activities	Operational and commercial data	Yes, for all utilities	Yes	Usage for prioritization of funds or activities	Information is widely cited and used by sector institutions and academia
Moldova	Voluntary	–	1996 2017	On an ad hoc basis by willing utilities	Operational and commercial data	–	–	–	–
Montenegro	Voluntary	–	2011 2016	On an ad hoc basis by willing utilities	Operational and commercial data	–	–	–	–
North Macedonia	Voluntary	–	2002 2016	On an ad hoc basis by willing utilities	Operational and commercial data	–	–	–	–
Romania	Conditional	Only at aggregated level	2001 2017	On an ad hoc basis by willing utilities	Operational and commercial data, process benchmarking	Yes, for all utilities	Yes	Usage for prioritization of funds or activities	–

Country	Nature of mechanism	Info publicly available	First and most recent year info is available	Active employment of benchma-rking	Scope of the benchmarking system	Public disclosure of financial info	General public availability of financial info	Formal usage for sector performance info	Informal usage for sector performance info
Serbia	Voluntary	Only at aggregated level	2007 2016	On an ad hoc basis by willing utilities	Operational and commercial data	Yes, for all utilities	—	No	No, demand for the information is limited
Slovakia	Mandatory	Yes, by and large	2002 2017	On an ad hoc basis by willing utilities	Operational and commercial data	Yes, for all utilities	—	No	No, demand for the information is limited
Slovenia	Mandatory	Only at aggregated level	2009 2018	Not in a meaningful way	Mostly operational data	Yes, for all utilities	—	Usage for prioritization of funds or activities	Information is widely cited and used by sector institutions and academia
Ukraine	Conditional	No	2011 2013	On an ad hoc basis by willing utilities	Operational and commercial data	No	No	No	No, demand for the information is limited

SOURCE: DWP ELABORATION 2019.

NOTE: — = NOT AVAILABLE

IV. ACCESS TO SERVICES

44. **This chapter provides an overview of the access situation in all countries. In 2015, countries at the global level adopted the 2030 Agenda for Sustainable Development, which sets new definitions and targets for achieving better and more sustainable water and sanitation services.** Before 2015, countries agreed to meet the Millennium Development Goals (MDGs), where drinking water sources were classified into "improved" and "unimproved." Sustainable Development Goal 6 (SDG 6) now distinguishes "basic water" services (close to the previously "improved" access), and "safely managed" water services, which recognizes three additional aspects: access on premises, available when needed, and free from contamination. For sanitation, while the MDGs distinguish between improved and unimproved facilities, the SDGs now refer to "basic sanitation services (improved but not shared with others)" and "safely managed sanitation," which reflect whether human waste is either disposed in situ, emptied and treated, or whether the wastewater is treated. The SDG 6 also includes a target on improving water quality, reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated waste water, and substantially increasing recycling and safe reuse globally (see Box 5)

45. **The World Health Organization/United Nations Children's Fund (WHO/UNICEF) Joint Monitoring Programme (JMP),[19] is tasked with monitoring progress toward meeting SDG 6 on water supply and sanitation (WSS).** The JMP includes nearly 5,000 national databases enabling the production of estimates for over 200 countries, areas, and territories. National, regional, and global estimates can be explored online or downloaded for further analysis. Given JMP's role in monitoring SDG 6 and the ease of data accessibility, this SoS 2018 report uses its estimates to produce access estimates. This methodology differs to the approach employed in the 2015 SoS, which relies directly on household-level or household-level-based statistics for the bulk of the analysis. Therefore, the figures quoted for access in both reports are not directly comparable in all cases. To observe trends, data from the JMP at the time of preparation of SoS 2015 have been used to analyze evolution in the access dimension. This does not solve entirely the issue of comparability, however, since the indicators "safely managed water services" and "safely managed sanitation" have been tracked only since 2015. They include different estimates by the JMP than the indicators previously used for tracking the MDGs, so the report includes some assumptions and uses the above mentioned indicators in different cases to illustrate the progress made by the countries in improving access to the services since 2015.

Box 5 SDGs on Water Supply and Sanitation

The 2030 Agenda for Sustainable Development, adopted by all UN member states in 2015, has elaborated 17 SDGs subdivided into 169 objectives, which form an action plan to achieve a better and more sustainable future for all. They address actual and future global challenges, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. SDG 6 focuses on clean water and sanitation (Table B5.1). For each objective, indicators are defined and monitored to follow progress and achievements of SDGs (Table B5.2).

Table B5.1 SDG 6 Descriptions

SDG	Description of SDG objective
6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all
6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
6.5	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
6.6	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

19 See the JMP website, http://www.unwater.org/publication_categories/whounicef-joint-monitoring-programme-for-water-supply-sanitation-hygiene-jmp/.

6.A	By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
6.B	Support and strengthen the participation of local communities in improving water and sanitation management

Table B5.2 Indicators Associated with SDG 6

SDG	SDG 6-associated indicators
6.1	Proportion of population using safely managed drinking water services
6.2	Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water
6.3	Proportion of wastewater safely treated Proportion of bodies of water with good ambient water quality
6.4	Change in water-use efficiency over time Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
6.5	Degree of integrated water resources management implementation (0–100) Proportion of transboundary basin area with an operational arrangement for water cooperation
6.6	Change in the extent of water-related ecosystems over time
6.A	Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan
6.B	Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management

SOURCE: SDG 6 MONITORING WEBSITE

A. Water

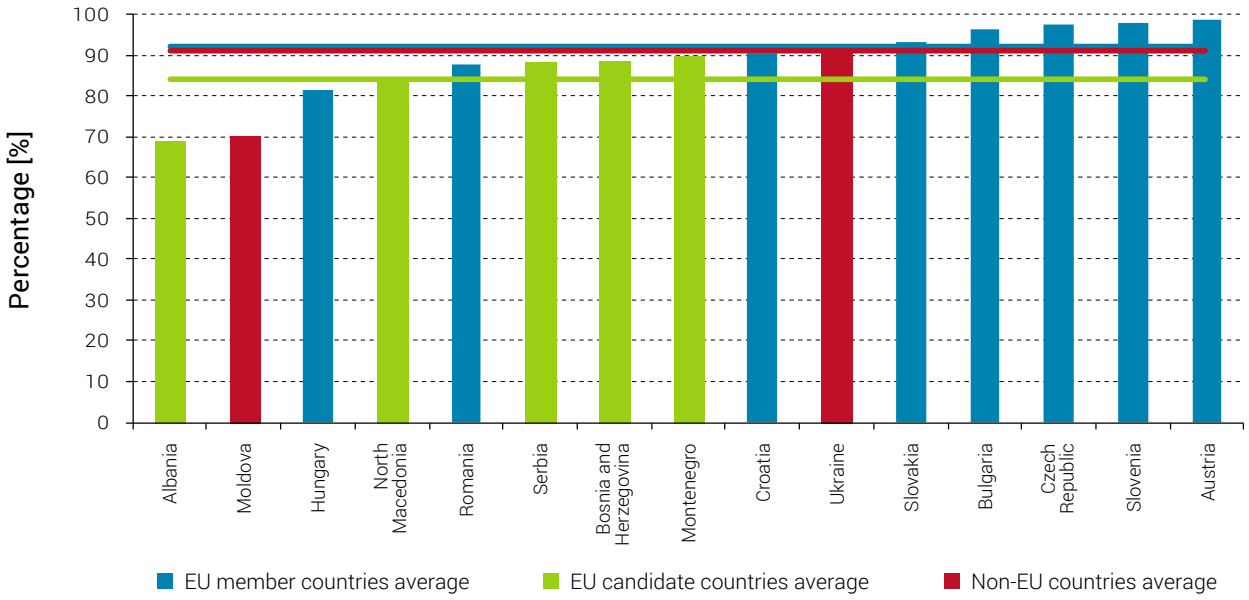
46. **Half of the countries in the region provide at least 90 percent of their inhabitants with safely managed drinking water services.** SDG 6.1 (see Box 5, Table B5.2) targets that, by 2030, universal and equitable access to safe and affordable drinking water for all is achieved. This objective is being monitored through a dedicated indicator that reports the proportion of population using safely managed drinking water services.[20] According to the data gathered by WHO/JMP, half of the countries in the Danube region provide more than 90 percent of their population with safely managed water services (Figure 19). Unsurprisingly, all European Union (EU) member states, with notable exception for Hungary and Romania, are among these countries. Albania and Moldova are lagging with less than 70 percent of their population having access to safely managed water services.

47. **Household coverage with piped water has increased in most countries from the Danube region, from an average of 80 percent in 2000 to 83 percent in 2015, with a few notable exceptions.** In most EU member states, piped water coverage was already high in 2000 and continued to increase steadily until 2016. Romania is the only EU country lagging with 76 percent of piped access in 2016 (HBS 2016). Moldova is making efforts to catch up with a 20 percent increase in piped access from 2000 to 2015. In addition, data reported by the Kosovo Water Services Regulatory Authority through its annual water sector reports show a 10 percent increase in public drinking water services between 2014 (84 percent) and 2017 (94 percent), underlying the priority that the water sector has in the government's agenda. According to JMP estimates, access to piped water has been reduced in Ukraine (from 68.6 percent in 2012 to 66.0 percent in 2015) and Montenegro (from 85.6 percent) in 2012 to 84.2 percent in 2015),[21] which may be explained by weak operation and maintenance practices and lack of operational cost recovery in these countries for the replacement of broken pipes. Figure 20 also shows the persistent gap between EU member and candidate countries and their less EU-integrated peers in the east.

20 Safely managed water services are defined as "improved source located on premises, available when needed, and free from microbiological and priority chemical contamination."

21 Overall access to improved and safely managed water is increasing in both countries due to increasing access to improved nonpiped sources.

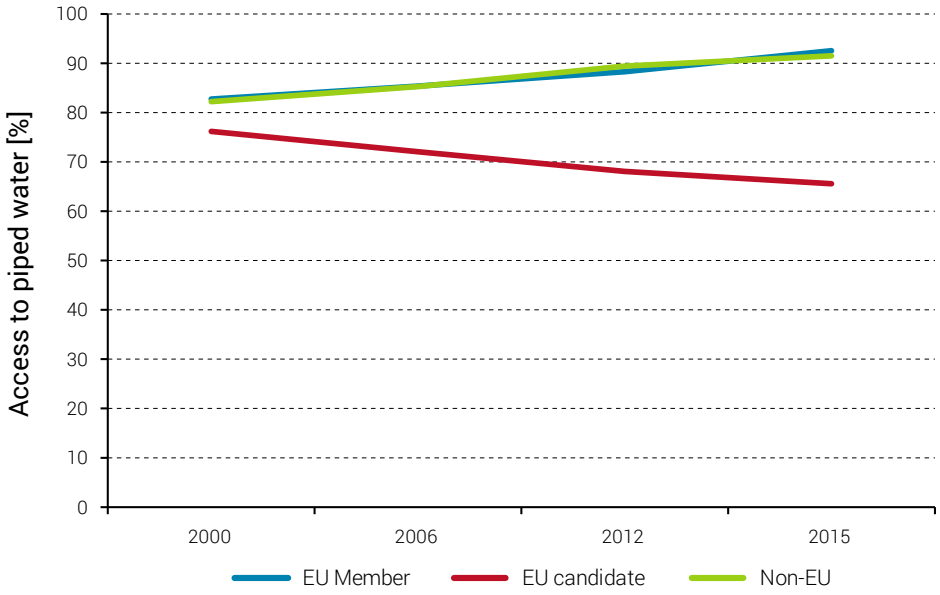
FIGURE 19: SHARE OF POPULATION USING SAFELY MANAGED WATER SERVICES IN DANUBE REGION , 2015



SOURCE: WHO/UNICEF JMP DATABASE, 2017.

NOTE: NO DATA REPORTED BY JMP FOR KOSOVO. SAFELY MANAGED WATER SERVICES ARE DEFINED AS "IMPROVED SOURCE LOCATED ON PREMISES, AVAILABLE WHEN NEEDED, AND FREE FROM MICROBIOLOGICAL AND PRIORITY CHEMICAL CONTAMINATION."

FIGURE 20: PIPED WATER COVERAGE FOR EU MEMBER STATES, CANDIDATES, AND NON-EU COUNTRIES, 2000–15

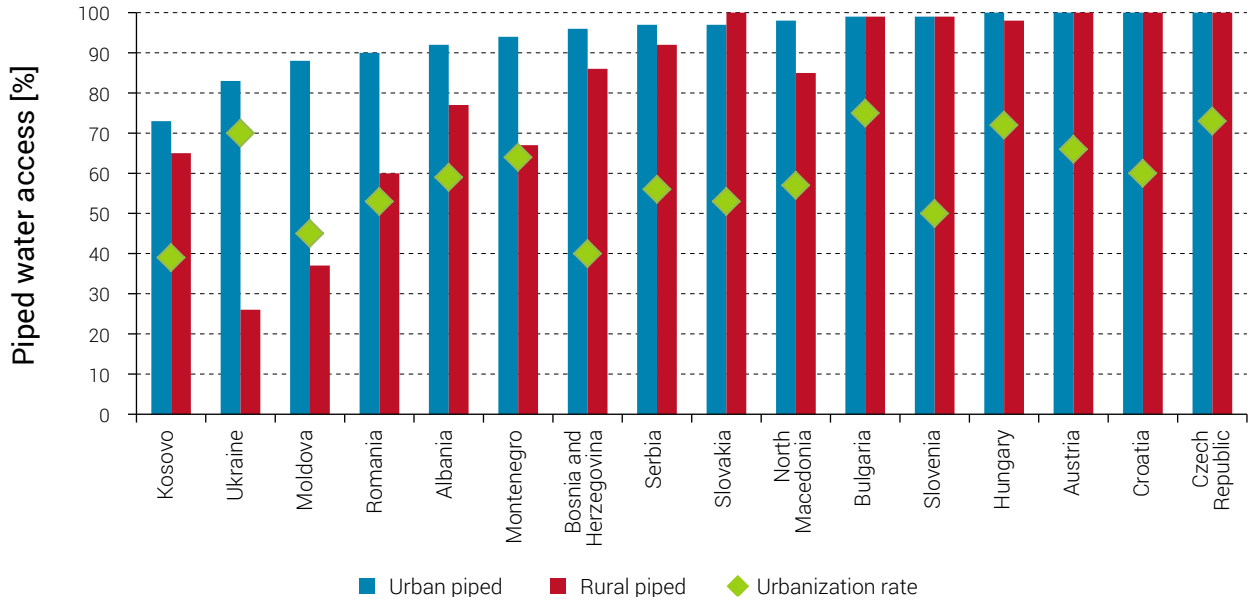


SOURCE: WHO/UNICEF JMP DATABASE 2017.

NOTE: DATA EXCLUDE THOSE FOR KOSOVO. DATA POINT FOR ROMANIA IN 2015 COMES FROM THE 2016 ROMANIA HBS. EU = EUROPEAN UNION.

48. **Much lower coverage in rural areas is driving overall coverage down in some countries.** Most EU countries, with the notable exception of Romania, exhibit nearly 100 percent piped water access irrespective of location (see Figure 21), and even poorer countries, such as Bosnia and Herzegovina, Serbia, and North Macedonia, show a low access gap between rural and urban residents, though with perhaps higher reliance on service 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 also have the lowest average access to piped water.

FIGURE 21: SHARE OF POPULATION WITH PIPED WATER IN DANUBE REGION, 2015



SOURCES: DATA FOR KOSOVO FROM MICS 2014; WHO/UNICEF JMP DATABASE 2017.

49. **Although the gap in access to piped water supply is slowly closing, increasing access to piped water supply remains a challenge for all Danube countries, especially in less densely populated areas. Access to piped water in the region has increased from 81 percent to 83 percent as estimated by JMP in 2017.**[22] The estimated number of people without access to piped water in the Danube region decreased by about 2 million during the period, underlying government efforts to expand access to water services. Most of this increase is driven by better access rates seen in Romania, Serbia, and Moldova. This overall moderately positive trend, however, hides less positive developments in some other countries. In Ukraine, according to JMP estimates, about 1 million people lost access to piped water from 2012 to 2015.[23] This underlines the importance of good asset management and operations and maintenance (O&M) capacity needed by service providers. Overall, lack of access to piped water is largely a phenomenon of rural or less densely populated settlements, which typically lack the economies of scale and political voice to cost-effectively provide network services through modern infrastructure.

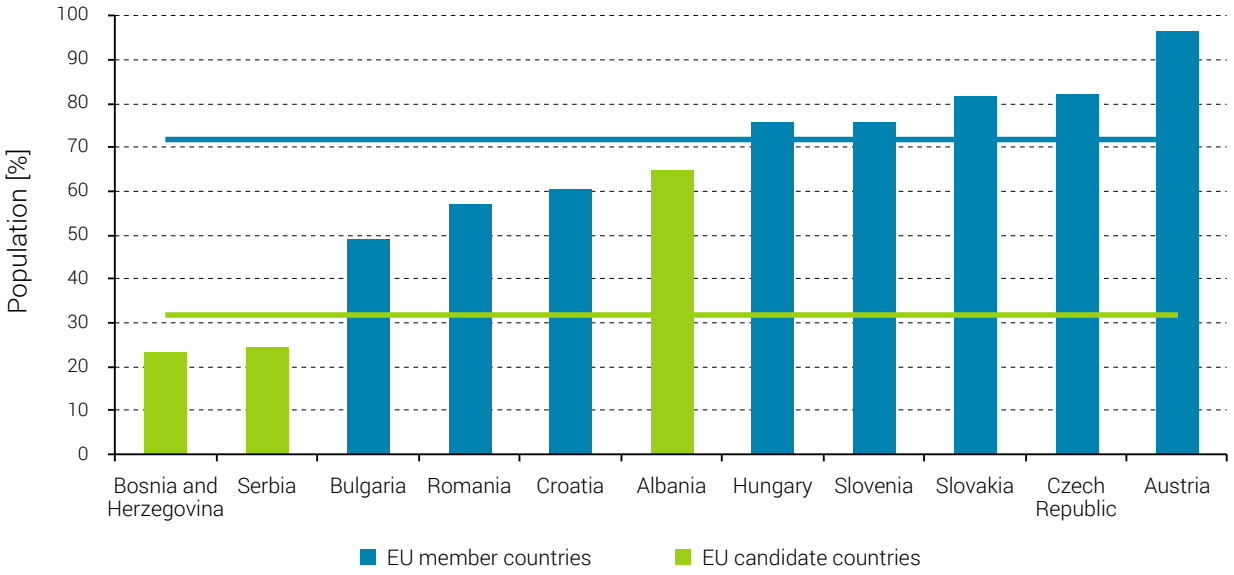
B. Sanitation and Sewerage

50. **Only five countries provide more than 75 percent of their population with safely managed sanitation services.** SDG 6.2 targets the achievement, by 2030, of adequate and equitable access to sanitation and hygiene for all. This objective is being monitored through a dedicated indicator that reports the proportion of population using safely managed sanitation services. According to the data gathered by WHO/JMP, five countries in the region provide more than 75 percent of their population with safely managed water services (Figure 22). Unsurprisingly, these countries are all EU member states. However, Bulgaria, Romania, and Croatia provide less than 60 percent of their population with safely managed sanitation services, showing some room for improvement even among EU member countries. Serbia and Bosnia and Herzegovina are lagging with less than 25 percent of their population accessing safely managed sanitation services.

22 JMP data (2017) at time of SOS 2015 (which refers to 2012 data) and SoS 2018 (which refers to 2015 data). The baseline numbers are lower than the one reported in the 2015 SOS report of 83 percent because of the change in data source from household budget surveys to JMP estimations. Access to piped water for Romania in 2015 was calculated using data from HBS 2016. Data exclude Kosovo.

23 According to JMP estimates, access to piped water has decreased from 69 percent in 2012 to 66 percent in 2015. A part of this trend could be explained by the deterioration of current piped infrastructure due to inadequate maintenance practices, especially in rural areas. However, a part of it is also explained by the exclusion of water related data concerning the Autonomous Republic of Crimea and temporarily occupied territories of Donetsk and Lugansk regions from Ukraine's annual reporting.

FIGURE 22: SHARE OF POPULATION USING SAFELY MANAGED SANITATION SERVICES IN DANUBE REGION, 2015

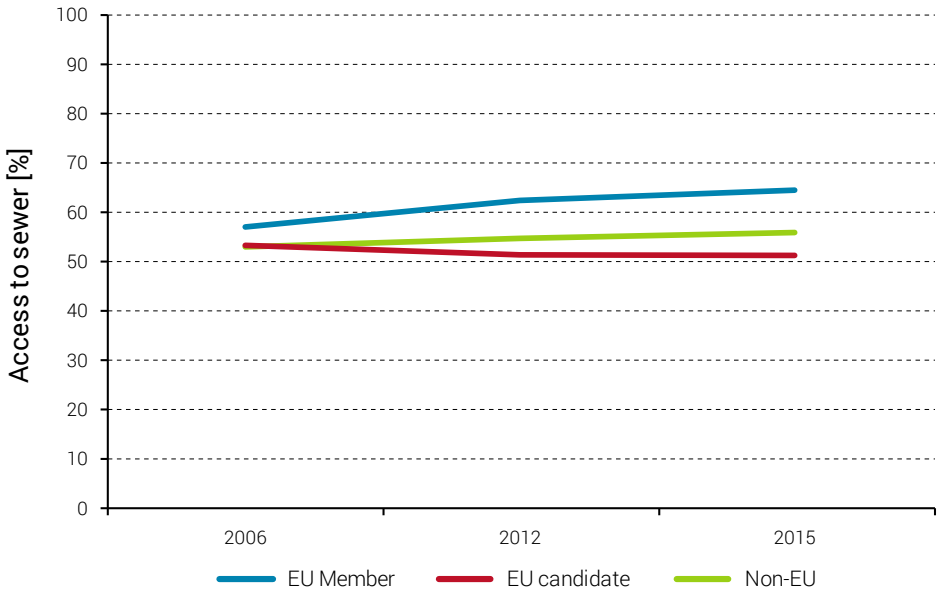


SOURCE: WHO/UNICEF JMP DATABASE 2017.

NOTE: SAFELY MANAGED SANITATION SERVICES ARE DEFINED AS "PRIVATE IMPROVED FACILITY WHERE FECAL WASTES ARE SAFELY DISPOSED ON-SITE OR TRANSPORTED AND TREATED OFF-SITE; PLUS A HAND-WASHING FACILITY WITH SOAP AND WATER." NO DATA REPORTED BY JMP FOR KOSOVO, NORTH MACEDONIA, MOLDOVA, MONTENEGRO, OR UKRAINE

51. **According to 2015 WHO/JMP data, 60 percent[24] of the Danube population, or 78.8 million, are connected to sewer networks, representing an increase of 6 percent and 2 percent from 2006 and 2012 rates, respectively.** Although progress has been made since 2006 in increasing the coverage of the population with connection to sewers, changes are mostly visible among EU member countries, driven mostly by improvements in connection rates in Romania and Bulgaria (Figure 23). For Moldova, Montenegro, and Ukraine, access to sewers is decreasing, while it is stagnating for Slovakia and Bosnia and Herzegovina.

FIGURE 23: SEWERAGE CONNECTION RATE IN DANUBE REGION, 2006–15



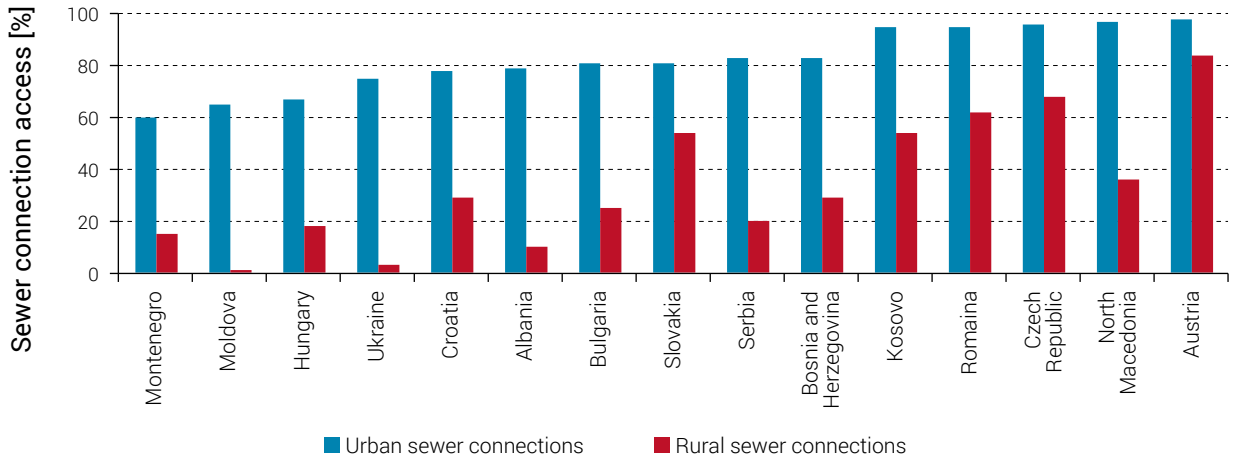
SOURCE: WHO/UNICEF JMP DATABASE 2017.

NOTE: DATA FOR KOSOVO AND ALBANIA NOT REPORTED.

24 This figure does not include Kosovo, for which WHO/JMP does not provide data. In addition, it represents a lower figure than the one reported in the 2015 SOS report because of the change in data source.

52. **Even more than in piped water supply, lack of access to improved sanitation is most prevalent in rural areas or areas with low population density.** The difference between urban and rural access to sewer connection is the largest in non-EU countries (Moldova and Ukraine, see Figure 24). Montenegro has the lowest rate of urban population connected to sewers, with 60 percent. Half of the Danube countries have at least 80 percent of their urban population connected to sewers, but about 5.5 million, or 4 percent of the region's population, have access only to unimproved sanitation. Most of the population with unimproved sanitation are in rural areas, and two-thirds of the people in the region with unimproved sanitation which are in Romania.

FIGURE 24: SHARE OF POPULATION WITH SEWER CONNECTIONS IN DANUBE REGION, 2015



SOURCES: DATA FOR KOSOVO FROM MICS 2014; DATA FOR ROMANIA FROM HBS 2016; DATA FOR ALBANIA FROM NAWSSWI; WHO/UNICEF JMP DATABASE 2017.

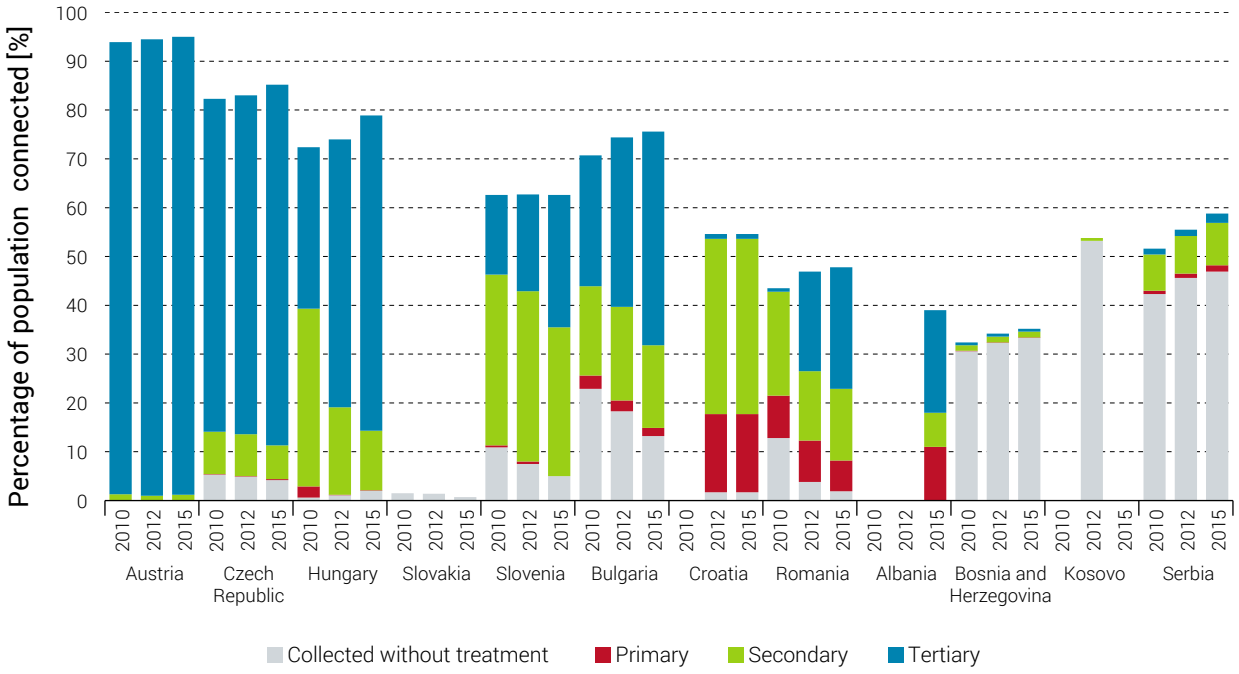
C. Wastewater Treatment

53. **Over the past five years, the share of population connected to wastewater treatment has increased in EU member states across the Danube region (Figure 25), but there is still significant underinvestment on wastewater management in non-EU and non-candidate countries.** Some EU member states (the Czech Republic, Hungary, and Bulgaria) have increased the connection above 70 percent, with two-thirds of the connected population receiving tertiary treatment. Other EU member countries are lagging (e.g., Romania), and their wastewater connection rate has stagnated over the past five years (Slovenia, Croatia). In candidate countries, little progress has been made: wastewater is predominantly collected without being treated, except for Albania. Figure 26 shows the difference in levels of wastewater treatment of agglomerations greater than 2,000 PE in the Danube River Basin for 2011–12.

54. **EU countries have committed themselves to comply with wastewater collection targets. They face different deadlines and challenges to reach full compliance with the UWWTD.** EU directives require wastewater collection for all settlements with populations 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 26 and 61 percent, respectively. Both countries were expected to meet compliance with wastewater collection in settlements with populations above 2,000 by 2015. Romania was expected to meet UWWTD requirements by end of 2018, but its compliance rate regarding collection is below 90 percent and below 60 percent for secondary treatment. Croatia still has until 2023 to close the gap, but needs to start, since only 44 percent of its residents are connected to a public sewer system.

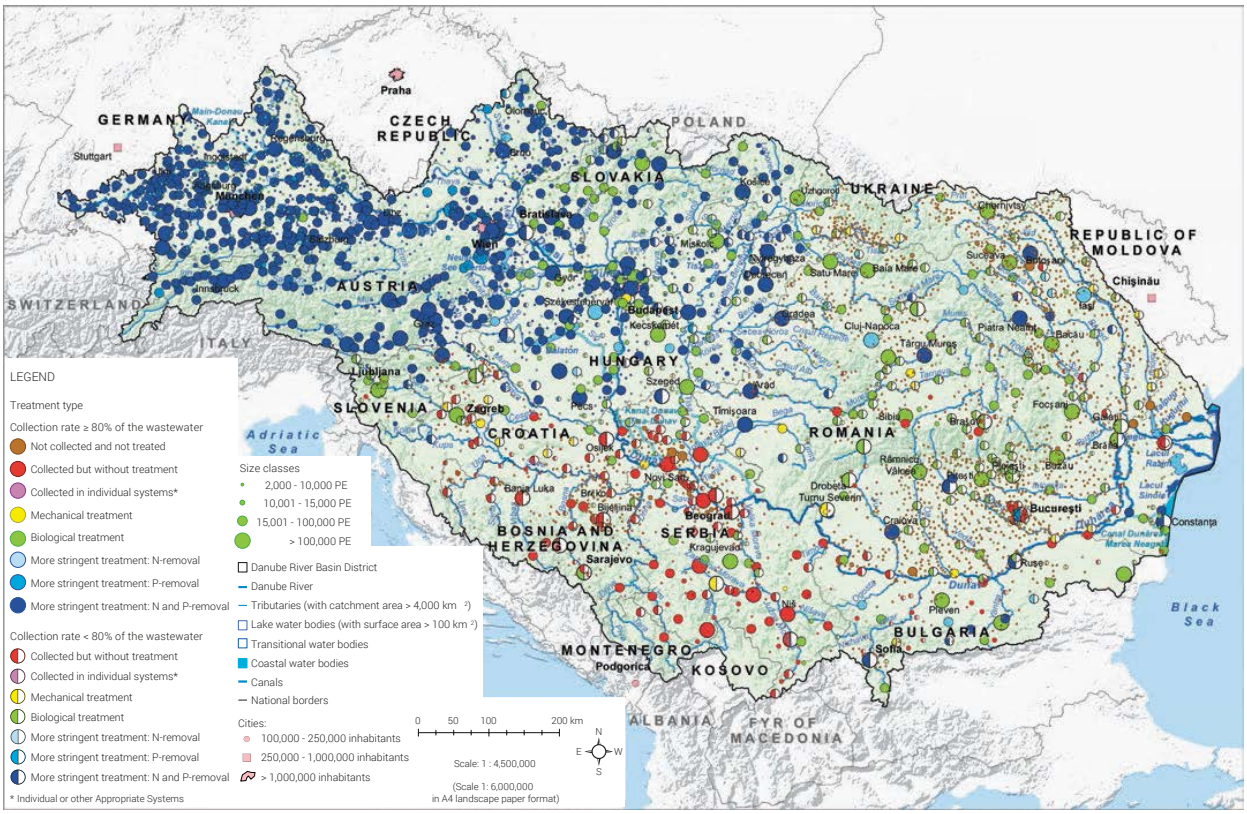
55. **Over the past 15 years, wastewater treatment levels have greatly improved due to the region benefiting from very large investments, mostly financed by EU grant funds, but also with substantive co-financing provided by individual countries.** The share of wastewater treated according to the UWWTD requirements, in terms of PE treated at secondary and tertiary levels, and through individual and other appropriate systems—among observed Danube Region Basin member states since membership in 2004—continues to rise. It is now reaching 79 percent,

FIGURE 25: SHARE OF POPULATION CONNECTED TO SEWAGE COLLECTION SYSTEMS OF VARYING TREATMENT LEVELS IN DANUBE REGION, 2010, 2012, 2015



SOURCE: EUROPEAN ENVIRONMENTAL AGENCY.

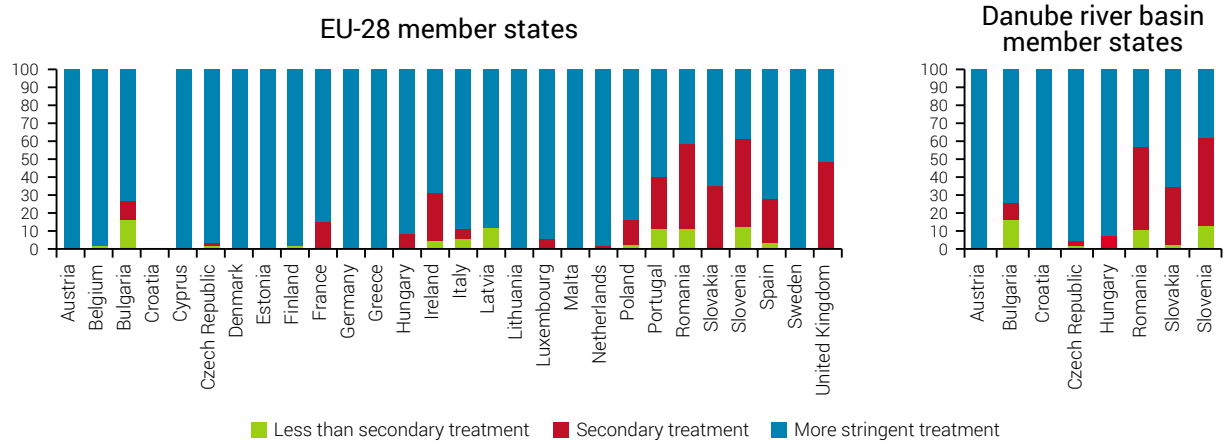
FIGURE 26: WASTEWATER TREATMENT LEVELS OF AGGLOMERATIONS GREATER THAN 2,000 PE IN DANUBE RIVER BASIN, 2011–12



SOURCE: WORLD BANK 2018B.

although with significant variations between countries. While this evolution shows a major improvement, the Danube Region Basin member states still lag behind the EU-28 average (Figure 27, panels a and b). Compared to older EU member states, the level of UWWTD compliance is significantly lower in the Danube EU member states, indicating a significant gap in wastewater collection (Article 3 of UWWTD), secondary treatment (Article 4), and more stringent treatment (Article 5) of wastewater (Figure 28 and Figure 29). However, in comparison, EU candidate countries or perspective candidate countries from the Danube region (Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, and Serbia) are even farther behind because urban wastewater is still mainly collected without treatment. In these countries, the overall share of the population connected to urban wastewater systems ranges from 35 percent to 59 percent, but most of this collected urban wastewater is not adequately treated.

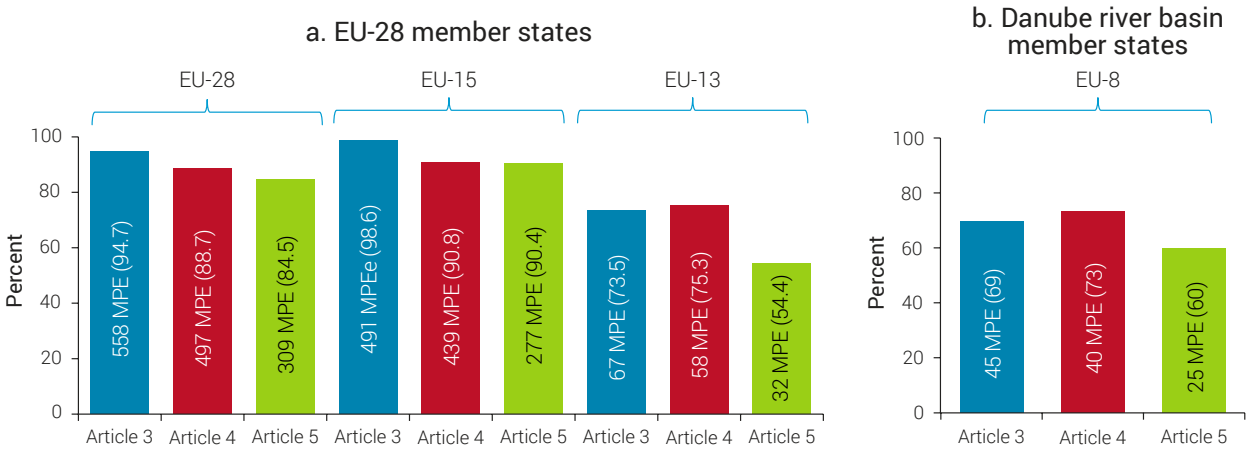
FIGURE 27: WASTEWATER TREATMENT LEVELS FOR EU-28 MEMBER STATES AND DANUBE RIVER BASIN MEMBER STATES, 2014



SOURCE: WORLD BANK 2018B.

NOTE: EU = EUROPEAN UNION. SINCE CROATIA JOINED THE EU IN JULY 2013, DATA WERE NOT AVAILABLE AT TIME OF THIS FIGURE.

FIGURE 28: SHARE AND AVERAGE COMPLIANCE RATES WITH UWWTD ARTICLES 3, 4, AND 5 IN RELATION TO TOTAL SUBJECTED WASTEWATER LOAD FOR EU-28 AND DANUBE RIVER BASIN MEMBER STATES, 2014

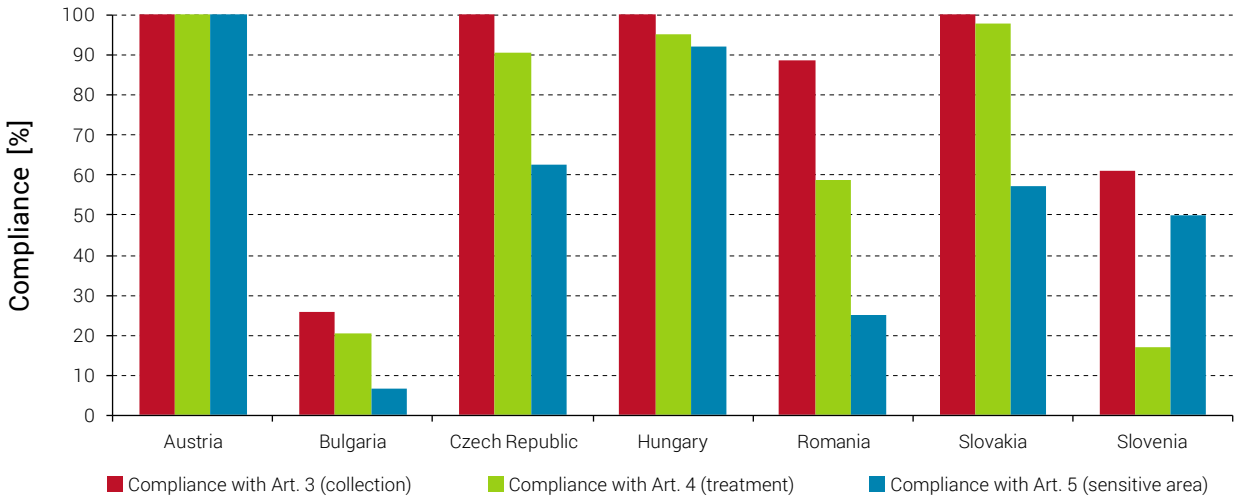


SOURCE: WORLD BANK 2018B.

NOTE: "ARTICLE 3: MEMBER STATES SHALL ENSURE THAT ALL AGGLOMERATIONS LARGER THAN 2,000 PE ARE PROVIDED WITH COLLECTING FOR URBAN WASTEWATER. WHERE THE ESTABLISHMENT OF COLLECTING SYSTEM IS NOT JUSTIFIED EITHER BECAUSE IT WOULD PRODUCE NO ENVIRONMENTAL BENEFIT OR IT WOULD INVOLVE EXCESSIVE COST, INDIVIDUAL SYSTEMS OR OTHER APPROPRIATE SYSTEMS WHICH ACHIEVE THE SAME LEVEL OF ENVIRONMENTAL PROTECTION SHALL BE USED. ARTICLE 4:MEMBER STATES SHALL ENSURE THAT URBAN WASTE WATER TREATMENT PLANTS SHALL SATISFY THE RELEVANT REQUIREMENTS PROVIDED IN ANNEX OF THE DIRECTIVE. ARTICLE 5: MEMBER STATES SHALL ENSURE THAT URBAN WASTE WATER ENTERING COLLECTING SYSTEMS SHALL BEFORE DISCHARGE INTO SENSITIVE AREAS BE SUBJECT TO MORE STRINGENT TREATMENT THAN THAT DESCRIBED IN ARTICLE 4, FOR ALL DISCHARGES FROM AGGLOMERATIONS OF MORE THAN 10,000 PE."

EU = EUROPEAN UNION; MPE = MILLION PERSON EQUIVALENT; UWWTD = URBAN WASTE WATER TREATMENT DIRECTIVE.

FIGURE 29: SHARE OF COMPLIANCE LEVELS WITH UWWTD ARTICLES 3, 4, AND 5 IN DANUBE EU MEMBER STATES, 2017



SOURCE: EC 2017.

NOTE: UWWTD = URBAN WASTE WATER TREATMENT DIRECTIVE.

D. Providing Access to Marginalized Populations and Minorities

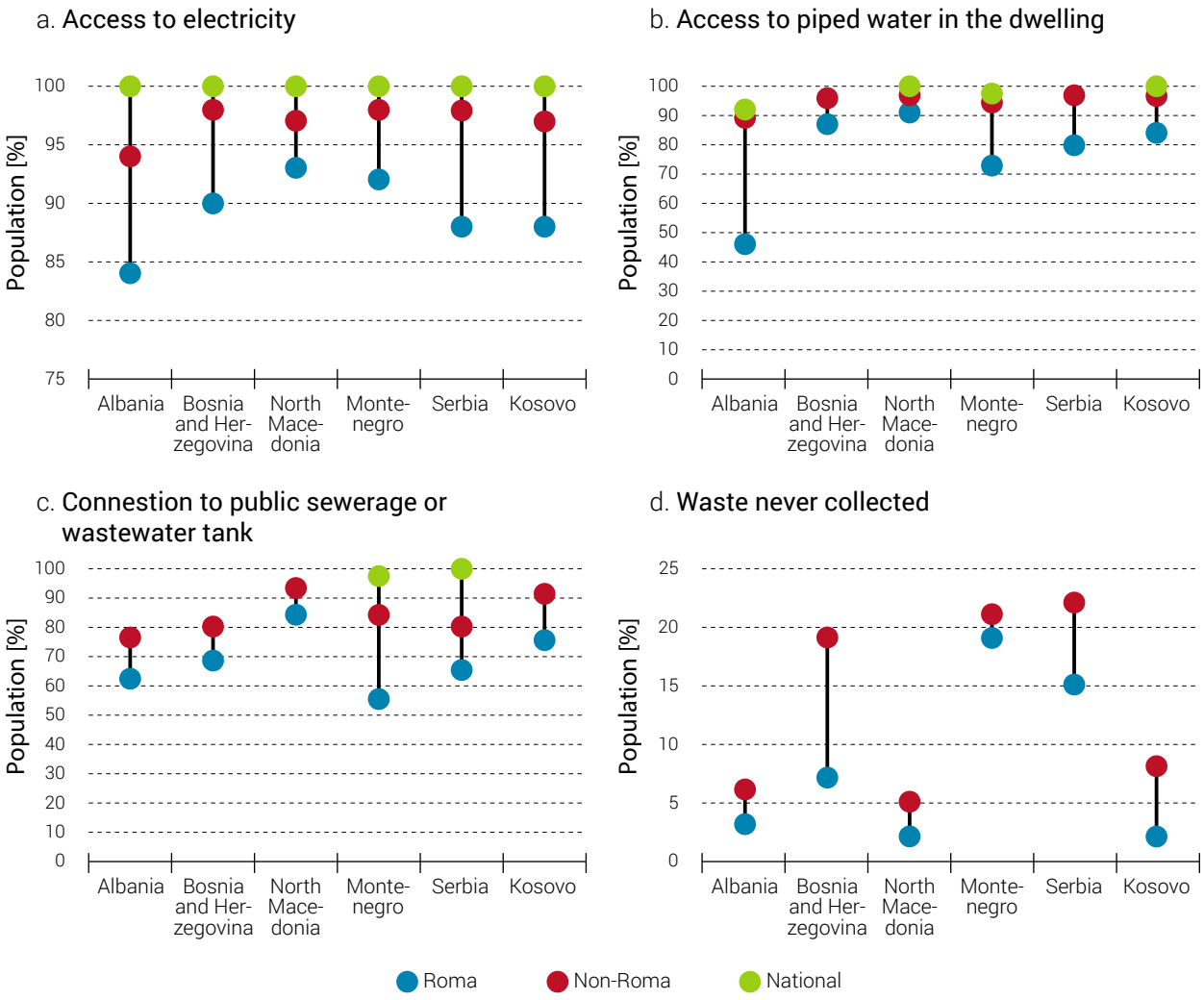
56. **Closing the rural-urban services gap and reaching universal access are important challenges requiring countries to expand services to rural areas. The enabling policies, legislative framework, and financing measures need to recognize the service delivery models required to address all rural water supply needs.** Access levels to WSS are much lower in rural areas than in urban areas. In addition, the quality of the service and operator practices are often weaker than in urban areas, even when provided by formal public service providers. As mentioned in Chapter III, some countries are addressing this gap through introducing regionalization reforms. However, while regional and urban utilities may be able to reach a substantial share of the rural population, in some countries, parallel local operator models might continue to bring services to villagers. Regional and urban utilities may not be able to reach these segments in the medium or long term because conflicting interests and misaligned incentives may hinder progress. In addition, for dispersed and remote populations (although shrinking in size), a piped networked system may not be feasible, and self-supply is the only viable alternative. Hence, the trajectory for reaching universal access is shaped by country realities in terms of access levels, the existing provider landscape and demographics, and sector evolution. See Box 6 for national examples of closing the rural-urban gap.

Box 6 National Approaches to Close the Rural-Urban Gap

Albania is addressing access to water in rural areas through the implementation of the Territorial Administrative Reform, which mandates the integration of stand-alone WSS schemes previously operated by informal community groups or commune units under one of the 58 regional utilities. In Croatia, the process of integrating locally managed rural water systems within the service areas of public utility companies has seen remarkable achievements. Over the past decade independently managed water supply systems have thus decreased, and there is a much higher connection rate to public water utilities due to network expansions to reach rural areas. Croatian Water estimates that 4 percent of the total population remains connected to locally managed systems, and 12 percent of the total population continues to use self-supply, almost entirely among rural populations. In Kosovo, the Inter-Ministerial Water Council (the national coordination body for water-related issues) put forward a strategy for the management of rural water systems to integrate independently operated water schemes into respective regional water companies (RWCs) in 2014. Since then, about 240 systems have been upgraded and absorbed under the management of the RWCs. Based on a national inventory, it is estimated that 55 percent of the rural population are served by RWCs. Around one-third of those are served through stand-alone rural systems and around two-thirds through extending urban networks to rural areas. Around 15 percent of the rural population are served by rural water systems operated by local operators, typically community-based groups planned for transfer to utilities. The remaining 30 percent rely on self-supply, although one in five resides in settlements with a piped system that is dysfunctional and requires rehabilitation.

57. **Minorities continue to have much lower access to WSS services as compared to the past five years.** All countries concerned keep stating that they have the same approach to all customers regardless of their ethnicity or social status. Nevertheless, the Roma community continues to present worse socioeconomic indicators in almost all areas. A World Bank (2019) study highlights how marginalized Roma in the Western Balkans do not have the endowments and assets they need nor the ability to use the assets they have efficiently and intensively to generate economic gains and climb the socioeconomic ladder. In 2017, the European Roma Rights Centre (ERRC) conducted a field study in 75 Roma settlements located in Albania, Hungary, North Macedonia, Montenegro, Moldova, and Slovakia. This study targeted Roma communities' access to drinking water and sanitation. The research shows that 77 percent of the surveyed settlements do not have access to tap water in their dwelling and 39 percent have to resort to open access to water resources. Moreover 91 percent have to use external, self-made dry toilets or resort to open defecation, while only 23 percent have toilets in their homes (ERRC 2017). In addition, Figure 30, panels a–d, showcases differences in access to essential services between non-Roma and Roma populations in the Western Balkans. Three countries have a national strategy to improve living conditions of minorities: Albania with its National Action Plan for the Integration of Roma and Egyptians for 2016–2020, Slovenia with its National Governmental Action Programme for Roma (2017–2021), and Montenegro with its Roma Strategy 2008–2012.

FIGURE 30: SHARE OF ROMA, NON-ROMA, AND NATIONAL ACCESS TO ESSENTIAL SERVICES IN WESTERN BALKANS, 2017



SOURCE: WORLD BANK 2019.

V. PERFORMANCE OF SERVICES

58. **The overall performance of water and wastewater services, in terms of their quality and efficiency, varies widely in the region, but positive trends have been registered on several variables since the last SoS report, 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.

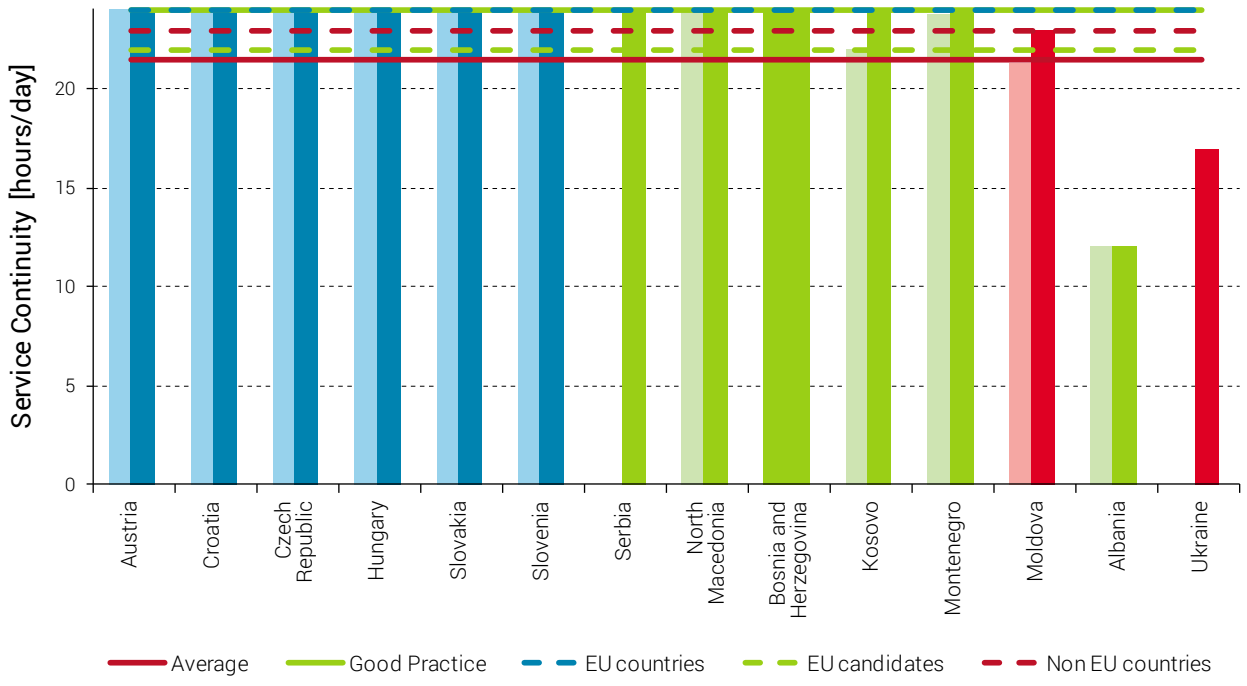
59. **This chapter covers services provided by formal utilities or service providers ("public supply"), which serve about 82 percent of the population in the region (see Chapter III).** Unfortunately, little information is available about the performance, quality, or even cost structures of informal providers (community or village systems and self-supplied households), which serve the remaining 18 percent. An attempt to characterize these informal providers was done in 2017 through a review of rural water supply and sanitation services in seven countries of the Danube region.

60. **Most of the information in this chapter is derived from the SoS 2018 updated data collection and referenced individually in the country tables at the end of the document. The chapter also sources the large dataset available, from International Benchmarking Network for Water and Sanitation Utilities (IBNET) DANUBIS.org database,** which covers more than 450 utilities and close to 3,400 observations between 1995 and 2017. Both sources entail potential data challenges, which are explained in the methodological note in Appendix B.

A. Service Quality and Customer Practices

61. **Five years ago, service continuity had reached or was moving toward reaching 24 hours per day in half of the Danube countries, two new countries have reached continuous water supply to the majority of citizens** (Figure 31). The eight countries that provide 24 hours per day water supply have maintained this level of service over the

FIGURE 31: SERVICE CONTINUITY IN DANUBE REGION, 2013 AND 2017



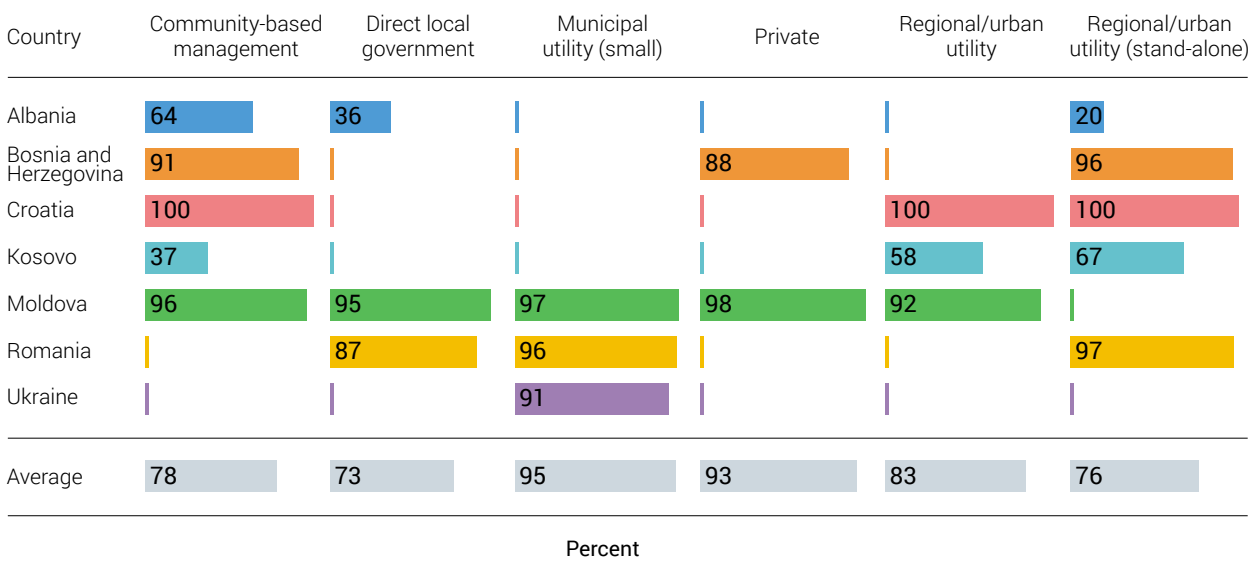
SOURCE: SOS DATA COLLECTION 2019.

NOTE: DARKER COLOR REPRESENTS VALUE FOR YEAR 2017; LIGHTER COLOR REPRESENTS VALUE FOR YEAR 2013.

past few years. In addition, Kosovo has managed to increase its average service continuity from 22 to 24 hours per day, and Moldova from 21 to 23 hours per day. Bosnia and Herzegovina, for which no data are available in 2015, shows a 24 hour per day continuity. Albania is struggling to improve continuity, staying at an average of 12 hours per day over the past five years, although continuity of supply is one of the key objectives of the country's national water strategy (it was targeted to reach 20 hours per day in 2017). Data on continuity of water supply for Bulgaria and Romania are not available, as in the first SoS.

62. **The level of service continuity achieved in Moldova, Bosnia and Herzegovina, and Serbia (Figure 31) should however be nuanced: it varies by type and size of service provider, especially in rural areas.** Figure 32 shows that in rural areas, regional or stand-alone urban utilities provide 24/7 continuity to a larger share of their served population than do smaller providers, except for Albania and Moldova, in which community base providers seem to be reaching a larger share of their customers with continuous supply.

FIGURE 32: SHARE OF CONNECTED HOUSEHOLDS WITH 24-HOUR SUPPLY IN RURAL AREAS (BY SERVICE PROVIDER) IN DANUBE REGION



SOURCE: WORLD BANK 2018.

NOTE: REGIONAL STANDALONE UTILITIES REFER TO REGIONAL UTILITIES MANAGING SEPARATE STANDALONE RURAL NETWORKS, RATHER THAN A REGIONAL UTILITY MANAGING A RURAL NETWORK WHICH IS PHYSICALLY CONNECTED TO AN URBAN SYSTEM.

63. **Drinking water quality is now compliant with national standards in the majority of countries and continues to reach EU standards in all EU member states** (Table 11). In addition, candidate and potential candidate countries are making efforts to harmonize national standards with EU ones. Most countries with available data display compliance rates for chlorine residual above 94 percent, with remarkable progress being made by Bosnia and Herzegovina since 2014 (albeit a drop-in compliance in 2017), and by Slovakia since 2016. For coliform, compliance rates are above 97 percent except for Serbia, which is struggling to improve bacterial quality of drinking water above 70 percent, and has dropped slightly in compliance for chlorine residual in 2017.

64. **For wastewater discharge, EU member states have transposed and are enforcing EU requirements, in accordance with the UWWTD, while other countries rely mainly on national standards inherited from the Soviet era.** Some harmonization efforts with EU and World Health Organization (WHO) standards are being made in Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Kosovo. Table 11 and Figure 33 provide an overview of the situation regarding service quality standards in the different countries for which information is available.

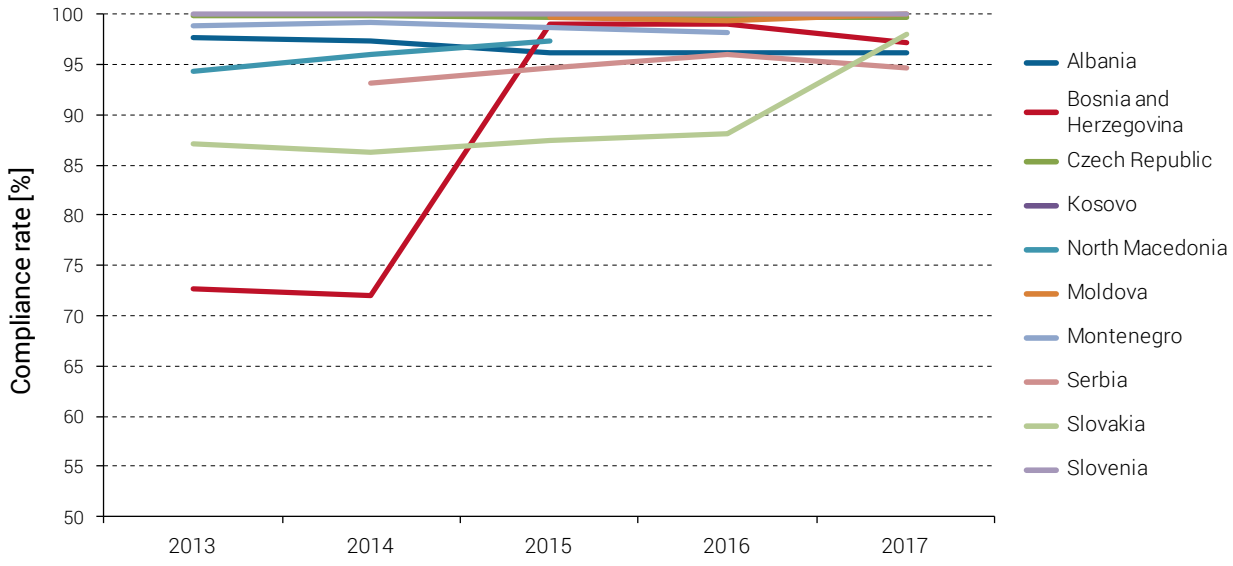
TABLE 11: OVERVIEW OF SERVICE QUALITY STANDARDS IN DANUBE REGION

Country	Is water quality compliant with applicable standards?	Water service continuity			Is wastewater treatment compliant with discharge permits?
		Is service continuous?	Value (hours/day)	Year	
Albania	In many cities	Only four cities get 24/7 supply	12	2017	In some cities
Austria	Yes	Yes	24	2017	Yes
Bosnia and Herzegovina	In most cities	In most cities	24	2017	Yes
Bulgaria	Yes	Yes	n.a.	–	Yes
Croatia	–	Yes	24	2014	–
Czech Republic	Yes	Yes	24	2017	Yes
Hungary	Yes	Yes	24	2017	
Kosovo	Yes	Yes	24	2017	No
Moldova	–	In most cities	23	2017	–
Montenegro	–	–	24	2016	–
North Macedonia	Yes	Yes	24	2013	–
Romania	Yes	Yes	24	–	–
Serbia	In most cities	In most cities	24	2017	–
Slovakia	Yes	Yes	24	2017	Yes
Slovenia	Yes	Yes	24	2017	Yes
Ukraine	In many cities	–	–	–	In many cities
Regional average	**–**	**–**	**22**	**–**	**–**

SOURCE: SOS DATA COLLECTION 2019.

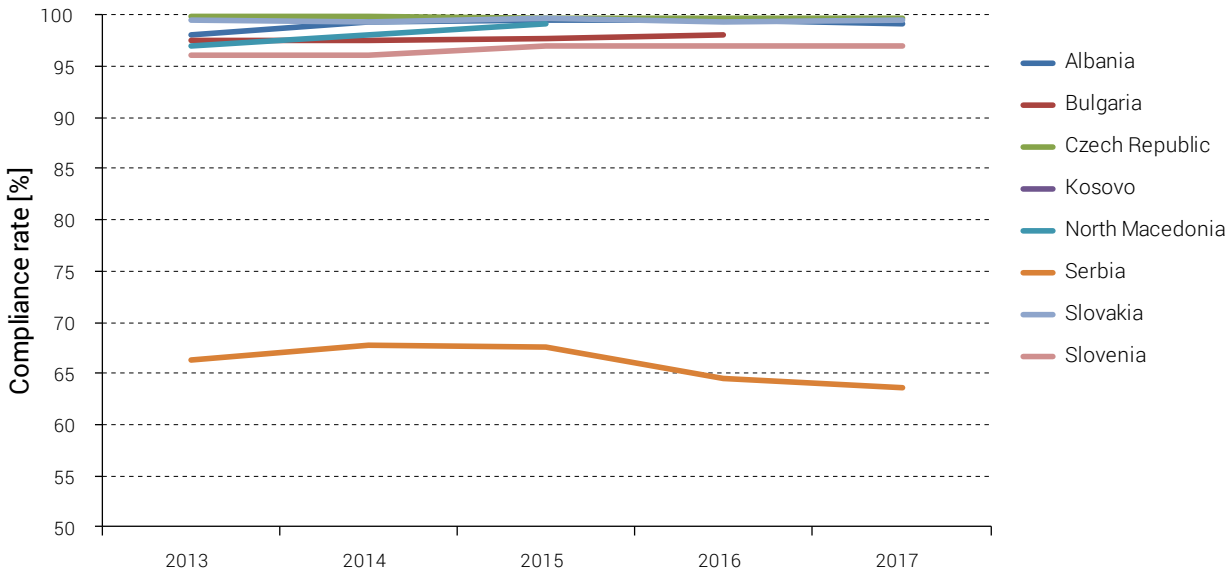
NOTE: N.A. = NOT APPLICABLE; – = NOT AVAILABLE.

FIGURE 33: SHARE OF COMPLIANCE RATE FOR CHLORINE RESIDUAL IN DANUBE REGION, 2013–17



SOURCE: SOS DATA COLLECTION 2018

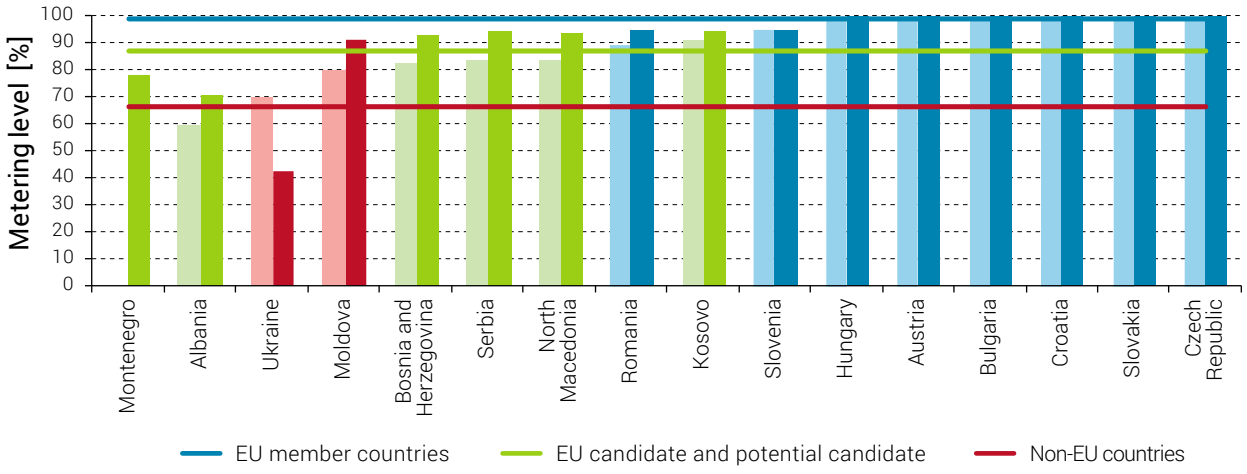
FIGURE 34: SHARE OF COMPLIANCE RATE FOR COLIFORM IN DANUBE REGION, 2013–17



SOURCE: SOS DATA COLLECTION 2018.

65. **Over the past five years, metering level has increased in all countries, with few exceptions. Because of this positive evolution, 13 countries in the region are now displaying metering level above 90 percent. Three countries are still struggling to improve their level of metered consumption** (Figure 35): Albania with 71 percent, Montenegro with 78 percent, and Ukraine with 42 percent. In Ukraine, the metering level is reported to have decreased by about 30 percent since 2013. This evolution might result from data inaccuracy, especially since metering levels reported in each oblast vary quite widely from one year to another in the same region. In Albania, the national strategy had planned massive metering installation investments from 2011 to 2017. But these investments did not occur, and full metering targets were not met. The new WSS strategy under development for 2019–30 is targeting universal metering by 2022. The average metering level in EU countries is 99 percent; it amounts to 87 percent in candidate and potential candidate countries and up to 67 percent in non-EU countries. Moreover, in Albania, Kosovo, North Macedonia, Moldova, Romania, and Serbia, the metering level increased and the share of population connected to public water supply rose as well. This shows substantial efforts from utilities to meter both historic and new customers.

FIGURE 35: SHARE OF METERED CONNECTION IN DANUBE REGION, 2012–13 AND 2016–17

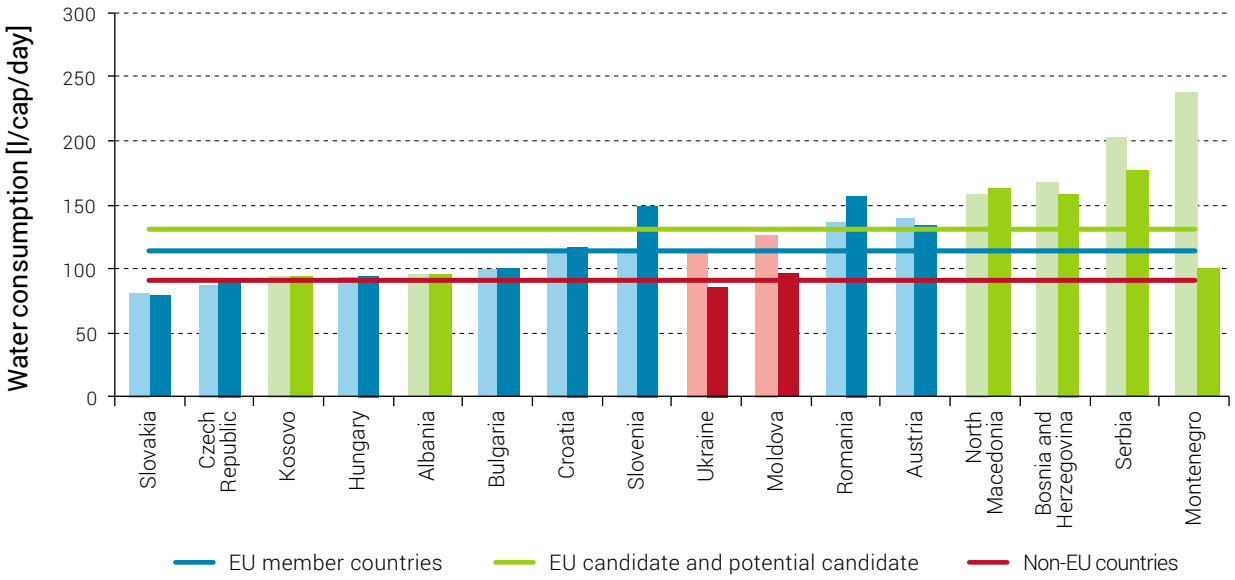


SOURCE: SOS DATA COLLECTION 2018.

NOTE: DARKER COLOR REPRESENTS VALUES FOR YEAR 2016–17; LIGHT COLOR REPRESENTS VALUES FOR YEAR 2012–13.

66. **Water consumption is generally following a decreasing trend, with significant reductions in per capita consumption in seven countries, slight (with one exception) increases in five countries, and remaining stable in another four over the past five years (Figure 36).** In Montenegro, Ukraine, Moldova, and North Macedonia, consumption decreases range from 20 percent to 58 percent. In Ukraine, following the November 2013 political events and the hostilities in the eastern part of the country, inflation increased significantly, thus decreasing households' purchasing power. As a result, the overall consumption went down, including consumption of water as well as other local public services. In Moldova and Montenegro, the significant increase in WSS tariffs, which more than doubled compared to five years ago, may explain the reduction in water consumption observed. On the contrary, consumption increased by 31 percent in Slovenia, with no clear explanation for such an evolution other than the increase of 13 percent in the population connected to public water supply at national level. The average water consumption is stabilized around EU-wide standards of 100 liters per capita per day to 120 liters per capita per day. The average consumption reaches 114 liters per capita per day in EU countries and 92 liters per capita per day in non-EU countries. It remains well above in EU candidate and potential candidate countries at 125 liters per capita per day.

FIGURE 36: WATER CONSUMPTION IN DANUBE REGION, 2012–13 AND 2016–17



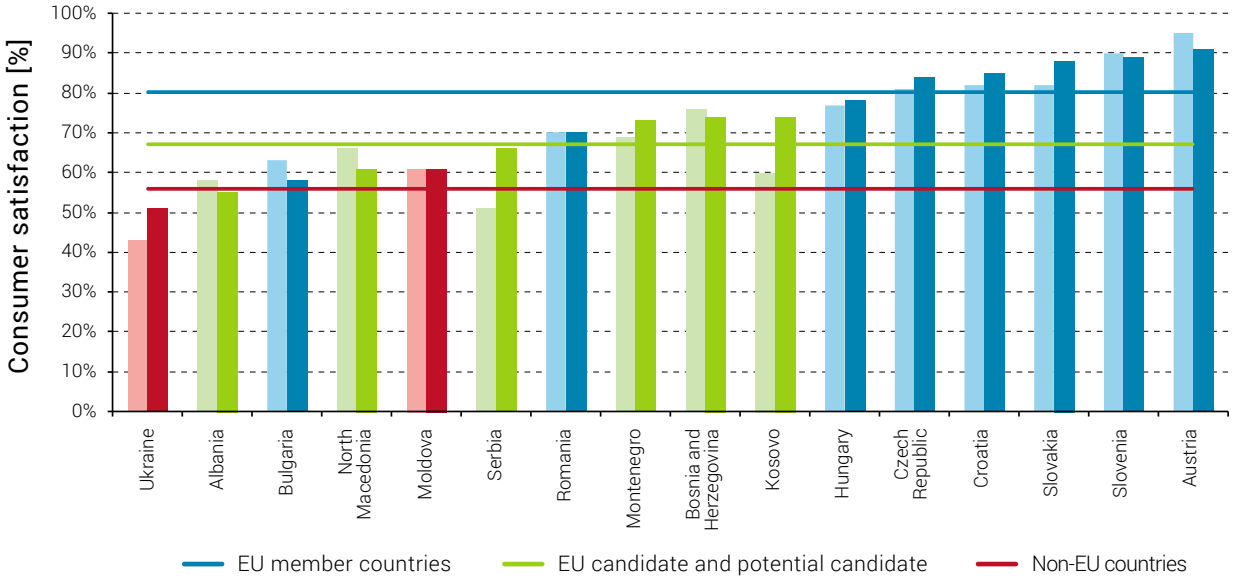
SOURCE: SOS DATA COLLECTION 2018.

NOTE: DARKER COLOR REPRESENTS VALUES FOR YEAR 2016–17; LIGHT COLOR REPRESENTS VALUES FOR YEAR 2012–13.

67. **Regional customer protection mechanisms and practices have not evolved significantly over the past five years.** In nine countries, utilities have occasionally conducted customer surveys, but the results are rarely made public. In addition, those surveys are not very widespread or done regularly. In 10 countries, utilities are entitled by law to set up customer complaint mechanisms. Moreover, in countries with a national regulatory authority, the regulator is also responsible for customer protection, with the exception of Kosovo and Hungary, in which other institutions take on this duty (Table 12).

68. **Over the past decade, customer satisfaction regarding water service quality has remained high or increased in most EU member states, but has dropped significantly in some EU members and in most EU candidate countries** (Figure 37). In Austria, Slovakia, Hungary, Croatia, and the Czech Republic, customer satisfaction has remained stable at a high level (above 75 percent), and it has increased in Slovenia from 85 percent to 94 percent. However, satisfaction rate has decreased below 60 percent in Bulgaria and remains below 70 percent in Romania over the same period. In the other Danube countries, the customer satisfaction rate ranges from 51 percent to 72 percent (2018).

FIGURE 37: SHARE OF CUSTOMER SATISFACTION REGARDING WATER SERVICE QUALITY IN DANUBE REGION, 2013 AND 2017

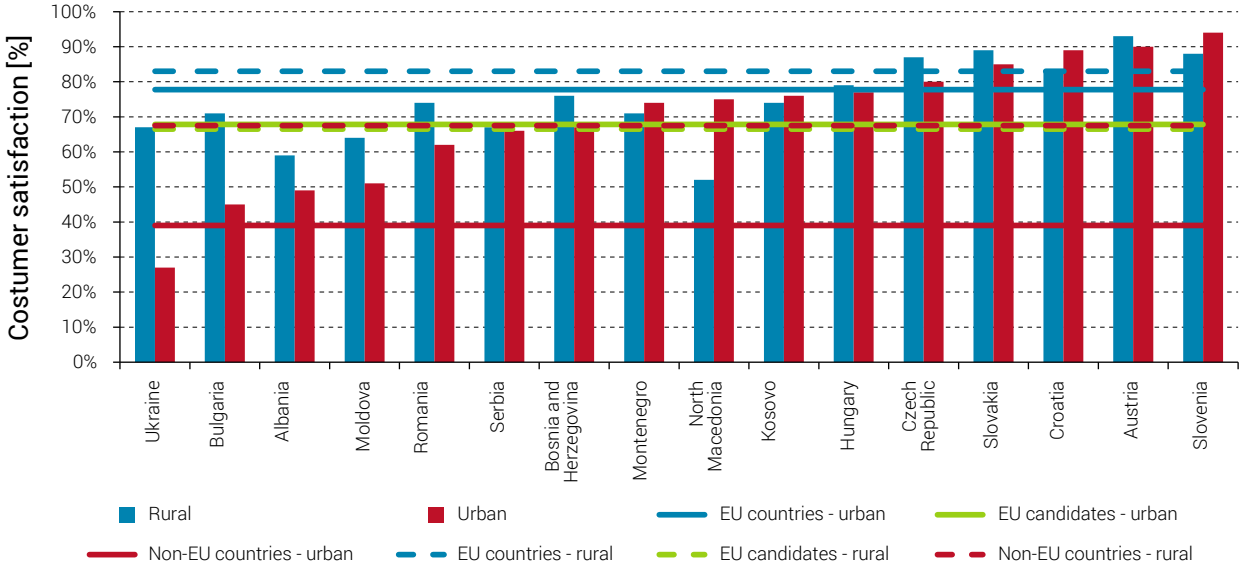


SOURCE: GALLUP 2018.

NOTE: DARKER COLOR REPRESENTS VALUES FOR 2017; LIGHT COLOR REPRESENTS VALUES FOR 2013

69. **Customer satisfaction with regard to water service quality shows higher rates in rural settlements than in urban areas in two-thirds of the Danube countries** (Figure 38). Over the past decade, in Albania, Ukraine, Bosnia and Herzegovina, Moldova, Austria, Bulgaria, Croatia, the Czech Republic, and Hungary, rural customers tend to be more satisfied about water service quality than urban ones. In Kosovo and Slovakia, the satisfaction rate between urban and rural customers tend to be similar whereas urban customers declare greater satisfaction in Slovenia, Serbia, Montenegro, and North Macedonia. These results (for which there was no breakdown available in the original SoS 2015) are counterintuitive because service provision in rural areas is less developed than in urban areas in many countries. This could be explained by a disconnect of perceptions on actual water quality, as well as by closeness to small service providers in rural areas and lower tariffs (World Bank 2018a).

FIGURE 38: SHARE OF URBAN AND RURAL CUSTOMER SATISFACTION REGARDING WATER SERVICE QUALITY IN THE DANUBE REGION, 2017

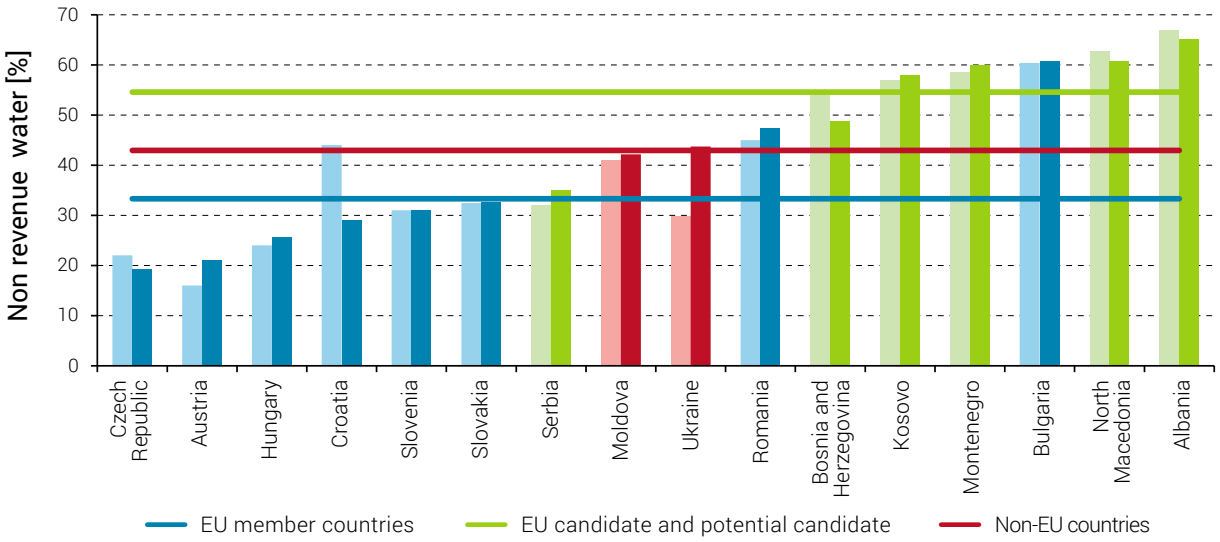


SOURCE: GALLUP 2018.

B. Efficiency

70. **Nonrevenue water (NRW) has followed quite a diverse evolution across the region over the past few years, with half of the Danube countries making improvements in the reported NRW figures or keeping it stable, and the other half reporting increases** (Figure 39). Although the observed NRW trend over the past 15 years shows no clear and positive evolution for countries (particularly those with rates higher than 30 percent), a few countries—including Austria, Albania, Bosnia and Herzegovina, Croatia, and Moldova—have made important improvements in the last three years (especially Bosnia and Herzegovina). But NRW continues to be a key challenge for most utilities, especially in non-EU member countries. The average NRW level in EU member states is 33 percent; it is 58 percent in candidate and potential candidate countries and up to 43 percent in non-EU countries. Austria and the Czech Republic are the only countries reaching international good practice with less than 25 percent of NRW. In Montenegro, reported NRW has increased steadily and deteriorated significantly in the past few years since the last SoS. In addition, a capacity building program on NRW reduction has been initiated under the Danube Learning Partnership Program (see box 7).

FIGURE 39: SHARE OF NONREVENUE WATER IN DANUBE REGION, 2013 AND 2017



SOURCE: SOS DATA COLLECTION 2018.

NOTE: DARKER COLOR REPRESENTS VALUES FOR 2016-2017; LIGHT COLOR REPRESENTS VALUES FOR 2011-2013.

71. **The performance of service providers and countries with regard to energy efficiency continues to require further research.** Information at the country level is not systematically available (Figure 40), and evidence from a limited sample of utilities undertaken in the first SoS report shows that the adoption of energy efficiency measures could help offset the generally increasing energy costs at the time. [25] For

25 As shown in the SoS 2015, a review done in the context of the DWP 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 investments that 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.

Box 7 Nonrevenue Water Program from the Danube Learning Partnership

High levels of NRW (water either physically lost or not paid for by customers) is a major problem in many utilities. The Danube Learning Partnership, launched in 2016, is a capacity building program for utilities on basic NRW management; it offers specific tools for diagnosis of water losses with the aim to increase understanding of utility staff and management on where the losses are and how they can be tackled. This program raises awareness of physical and commercial water losses among the participating utility companies and of activities to be undertaken to decrease them to consequently improve the operational and financial performance.

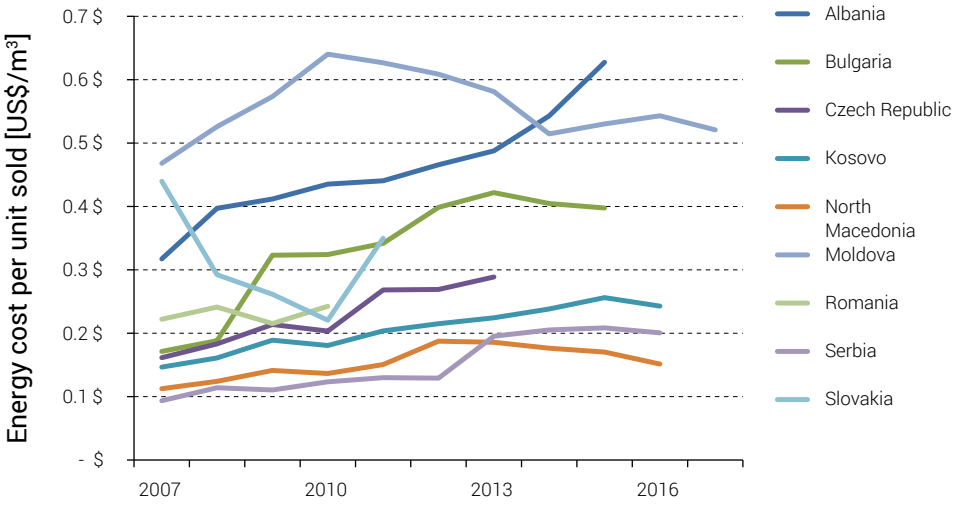
The program has been developed in cooperation with the technical partner Una Consulting, which reviews existing activities and programs on NRW and develops guidelines, tools, training material, and manuals regarding NRW providing their applicability for water utilities in Danube region.

The program is delivered by national or regional hubs in local languages. Participating hubs are Aquasan Network in Bosnia and Herzegovina, Water Supply and Sewerage Association of Albania, and Wastewater Works Association of Kosovo. The one-year program consists of workshops as well as hands-on exercises at the utilities with support of trainers. Participating utilities pay a registration fee.

most countries, the steady increases in unitary costs observed until 2013 have not continued, at least not as strongly. This is in line with world energy price developments, and the secular decline in oil prices. Moreover, when looking at available data at country level, energy costs are reported to represent from 7 percent to 24 percent of overall operating expenses (opex).

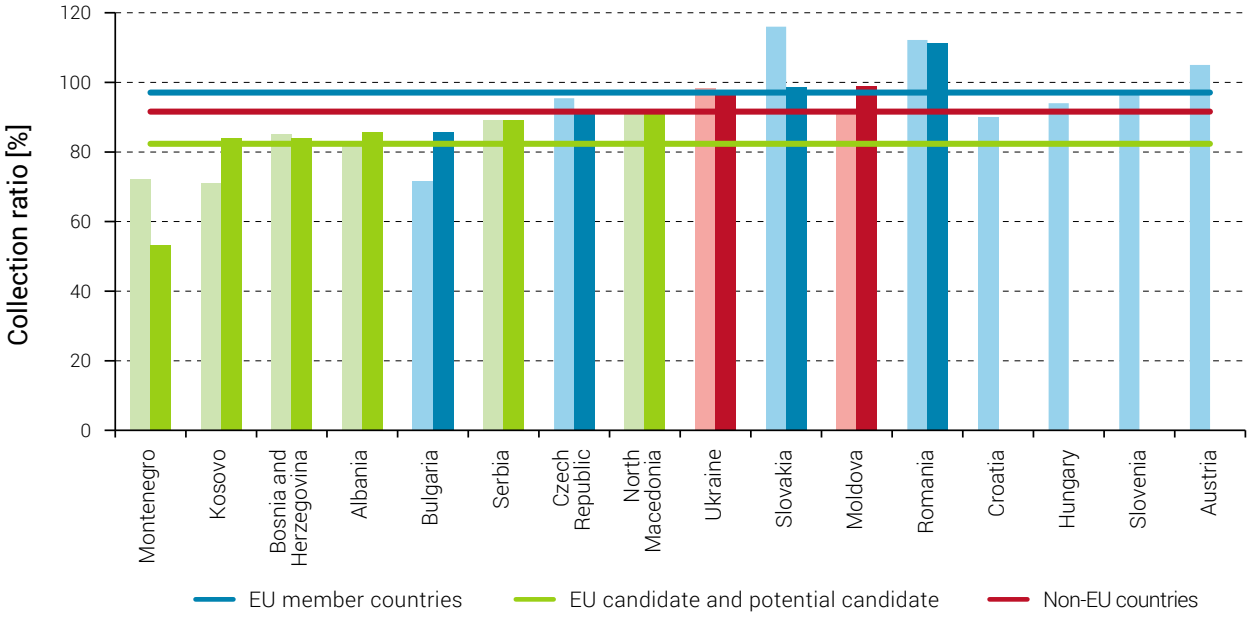
FIGURE 40: ENERGY COSTS PRODUCED IN SAMPLE OF UTILITIES IN DANUBE REGION, 2007–16

SOURCE: SOS DATA COLLECTION 2018.



72. **Staff efficiency has followed a generally positive trend in most countries in the region during the last few years, following steady progress since the early 2000s. However, despite the noticeable recent efforts in several countries, utilities still show staffing levels above international good practices,** and overstaffing remains an issue in most utilities (see Chapter III). Continuing to improve staff productivity is a key aspect to enhance utilities' efficiency because staff costs often represent the most important operational expenditure. Since the SoS 2015, eight countries have managed to keep stable or improve their staff per 1,000 connections productivity (but updated data are missing for Romania[26]).

FIGURE 41: SHARE OF COLLECTION RATIO IN DANUBE REGION, 2010-13 TO 2015-17



SOURCE: SOS DATA COLLECTION 2018.
NOTE: DARKER COLOR REPRESENTS VALUES FOR 2016-2017; LIGHT COLOR REPRESENTS VALUES FOR 2011-2013.

26 That was an outlier in 2012 with a rate of 18 employees for 1,000 connections.

73. **The commercial efficiency of utilities in the region has improved (from an already solid base) or remained stable and high; currently 10 countries are reaching, on average, collection ratios above 90 percent** (Figure 41). Four countries have improved their collection ratio, while six still have ratios below 90 percent. Collection ratio in Romania remains above 100 percent, showing that utilities are collecting both current invoices and arrears. The medium-term trend shows a convergence of collection ratios in the region above 85 percent, and annual variations are steadily smoothing, except for North Macedonia.

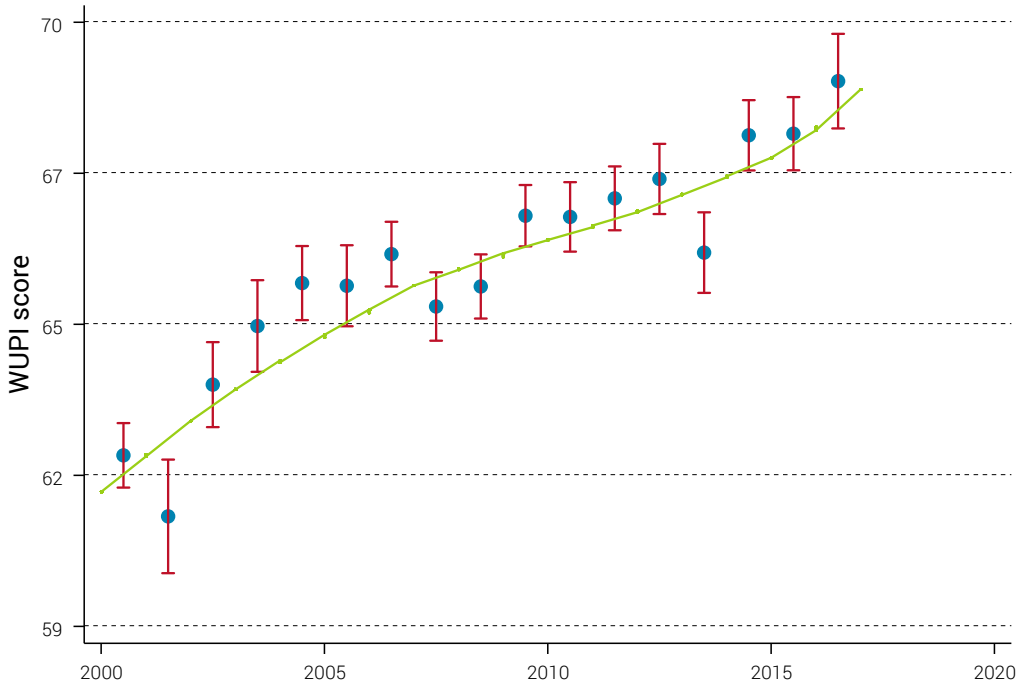
C. Overall Performance Trends and Drivers

74. **In the SoS 2015, an econometric analysis of utility performance trends and drivers was performed to complement the descriptive analysis of sector performance.** Such an analysis makes it possible to analyze the data more rigorously and draw conclusions that are substantiated statistically. For that purpose, the most recent IBNET/DANUBIS.org dataset was used to update the Water Utility Performance Index (WUPI), a specific performance index calculated by the author team (see box 8) to measure the overall performance of utilities (in terms of service coverage, service quality, and management) against various parameters. The IBNET dataset is not representative in all countries: Albania, the Czech Republic, Kosovo, Moldova, and Serbia are the most complete, while Austria and Slovenia are entirely missing; data are dated in Hungary, the Czech Republic, and Romania and very partial in Montenegro and Ukraine. However, the results here include conclusions that have been thoroughly vetted. More details about the corresponding analysis can be obtained in the methodological note in Appendix B.

Box 8 Water Utility Performance Index

The WUPI is a simple index measuring how close 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/DANUBIS.org dataset. Those dimensions are grouped in three categories: coverage (water supply, sewer, and wastewater treatment); quality (service continuity and sewer blockage) and management (metering, NRW, Staff productivity, collection rate, operating cost recovery). For each dimension a 1–10 score 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 refer to Appendix B.

FIGURE 42: WUPI SCORES IN DANUBE REGION, 2000–17



SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: BLUE DOTS REPRESENT AVERAGE SCORE BY YEAR, WITH 95 PERCENT CONFIDENCE INTERVALS IN RED. THE GREEN LINE IS THE SMOOTHED RESULT FROM A LOCAL LINEAR REGRESSION. RAW DATA ARE ADJUSTED BY REGRESSING WUPI SCORES ON UTILITY-LEVEL FIXED EFFECTS. WUPI = WATER UTILITY PERFORMANCE INDEX.

75. **Utility performance in the Danube region has further increased since 2013.** Overall, the increase over all utilities was 5.2 points, and 4.2 points accounting for the fact that the underlying sample of utilities changes over the years.[27] As shown in Figure 42, this improvement follows the long-term trend since 2000, but has been slightly increasing in recent years. Albeit some diverging trends within countries, WUPI scores at the country level have increased or remained stable in virtually all cases since the first SoS in 2015 (see Figure 43).

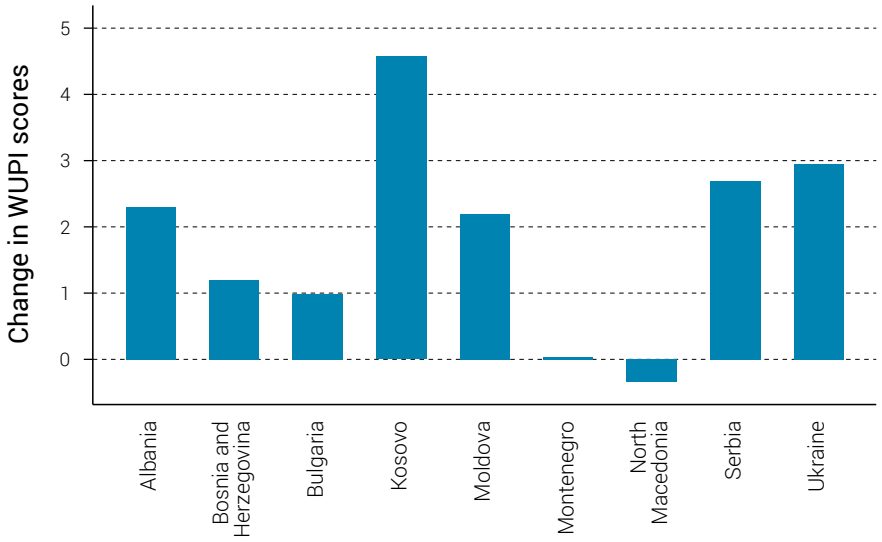


FIGURE 43: CHANGE IN WUPI SCORE (2014-17) COMPARED TO 2010-13

SOURCE: WORLD BANK ELABORATION OF IBNET.

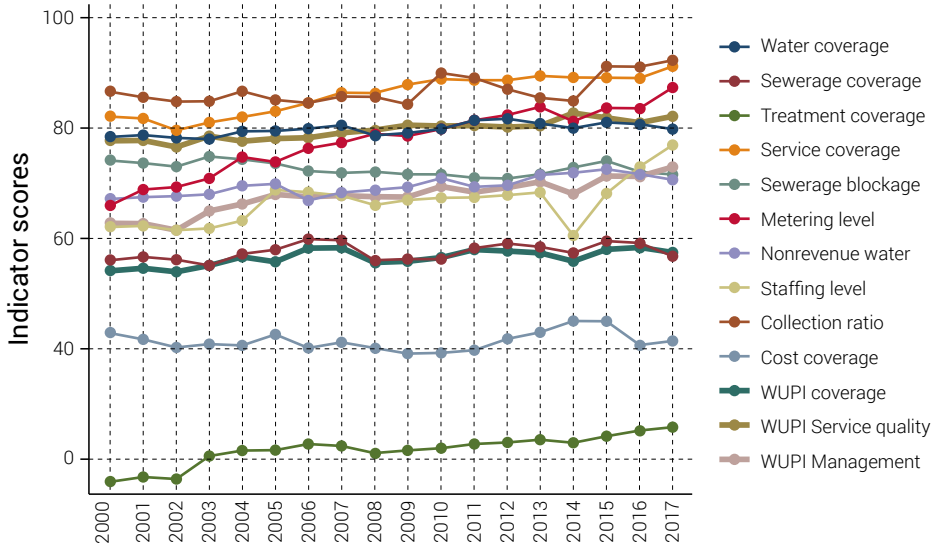
NOTE: WUPI = WATER UTILITY PERFORMANCE INDEX. ONLY COUNTRIES WITH UTILITY INFORMATION IN BOTH PERIODS 2010-13 AND 2014-17 ARE SHOWN. UTILITY DATA IS AVERAGED OVER THESE TWO PERIODS. INFORMATION IN THIS GRAPH MAY DIFFER FROM INFORMATION PROVIDED IN THE APPENDED COUNTRY PAGES BECAUSE, IN THE LATTER CASE, WUPI IS CALCULATED ONLY USING LATEST AVAILABLE YEAR FOR WHICH DATA EXISTS.

76. **Utility performance improvements have been focused on management.** Looking at the origins of the WUPI improvements points toward management practices as the main driver of the observed gains. As shown in Figure 44, indicators for metering, staffing, and collection of tariffs exhibit increased performance. There are also slight improvements related to service quality (service continuity), but virtually no progress with respect to service coverage, especially on access to wastewater collection and treatment services. This indicates that not only is the potential for performance improvements largest around service coverage but they also appear difficult to reap. Given that service coverage is often related to significant upfront investments, the lack of financial means might represent a key hindrance to the improvement of water sector performance in the Danube region.

FIGURE 44: WUPI SUBINDICATOR SCORES IN DANUBE REGION, 2000–17

SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: RAW DATA ARE ADJUSTED BY REGRESSING WUPI SCORES ON UTILITY-LEVEL FIXED EFFECTS. WUPI = WATER UTILITY PERFORMANCE INDEX.



27 The adjustment is achieved by regressing WUPI scores on utility-level fixed effects.

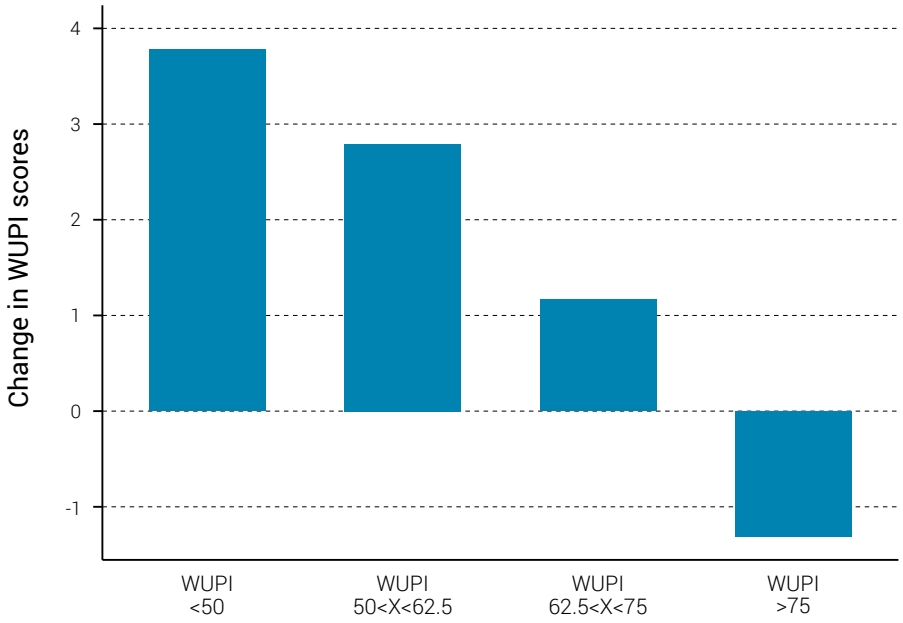
77. **The difficulties for utilities in increasing access to the services are most blatant regarding the collection and treatment of wastewater.** So far, a total of €42.5 billion has been invested to implement the urban wastewater treatment directive in the region. Three-quarters of this amount was spent on sewer networks and the rest on wastewater treatment plants in the eight Danube countries that are EU member states (see Chapter VI). However, despite this important investment effort, an additional €17 billion (Umweltbundesamt and IOW 2017) is still needed to fund new investment in nonequipped agglomerations above 2,000 PE (two-thirds for sewers and the rest for wastewater treatment plants). The situation might be more challenging in non-EU countries, which face significantly larger investment needs and a lower level of economic development. The cost of UWWTD implementation for today's candidate and potential candidate countries is estimated to amount to €19 billion (World Bank 2018).

78. **The region's utilities keep showing a converging trend toward better practices, except for a number of high performing utilities that performed slightly worse than in previous years** (Figure 45). Utilities with lower initial WUPI grew stronger since 2013 than utilities with higher WUPIs. On the one hand, this confirms the finding of the previous SoS, showing that utility performance in the area is converging. On the other hand, there are a number of utilities with higher initial WUPI that at least slightly decreased their WUPI score. While the origin of this backsliding are beyond this report, it shows that achieving further improvements after a certain level may prove to be challenging. And a push toward the frontier utilities is not guaranteed.

FIGURE 45: CHANGE IN WUPI SCORES IN DANUBE REGION, 2014–17, BY INITIAL WUPI LEVELS, 2010–13

SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: WUPI = WATER UTILITY PERFORMANCE INDEX.



79. **The performance differences of utilities tend to be larger across countries than within countries.** The crucial role of the country context for water utility performance is further highlighted in Figure 46. In most countries, the variation in utility performance is not very large, and most utilities fall into performance categories close to their average. This is most visible for countries with high or low WUPI scores. Despite the performance improvements in many countries, this picture is rather similar to the last report[28]. The water sectors in the region are converging, albeit at a pace that will still require several years before a level playing field is reached. At the same time, and this is particularly true for countries with intermediate WUPI scores, high and low performance utilities appear to coexist even within countries. This is particularly important because it indicates that in those countries, it is possible to perform at a high level, yet many utilities do not do so. This represents an important opportunity for possible efficiency potentials.

80. **In general, high performing utilities score well across the three subdimensions[29] of WUPI.** On the country level for instance, Figure 47 shows that the top performers, the Czech Republic and Hungary, receive high scores (above 80) in all three areas. Similarly, utilities with low performance tend to exhibit weak performance in all three subdimensions.

28 It should also be mentioned that particularly for the countries with the best performing utilities, the data shown in Figure 48 is often quite dated. For completeness those countries are still shown to give a full account of the range of service performance in the region.

29 Service coverage, service quality, and management.

Between these two extremes, however, it appears that a considerable part of the performance gap to the best practice countries is driven by indicators related to service coverage, specifically wastewater collection and treatment.

FIGURE 46: SHARE OF UTILITY DISTRIBUTION IN DANUBE REGION BASED ON WUPI SCORES, 2017

SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: YEAR IS 2017 OR LATEST AVAILABLE. THE DIFFERENT CATEGORIES REPRESENT THE FIVE QUINTILES: LOW ARE UTILITIES BELOW THE 20TH PERCENTILE. THE (APPROXIMATE) THRESHOLDS OF THE WUPI QUINTILES ARE AS FOLLOWS: 62, 68, 74, 80. WUPI = WATER UTILITY PERFORMANCE INDEX. COUNTRIES ORDERED BY AVERAGE WUPI.

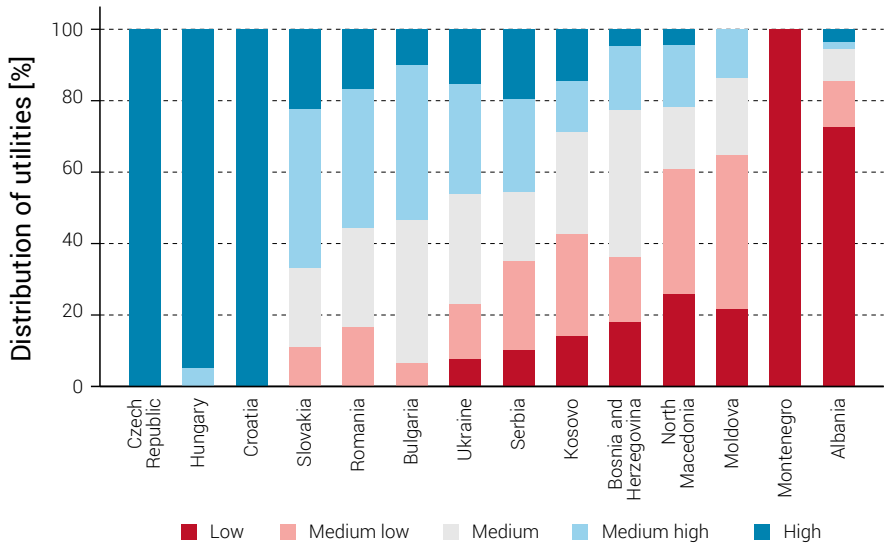
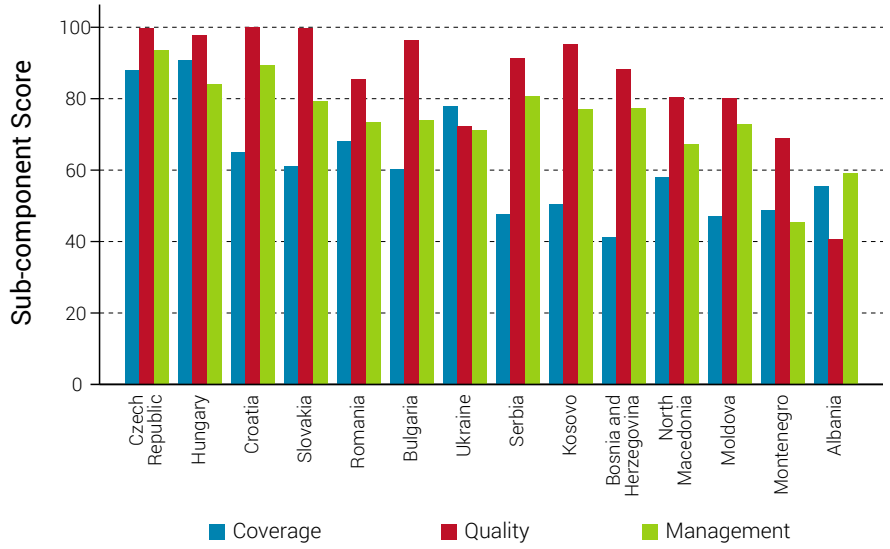


FIGURE 47: AVERAGE SCORE OF WUPI SUBCOMPONENT IN DANUBE REGION, 2017

SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: YEAR IS 2017 OR LATEST AVAILABLE. WUPI = WATER UTILITY PERFORMANCE INDEX.



81. **Higher WUPI scores are strongly correlated with higher tariffs (measured as revenue per cubic meter of water sold)** (Figure 48). Although this pattern might in part be related to economic development of countries, it suggests that increasing utility performance will go hand in hand with increasing tariffs. Within countries, higher tariffs do not necessarily mean better performance, but on the country level the relationship appears very clear. Linking tariffs with macroeconomic indicators (e.g., inflation) instead of ad hoc changes might be a sensible way to achieve enough financial means to achieve performance improvements.

82. **Collecting sufficient revenue to cover at least variable cost is indispensable for high performance.** Figure 49 shows that although there is a strong relationship between costs and revenue, the correlation is far from perfect. Many utilities do not collect enough revenue to cover operating cost. Second, utilities with tariffs that exceed cost tend to have higher WUPI scores. For a given cost level, utilities with tariffs above that level exhibit higher performance scores. Cost recovery is therefore not only a desirable goal in itself but also seems a crucial requirement for utilities to provide above average services. Given that tariffs in the region have stagnated or even decreased in some countries, the question arises whether the current level of revenues is enough to further improve services.

FIGURE 48: WUPI SCORES AND TARIFFS IN DANUBE REGION BY UTILITY, 2017

SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: YEAR IS 2017 OR LATEST AVAILABLE. WUPI = WATER UTILITY PERFORMANCE INDEX.

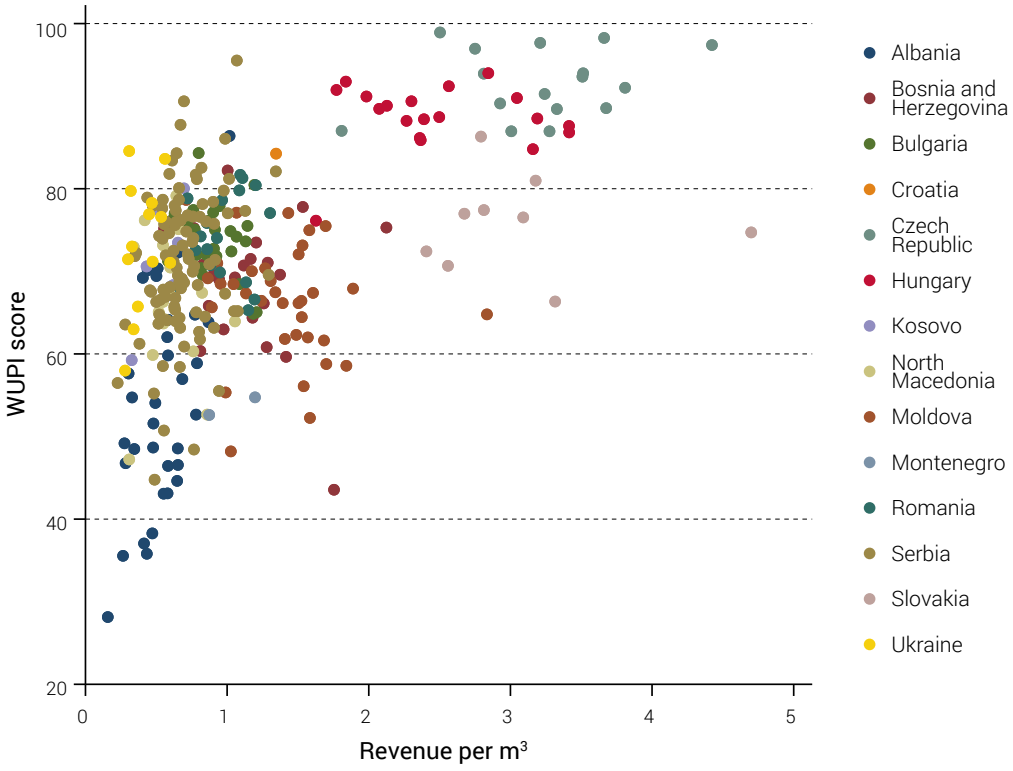
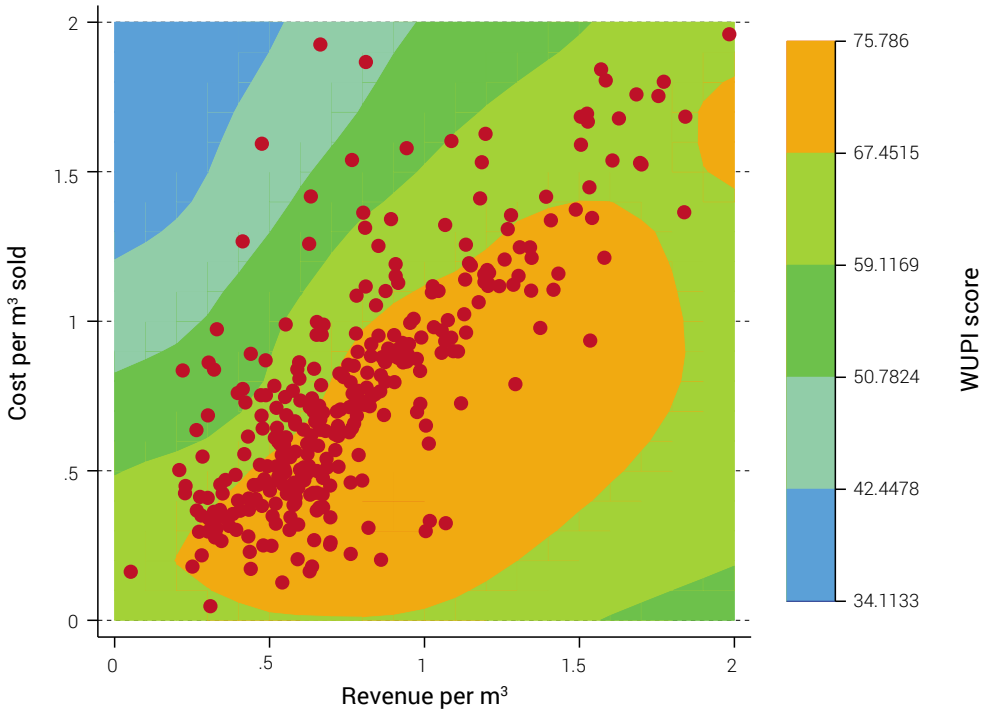


FIGURE 49: WUPI FOR COMBINATIONS OF COST AND REVENUE IN DANUBE REGION, 2017

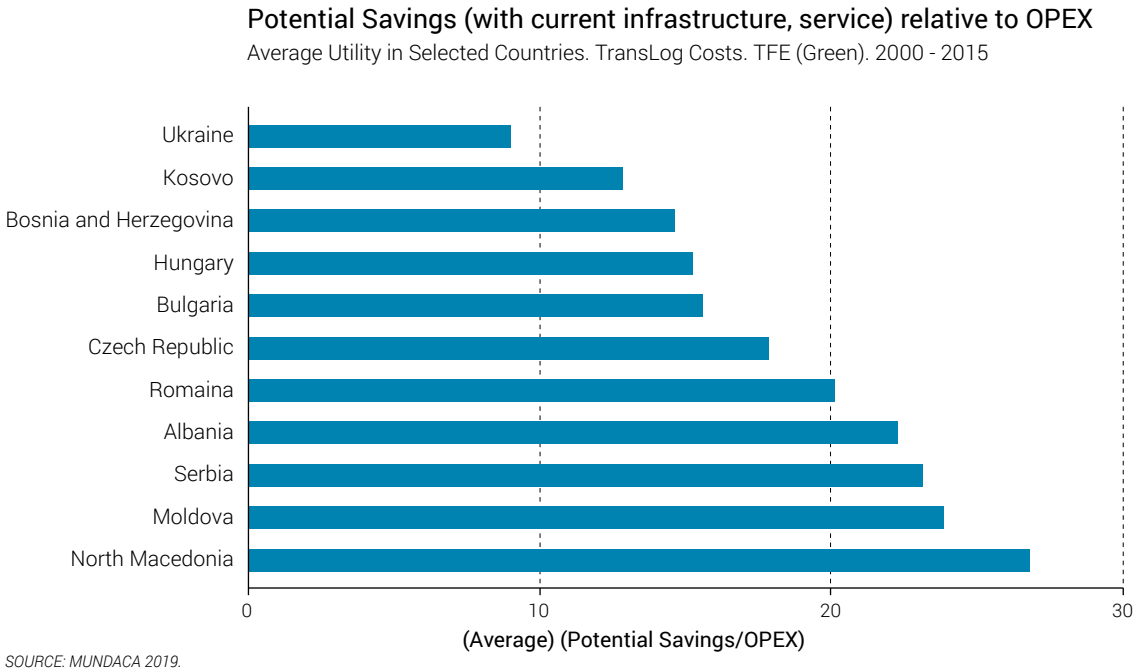
SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: YEAR IS 2017 OR LATEST AVAILABLE. RED DOTS REPRESENT UTILITY OBSERVATIONS. CONTOUR COLORS REPRESENT DIFFERENT LEVELS OF WUPI SCORES, AND WERE CALCULATED USING SHEPARD (INVERSE DISTANCE WEIGHTING) FOR THE INTERPOLATION. WUPI = WATER UTILITY PERFORMANCE INDEX.



83. **Improving cost efficiency could help to improve performance and maintain affordability at the same time.** Another reading of Figure 49 suggests that costs are only weakly related to performance. For a given level of WUPI, indicated by the color of the contour plot, a wide variety of both low- or high-cost utilities can be found. While structural differences in the operating environment might drive this, this alludes to important cost efficiency potentials in the Danube area. As the results from Mundaca (2019) show, even under conservative assumptions, the potential cost savings amount to very large amounts. Figure 50 shows the average potential cost savings (in terms of opex) per country. The suggested range of 10 percent to 25 percent of opex is substantial and underlines the fact that increasing technical efficiency of utilities can bring quantitatively large benefits.

FIGURE 50: SAVINGS PER OPEX (AVERAGE UTILITY) IN DANUBE REGION COMPARING UTILITIES TO THEIR EFFICIENCY FRONTIER, 2000–15



SOURCE: MUNDACA 2019.

NOTE: OPEX = OPERATING EXPENSES.

84. **Increasing cost efficiency can help to pursue other goals.** The analysis of utility efficiency in Mundaca (2019) indicates that utilities with higher cost efficiency can achieve better performance. A 10 percentage point increase in cost efficiency is related to a 5-point increase in WUPI scores. Higher cost efficiency can set free funds for improving utility performance (e.g., by raising service quality or connecting larger shares of population to the service). It might also make utilities more financially sustainable because cost-efficient utilities tend to exhibit higher cost recovery ratios.

D. Capacity for Performance

85. **Addressing the performance challenges presented in this chapter will require strengthening staff capacity. The analysis shows that implementing staff and human resource (HR) measures can help increase utility performance.** Using the information in IBNET related to HR,[30] one can differentiate utilities according to the HR measures or incentive schemes the utility management employs. As Figure 51 shows, the WUPI scores of utilities employing HR measures are significantly higher compared to utilities without such measures. While it is hard to pinpoint the measures that have the highest impact, the results indicate that using a set of measures is more effective than only a single approach. The effects of HR measures is most clearly visible in the WUPI subcomponent "WUPI management." This is hardly surprising because professionalized staff can help to improve business practices—most of which are part of WUPI management—but has probably less of an effect on performance indicators that require capital investment (e.g., WUPI coverage).

30 IBNET has the following items on human resources:

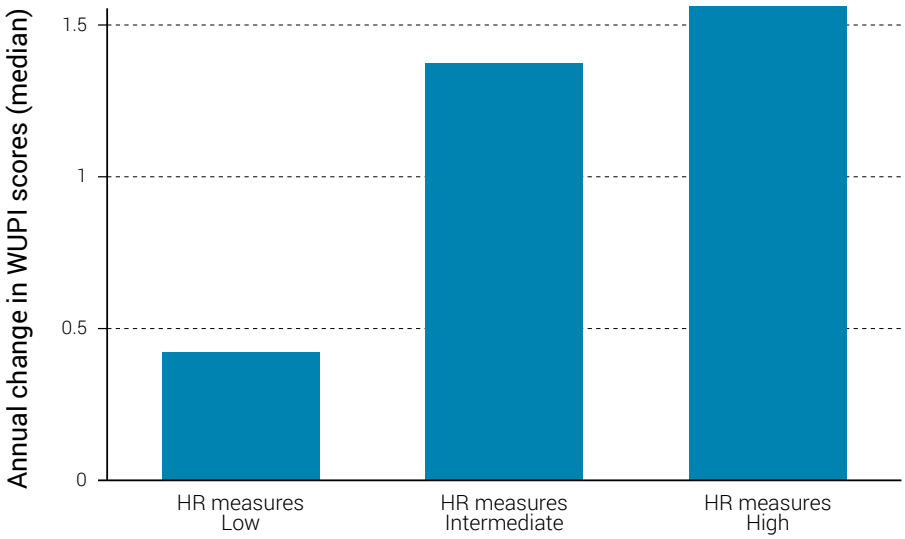
HR1 Has a skills and training strategy for all staff? – Yes/No
HR2 Has an annual appraisal and target setting system for managers? – Yes/no
HR3 Has an annual appraisal and target setting system for all staff? – Yes/no
HR4 Has a reward and recognition programme for all staff? – Yes/no
HR5 Has the ability to recruit and dismiss staff (within an agreed plan)? – Yes/no

Utilities answering one to three questions with yes are considered utilities with intermediate HR measures. Utilities with four or more of the above questions with yes are considered utilities with a high level of HR measures. Other utilities are considered as low HR measure utilities.

FIGURE 51: ANNUAL CHANGES IN WUPI SCORES FOR UTILITIES IN DANUBE REGION WITH DIFFERENT LEVELS OF HR MEASURES, 2010–17

SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: WUPI = WATER UTILITY PERFORMANCE INDEX.



86. **Utility associations can help foster capacity building of their member utilities. All countries in the region have a utility association covering either water supply, wastewater, or both sectors** (Table 12). These associations have their own operating budgets and staff. Most of them provide knowledge exchange, training, and public relations services to their members, while a few also set technical standards. In addition, since the last review a number of initiatives have begun consolidating capacity building activities in the region, such as under the Danube Learning Partnership (D-LeaP) (see box 9) and the Regional Capacity Development Network (RCDN).

TABLE 12: DANUBE REGION WATERWORKS ASSOCIATIONS AND THEIR SERVICES

Country	Name	Scope	Year established	Full-time staff	Services offered					
					Training	Technical assistance	Knowledge exchange	Lobbying and advocacy	Public relations	Standards setting
Albania	SHUKALB	Water supply and wastewater	2000	5	✓		✓	✓	✓	
Austria	ÖVGW	Water supply	1881	n.a.	✓	✓	✓	✓	✓	✓
	ÖWAV	Waste water	1909	n.a.	✓	✓	✓	✓	✓	✓
Bosnia and Herzegovina	VRS	Republika Srpska	2001	3	✓		✓			
	UPKP	FBiH / utility services	1999	1	✓		✓			
Bulgaria	BWA	Water supply and wastewater	2001	1–3			✓	✓	✓	
Croatia	GVIK	Water supply and wastewater	1972	n.a.	✓	✓	✓	✓		
Czech Republic	SOVAK	Water supply and wastewater	1989	7	✓	✓	✓	✓	✓	
Hungary	MAVIZ	Water supply and wastewater	1990	10	✓		✓	✓	✓	
Kosovo	SHUKOS	Water supply and wastewater	2001	3	✓	✓	✓	✓	✓	
Moldova	AMAC	Water supply and wastewater	2000	10	✓	✓	✓	✓	✓	

Country	Name	Scope	Year established	Full-time staff	Services offered					
					Training	Technical assistance	Knowledge exchange	Lobbying and advocacy	Public relations	Standards setting
Montenegro	UVCG	Water supply and wastewater	1999	n.a.		✓	✓	✓	✓	✓
North Macedonia	ADKOM	Municipal services	2004	n.a.	✓	✓	✓	✓	✓	
Romania	ARA	Water supply and wastewater	1995	n.a.	✓	✓	✓	✓	✓	✓
Serbia	WSAS	Water supply and wastewater	2011	n.a.	✓	✓	✓		✓	✓
	UTVSI	Water professionals	1960	n.a.	✓	✓	✓		✓	✓
Slovak Republic	AVS	Water supply and wastewater	2004	2	✓	✓	✓	✓	✓	
Slovenia	CCIS	Chamber of commerce	1851	n.a.			✓	✓	✓	
Ukraine	UWA	Water supply and wastewater	1995	9	✓	✓	✓	✓	✓	✓

SOURCE: SOS DATA COLLECTION.

NOTE: ADKOM = ASSOCIATION OF UTILITY SERVICE PROVIDERS OF MACEDONIA; AMAC = MOLDOVA NATIONAL ASSOCIATION OF WATER AND SANITATION UTILITIES; ARA = ROMANIAN WATER ASSOCIATION; AVS = ASSOCIATION OF WATER COMPANIES; BWA = BULGARIAN WATER ASSOCIATION; CCIS = CHAMBER OF COMMERCE AND INDUSTRY OF SLOVENIA; GVIK = WATER AND SEWAGE ASSOCIATION; MAVIZ = HUNGARIAN WATER UTILITY ASSOCIATION; N.A. = NOT APPLICABLE; ÖVGW = AUSTRIAN ASSOCIATION FOR GAS AND WATER; ÖWAV = AUSTRIAN WATER AND WASTE MANAGEMENT ASSOCIATION; SHUKALB = WATER SUPPLY AND SEWERAGE ASSOCIATION OF ALBANIA; SHUKOS = WATER AND WASTEWATER ASSOCIATION OF KOSOVO; SOVAK = WATER SUPPLY AND SEWERAGE ASSOCIATION OF THE CZECH REPUBLIC; UPKP = ASSOCIATION OF THE EMPLOYERS OF UTILITY COMPANIES; UTVSI = ASSOCIATION FOR WATER TECHNOLOGY AND SANITARY ENGINEERING; UVCG = WATERWORKS ASSOCIATION OF MONTENEGRO; UWA = UKRAINIAN ASSOCIATION OF WATER UTILITIES; VRS = ASSOCIATION OF WATERWORKS OF REPUBLIKA SRPSKA; WSAS: WATERWORKS AND SEWERAGE ASSOCIATION OF SERBIA.

Box 9 Danube Learning Partnership

D-LeaP is a regional, integrated, and sustainable capacity building initiative of national water utility associations and the International Association of Water Service Companies in the Danube River Catchment Area (IAWD), and provides a comprehensive curriculum to the staff of water and wastewater utilities in the Danube region. D-LeaP is a committee of IAWD, comprising representatives of national water utility associations.

The primary target audience of D-LeaP programs consists of the water supply and wastewater utility companies in the Danube region and their management and technical staff. Of the 17 countries covered by D-LeaP, utilities in 12 countries are expected to have a particular interest in D-LeaP programs based on the level of development of their utility sector: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Kosovo, Moldova, Montenegro, North Macedonia, Romania, Serbia, and Ukraine.

SOURCE: D-LEAP WEBSITE, HTTPS://WWW.D-LEAP.ORG/.

87. **Raising awareness about workforce diversity, especially on gender imbalance in water utilities staff, continues to be a challenge—despite its importance for strengthening the sector's capacity—although dialogue has begun in some pioneering utilities of the region.** Many countries have policies or laws addressing gender balance issues, but few are translated into strategies and are not targeted toward the WSS nor have they been sufficiently backed by adequate resources. When looking at the WSS sector specifically, women's participation as staff or engineers is still low (Table 13). In Slovenia, for instance, among the 102 utilities, only eight CEOs are female. Austria is the only country reporting that some utilities take actions to address gender imbalance. Despite this, positive developments are observed with a number of utilities engaging in assessments to better understand gender and age related issues in their workforce (See Box 10).

TABLE 13: SHARE OF WOMEN STAFF AND ENGINEERS IN DANUBE REGION

Country	Women staff (%)	Women engineers (%)
Bosnia and Herzegovina	26	3
Moldova	29	16
Serbia	19	3
Ukraine	10	2

SOURCE: IBNET 2015–17

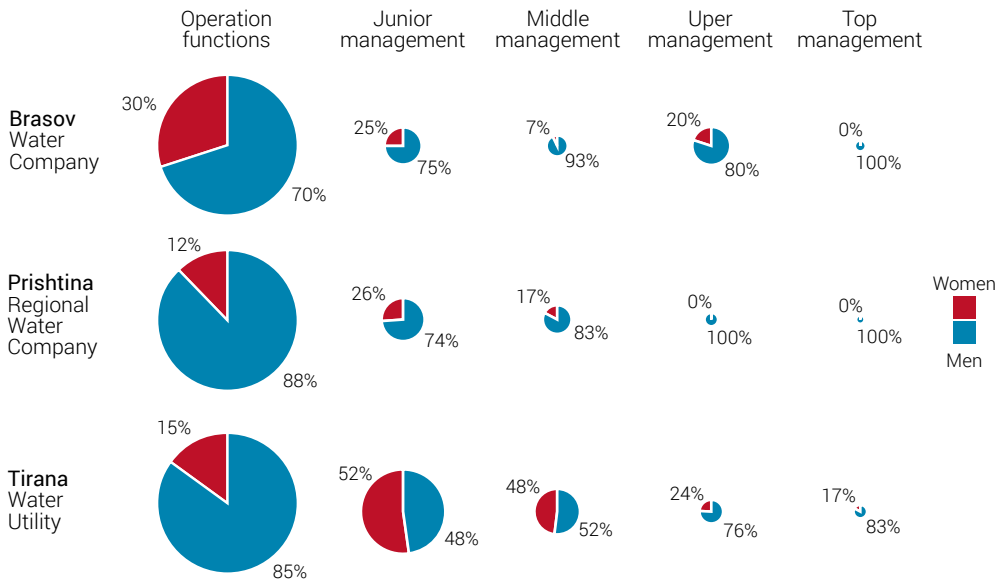
Box 10 Case Study: Gender Assessments in Three Danube Region

Around the globe, an increasing number of private and public companies are realizing that promoting gender equality in the workplace is good for business and development. In the Danube region, utilities often face a predominantly male and sometimes aging workforce. However, gender gaps in tertiary education including in science, technology, engineering, and mathematics are gradually closing. For the water sector, creating an environment with equal opportunities for men and women at all levels of responsibility and an inclusive work culture should thus be an integral part of every utility's modernization process.

In 2018, the DWP and the World Bank Global Water Security and Sanitation Partnership collaborated with three pioneering utilities in the Danube region to take a closer look at gender equality in their workplace. The Brasov Regional Water Utility in Romania, the Prishtina Regional Water Utility in Kosovo, and the Tirana Water Utility in Albania undertook a gender assessment, using a globally certified methodology (http://edge-cert.org/).

The assessment shows that all three utilities scored above the EDGE international standard for gender equality in junior management positions; however, they fell short in terms of top management, and none of the utilities had any women sitting on their boards (see Figure B10.1). In terms of career trajectory, at the operational level, male staff were more likely to be promoted than female staff, and men were more likely to be recruited to junior management positions. In all three utilities, men were systematically more likely than women to be promoted at all levels of operations and management. At Brasov Water Company, women are more likely to stay in the same position or make a lateral move at the junior management and upper management levels while men are more likely to make that transition at the middle and top management levels. At Prishtina Regional Water Company, women are more likely to stay in the same position or make a lateral move at the junior management level, while men are more likely to make that transition at the upper and top management levels. Finally, at Tirana Water Utility, men and women are equally likely to stay in the same position or make a lateral move across all levels of responsibility.

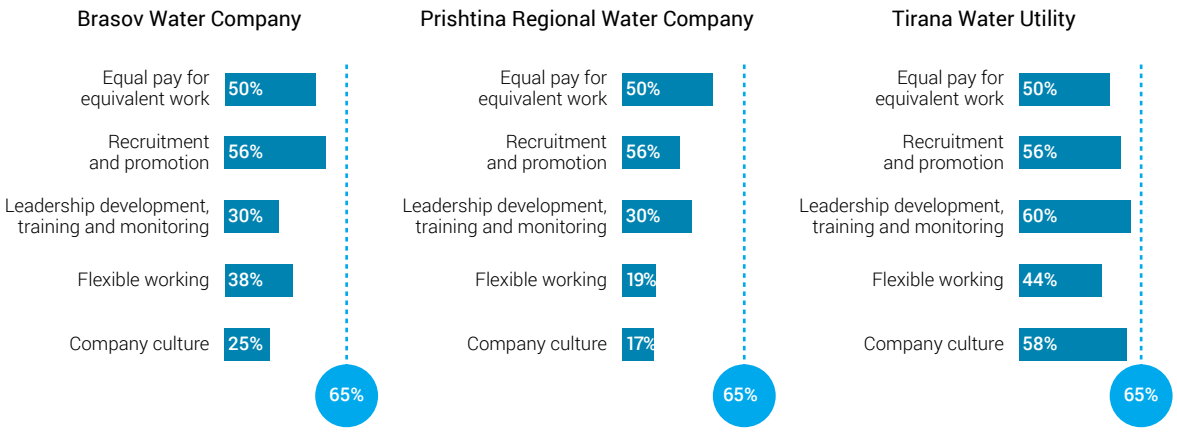
FIGURE B10.1
BREAKDOWN OF STAFF POSITIONS BY GENDER



When looking at effectiveness of policies and practices, while all three utilities demonstrate some degree of proactiveness when it comes to equal pay for equivalent work, there is still room for improvement (See Figure B10.2). None of the three companies have a specific policy when it comes to equal pay for equivalent work. No gender pay gap assessment is routinely done by the utilities, although this measure was introduced by Brasov for the first time. In addition, none of the three utilities

have set targets or objectives for the gender compositions at any management level, and the Brasov Water Company and Prishtina Regional Water Company do not take the gender dimension into consideration in their success planning. However, all three companies have flexible promotion practices that systematically accommodate flexible promotion rhythms, do not require geographical mobility, and allow career breaks. Performance evaluation processes could be improved in all utilities, and systematic mechanisms to identify high performing staff are in place. Finally, nondiscrimination with regard to professional development is demanded by the law. Therefore, none of the three utilities have formulated a specific policy in this respect, though perception of such opportunities show a gender gap in some utilities. When it comes to mentoring and sponsorship, none demonstrated having formal mentoring programs for men and women. Flexible working practices are mostly used informally, but good examples were found, especially when initiated by staff themselves (e.g. the organization of weekend shifts in Prishtina laboratory, a unit that employs a significant number of women) and further technological innovations can be expected to facilitate such practices in the future, calling for more formal and transparent policies.

FIGURE B10.2 UTILITIES' PERFORMANCE AGAINST THE ESTABLISHED EDGE STANDARD FOR EFFECTIVENESS OF POLICIES AND PRACTICES



Note: the dotted line at 65% indicates the minimum percentage to be reached in each area, in order to meet the EDGE Standard.

SOURCE: EDGE GENDER ASSESSMENT FOR BRASOV, TIRANA AND PRISHTINA UTILITIES

Regarding employees' perceptions of an inclusive culture, most employees across all three utilities consider that women and men are given the same opportunities to be hired (with the exception of women at the Brasov Water Company, in which 49 percent of women answered positively). Respondents were less optimistic when asked whether there were fair opportunities to be promoted across all three utilities. When it comes to being paid fairly for the work that they do compared to others in the utilities, employees were slightly more negative across utilities. In all cases, a notable gender gap in perceptions was found, with men being more optimistic than women on these questions. A gender pay gap assessment would shed light on whether these perceptions are based on evidence. In the case of the Brasov utility, such negative perceptions were not founded in facts, pointing to the need for clear, consistent, and transparent communication to employees.

Gender pay gap. The unexplained gender salary gap in the Brasov utility is 13 percent in favor of women, although narrowed to only 5 percent when salary and bonuses are included. The unexplained gender pay gap means that pay differences are not explained by factors such as age, years with the company, management role, level of responsibility, or job function, but are likely to be explained by gender. The utility is refining this analysis to understand how performance ratings impact on these results.

The assessment allows for the identification of priority challenges and an action plan. The utilities have each self-identified three priorities, such as (i) conducting yearly gender pay gap assessments, (ii) improving the transparency of the promotion process and promotion criteria, or (iii) implementing a systematic procedure to identify top talents, and are addressing those. In addition, they have been sharing their experience with other water utilities in the region through regional knowledge exchange events, leading to lively debate and discussion, indicating the relevance of the topic to utility staff and sector professionals.

This is an important development in the region's WSS sector, from one in which gender considerations were not discussed to one in which utilities are actively seeking a better understanding of how they are doing, and how an inclusive workforce can be translated to better utility management. With a transformation of utilities and new incoming workforce of younger males and females, the management of human assets is increasingly recognized to be equally important as management of physical assets.

VI. FINANCING OF SERVICES

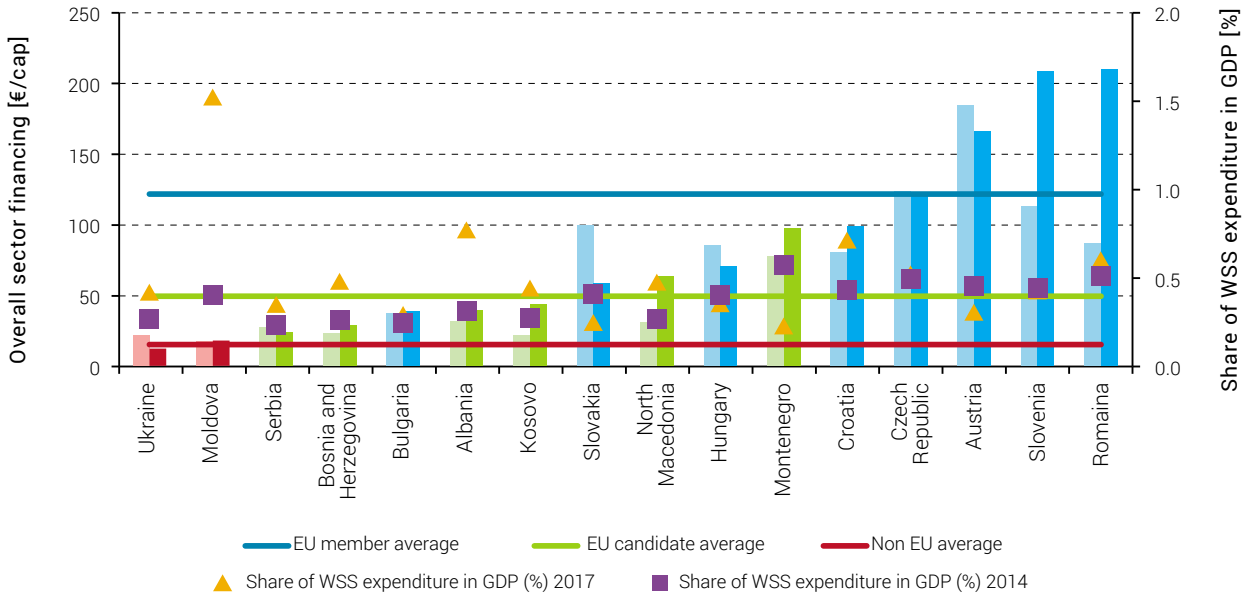
88. This chapter describes the main trends with regard to sources of funding, overall expenditures, cost recovery, and affordability of water and wastewater services across the region. On the sources of sector funding[31], it adopts the Three Ts framework from the Organization for Economic Co-operation and Development (OECD). Consistent information about those three factors is, however, scarce[32], 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 funding 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.

89. 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. The methodology and assumptions necessary for this chapter are briefly described in Methodological Notes C (sector financing) and D (affordability calculation), at the end of the document.

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

90. **The level of sector financing and percentage of expenditure in WSS over GDP varies widely from country to country, with European Union (EU) members sprinting ahead both in terms of level of expenditure over GDP and sector financing per capita** (Figure 52). Many of the candidate and non-EU countries remain in the lower range of the generally accepted value for overall sector expenditure as a share of gross domestic product for middle and low-income countries (0.54 to 2.60 percent and 0.70 percent to 6.30 percent of GDP respectively) (OECD 2006).

FIGURE 52: SECTOR FINANCING ACROSS COUNTRIES OF THE REGION IN PER CAPITA AND PERCENTAGE OF GDP



SOURCE: SOS DATA COLLECTION.

EU = EUROPEAN UNION; GDP = GROSS DOMESTIC PRODUCT; WSS = WATER SUPPLY AND SANITATION.

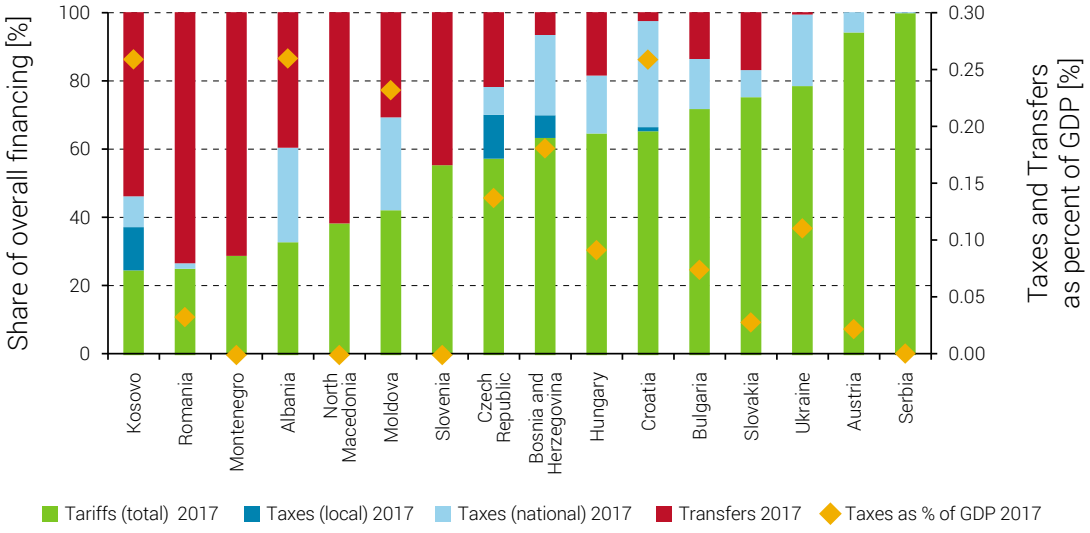
NOTE: DARK COLORS REPRESENT SECTOR FINANCING PER CAPITA FOR THE YEAR 2017; LIGHT COLORS REPRESENT VALUES FOR YEAR 2014.

31 Strictly speaking, the amounts provided by three "Ts" are "funding" sources. Funding refers to the sources ultimately used to pay for the cost of a service or an asset (including investment and operation and maintenance), whereas financing normally requires a return. The term "sector financing" is being utilized in this report as referring to the funding available for the sector coming from the three "Ts" sources.

32 Specifically, the availability of information with detailed breakdown of international financing by nature (grants or loans) for all the countries is limited.

91. **The share of tariffs in overall sector financing has increased above 75% in a few countries in the last three years, showing the gradual adoption of the cost recovery principle in the region** (Figure 53). This evolution is mainly supported by a strong increase in water and wastewater tariffs in some countries such as Montenegro, Moldova, and Slovenia (see part C of the present chapter).

FIGURE 53: PROPORTION OF SECTOR FINANCING FROM TARIFFS, TAXES, AND TRANSFERS IN THE COUNTRIES OF THE DANUBE REGION



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

92. **In all of the Danube countries (except Austria and Serbia, were sector financing comes almost entirely from tariffs), taxes and transfers are still financing investments.** Not surprisingly, in most EU member countries and some candidate countries, EU-related funding (cohesion funds, regional policy funds, and Instrument for Pre-Accession [IPA] funds) represent the largest share of external financing to the sector, whereas in non-EU countries, International Financing Institution (IFI) and bilateral donors continue to play the main role. In addition, four countries (Croatia, Czech Republic, Slovakia, and Slovenia) have set up dedicated funds to finance the water sector investments, thus avoiding potential national budget appropriation and allowing securing predictable funding (Table 14). A great diversity of funds allocation methods can be observed across the region: five countries allocate investment funds on a needs basis, three on an ad-hoc basis, three on a first-come-first-serve basis, and three on a performance basis.

TABLE 14: MAIN SECTOR FINANCING CHARACTERISTICS IN THE DANUBE REGION

	Cost recovery policy	Investment targeting mechanism	Main national funding source	Main international funding sources	Dominant source funding O&M	Dominant source funding rehabilitation	Dominant source funding new investments
Albania	Yes	Needs and Performance -based	National budget	Bilateral funds	Tariffs and national-level subsidies	Tariffs and national-level subsidies	Foreign aid subsidies
Austria	Yes	First come, first serve	National budget	--	Tariffs only	Tariffs and local-level subsidies	Tariffs and national and subnational subsidies
Bosnia and Herzegovina	No	Based on strategy and policy development per entity	National budget	IFI loans	Tariffs and local-level subsidies	Tariffs and local-level subsidies	Credit, local and national subsidies, grants from EU,WB

	Cost recovery policy	Investment targeting mechanism	Main national funding source	Main international funding sources	Dominant source funding O&M	Dominant source funding rehabilitation	Dominant source funding new investments
Bulgaria	Yes	Ad hoc	National budget	EU-related funding	Tariffs only	Tariffs and national-level subsidies	EU grants
Croatia	Yes	Needs-based	Dedicated tied fund	EU-related funding	Tariffs only	Tariffs and national-level subsidies	EU grants
Czech Republic	Yes	Performance-based	Dedicated tied fund	EU-related funding	Tariffs only	Tariffs only	EU grants
Hungary	Yes	First come, first serve	National budget	EU-related funding	Tariffs only	Tariffs and national-level subsidies	EU grants
Kosovo	Yes	Needs-based	National budget	--	Tariffs only	Tariffs and foreign aid subsidies	National subsidies, EU grants, foreign aid
Moldova	No	First come, first serve	National budget	IFI grants/ credits	Tariffs only	Tariffs only	Foreign aid subsidies
Montenegro	No	"Multi-criteria analysis" for project ranking	National budget	EU-related funding	Tariffs only	Tariffs and local-level subsidies	Foreign aid subsidies
North Macedonia	Yes	Needs-based	National and municipal budgets	IFI loans	Tariffs and local-level subsidies	Tariffs and local-level subsidies	Foreign aid subsidies
Romania	Yes	First come, first serve	National budget	EU-related funding	Tariffs only	Tariffs and local-level subsidies	EU grants
Serbia	No	Needs-based	National budget	--	Tariffs and local-level subsidies	Tariffs and local-level subsidies	National subsidies and foreign loans
Slovakia	Yes	Performance-based	Dedicated tied fund	EU-related funding	Tariffs only	Tariffs and local-level subsidies	EU grants
Slovenia	Yes	Ad hoc	Dedicated tied fund	EU-related funding	Tariffs only	Tariffs and local-level subsidies	EU grants
Ukraine	Yes	Ad hoc	National budget	IFI loans	Tariffs only	Tariffs and local-level subsidies	Tariffs only

SOURCE: SOS DATA COLLECTION.

EU = EUROPEAN UNION; IFI = INTERNATIONAL FINANCING INSTITUTION; O&M = OPERATION AND MAINTENANCE; WB = WORLD BANK.

93. **EU funds are especially being used for investments linked to Urban Waste Water Treatment Directive (UWWTD) implementation.** An important proportion of the UWWTD investment costs have so far been covered by transfers from EU cohesion funds for new EU member states, which account for more than 40 percent of investment funding in some countries. Up until 2020, €15 billion has been allocated and transferred. In the current programming period (2014–2020), Bulgaria, Croatia, and Romania continue to receive substantial EU funding, as their wastewater infrastructure is still below UWWTD compliance requirements (Table 15). But the potential reduction of EU allocations for the next EU budget period (2021–2027) might jeopardize the overall funding of wastewater capital expenditure in the region just when investment will need to increase to ensure asset renewal. As a result, countries will have to turn to a combination of taxes and tariff increases to fund those investments, which could possibly present fiscal, political, and social challenges.

TABLE 15: EU FUNDS USED TO CO-FINANCE INVESTMENTS IN WASTEWATER INFRASTRUCTURE IN DANUBE RIVER BASIN EU MEMBER STATES (2000–2020) IN MILLION EUROS

Target countries	2000–2006 ISPA, ERDF	2007–2015 CF, ERDF	2014–2020 Budgets CF, ERDF	Total EU contribution
Bulgaria	246	1,122	1,000	2,368
Czech Republic	397	229	0	626
Croatia*	21	200	1,100*	1,321
Hungary	493	410	900	1,803
Romania	1,044	2,382	3,810*	7,236
Slovenia	117	351	250	718
Slovakia	259	546	200	1,005
Total Danube Region	**2,577**	**5,240**	**7,260**	**15,077**

SOURCE: THE WORLD BANK 2018B.

CF = COHESION FUND; ERDF = EUROPEAN REGIONAL DEVELOPMENT PLAN; EU = EUROPEAN UNION; ISPA = INSTRUMENT FOR STRUCTURAL POLICY FOR PRE-ACCESSION.

**PARTIALLY DISBURSED AFTER 2020.*

B. Services Expenditures: Operating and Investment Costs

94. **On average, the sector directs about half of overall expenditures toward operation and maintenance (O&M) infrastructure, and half toward renewal or expansion.** Figure 54 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 19 and 75 percent. 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. Compared to three years ago, eight countries of the region have decreased the share of financing going toward investment, while it remained unchanged in Slovenia and Croatia and increased in the seven remaining countries (Table 16). 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 operation of water utilities but also to the planning and implementation of investment projects (see box 11). In that respect, the particularly low levels of investment (as a share of GDP) raises questions about whether assets are being 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 54: SHARE OF OVERALL EXPENDITURES GOING TOWARD O&M AND INVESTMENTS

SOURCE: AUTHORS' ELABORATION FROM 2019 SOS DATA COLLECTION.

GDP = GROSS DOMESTIC PRODUCT; OPEX = OVERALL EXPENDITURES; WSS = WATER SUPPLY AND SANITATION.

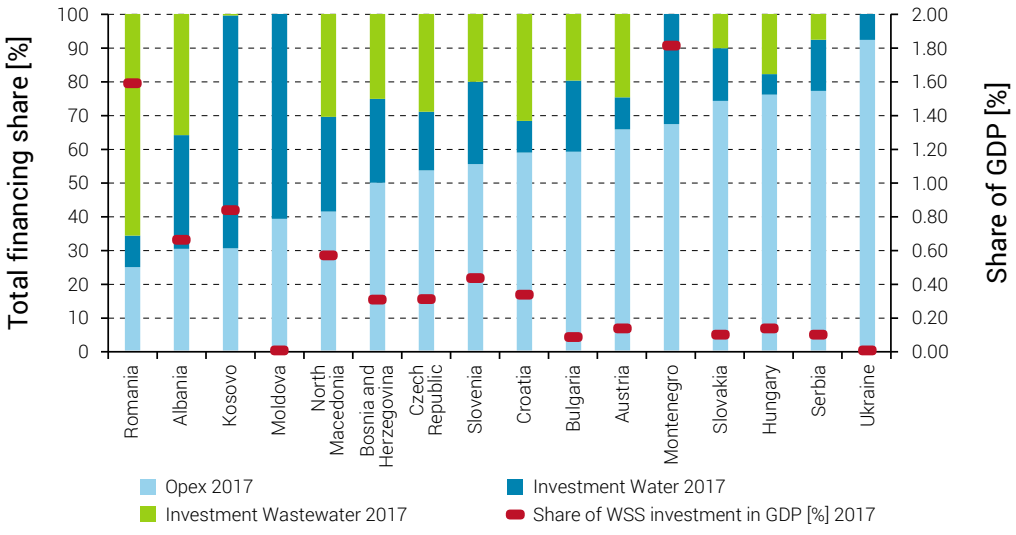


TABLE 16: EVOLUTION OF OVERALL EXPENDITURES GOING TOWARD INVESTMENTS

Country	Share of expenditure going toward investment (percent)	Evolution over the past three years
Albania	70	↗
Austria	34	↘
Bosnia and Herzegovina	50	↗
Bulgaria	19	↘
Croatia	42	→
Czech Republic	46	↘
Hungary	24	↗
Kosovo	70	↘
Moldova	0	↘
Montenegro	33	↘
North Macedonia	59	↗
Romania	75	↗
Serbia	23	↗
Slovakia	26	↘
Slovenia	45	→
Ukraine	0	↘

SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

Box 11 Investment Levels in the Water Supply and Sewerage Sector in Albania

Demographic changes related to the rapid rural-to-urban population migration after the regime change in 1991, and the subsequent sharp increase in the demand for drinking water and sewage disposal services, have exacerbated the already precarious situation of the water supply and sewerage infrastructure, which is often operating at peak capacity. Although in recent years investments have been increasing, and recently more targeted toward wastewater, they were never sufficient to meet capital investment needs. According to the most recent information collected by the Danube Water Program, around €28 per inhabitant are invested yearly, financed from a combination of national and international sources. This amount remains well below the estimated €63 per capita per year needed to fund the investments (MPWT 2012) as stated in the National Water Supply and Sewerage Master Plan recently developed and approved by the government of Albania as a fundamental tool for national investment planning. The Master Plan is based on a sector analysis and considers national strategies and policies. It presents the total investments identified for both the water and wastewater sectors for 2012–2040 (see table). Through this tool, the elaboration of a priority ranking for the defined projects supports the sustainable use of investment funds in line with sector considerations and development policies. Based on priorities, a ranking according to short-, medium-, and long-term investment is defined by considering national and foreign investments for water and sanitation. Eighty percent of the identified investment needs is planned to go toward wastewater management (sewer extension and wastewater treatment plant construction), which is consistent with the country's ambitions regarding EU integration.

TABLE BOX 11.1: TOTAL INVESTMENTS NEEDED FOR THE WATER AND WASTEWATER SECTORS, 2012-40

Sector	Item	Rehab.	Extension	New	Total	%
Water supply	Utility based	530.5	352.7	3.4	886.6	17.45%
	OJ based	0	0	154.7	154.7	3.04%
	Total	**530.5**	**352.7**	**158.1**	**1041.3**	**20.50%**
Sewerage	Utility;	285.2	1714	482.1	2481.30	48.84
	Utility;	0	185.8	39.9	225.70	4.44
	OJ;	1.3	15.5	1280	1296.80	25.31
	OJ;	0	0.7	45.7	46.40	0.91
	Total	**286.5**	**1916**	**1847.7**	**4050.2**	**79.50**
Total		**817**	**2268.7**	**2005.8**	**5091.5**	**100**

SOURCE: MPWT 2012.

NOTE: PRIOR TO THE TERRITORIAL ADMINISTRATIVE REFORM (2015–2016), THE 58 WATER SUPPLY AND SEWERAGE UTILITIES THAT OFFICIALLY PROVIDED DATA TO THE BENCHMARKING AND MONITORING UNIT IN ALBANIA COVERED 80 PERCENT OF THE POPULATION. THE REMAINING 20 PERCENT, CALLED OUT OF JURISDICTION (OJ), WERE SERVED BY COMMUNAL/VILLAGE SYSTEMS.

95. **Total water and wastewater investments in the region in 2017 cover less than 70 percent of needs estimated by the region's governments to achieve EU or national targets (Figure 55).** 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. Overall, about 40 percent of all investment needs are directed at water supply and compliance with the Drinking Water Directive (DWD), and 60 percent are for wastewater management and compliance with the UWWTD. Very large investment programs amounting to €3 billion in the last couple of years have been implemented in Romania to catch up for the delay in UWWTD implementation as full compliance was to be reached by end of 2018. Leaving aside this specific situation, the level of overall investment in the region is around €2.1 billion, which remains well below the needed €4.5 billion (for the region except Romania). Nevertheless, efforts have been made compared to five years ago as most countries have seen their level of investment per capita increased except Slovakia, Bulgaria, the Czech Republic, and Austria. However, for the latter two, the level of investment still remains among the highest of the region despite this decrease. In EU member states, investment per capita is twice as high as in EU candidate countries, underlining the costs associated with EU water legislation compliance. A total of €42.5 billion has been invested in total by the seven new EU member states of the Danube region, plus Austria, to implement the UWWTD. An additional €57 billion will be needed to reach and maintain full compliance until 2040, and new EU member states will have to mobilize significant additional funds, either from taxes or tariffs, in the next few decades to bridge the investment gap and remain compliant with the UWWTD. Total cost recovery achievement is a challenge in most countries of the region.

FIGURE 55: ACTUAL COMPARED TO NEEDED PER CAPITA INVESTMENT COSTS IN COUNTRIES OF THE REGION, 2017

SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

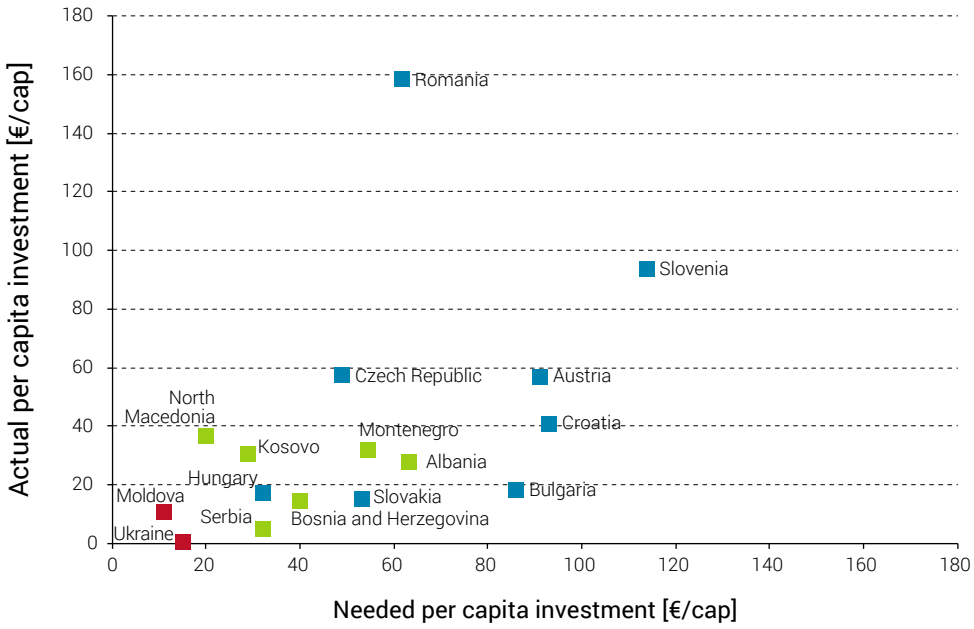


TABLE 17: CALCULATED TOTAL INVESTMENT COSTS NEEDED FOR INITIAL FULL UWWTD COMPLIANCE

Target Countries	Total Pollution load, PE	Historical Investment costs €, millions		Future Investment costs €, millions		Total Investment cost for full compliance €, millions
		Sewer network	WWTP	Sewer network	WWTP	
Austria	20,270,894	10,150	4,238	–	–	14,388
Bulgaria	8,080,245	3,370	810	804	865	5,849
Czech Republic	7,179,593	4,675	1,590	–	21	6,286
Croatia	5,026,227	0	0	3,074	999	4,073
Hungary	10,210,998	5,592	1,221	–	12	6,825
Romania	20.786,160	5,852	990	7,037	3,373	17,252

Target Countries	Total Pollution load, PE	Historical Investment costs €, millions		Future Investment costs €, millions		Total Investment cost for full compliance €, millions
		Sewer network	WWTP	Sewer network	WWTP	
Slovenia	1,371,002	883	87	112	222	1,304
Slovakia	3,890,209	2,360	578	17	281	3,236
Danube Region	**76,815,328**	**32,882**	**9.514**	**11,044**	**5.773**	**59,213**

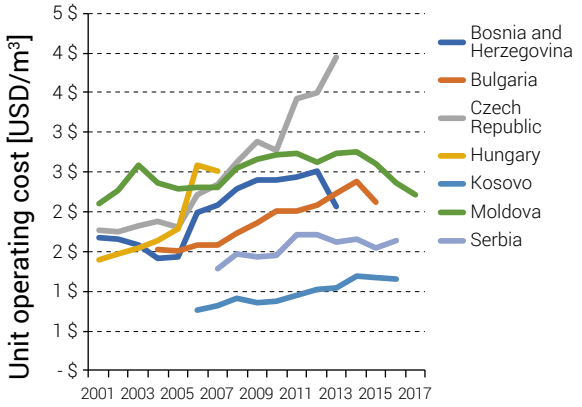
SOURCT: UMWTLTBUNDTSAMT AT AL. 2017.

NOLO: UMWELT BUNDOSAMT AT AL (2017) MENTIONS A TOTAL INVESTMENT NEED FOR INITIAL FULL UWWTD COMPLIANCE OF € 17 BILLION FOR ROMANIA. HOWEVER, IT SHOULD BE NOTED THAT OTHER SOURCES PROVIDE FIGURES VARYING FROM €8 BILLION TO €20 BILLION. PE = POPULATION EQUIVALENT; UWWTO = URBAN WASTEWATER TREATMENT DIRECTIVE; WWTP =WASTEWATER TREATMENT PLANT; – =NOT AVAILABLE .

C. Cost Recovery: Cost and Tariff Trends

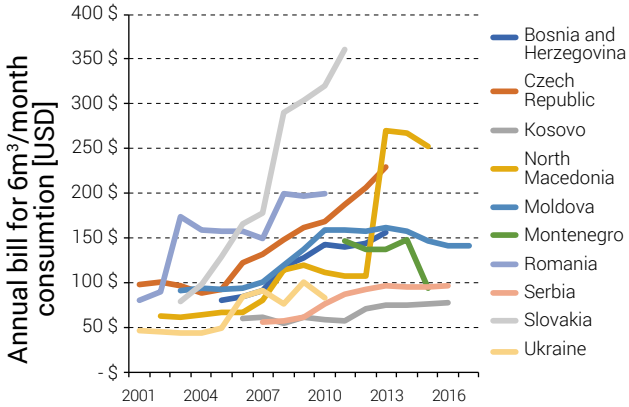
96. **The costs of providing services vary widely from country to country but have grown significantly over the past 20 years, accompanied by parallel tariff increases.** The chapters on access to services (Chapter IV) and utility performance (Chapter V) have demonstrated how the sector's overall performance has improved, in terms of coverage and quality of services, in the past 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 56 shows the evolution of operating costs in a sample of water and sewerage utilities, with increases in many countries, particularly EU member countries. However, this increase has not continued at the same pace over the past years. Figure 57 shows that utilities have increased their revenues in a similar fashion, largely through tariff raises. Nevertheless, in the past three years, the increase in tariffs levels appear less pronounced.

FIGURE 56: EVOLUTION OF WATER AND SEWERAGE UNIT OPERATING COSTS IN SELECTED UTILITIES/COUNTRIES



SOURCE: IBNET/DANUBIS.ORG DATA.

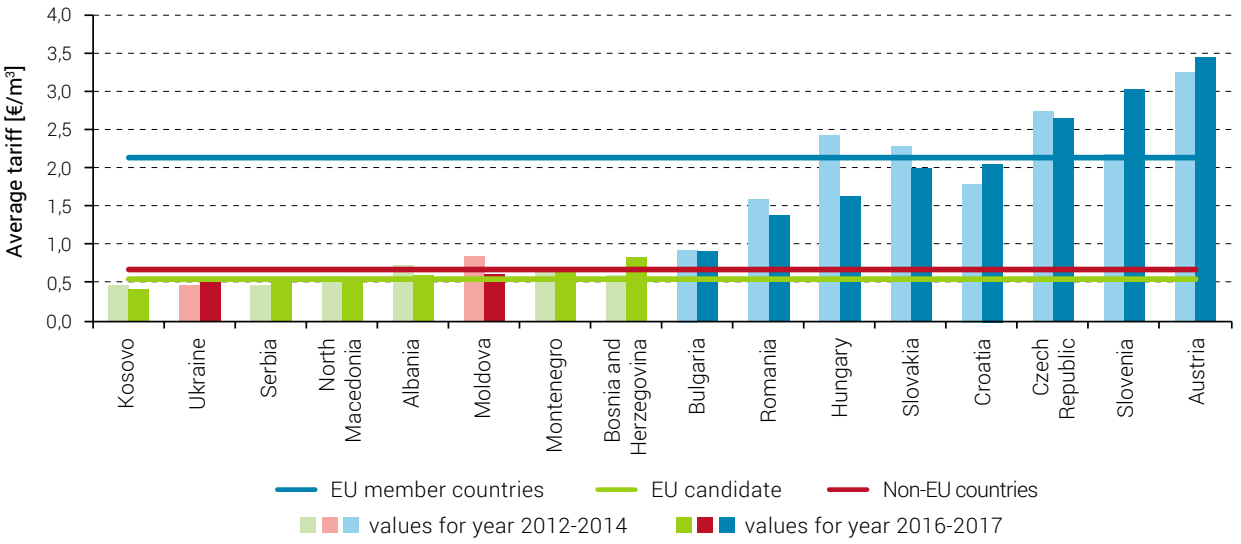
FIGURE 57: EVOLUTION OF WATER AND SEWERAGE UNIT AVERAGE BILL IN SELECTED UTILITIES/COUNTRIES



SOURCE: IBNET/DANUBIS.ORG DATA.

97. **Residential tariffs generally follow the level of economic development of countries, with highest levels observed in EU member countries.** Over the past three years, the average water and wastewater tariff in the region has risen by 4 percent to reach €1.37/m³. Nevertheless, tariffs have followed a different trend in the region. In half of the countries, they have increased (in a range varying from 6 percent in Austria to 39 percent in Slovenia), thus inducing an improvement in cost recovery level. In the rest of the countries, tariffs have actually decreased (from 2 percent in Bulgaria to 33 percent in Hungary), where prices are under strict control. As Figure 58 shows, Austria clearly presents the highest tariffs, followed by all other EU members. In contrast, most countries of the Western Balkans have tariff levels far below the regional average, even though affordability is not generally a constraint. Overall, the average water and wastewater tariff remained stable at €2.13/m³ (- 0.51% compared to five years ago) in EU member states and in EU candidate countries with 0.60€/m³ (-0.4%) while it strongly decreased to reach 0.57€/m³ (-14%) in non-EU countries.

FIGURE 58: RESIDENTIAL TARIFFS (WATER AND WASTEWATER) IN THE COUNTRIES OF THE REGION

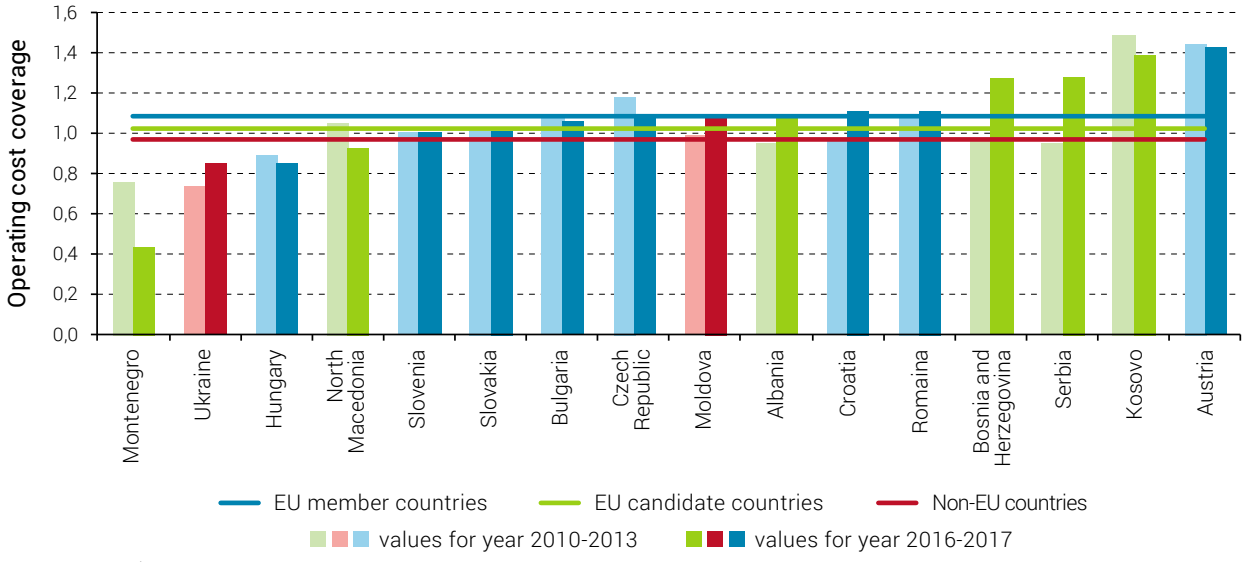


SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION.

NOTE: DARK COLORS REPRESENT TARIFF FOR YEARS 2016¬–2017; LIGHT COLORS REPRESENT VALUES FOR YEARS 2012–2014.

98. **In two-thirds of the countries, revenues from tariffs exceed operating costs. Five years ago, only half of the countries could reach an operating cost coverage above 1.** 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 59 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, a majority of countries' utilities recover all of their operating expenses from their own revenues. Among EU member countries, Hungary is the only one that does not appear to fully comply with EU requirement of cost recovery due to strong tariff control in place. 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 (Figure 59) and may be even lower (provisions are seldom made for accounts receivable write-offs). The long-term trend regarding operating costs coverage evolution only shows slow and limited improvements (Figure 60).

FIGURE 59: OPERATING COST COVERAGE IN COUNTRIES OF THE REGION (BILLED OPERATIONAL REVENUE/OPERATING COSTS)



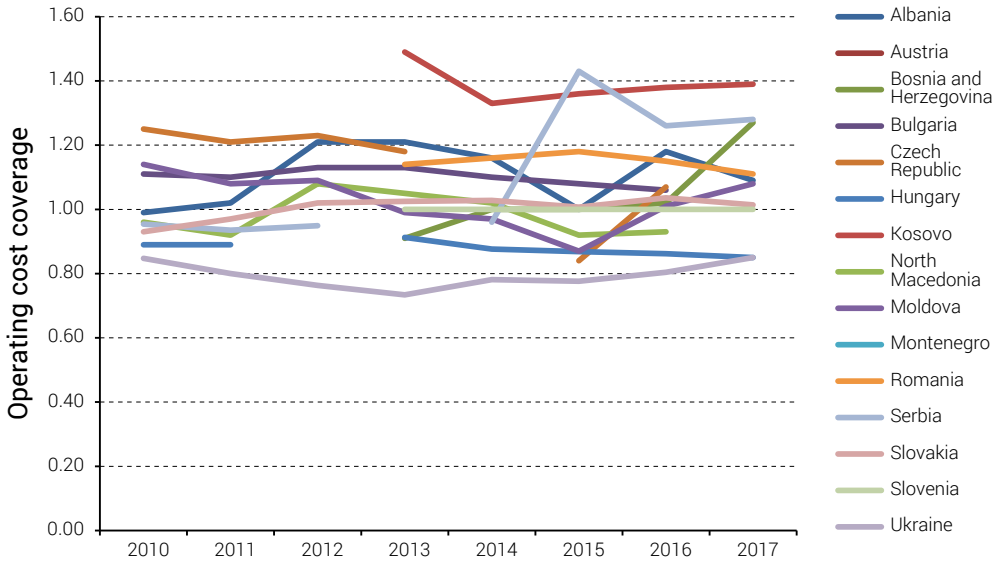
SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

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; THEREFORE, COLLECTED REVENUE IS SIGNIFICANTLY BELOW BILLED REVENUE, WHICH IS USED TO COMPUTE THIS INDICATOR.

NOTE: DARK COLORS REPRESENT VALUES FOR YEAR 2016–2017; LIGHT COLORS REPRESENT VALUES FOR YEAR 2010–2013.

FIGURE 60: EVOLUTION OF OPERATING COST COVERAGE IN COUNTRIES OF THE REGION (BILLED OPERATIONAL REVENUE/ OPERATING COSTS)

SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION AND OTHER PUBLICLY AVAILABLE SOURCES.



Box 12 Sustainability of O&M Costs of WWTPs in Bosnia and Herzegovina

Access to public services in Bosnia and Herzegovina is about 60 percent for water supply and 32 percent for wastewater collection. During recent years, with significant financial support from the EU, several WWTPs (in Sarajevo, Bihać, Mostar, Bileća, Konjic, and Zivinice) have been constructed or reconstructed, increasing percentage of wastewater treatment from 3 percent to currently 20 percent. However, authorities face challenges in the post-completion phase of the project to maintain the achievements. For example: (a) low financial capacity because of low tariffs and substantial overall inefficiencies in the public water utility (PWU) operations and (b) low technical capacity, lack of qualified staff, and lack of interest from the authorities in improvement of the PWUs' accountability through reforms. O&M of newly constructed WWTPs is under the responsibility of municipal PWUs, which have neither the adequate financial nor human resources to manage it. Although operation of the facilities has started, the tariff structure for services has not changed, directly endangering both wastewater treatment and water supply systems. Often, support to PWU to manage WWTPs is given on an ad hoc basis, mainly through financial subsidies from municipal or higher levels of government (Sarajevo WWTP). This situation is directly endangering investments, and PWUs are struggling to secure stable funding for WWTP operation. If practices do not change soon, some may stop working. Typical is the city of Mostar, in which the World Bank, an EU delegation, and the Swedish government have invested more than US$13 million in construction of the WWTP. Although all works were finished in June 2017, the facility is still not in operation (as of May 2018) due to lack of local financial and operational capacities to run the WWTP. This clearly shows that local communities and higher governmental intervention have failed to perform necessary assessment of affordability and operating costs of the WWTP and other capital investments before its implementation. Although Bosnia and Herzegovina is not an EU member state, its legal framework is being harmonized with the EU acquis (Drinking Water Directive [DWD] and UWWTD). However, the implementation is very weak, and the new legal and operational framework should be established to enable sustainable development and operation of WWTP investment. Findings of the World Bank Implementation Completion and Results (ICR) report, prepared for recently completed projects (Sarajevo Wastewater Project and Water Quality Protection Project), have identified issues characteristic for water utility operations and projects in Bosnia and Herzegovina and regionwide, including the following:

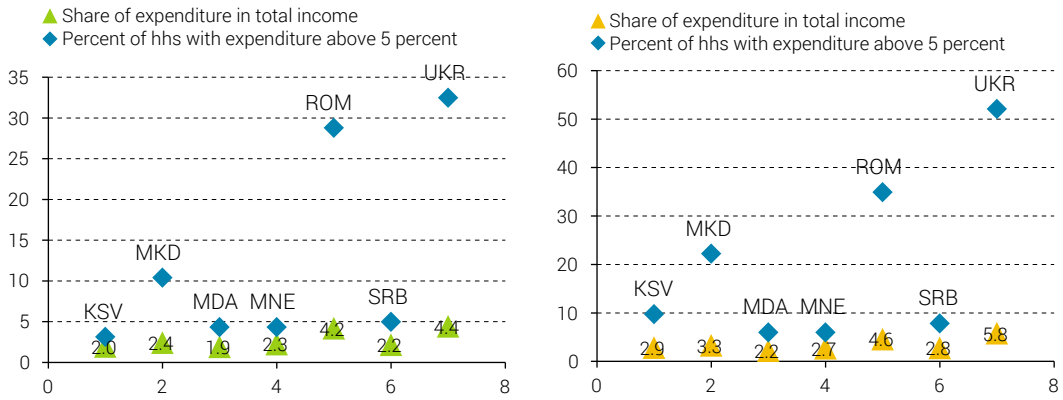
- The financial sustainability of the water utilities is often precarious, and efforts are needed to ensure that utility can fully cover their operating costs.
- Project objectives should be closely tailored to the capacity of the government and utility and the conditions of the enabling environment existing at the time of project preparation.
- Operation costs need to be properly calculated.
- Affordability of tariffs needs to be carefully assessed before the project.
- Authorities at various levels in government must secure upfront sustainability of investments and commitment to guarantee sustainable and efficient operations.
- Active measures for wastewater collection and users' connection to sewers must exist as construction of wastewater treatment facilities are constructed.
- Implementing sectoral or tariff reforms needs to be joined with improvement of water and wastewater services for consumers to find tariff increases acceptable.

D. Addressing Affordability

99. **Although tariffs have increased over the past decade, current levels are still affordable for the average consumer.** Real tariffs have increased by 5 to 10 percent per year, on average, over the past 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[33], with the highest shares of 4.4 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 (32.5 and 28.8 percent for Ukraine and Romania, respectively).

100. **Estimations of the expenditure share for the bottom 40 percent show a slight increase, but affordability constraints are prevalent only in Ukraine and Romania.** 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 [purchasing power parity, 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 61.

FIGURE 61: CURRENT AFFORDABILITY OF WATER AND WASTEWATER TARIFFS BY DIFFERENT INCOME GROUPS: AVERAGE (LEFT PANEL) AND BOTTOM 40 (RIGHT PANEL)



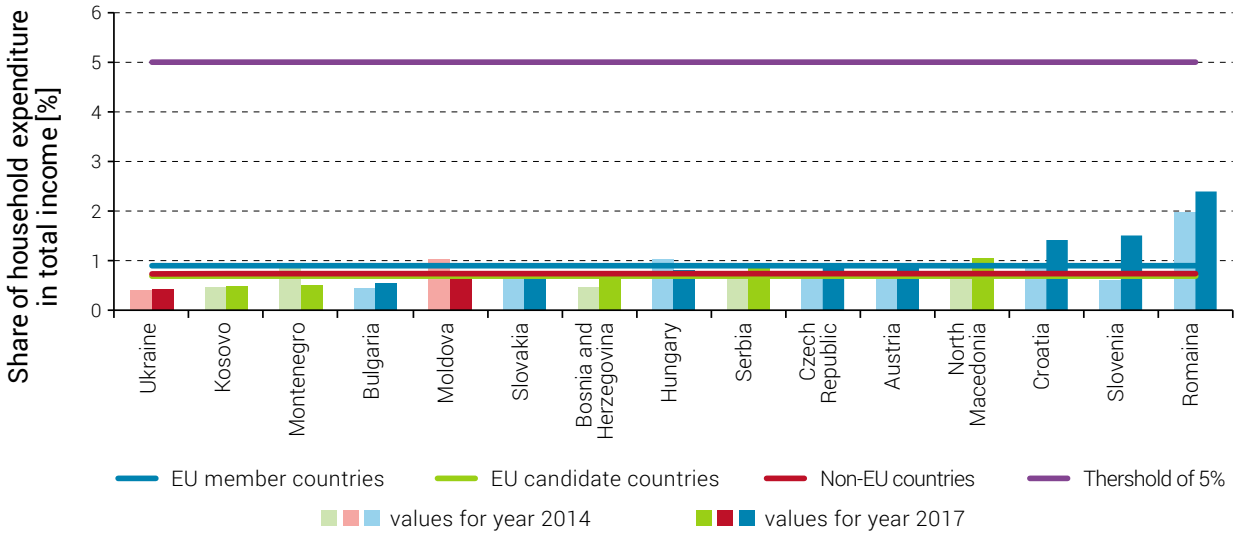
SOURCE: AUTHORS' ELABORATION BASED ON SOS DATA COLLECTION.

NOTE: DARK COLORS REPRESENT TARIFF FOR YEARS 2016¬–2017; LIGHT COLORS REPRESENT VALUES FOR YEARS 2012–2014.

101. **When assuming that the entire population would be connected to piped water and sewage services at an average consumption level and prevailing tariffs, affordability constraints emerge in Romania.** Using reported country statistics on average tariffs and average consumption per capita per day, 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, Romania shows expenditure for water and sewage services above 2.5 percent of income for the average citizen and near 6 percent for the bottom 40 percent of income distribution. (Figure 62 and Figure 63). Compared to three years ago, the affordability situation with regard to water and wastewater expenditure seems to have worsened in most of the countries of the region. Countries with improved affordability, like Montenegro, report lower consumption rates and in some cases, decreases in (WSS) tariffs.

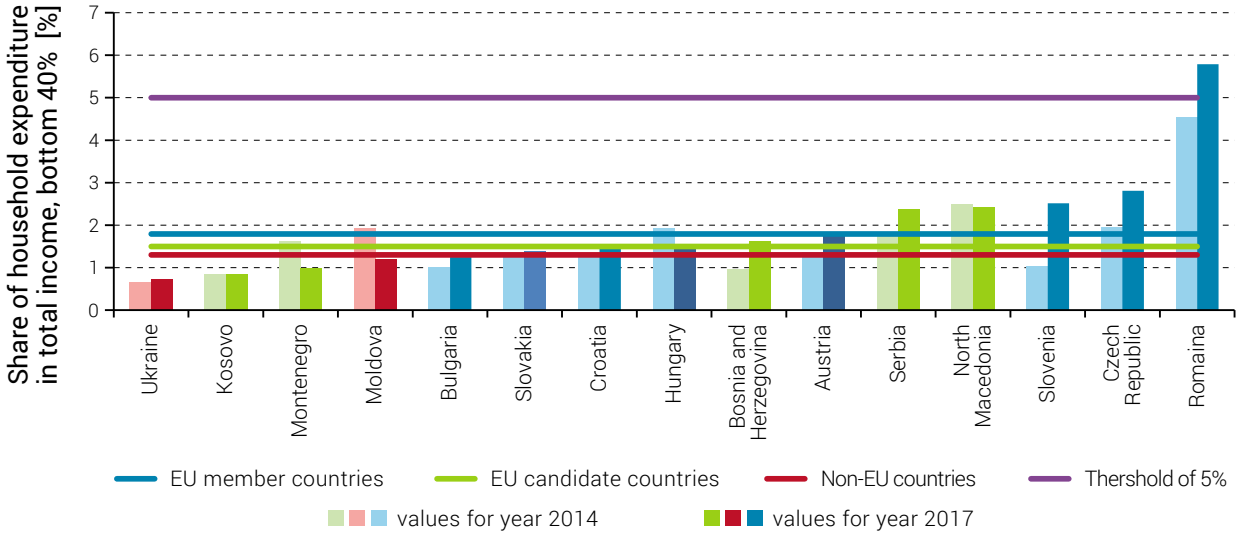
33 Different donor institutions have applied different thresholds for assessing affordability constraints of utility services, including electricity, heating, water, and wastewater. An excellent overview of these thresholds is provided in Fankhauser and Tepic 2005, 5. For water and wastewater, 3 to 5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

FIGURE 62: 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: DARK COLORS REPRESENT 2017 VALUES; LIGHT COLORS REPRESENT 2014 VALUES.

FIGURE 63: POTENTIAL AFFORDABILITY CONSTRAINTS FOR THE BOTTOM 40 PERCENT



SOURCE: AUTHORS' ELABORATION FROM VARIOUS HOUSEHOLD SURVEYS, USING ASSUMPTIONS ON AVERAGE CONSUMPTION AND AVERAGE TARIFF PROVIDED BY SOS DATA COLLECTION.
NOTE: DARK COLORS REPRESENT 2017 VALUES; LIGHT COLORS REPRESENT 2014 VALUES.

102. **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 North Macedonia and Montenegro use 5 percent as the threshold and would face no affordability constraints for 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.

103. **Only Croatia, Hungary, North 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, though 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 North 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.

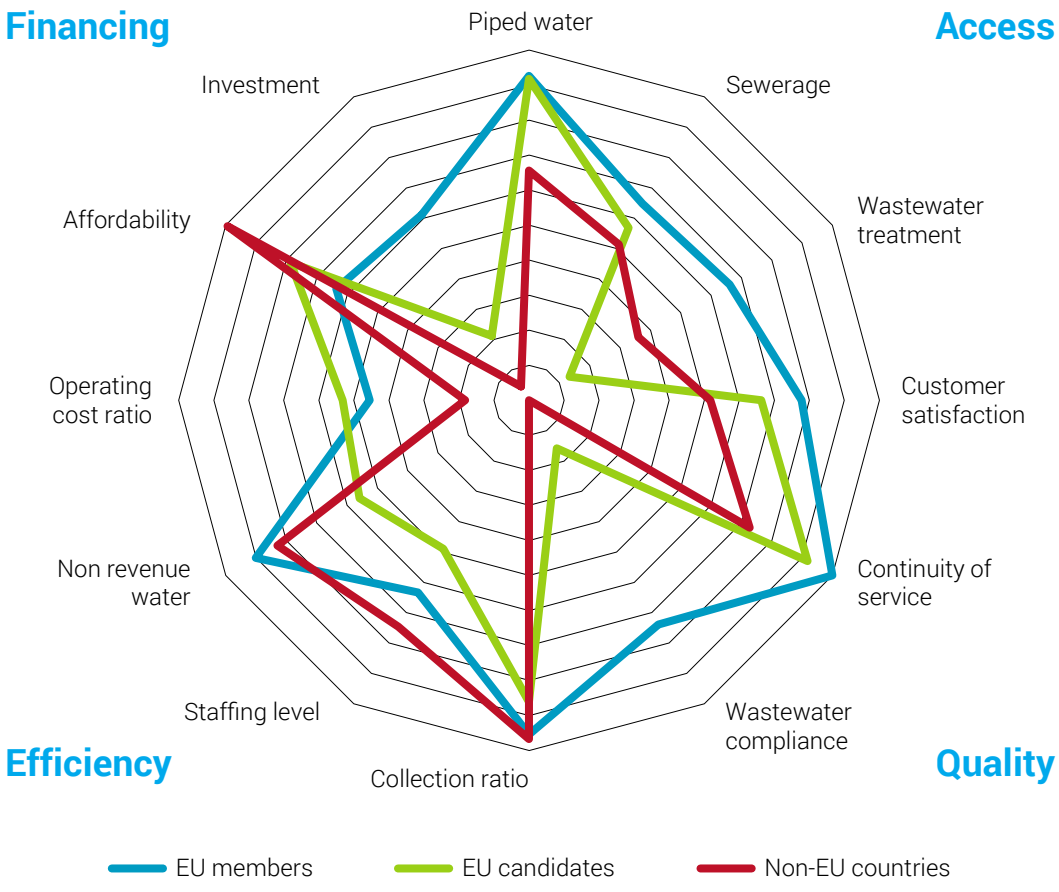
104. **The performance of subsidy schemes ultimately depends on what percentage of the subsidy reaches households in need of such subsidy.** Subsidies delivered by charging tariffs below cost or through transfer from local government to utility budgets are not targeted, and one would expect a large part 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. Since 2014, there have been various reforms to improve the provision of housing subsidies. The latest reform from January 2019 improves targeting to the poor and is now based on cash payments made for housing expenditures.

VII. CONCLUSIONS

A. Progress since 2015

105. **The water and wastewater sector in the Danube region has moved forward since 2015, with generally positive trends in terms of expanding access, improving the quality of services and the efficiency of service providers, and increasing cost recovery and overall investments going to the sector.** These trends are confirmed by the overall sustainability assessment using the WASCO methodology which looks at the basic dimensions of access to services, quality of such services, efficiency of service providers and financing of services, using latest data available from the SoS 2018 data collection exercise[34]. On average, all variables analyzed under each of the four dimensions have improved for the region as a whole, except for an overall deterioration of affordability levels (logical given increased in costs and tariffs), as well as compliance with the UWWTD, which has remained at 2015 levels. Figure 64 presents the updated sustainability assessment for the entire region and Figure 65 by groups of countries, showing the trends and the evolution of each group from 2015 to 2018.

FIGURE 64: ASSESSMENT OF SERVICES SUSTAINABILITY IN THE REGION (HIGHER IS BETTER) 2018



SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

34 Which includes in general sector data from 2017

EU Member Countries

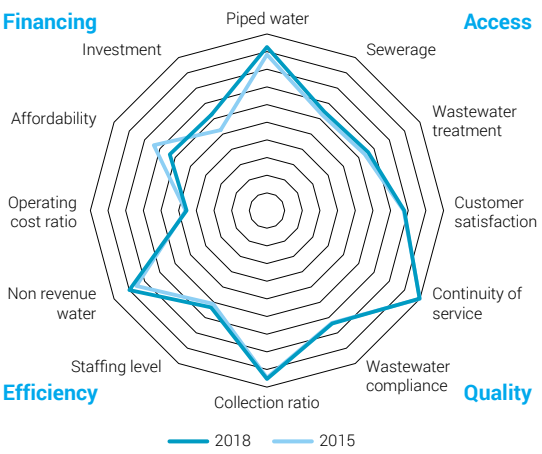
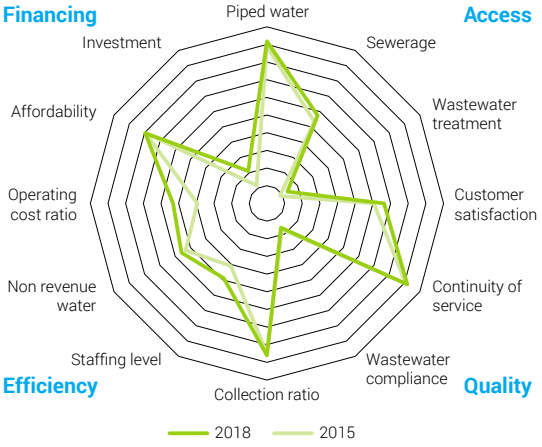


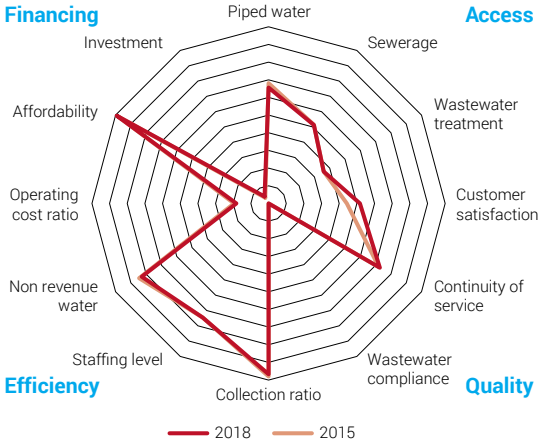
FIGURE 65: ASSESSMENT OF SERVICES SUSTAINABILITY IN THE REGION (HIGHER IS BETTER) 2018 VS. 2015

SOURCE: AUTHORS' ELABORATION FROM SOS DATA COLLECTION.

EU Candidate Countries



Non-EU Countries



106. **Consistently with the overall progress noted above, the overall water sector sustainability index/score (WASCO) for the Danube region has improved by one point since 2015, (from 67 in SoS 2015 to 68 in SoS 2018). The comparison between 2015 and 2018 shows a converging trend in the region during the period between the EU and non-EU countries, with the following key trends observed by groups of countries:**

- **EU countries have maintained, in general, their 2015 levels in quality of service, and made further improvements in efficiency (staffing and NRW) as well as in investment levels**. Affordability has however deteriorated, reflecting that, as investments and cost recovery increase, the issue of affordability emerges. Compliance with UWWTD has also stalled (most likely due to improved data and country reporting mechanisms).

- **EU candidate countries have significantly progressed since 2015 in almost all dimensions, particularly access, quality of service, efficiency, and operating cost coverage**, which could be attributed to different efforts by the countries and service providers to improve in these areas in recent years, and showing that, as service provider efficiency improves, cost coverage also increases. EU-candidate countries have stepped up three points (from 57 to 60) in their average WASCO index, closing part of the gap with EU countries;

- **Non-EU countries have progressed overall in-service quality (mostly driven by improvements in continuity in Moldova) and customer satisfaction (in Ukraine), although they are showing a slightly**

decreasing trend in access to the services (in Ukraine), probably due to insufficient investment (which has also increased from 2015, but at a much slower rate than EU candidate countries). Non-EU countries have also worsened slightly on NRW levels (driven by an increase of reported NRW in Ukraine over the period). Non-EU countries are also scoring two points higher (from 58 to 60) in their WASCO index.

107. **At individual level, two thirds of the countries in the region have either maintained or improved their water services sustainability assessment score, driven in each case by different dimensions (Figure 66).** Although each country is at a different stage, all have areas in which they can further improve. Most countries in the region offer reasonably good service quality to those connected to public supply. Several countries are showing improvement in the quality and efficiency dimensions, especially candidate and non-EU countries. Albeit some overall improvement in the level of investment going to the sector, sound sector financing remains an issue throughout the region, with some exceptions in older EU member states. Those that have come down on their score are all from the group of EU countries (except Montenegro), showing that high levels of sustainability in all dimensions are not easy to be maintained (and that there are trade-offs between increasing investments funded by tariffs and affordability).

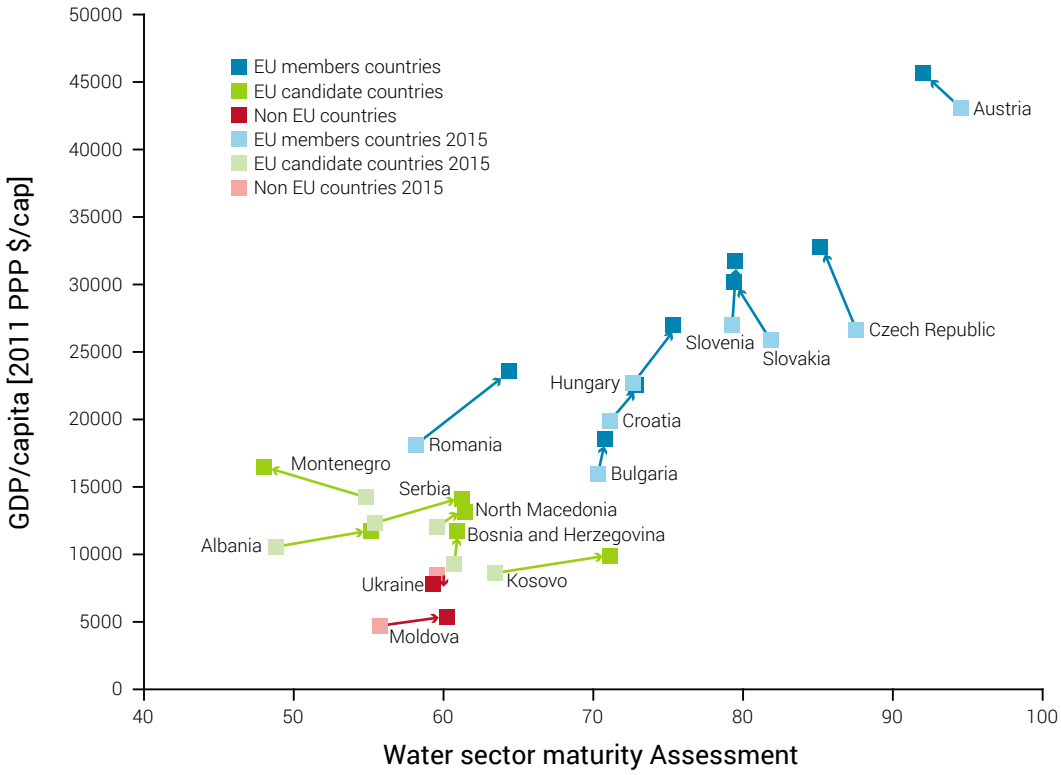
FIGURE 66: COUNTRY-BY-COUNTRY SERVICE SUSTAINABILITY ASSESSMENT (2018 VS. 2015)

Maturity Dimension	Albania		Austria		Bosnia and Herzegovina		Bulgaria		Croatia		Czech Republic		Hungary		Kosovo		Moldova		Montenegro		North Macedonia		Romania		Serbia		Slovakia		Slovenia		Ukraine	
Year	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018	2015	2018
Access																																
Quality																																
Efficiency																																
Financing																																
Overall	49	55	94	92	61	61	70	70	71	73	87	85	73	75	63	71	56	60	55	48	59	61	58	64	55	61	82	79	79	79	59	59

SOURCE: WORLD BANK ELABORATION BASED ON SOS DATA COLLECTION.

108. **Economic development is a good predictor for the water sustainability assessment across countries, but not exclusively.** As shown in Figure 67, there is a strong relationship between economic development and the WASCO scores. It is particularly noteworthy that the least developed countries would have improved, while the more developed have either improved less than their economic development, or regressed, suggesting that improvement can reach a plateau after a certain level. There are also several deviations where WASCO performance is considerably higher than the level of GDP per capita would suggest. This could be attributed to the leadership of some countries in initiating sector reforms to address political economy and structural institutional issues, whereas others, even if focused on EU compliance agenda, don't fare so well in addressing broader sector challenges. The cases of Kosovo and Moldova also suggest that contextual factors other than economic development alone can shape the performance of a country's water utility sector, as some countries are clearly outperforming others at similar levels of development. Kosovo's remarkable improvement in the score is driven by a combination of increased investment in the sector (up by 17% from 2015 levels) with significant efficiency gains (reported NRW reduction of 20% and improvement in collection efficiency of 13% since 2015) which has probably also positively impacted customer satisfaction with the services (up by 14% since 2015). Montenegro's deterioration of its WASCO score in spite of economic progress is another example, in this case mostly driven by a sharp decrease of its collection efficiency.

FIGURE 67: SERVICES SUSTAINABILITY ASSESSMENT COMPARED TO GDP PER CAPITA IN COUNTRIES OF THE REGION



SOURCE: WORLD BANK ELABORATION BASED ON SOS DATA COLLECTION.

B. Remaining Challenges and Policy Implications

109. **Despite the overall progress described in the previous section, this SoS 2018 report has also highlighted important challenges to sector sustainability, where stepped-up targeted policies and systems will be needed and bring the sector in this region to the standards of the SDG on water and to link it with a water security approach for the world of tomorrow.** These are namely focused on: i) reaching universal access to safely and adequately managed water supply and wastewater/sanitation services, especially in rural areas (often home to the poor and more vulnerable), where access rates to the services are significantly lower; and ii) sustaining and continuing to improve utilities efficiency and performance (both operational and financial) to increase the overall funding and financing available for the sector and improve/maintain service quality levels, while addressing affordability issues for those segments of the population that need them. The research conducted by the World Bank with support from the DWP in the last three years suggests that countries will need to make policy adjustments to successfully address these remaining (and emerging) challenges. Below are some of the policy recommendations emanating from this research and from the present SoS 2018 review.

110. **Policy recommendations for countries to address the access dimension include:**

- **Adopt a "portfolio approach" to water supply, supporting multiple solutions for universal access and "last mile" service delivery:** Despite the progress highlighted in previous section, still about 17 percent of the population in the region (about 22 million people) is currently without access to piped water supply, with prevalence in rural or less densely populated settlements, where often the poorest population resides. Countries will need to work with different service delivery models, rather than one-size-fits-all, to reach different rural population groups, as various delivery models co-exist, including self-supply, and public service alone won't get the countries to safe universal water services — nor to meeting any future requirements of the Drinking Water Directive (DWD) toward ensuring access by vulnerable and marginalized populations. Countries will need to develop policies, legislative frameworks, and financing measures that recognize and enable the variety of service models, and set up targeted investment programs for rural areas, as well as establish performance monitoring systems and oversight arrangements (with special attention to water quality).

- **Foster rural sanitation investments, including household self-investments and individual solutions, leveraging on technology advances (on decentralized systems and on-site solutions) and innovative financing mechanisms (including supporting household investments and involving the private sector where possible):** Access to safely managed sanitation and to public sewer systems by the population is still considerably low in a few countries, also particularly acute in rural and dispersed areas. Some of the countries in the region are indeed facing an enormous challenge in the rural sanitation agenda (Moldova, Ukraine, and Romania had only one in eight, one in four, and one in two households, respectively, use a flush toilet and citizens living in these areas are using outdoor pit latrines of doubtful hygienic status with limited comfort and often lacking nearby handwashing facilities). The main policy recommendations for countries are to: (a) develop special rural sanitation strategies based on providing guiding criteria for individual and appropriate systems (as opposed to sewerage network solutions for agglomerations with a population of fewer than 10,000 people), identifying relevant service delivery models across the service chain for different segments of the rural population and decoupling technology aspects from service levels, to facilitate the identification of sanitation solutions beyond centralized network based wastewater collection and treatment; and (b) accelerate self-investments through comprehensive rural sanitation programs in coordination with local governments and communities. Key elements in these programs are public outreach and communication for improved awareness and engagement (using sanitation marketing and behavior change techniques), and the development of local markets and conditions for affordable sanitation products, exploring ways to increase access to financing options for household self-investment (microcredits) and using targeted subsidies for the poorest.

- **Take on board new technical, institutional and financing approaches to wastewater management:** Almost all countries of the Danube River basin have witnessed improvements in the levels of wastewater treatment, particularly EU members, thanks to the drive of complying with the UWWTD (though most of the recent EU member states are falling behind implementation schedule), and the recent investments by candidate countries (supported by EU IPA and other funds) to develop wastewater treatment plants (though countries need to improve their technical and institutional capacity to adequately operate and maintain the infrastructure). The non-EU countries have stalled in terms of expanding the required infrastructure and will have to ramp up current investment levels for any further progress to take place. Candidate and non-EU countries are far from compliant with the UWWTD, and they face significantly lower economic development levels than EU member states, further constraining their ability to fund the needed investments. These countries will need to prepare strategic financing plans for wastewater infrastructure, and candidate countries will need to negotiate appropriate deadlines to implement the UWWTD, considering the sustainability and affordability of this costly piece of EU environmental legislation. The recent EU member states will also need to mobilize significant additional funds (from taxes, tariffs, or further transfers) to bridge the investment gap and remain compliant with the UWWTD going forward, while total cost recovery from tariffs of wastewater management costs remains a challenge in most countries. A total of €42.5 billion has been invested to date by the seven new EU member states of the Danube region since joining the EU, plus Austria, to implement the UWWTD. An additional €57 billion will be needed to reach and maintain full compliance until 2040. To continue with the effective and sustainable implementation of the UWWTD, countries will need to use cost-effectiveness analysis to prioritize investments for the most impactful projects to fulfil the objectives of the EU Water Framework Directive (WFD) and explore opportunities to increase benefits from UWWTD implementation through the promotion of wastewater reuse and a circular economy approach.

111. **Policy recommendations to improve WSS utilities efficiency and performance include:**

- **Increase the overall financing framework to increase the available funding going to the sector using a combination of tariffs, taxes and transfers**, as meeting the region's demand for WSS services will require significant investments that the public sector or consumers alone cannot afford at this moment. Countries can do this by reviewing tariff methodologies and overall levels vs affordability thresholds and leveraging available grant funding and tax allocations under a strategic sector financial planning approach and development of financing strategies/policies. Total water and wastewater investments in the region in 2017 covered less than 50 percent of needs estimated by the region's governments to achieve EU or national targets. Tariffs represent on average 58% in the funding of overall sector expenditures, and EU funds (grants) continue to largely fill the funding gap (28%), especially for investments linked to urban wastewater treatment directive implementation.

- **Improve the efficiency of service providers through adoption of incentive mechanisms and a longer-term approach that can consolidate emerging positive trends and establish a virtuous improvement cycle**, promoting operational improvements which will also lead to improvement in direct cost recovery (via tariffs) and overall improvement in the financial situation and creditworthiness of WSS utilities. This would enable the best performing creditworthy service providers to access commercial and blended finance to continue to improve quality and expand the coverage of services (with support from guarantee schemes where needed). In around two-thirds of the countries, WSS operating costs are covered by revenues from tariffs (whereas three years ago, only half of the countries were covering operating costs), however most utilities have still a long way to become commercially viable. To improve and maintain service quality in the long run, utilities should be able to recover their regular operating and maintenance costs, as well as those necessary for asset management (which will increase further as new infrastructure is put in place - particularly wastewater), to ensure the operational sustainability of newly built infrastructure.

- **Focus on building favorable institutional frameworks and enabling environments for improved operational and financial performance of service providers**, targeting public resources where they can be most impactful (subsidy mechanisms reach the poor, performance-based financing to service providers to incentivize efficiency and good performance, financing of infrastructure renewal and capex with strong externalities from public budgets, etc.).

112. **The report has also highlighted cross-cutting areas of work and opportunities for addressing the above challenges, where several recommendations for countries can be drawn:**

- **Coordination between the central and local levels of government and further clarification and strengthening of their different roles and those of other water and wastewater sector authorities will be key** in a context where most local governments (directly responsible for the services in most countries) have weakened technical and financial capacities.

- **Countries in the region should keep developing smart WSS sector policies to create a resilient water supply, drive more effective wastewater management and more responsive utilities, and harness the power of new technologies and innovative schemes to attract financing and expertise from the public and private sectors.** Tools available to the countries include planning instruments, strategic financial planning tools, establishment of regulatory agencies or specialized agencies and tariff regulation, platforms for systematic reporting of service provider performance indicator data, benchmarking tools, technical assistance, capacity-building programs[35], skills certification programs (some of these are often led at the country level by national WSS utility associations or national local government associations). The digitalization of the water industry also opens doors to a wide array of opportunities for WSS utilities to capture the benefits of digital technologies to improve operations[36]. Customer and citizen engagement is also an area that can be greatly improved thanks to new digital tools, which can radically change how the water utility communicates to its consumers. Policies could promote increased citizen engagement in the sector, which can go a long way to instill greater sector transparency and accountability and promote a culture of valuing water in society.

- **Countries should also invest in the *people* who will shape and form the future of the sector, and not only in infrastructure.** The drive for performance and continuous improvement will require a capable and motivated workforce in the sector at all levels. Policy setting will take committed leaders to embrace their roles and be willing to try new approaches. Managers and CEOs looking for utility turnaround will require vision and skills, as well as a disposition to innovate and adapt. The water sector is undergoing rapid technological advancements and there are great efficiencies to be gained. But these must be paired with the training and development of utility staff. At the same time, improvements of basic technical skills (in NRW reduction, energy efficiency, asset

35 An evidence based independent external review of the DWP conducted in 2017 concluded that utilities participating in the Program have achieved concrete positive results in improving their work practices related to asset management, as well as commercial and energy efficiency, and that overall the capacity building programs has led utilities to introduce changes in their operations/processes, with could then lead to improved performance.

36 These include non-revenue water management, efficient energy use, and monitoring of supply and operations. Smarter operation of water supply systems and networks is another area for potential improvement, thanks to advances in leakage detection tools based on the use of fiber optics and others, as well as commercial management and billings using the more common telemetering, amongst other technologically-inspired developments. From "21st Century Water Utilities – the Smart Utility, report by Isle Utilities.

management, wastewater treatment plants operation, water safety planning, preventive maintenance and many others) are required in many countries both at management and operational levels. A diverse, gender and age balanced workforce and adequate recruitment and retention practices will be a foundation for more inclusive, dynamic and talent-oriented modern utilities with motivated and engaged teams of people. Focusing on serving the region's people's needs, while building on people's talent and values will be at the core of transformation to "sustainable water and sanitation services" for many countries in the Danube region.

- **Finally, countries and people in the region have a unique opportunity to build on and foster wide-ranging *partnerships* for sector development.** Countries should make full use of the opportunity represented by EU accession in terms of providing an overarching legislative framework and standards, as well as significant funding. They can do so by using these tools to address sector issues comprehensively, moving from a comparatively smaller focus on EU compliance to a one of universal safe services for all. The EU negotiation process and infringement procedures have helped foster a much more vigorous debate on policy decisions, and the general level of awareness in the region on policies and trends and sector situation has improved. Awareness on policy options and good practices is also increasing given thriving knowledge-sharing practices in the region, promoted under different initiatives and platforms, including the Danube Water Program (DWP), Danube Learning Partnership (D-LeaP) and the Regional Capacity Development Network (RCDN), the ICPDR, ISRBC and many others (Global Water Partnership, International Water Association [IWA], the European Water Platform, WssTP, EurEau, Aqua Publica Europea, European network of water regulators [WAREG], IAWD, German Water Partnership, Aquasan, regional conferences, national conferences by national WSS associations, private sector fairs, etc.), as well as universities, academia, think-tanks and scientific community generally from both public and private sector. Very much in the spirit of goals on increased international coordination under SDG on water, countries could also use these partnership opportunities to further prepare their strategies, institutions and utilities for the world of tomorrow.

C. The Way Forward

113. **Going forward, key priorities for the sustainability of the WSS services are emerging at global level and for the Danube region, linked to water being a natural resource essential for life on this planet.** The author team expects that the World Bank will be undertaking further analytical work on these under the DWP Phase III to include the results in a next SOS 2021 edition, including on the following:

- **Water security and climate change:** sustaining water services in the context of the multiple uses of water and the climate, population, and economic changes in the Danube region will require governments to adopt a water security approach in a context of climate change. Water security is understood as the overarching goal of sustaining and leveraging water resources within the means of the basins, delivering water services to meet the needs of communities and economies, and mitigating water related risks. This includes leveraging productive aspects of water for human well-being, livelihoods, environment and socioeconomic development, and the management of destructive impacts of water such as floods, droughts, and pollution. Further work on the region's and individual countries' potentials to achieve water security in the context of climate change will be needed to understand the implications for water supply and sanitation services. For example, the global work by the World Bank Integrating Green and Gray – Creating Next Generation Infrastructure (World Bank, 2019), advocates for a new generation of infrastructure projects that harness the power of nature to help achieve development goals, including water security and climate resilience. This is yet another area where emerging technology, such as earth-based observations and advanced modelling using collected data via sources such as sensors, cameras, radar and satellites can enable smarter basin level planning and help to improve resilience. Potential water quality impacts from micropollutants is also an emerging concern at the global and regional level, and sound monitoring of water quality will help to reduce the risk to health and safety. The WSS utilities of the Danube region – along local governments and other stakeholders - will have an important role to play in water security objectives under a watershed approach, as gatekeepers of the human right to water supply and managers of potential pollution from household and municipal wastewaters.

- **Water reuse and circular economy:** The water and wastewater services sector can very specifically contribute to promoting a greener circular economy, which remains largely untapped in the region. The potential role of

treated wastewater reuse as an alternative source of water supply is now well-acknowledged and embedded within international, European, and some national strategies[37]. There are different opportunities such as improving the management of sludge from wastewater treatment plants for recycling in biogas production or in agriculture[38], or promoting wastewater reuse in areas expected to be most affected by climate change (where high pumping costs currently make irrigation not economically viable). Water reuse is a top priority area in the strategic implementation plan of the European Innovation Partnership on Water, and several studies have been supported by the European Commission in recent years to assess the potential in this area. Further analytical and dissemination work would be helpful for the region to make use of this opportunity to fulfill the value of the water resource and contribute to a water-secure 21st century Danube region for all.

37 The UN Sustainable Development Goal on Water (SDG 6) specifically targets a substantial increase in recycling and safe reuse globally by 2030.
38 Heavy metal concentration is below EU Sludge Directive thresholds (86/278/EEC of June 12, 1986), and clear traceability needs to be implemented.

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 region's average (weighted by population).

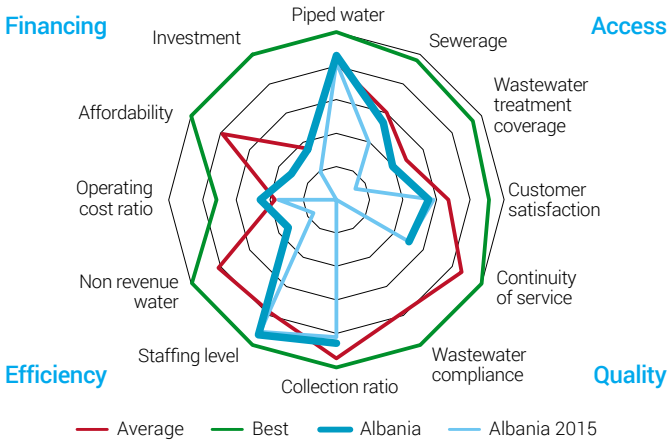
ALBANIA

EU Candidate Country

Sector Sustainability Assessment

55 ↑ 2018

49 2015



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.
	2017	(World Bank, 2017)	2.873	2.990	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	43	9	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	55	51	63	n.a.
	2017	(World Bank, 2017)	59	52	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	10,489	11,154	16,902	n.a.
	2017	(World Bank, 2017)	11,803	12,772	18,830	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	85	1,987	n.a.
	2017	(MI, 2017)	61	85	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	7,416	35,850	4,253	n.a.
	2017	Authors' elab.	47,106	35,106	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	9,551	8,128	7,070	n.a.
	2014	(FAO AquaStat, 2014)	10,425	10,408	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	43	18	26	n.a.
	2018	(World Bank, 2018)	43	41	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	17	42	31	n.a.
	2017	Water Resources Agency	17	29	28	n.a.
Organization of Services						
Number of formal water service providers	2013	(GDWSS, 2013)	58	75	661	n.a.
	2017	ERRU	58	78	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	36,822	28,963	9,496	n.a.
	2017	Authors' elab.	38,792	30,171	8,490	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					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Single line ministry?	Yes [Ministry of Infrastructure and Energy]					
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	WHO/JMP	85	89	81	100
	2015	WHO/JMP	86	92	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
	2017	Authors' elab.	78	81	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	69	84	88	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 *[%]*	2012	(WSS Sector Strategy, 2014)	39	55	58	94
	2018	NAWSSI, 2019)	55	56	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	65	37	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	Expert estimate	13	9	45	95
	2015	(European Environment Agency 2019)	39[39]	–	–	–
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	(GDWSS, 2013)	95	165	122	n.a.
	2017	AKUM	96	131	118	n.a.
Water supply continuity *[hours/day]*	2013	(GDWSS, 2013)	12	19	20	24
		AKUM	12	22	23	24
Drinking water quality *[% of samples in full compliance]*	2013	(GDWSS, 2013)	98	83	93	99.9
	2017	AKUM	96	97	98	100
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
	2018	(Gallup, 2018)	43	64	67	96
Efficiency						
Nonrevenue water *[%]*	2013	(GDWSS, 2013)	67	50	35	16
	2017	AKUM	65	55	42	19
Nonrevenue water *[m3/km/day]*	2013	(IBNet, 2015)	68	41	35	5
	2017	AKUM	55	43	28	3
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	(GDWSS, 2013)	5.6	11.5	9.6	2.0
	2017	AKUM	5.5	6.1	5.0	2.0

39 National sources indicate treatment coverage of 10%. The data from the European Environment Agency could be referring to forecasted coverage once did Anna WWTP will become operational.

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
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
	2017	AKUM	86	81	89	111
Metering level *[metered connections/connections] [%]*	2013	(GDWSS, 2013)	59	81	84	100
	2017	AKUM	71	87	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	51	59	69	94
	2018		46[40]	62	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	32	29	62	n.a.
	2017		39	49	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.39	0.34	0.45	n.a.
	2017		0.97	0.55	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	50	67	67	n.a.
	2017		33	54	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	26	17	13	n.a.
	2017		28	12	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	24	16	20	n.a.
	2017		40	34	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	48	32	38	n.a.
	2017		70	50	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	15	9	23	n.a.
	2017		28	24	38	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] [€/m3]*	2013	(GDWSS, 2013)	0.74	0.57	1.32	n.a.
	2017	AKUM	0.60	0.60	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	AKUM	1.09	1.02	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2.2	0.7	0.9	n.a.
	2017	Sector Financial Strategy 2017-43.	1.5	0.9	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	3.3	1.5	1.8	n.a.
	2017	Sector Financial Strategy 2017-43.	2.2	1.9	2.3	n.a.
Share of households with potential WSS expenditures above 5% of average income *[%]*	2017	Authors' elab.	0	1.6	14.1	n.a.
Sustainability of Services						
Sector Sustainability Assessment	2015	Authors' elab.	49	56	67	94
	2018		55	59	68	92

40 For the past several years, the WSS sector in Albania has gone through an aggregation process. As a result of this process, the coverage indicators for utilities have gone down as regional operators are covering larger territories and populations than before, including rural and scarcely populated areas where level of coverage are lower than in urban areas. This process has also resulted in increasing number of staff. Hence, the WUPI score for Albania has decreased when comparing latest available IB-Net utility data in 2018 with the one available in 2015 because of the way indicators for coverage and staffing are calculated. If one compares utility data averaged for 2010-13 and 2014-17, WUPI scores have actually increased for Albania.

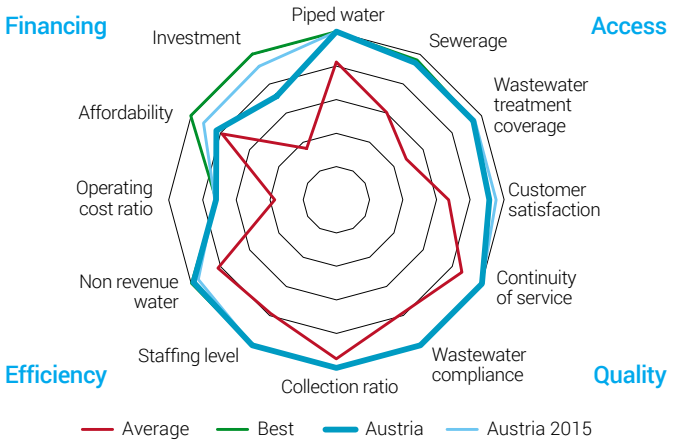
AUSTRIA

EU Member State

Sector Sustainability Assessment

92 ↓ 2018

94 2015



Indicator	Year	Source	Value	EU cand. 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.
	2017	(World Bank, 2017)	8.809	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	6	-4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	66	63	63	n.a.
	2017	(World Bank, 2017)	66	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	44,149	24,535	16,902	n.a.
	2017	(World Bank, 2017)	45,437	28,424	18,830	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.
	2017	(Statistics Austria, 2017)	2,098	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,600	3,632	4,253	n.a.
	2017	Authors' elab.	4,199	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	9,180	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2014)	9,093	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	18	38	26	n.a.
	2018	(World Bank, 2018)	21	31	32	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.
	2017	(ÖVGW, 2018)	5,465	1,136	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	1,427	6,643	9,496	n.a.
	2017	Authors' elab.	1,483	6,385	8,490	n.a.
Dominant service provider type	Local/ municipal utilities					
Service scope	Water and/or sanitation					
Ownership	Local municipalities/boards, cooperatives					
Geographic scope	Local/regional					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Water services law?	Yes					
Single line ministry?	Yes [Ministry for Sustainability and Tourism]					
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	WHO/JMP	100	88	81	100
	2015	WHO/JMP	100	93	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
	2015	Authors' elab.	92	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	99	93	88	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	WHO/JMP	94	62	58	94
	2015	WHO/JMP	94	65	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	97	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	94	62	45	95
	2015	(European Environment Agency 2019)	95	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	Expert estimate	140	113	122	n.a.
	2017	OVGW	133	114	118	n.a.
Water supply continuity *[hours/day]*	2013	Expert estimate	24	24	20	24
	2017	Expert estimate	24	24	23	24
Drinking water quality *[% of samples in full compliance]*	2010	(BMG, 2015)	99.9	96	93	99.9
	–	–	–	99	98	100
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
	2018	(Gallup, 2018)	89	75	67	96
Efficiency						
Nonrevenue water *[%]*	2012	(ÖVGW, 2015)	16	34	35	16
	2017	OVGW	21	33	42	19
Nonrevenue water *[m3/km/day]*	2012	(ÖVGW, 2015)	7	14	35	5
	2017	OVGW	4	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	(ÖVGW, 2015)	2.0	8.7	9.6	2.0
	—	—	—	6.1	5.0	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
	2017	OVGW	100	96	89	111
Metering level *[metered connections/connections] [%]*	2012	(ÖVGW, 2015)	100	96	84	100
	2017	OVGW	100	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	94	80	69	94
	2018		–	83	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	185	101	62	n.a.
	2017		166	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.57	0.55	0.45	n.a.
	2017		0.38	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	87	65	67	n.a.
	2017		94	51	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	13	10	13	n.a.
	2017		6	8	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	0	25	20	n.a.
	2017		0	41	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	40	42	38	n.a.
	2017		34	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	73	42	23	n.a.
	2017		57	56	38	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] [€/m3]*	2012	Expert estimate	3.25	2.18	1.32	n.a.
	2017	OVGW	3.45	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2018	Authors' elab.	1.44	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	0.7	0.9	0.9	n.a.
	2017		0.9	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1.4	1.8	1.8	n.a.
	2017		1.8	2.3	2.3	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	2015	Authors' elab.	94	77	67	94
	2018		92	77	68	92

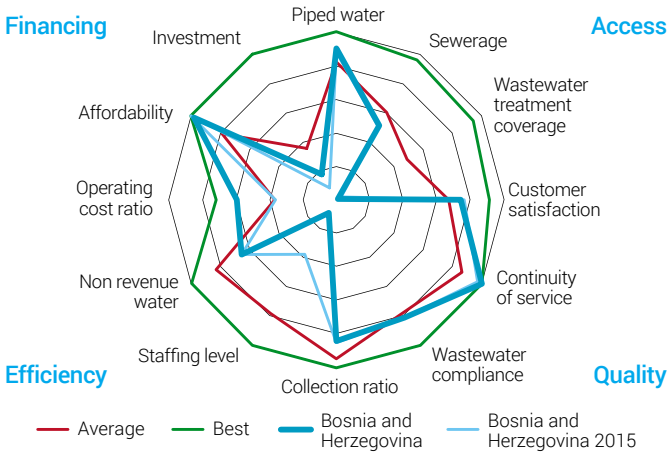
BOSNIA AND HERZEGOVINA

Potential EU Candidate Country

Sector Sustainability Assessment

61 ■
2018

61
2015



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.
	2017	(World Bank, 2017)	3.507	2.990	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	-4	9	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	39	51	63	n.a.
	2017	(World Bank, 2017)	41	52	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	9,632	11,154	16,902	n.a.
	2017	(World Bank, 2017)	11,714	12,772	18,830	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.
	2017	(UNDP, 2009)	142	85	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	26,967	35,850	4,253	n.a.
	2017	Authors' elab.	24,697	35,106	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	9,781	8,128	7,070	n.a.
	2014	(FAO AquaStat, 2014)	9,843	10,408	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	–	–	–	41	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	19	42	31	n.a.
	2014	Agency for statistics of Bosnia and Herzegovina – First Release –30.09.2014	14	26	28	n.a.
Organization of Services						
Number of formal water service providers	2014	(UPKP, 2015) & (Gov. RS, 2015)	142	75	661	n.a.
	2017	Water Association Company RS/BiH 2015	119[41]	78	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	15,641	28,963	9,496	n.a.
	2017	Authors' elab.	14,146	30,171	8,490	n.a.
Dominant service provider type	Municipal					
Service scope	Water and sanitation					

41 The number reported in 2015 was number of municipalities which explains the reduction in number of service providers. Some utilities provide services to more than one municipality.

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Ownership	Local government units					
Geographic scope	One to a few cities					
Water services law?	No					
Single line ministry?	Yes [FMAWF in FBiH & MSPCEE and MAFW 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	No					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	WHO/JMP	89	89	81	100
	2015	WHO/JMP	90	92	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
	2015	Authors' elab.	48	81	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	89	84	88	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	WHO/JMP	50	58	58	94
	2015	WHO/JMP	51	60	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	23	37	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	1.9	9	45	95
	2015	(European Environment Agency 2019)	1.9[42]	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	(FZS, 2015)	168	165	122	n.a.
	2017	IBNet	158	131	118	n.a.
Water supply continuity *[hours/day]*	2015	IBNet	23.3	19	20	24
	2017	IBNet	24	22	23	24
Drinking water quality *[% of samples in full compliance]*	2011	(HEIS & PR, 2011)	79	83	93	99.9
	2017	IBNet	97	97	98	100
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
	2018	(Gallup, 2018)	71	64	67	96
Efficiency						
Nonrevenue water *[%]*	2013	(FZS, 2014) & (RZS BiH, 2014)	55	50	35	16
	2017	IBNet	49	55	42	19

42 The data reported from the European Environment Agency may not reflect most recent developments. The 2017 WB-Institutional Water Services Sector Review in BiH reports 15% of population connected to wastewater treatment services.

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Nonrevenue water *[m3/km/day]*	2013	(FZS, 2014) & (RZS BiH, 2014)	30	41	35	5
	—	—	—	43	28	3
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2010	(HEIS & PR, 2011)	15.8	11.5	9.6	2.0
	2017	IBNet	6.3	6.1	5.0	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
	2017	IBNet	84	81	89	111
Metering level *[metered connections/connections] [%]*	2011	(HEIS & PR, 2011)	82	81	84	100
	2017	IBNet	93	87	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	52	59	69	94
	2018		69	62	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	23	29	62	n.a.
	2017		29	49	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.33	0.34	0.45	n.a.
	2017		0.60	0.55	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	71	67	67	n.a.
	2017		63	54	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	16	17	13	n.a.
	2017		30	12	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	13	16	20	n.a.
	2017		7	34	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	28	32	38	n.a.
	2017		50	50	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	7	9	23	n.a.
	2017		14	24	38	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] [€/m3]*	2012	Expert estimate	0.61	0.57	1.32	n.a.
	2017	Expert estimate	0.43	0.60	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	IBNet	1.27	1.02	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	0.5	0.7	0.9	n.a.
	2017		0.8	0.9	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1	1.5	1.8	n.a.
	2017		1.6	1.9	2.3	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	2015	Authors' elab.	57	56	67	94
	2018		61	59	68	92

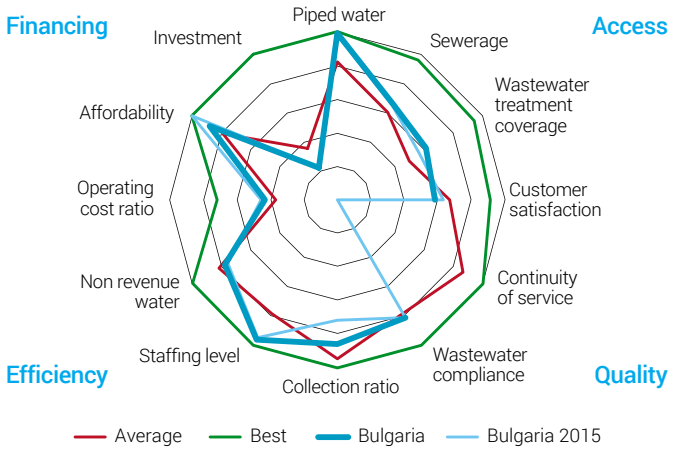
BULGARIA

EU Member State

Sector Sustainability Assessment

71 ↑ 2018

70 2015



Indicator	Year	Source	Value	EU cand. 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.
	2017	(World Bank, 2017)	7.076	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	-9	-4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	73	63	63	n.a.
	2017	(World Bank, 2017)	75	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	15,941	24,535	16,902	n.a.
	2017	(World Bank, 2017)	18,563	28,424	18,830	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.
	2017	National Statistical Institute	265	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	27,519	3,632	4,253	n.a.
	2017	Authors' elab.	26,702	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	2,927	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2014)	2,979	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	16	38	26	n.a.
	2015	(World Bank, 2018)	16	31	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	71	16	31	n.a.
	2016	Env. Agency	48	26	28	n.a.
Organization of Services						
Number of formal water service providers	2014	(EWRC, 2015)	56	1,060	661	n.a.
	2017	(EWRC, 2018)	64	1,136	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	128,437	6,643	9,496	n.a.
	2017	Authors' elab.	109,788	6,385	8,490	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					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
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					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	WHO/JMP	99	88	83	100
	2015	WHO/JMP	99	93	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
	2015	Authors' elab.	99	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	97	93	88	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	WHO/JMP	65	62	58	94
	2015	WHO/JMP	66	65	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	49	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	56	62	45	95
	2015	(European Environment Agency 2019)	62	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2011	(NSI, 2015b)	100	113	122	n.a.
	2016	EWRC	100	114	118	n.a.
Water supply continuity *[hours/day]*	—	–	—	24	20	24
	—	–	—	24	23	24
Drinking water quality *[% of samples in full compliance]*	2011	(MoH, 2015)	97	96	93	99.9
	2016	EWRC	98	99	98	100
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
	2017	(Gallup, 2018)	45	75	67	96
Efficiency						
Nonrevenue water *[%]*	2011	(NSI, 2015b)	60	34	35	16
	2016	EWRC	61	33	42	19
Nonrevenue water *[m3/km/day]*	2013	(EWRC, 2015)	22	14	35	5
	2016	EWRC	21	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	(IBNet, 2015)	6.2	8.7	9.6	2.0
	2016	EWRC	6.0	6.1	5.0	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
	2016	EWRC	86	96	89	111
Metering level *[metered connections/connections] [%]*	2012	(IBNet, 2015)	100	96	84	100
	2016	EWRC	100	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	77	80	69	94
	2018		76[43]	83	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	37	101	62	n.a.
	2017		39	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.31	0.55	0.45	n.a.
	2017		0.51	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	57	65	67	n.a.
	2017		72	51	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	14	10	13	n.a.
	2017		15	8	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	29	25	20	n.a.
	2017		14	41	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	47	42	38	n.a.
	2017		41	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	18	42	23	n.a.
	2017		18	56	38	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] [€/m3]*	2014	(EWRC, 2015)	0.94	2.18	1.32	n.a.
	2017	(EWRC, 2017)	0.92	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2016	(EWRC, 2017)	1.06	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	0.4	0.9	0.9	n.a.
	2017		0.6	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1	1.8	1.8	n.a.
	2017		1.3	2.3	2.3	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	2015	Authors' elab.	70	77	67	94
	2018		71	77	68	92

43 The decrease reflected here may be due to availability of IBNet data rather than an actual decrease in utility performance.

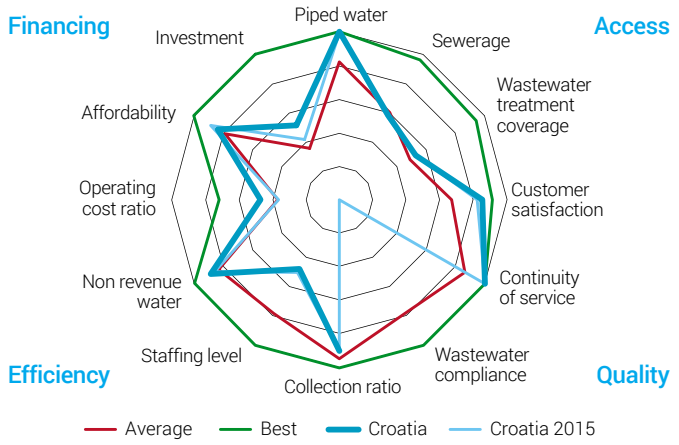
CROATIA

EU Member State

Sector Sustainability Assessment

73 ↑ 2018

71 2015



Indicator	Year	Source	Value	EU cand. 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.
	2017	(World Bank, 2017)	4.126	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	-4	--4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	58	63	63	n.a.
	2017	(World Bank, 2017)	60	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	20,904	24,535	16,902	n.a.
	2017	(World Bank, 2017)	22,670	28,424	18,830	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.
	2017	Croatian Bureau of Stat.	555	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	7,650	3,632	4,253	n.a.
	2017	Authors' elab.	7,434	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	24,495	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2014)	24,882	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	85	38	26	n.a.
	2013	(World Bank, 2018)	80	31	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	4	16	31	n.a.
	2016	RBM Plan	51	26	28	n.a.
Organization of Services						
Number of formal water service providers	2012	(WB&DE, 2012)	140	1,060	661	n.a.
	2016	(RBM Plan, 2016)	156	1,136	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	24,962	6,643	9,496	n.a.
	2017	Authors' elab.	22,215	6,385	8,490	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					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Environmental Protection and Energy]					
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	WHO/JMP	99	88	83	100
	2015	WHO/JMP	100	93	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
	2015	Authors' elab.	84	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	90	93	88	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 *[%]*	2012	WHO/JMP	57	62	58	94
	2015	WHO/JMP	58	65	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	60	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	53	62	45	95
	2015	(European Environment Agency 2019)	53	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2008	(WB&DE, 2012)	113	113	122	n.a.
	2017	Croatian Bureau of Stat.	116	114	118	n.a.
Water supply continuity *[hours/day]*	2014	Expert estimate	24	24	20	24
	–	–	–	24	23	24
Drinking water quality *[% of samples in full compliance]*	2012	(HZJZ, 2013)	85	96	93	99.9
	–	–	–	99	98	100
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
	2018	(Gallup, 2018)	65	75	67	96
Efficiency						
Nonrevenue water *[%]*	2011	(DZS, 2012)	44	34	35	16
	2017	Croatian Bureau of Stat.	29	33	42	19
Nonrevenue water *[m3/km/day]*	2011	(DZS, 2012)	14	14	35	5
	2014	RBMP	12	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	(WB&DE, 2012)	3	8.7	9.6	2.0
	2015	IBNet	3.1	6.1	5.0	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
	–	–	–	96	89	111
Metering level *[metered connections/connections] [%]*	2012	(WB&DE, 2012)	100	96	84	100
	2015	IBNet	100	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	73	80	69	94
	2018		84	83	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	81	101	62	n.a.
	2017		106	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.54	0.55	0.45	n.a.
	2017		0.86	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	57	65	67	n.a.
	2017		65	51	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	20	10	13	n.a.
	2017		32	8	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	23	25	20	n.a.
	2017		3	41	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	41	42	38	n.a.
	2017		41	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	33	42	23	n.a.
	2017		41	56	38	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] [€/m3]*	2012	(WB&DE, 2012)	1.80	2.18	1.32	n.a.
	2013	Expert estimate	2.06	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	IBNet	1.11	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	1	0.9	0.9	n.a.
	2017		1.4	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1.9	1.8	1.8	n.a.
	2017		2.8	2.3	2.3	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	2015	Authors' elab.	71	77	67	94
	2018		73	77	68	92

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Sector Sustainability Assessment

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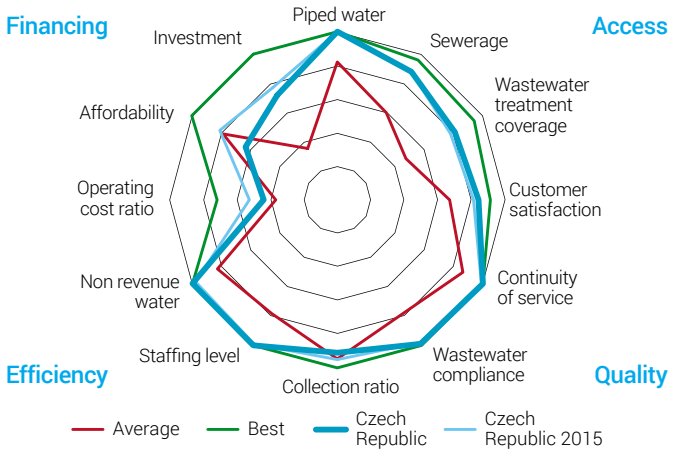

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	(World Bank, 2015)	10.512	8.481	8.451	n.a.
	2017	(World Bank, 2017)	10.591	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	0	-4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	73	63	63	n.a.
	2017	(World Bank, 2017)	73	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	27,344	24,535	16,902	n.a.
	2017	(World Bank, 2017)	32,606	28,424	18,830	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.
	2017	(CZSO, 2018)	6,258	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	1,681	3,632	4,253	n.a.
	2017	Authors' elab.	1,692	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	1,234	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2014)	1,249	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	42	38	26	n.a.
	–	–	–	31	32	
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	26	16	31	n.a.
	2017	EAGRI	52	26	28	n.a.
Organization of Services						
Number of formal water service providers	2013	Expert estimate	2,438	1,060	661	n.a.
	2017	(EAGRI, 2017)	2,878	1,136	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	3,993	6,643	9,496	n.a.
	2017	Authors' elab.	3,485	6,385	8,490	n.a.
Dominant service provider type	Private concession					
Service scope	Water/wastewater					
Ownership	Municipalities					
Geographic scope	Cities/regions					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Water services law?	Yes					
Single line ministry?	No					
Regulatory agency?	No					
Utility performance indicators publicly available?	Only at aggregated level					
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	WHO/JMP	100	88	83	100
	2015	WHO/JMP	100	93	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
	2015	Authors' elab.	95	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	98	93	88	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	WHO/JMP	88	62	58	94
	2015	WHO/JMP	88	65	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	82	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	78	62	45	95
	2015	(European Environment Agency 2019)	81	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	(CZSO, 2015)	87	113	122	n.a.
	2017	EAGRI	89	114	118	n.a.
Water supply continuity *[hours/day]*	2013	(IBNet, 2015)	24	24	20	24
	2017	EAGRI	24	24	23	24
Drinking water quality *[% of samples in full compliance]*	2013	(SZU, 2014)	99,8	96	93	99.9
	2017	EAGRI	99.7	99	98	100
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
	2018	(Gallup, 2018)	82	75	67	96
Efficiency						
Nonrevenue water *[%]*	2012	(CZSO, 2015)	22	34	35	16
	2017	EAGRI	19	33	42	19
Nonrevenue water *[m3/km/day]*	2012	(CZSO, 2015)	5	14	35	5
	2017	EAGRI	3	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	(IBNet, 2015)	5.2	8.7	9.6	2.0
	2016	EAGRI	3.6	6.1	5.0	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
	2016	EAGRI	91	96	89	111
Metering level *[metered connections/connections] [%]*	2013	(IBNet, 2015)	100	96	84	100
	2017	EAGRI	100	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	91	80	69	94
	2018		93	83	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	124	101	62	n.a.
	2017		124	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.62	0.55	0.45	n.a.
	2017		0.65	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	60	65	67	n.a.
	2017		57	51	76	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	18	10	13	n.a.
	2017		21	8	13	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	23	25	20	n.a.
	2017		22	41	11	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	50	42	38	n.a.
	2017		46	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	62	42	23	n.a.
	2017		57	56	38	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] [€/m3]*	2013	(MZe, 2014)	2.75	2.18	1.32	n.a.
	2017	Expert estimate	2.66	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	EAGRI	1.07	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	0.8	0.9	0.9	n.a.
	2017		0.9	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1.3	1.8	1.8	n.a.
	2017		1.5	2.3	2.3	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	2015	Authors' elab.	87	77	67	94
	2018		85	77	68	92

HUNGARY

EU Member State

Sector Sustainability Assessment

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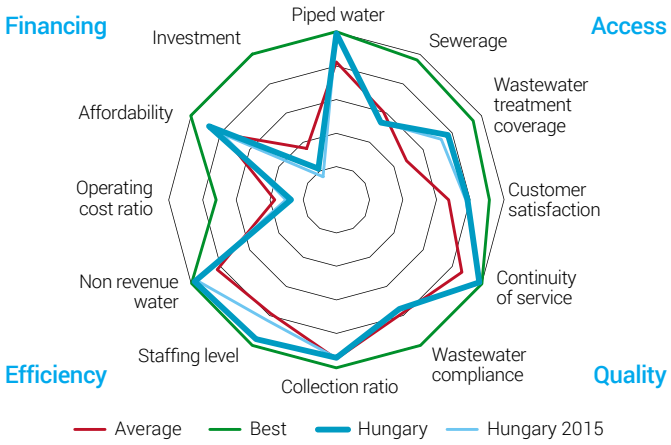


Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	(World Bank, 2015)	9.897	8.481	8.451	n.a.
	2017	(World Bank, 2017)	9.781	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	2	-4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	70	63	63	n.a.
	2017	(World Bank, 2017)	72	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	22,877	24,535	16,902	n.a.
	2017	(World Bank, 2017)	26,778	28,424	18,830	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.
	2017	(Gov. HU, 2015)	3,152	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,140	3,632	4,253	n.a.
	2017	Authors' elab.	3,103	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	10,425	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2014)	10,553	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	12	38	26	n.a.
	2012	(World Bank, 2018)	14	31	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	5	16	31	n.a.
	2017	Hungarian Energy and Public Utility Regulatory Authority 2018 (to be published)	3.5	26	28	n.a.
Organization of Services						
Number of formal water service providers	2014	Expert estimate	41	1,060	661	n.a.
	2017	Hungarian Energy and Public Utility Regulatory Authority 2018 (to be published)	40	1,136	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	226,912	6,643	9,496	n.a.
	2017	Authors' elab.	232,791	6,385	8,490	n.a.
Dominant service provider type	Municipal utilities					
Service scope	Water and wastewater					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Ownership	Municipal (82%), state (13%), mixed involving private operators (5%)					
Geographic scope	One to several hundred settlements					
Water services law?	Yes					
Single line ministry?	Yes [General Directorate of Water Management, Ministry of Interior]					
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	WHO/JMP	99	88	83	100
	2015	WHO/JMP	99	93	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
	2015	Authors' elab.	95	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	82	93	88	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	WHO/JMP	53	62	58	94
	2015	WHO/JMP	53	65	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	76	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	73	62	45	95
	2015	(European Environment Agency 2019)	77	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	(KSH, 2015)	94	113	122	n.a.
	2016	KSH	94	114	118	n.a.
Water supply continuity *[hours/day]*	2013	Expert estimate	24	24	20	24
		KSH	24	24	23	24
Drinking water quality *[% of samples in full compliance]*	2011	(EC, 2014)	95	96	93	99.9
	–	–	–	99	98	100
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
	2017	(Gallup, 2018)	77	75	67	96
Efficiency						
Nonrevenue water *[%]*	2012	(KSH, 2015)	24	34	35	16
	2017	KSH	26	33	42	19
Nonrevenue water *[m3/km/day]*	2012	(KSH, 2015)	6.1	14	35	5
	2017	KSH	5	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	Expert estimate	3.5	8.7	9.6	2.0
	2017	KSH	2.4	6.1	5.0	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
	—	—	—	96	89	111
Metering level *[metered connections/connections] [%]*	2012	Expert estimate	99.7	96	84	100
	2017	KSH	100	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	81	80	69	94
	2018		89	83	72	694
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	86	101	62	n.a.
	2017		71	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.51	0.55	0.45	n.a.
	2017		0.44	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	76	65	67	n.a.
	2017		65	51	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	5	10	13	n.a.
	2017		17	8	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	19	25	20	n.a.
	2017		19	41	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	15	42	38	n.a.
	2017		24	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	13	42	23	n.a.
	2017		17	56	38	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] [€/m3]*	2012	(KSH, 2015)	2.43	2.18	1.32	n.a.
	2017	Expert estimate/HEA	1.64	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	MAVIZ	0.85	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	1	0.9	0.9	n.a.
	2017		0.8	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1.9	1.8	1.8	n.a.
	2017		1.6	2.3	2.3	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	2015	Authors' elab.	73	77	67	94
	2018		75	77	68	92

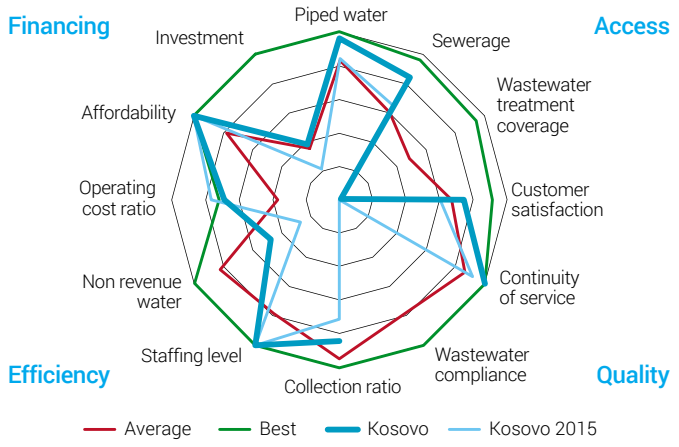
KOSOVO

Potential EU Candidate Country

Sector Sustainability Assessment

71 ↑ 2018

63 2015



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.
	2017	(World Bank, 2017)	1.831	2.990	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	n.a.	9	-6	n.a.
Share of urban population *[%]*	2011	(KAS, 2011a)	39	51	63	n.a.
	2017	(World Bank, 2017)	39	52	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	8,740	11,154	16,902	n.a.
	2017	(World Bank, 2017)	9,796	12,772	18,830	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.
	2017	(KAS, 2017)	38	85	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	48,000	35,850	4,253	n.a.
	2017	Authors' elab.	48,176	35,106	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2017	(Inter-Ministerial Water Council 2017)	1600	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	–	–	–	18	26	n.a.
	2017	(Inter-Ministerial Water Council 2017)	52	41	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	60	42	31	n.a.
	2014	(ICPDR, 2015)	60	29	28	n.a.
Organization of Services						
Number of formal water service providers	2012	(WWRO, 2013)	7	75	661	n.a.
	2017	WSRA	7	78	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	174,582	28,963	9,496	n.a.
	2017	Authors' elab.	245,837	30,171	8,490	n.a.
Dominant service provider type	Public, regional service providers					
Service scope	Water supply, wastewater collection, and treatment					
Ownership	Central government					
Geographic scope	Nationwide					
Water services law?	Yes					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Single line ministry?	Yes [Ministry of Economic Development]					
Regulatory agency?	Yes [Water Services Regulatory Authority]					
Utility performance indicators publicly available?	Yes [http://www.arru-rks.org/en/]					
National utility association?	Yes [SHUKOS for water and wastewater]					
Private sector participation	No					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2014	(WSRA 2014)	84	89	83	100
	2017	(WSRA 2017)	94[44]	92	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
	2015	Authors' elab.	94	81	83	99
People using safely managed drinking water services *[%]*[45]	–	–	–	84	88	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 *[%]*	2015	(WSRA 2015)	65	58	66	94
	2017	(WSRA 2017)	74	60	60	96
People using safely managed sanitation services *[%]*[46]	–	–	n.a.	37	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	Expert estimate	1	9	45	95
	–	–	–	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	(WWRO, 2013)	93	165	122	n.a.
	2017	(WSRA 2017)	111	131	118	n.a.
Water supply continuity *[hours/day]*	2013	(WWRO, 2013)	22	19	20	24
	2017	(WSRA, 2017)	24	23	23	24
Drinking water quality *[% of samples in full compliance]*	2013	(WWRO, 2013)	98	83	93	99.9
	2017	(WSRA, 2017)	99.6	97	98	100
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
	2018	(Gallup, 2018)	77	64	67	96
Efficiency						
Nonrevenue water *[%]*	2013	(WWRO, 2013)	57	50	35	16
	2017	(WSRA, 2017)	58	55	42	19
Nonrevenue water *[m3/km/day]*	2013	(IBNet, 2015)	59	41	35	5
	2017	(WSRA, 2017)	44	43	28	3

44 The Kosovo Water Services Regulatory Authority reports access to public drinking water services. Data from MICS 2014 shows 68% access to piped water supply.

45 The Joint Monitoring Program does not report for Kosovo.

46 Idem.

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	(WWRO, 2013)	6.6	11.5	9.6	2.0
	2017	(WSRA, 2017)	5.7	6.1	5.0	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
	2017	(WSRA, 2017)	84	81	89	111
Metering level *[metered connections/connections] [%]*	2013	(WWRO, 2013)	91	81	84	100
	2017	(WSRA, 2017)	94	87	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	65	59	69	94
	2018		72	62	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	22	29	62	n.a.
	2017		44	49	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.34	0.34	0.45	n.a.
	2017		0.55	0.55	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	34	67	67	n.a.
	2017		25	54	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	37	17	13	n.a.
	2017		22	12	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	29	16	20	n.a.
	2017		54	34	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	77	32	38	n.a.
	2017		70	50	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	17	9	23	n.a.
	2017		30	24	38	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] [€/m3]*	2013	(WWRO, 2013)	0.48	0.57	1.32	n.a.
	2017	(WSRA, 2017)	0.42	0.60	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	(WSRA, 2017)	1.39	1.02	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	0.5	0.7	0.9	n.a.
	2017		0.5	0.9	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	0.8	1.5	1.8	n.a.
	2017		0.9	1.9	2.3	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	2015	Authors' elab.	63	56	67	94
	2018		71	59	68	92

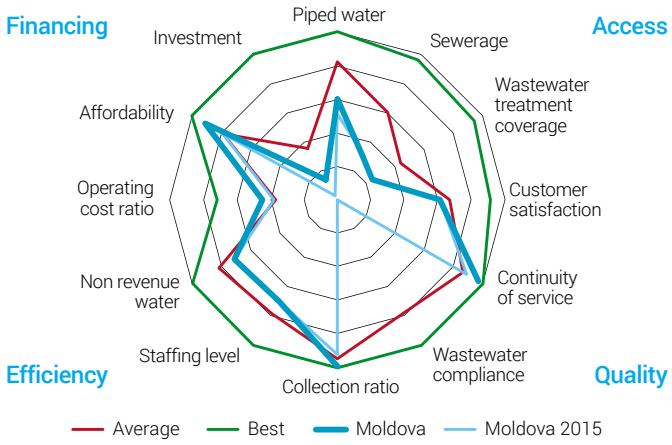
MOLDOVA

Non-EU Country

Sector Sustainability Assessment

60 ↑ 2018

56 2015



Indicator	Year	Source	Value	EU cand. 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.
	2017	(World Bank, 2017)	3.550	24.190	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	-13	-10	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	45	67	63	n.a.
	2017	(World Bank, 2017)	45	68	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	4,669	8,489	16,902	n.a.
	2017	(World Bank, 2017)	5,190	7,696	18,830	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.
	2017	(IMF, 2012)	981	5,603	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,628	3,891	4,253	n.a.
	2017	Authors' elab.	3,619	4,318	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	3,315	9,156	7,070	n.a.
	2014	(FAO AquaStat, 2014)	3,015	3,463	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	14	20	26	n.a.
	2013	(World Bank, 2015)	14	18	32	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.
	2018	(Moldova National Agency for Energy Regulation 2018)	43[47]	1,206	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	29,430	18,882	9,496	n.a.
	2017	Authors' elab.	43,007	12,246	8,490	n.a.
Dominant service provider type	Joint-stock water and sanitation companies					
Service scope	Water and/or sanitation					

47 This number represents the 43 formally licensed utilities by ANRE. However, in Moldova there are about 500 smaller non-licensed municipal enterprises, some of them formally registered but not regulated at national level. The previously reported number for 2012 was based on numbers reported by AMAC based on utility membership.

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Ownership	State owned					
Geographic scope	Municipal					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Agriculture, Regional Development and Environment]					
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 *[%]*	2012	WHO/JMP	56	68	81	100
	2015	WHO/JMP	60	66	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
	2015	Authors' elab.	63	62	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	70	81	88	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	WHO/JMP	31	51	58	94
	2015	WHO/JMP	30	51	60	96
People using safely managed sanitation services *[%]*	–	–	–	–	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2013	(IBNet, 2015)	24	36	45	95
	–	–	–	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	(AMAC, 2015)	126	116	122	n.a.
	2017	IBNet	97	92	118	n.a.
Water supply continuity *[hours/day]*	2012	(IBNet, 2015)	21	17	20	24
		IBNet	23	23	23	24
Drinking water quality *[% of samples in full compliance]*	2014	(Mediu, 2014)	86	86	93	99.9
	2017	IBNet	99.9	99.9	98	100
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
	2017	(Gallup, 2018)	51	43	67	96
Efficiency						
Nonrevenue water *[%]*	2013	(IBNet, 2015)	41	31	35	16
	2017	IBNet	42	43	42	19
Nonrevenue water *[m3/km/day]*	2013	(IBNet, 2015)	25.5	59	35	5
	2017	IBNet	26	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	(AMAC, 2015)	13.3	13.3	9.6	2.0
	2017	IBNet	3.2	3.2	5.0	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
	2017	IBNet	99	98	89	111
Metering level *[metered connections/connections] [%]*	2012	(IBNet, 2015)	80	70	84	100
	2017	IBNet	91	67	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	58	59	69	94
	2018		66	69	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	17	21	62	n.a.
	2017		18	15	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.50	0.35	0.45	n.a.
	2017		0.59	0.53	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	86	65	67	n.a.
	2017		42	74	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	4	30	13	n.a.
	2017		27	22	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	9	5	20	n.a.
	2017		31	4	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	13	14	38	n.a.
	2017		13	14	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	2	3	23	n.a.
	2017		11	6	38	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] [€/m3]*	2012	(AMAC, 2015)	0.85	0.51	1.32	n.a.
	2017	Expert estimate's	0.62	0.57	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	IBNet	1.08	0.97	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	1	0.7	0.9	n.a.
	2017		0.7	0.6	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	1.9	1.3	1.8	n.a.
	2017		1.2	1	2.3	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	2015	Authors' elab.	56	58	67	94
	2018		60	60	68	92

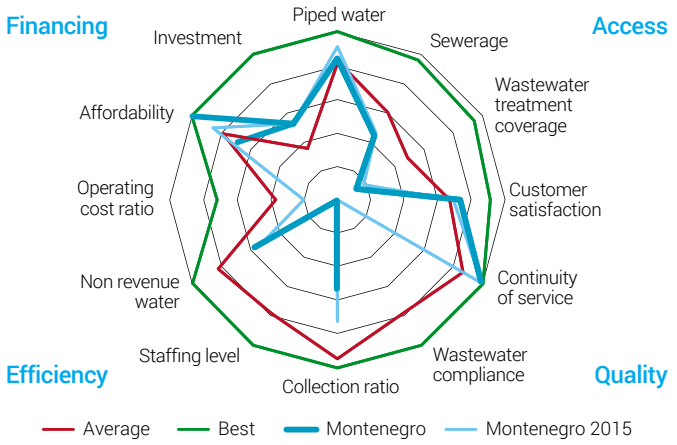
MONTENEGRO

EU Candidate Country

Sector Sustainability Assessment

48 ↓ 2018

55 2015



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.
	2017	(World Bank, 2017)	0.622	2.990	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	42	9	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	64	51	63	n.a.
	2017	(World Bank, 2017)	64	52	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	14,318	11,154	16,902	n.a.
	2017	(World Bank, 2017)	16,409	12,772	18,830	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.
	2017	(MonStat, 2018)	23	85	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	27,017	35,850	4,253	n.a.
	2017	Authors' elab.	28,294	35,106	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	–	–	–	8,128	7,070	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	60	18	26	n.a.
	2018	(World Bank, 2018)	60	41	32	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.
	2013	(MRT, 2013)	22	78	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	21,466	28,963	9,496	n.a.
	2017	Authors' elab.	25,748	30,171	8,490	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?	Yes [Ministry of Sustainable Development and Tourism]					
Regulatory agency?	Yes [Energy Regulatory Agency]					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
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 *[%]*	2012	WHO/JMP	86	89	83	100
	2015	WHO/JMP	84	92	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
	2015	Authors' elab.	91	81	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	90	84	88	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	WHO/JMP	46	58	58	94
	2015	WHO/JMP	44	60	60	96
People using safely managed sanitation services *[%]*	–	–	–	37	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(MRT, 2012a)	18	9	45	95
	–	–	–	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	(MRT, 2012a)	237	165	122	n.a.
	2016	IBNet	100	131	118	n.a.
Water supply continuity *[hours/day]*	2010	(MRT, 2012a)	23.8	19	20	24
	2016	IBNet	24	22	23	24
Drinking water quality *[% of samples in full compliance]*	2012	(MRT, 2012a)	86	83	93	99.9
	2016	IBNet	98	97	98	100
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
	2018	(Gallup, 2018)	60	64	67	96
Efficiency						
Nonrevenue water *[%]*	2012	(MRT, 2012a)	59	50	35	16
	2016	MONSTAT	60	55	42	19
Nonrevenue water *[m3/km/day]*	2012	Authors' elab.	39	41	35	5
	–	–	–	43	28	3
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	(MRT, 2012a)	10.3	11.5	9.6	2.0
	2016	IBNet	8.3	6.1	5.0	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
	2016	IBNet	53	81	89	111

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Metering level *[metered connections/connections] [%]*	–	–	–	81	84	100
	2016	IBNet	78	87	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	48	59	69	94
	2018		53	62	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	78	29	62	n.a.
	2017		98	49	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.72	0.34	0.45	n.a.
	2017		0.40	0.55	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	35	67	67	n.a.
	2017		29	54	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	42	17	13	n.a.
	2017		0	12	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	23	16	20	n.a.
	2017		–	34	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	54	32	38	n.a.
	2017		33	50	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	42	9	23	n.a.
	2017		32	24	38	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] [€/m3]*	2012	(MRT, 2012a)	0.67	0.57	1.32	n.a.
	2017	Expert Estimate	0.65	0.60	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2016	IBNet	0.43	1.02	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2011	Authors' elab.	0.9	0.7	0.9	n.a.
	2017		0.5	0.9	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2011	Authors' elab.	1.6	1.5	1.8	n.a.
	2017		1.0	1.9	2.3	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	2015	Authors' elab.	55	56	67	94
	2018		45	59	68	92

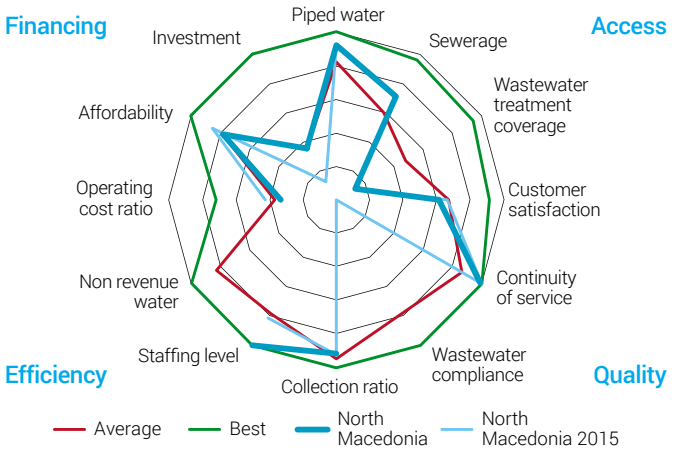
NORTH MACEDONIA

EU Candidate Country

Sector Sustainability Assessment

61 ↑ 2018

59 2015



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.
	2017	(World Bank, 2017)	2.083	2.990	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	4	9	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	57	51	63	n.a.
	2017	(World Bank, 2017)	57	52	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	11,802	11,154	16,902	n.a.
	2017	(World Bank, 2017)	13,111	12,772	18,830	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.
	2019	(SSO, 2019)	80	85	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	26,339	35,850	4,253	n.a.
	2017	Authors' elab.	26,040	35,106	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	3,039	8,128	7,070	n.a.
	2014	(FAO AquaStat, 2014)	3,039	10,408	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	21	18	26	n.a.
	2013	(World Bank, 2015)	21	41	32	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.
	2017	(ADKOM 2018)	75	78	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	23,241	28,963	9,496	n.a.
	2017	Authors' elab.	24,720	30,171	8,490	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					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Single line ministry?	No					
Regulatory agency?	Yes					
Utility performance indicators publicly available?	Yes [www.danubis.org]					
National utility association?	Yes [ADKOM for municipal services]					
Private sector participation	Only one private operator					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	WHO/JMP	92	89	81	100
	2015	WHO/JMP	92	92	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
	2015	Authors' elab.	89	81	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	83	84	88	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 *[%]*	2012	WHO/JMP	70	58	58	94
	2015	WHO/JMP	71	60	60	96
People using safely managed sanitation services *[%]*	–	–	–	37	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(MoEPP, 2011)	13	9	45	95
	–	–	–	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	(IBNet, 2015)	158	165	122	n.a.
	2016	IBNet	162	131	118	n.a.
Water supply continuity *[hours/day]*	2013	(IBNet, 2015)	24	19	20	24
	2016	IBNet	24	23	23	24
Drinking water quality *[% of samples in full compliance]*	2009	(IPH, 2014)	95	83	93	99.9
	–	–	–	97	98	100
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
	2018	(Gallup, 2018)	66	64	67	96
Efficiency						
Nonrevenue water *[%]*	2013	(IBNet, 2015)	63	50	35	16
	2016	Project National Water Study	61	55	42	19
Nonrevenue water *[m3/km/day]*	2013	(IBNet, 2015)	101	41	35	5
	–	–	–	43	28	3
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	(IBNet, 2015)	8.2	11.5	9.6	2.0
	2016	IBNet	6.0	6.1	5.0	2.0

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
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
	2016	IBNet	92	81	89	111
Metering level *[metered connections/connections] [%]*	2012	Expert estimate	84	81	84	100
	2016	IBNet	94	87	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	62	59	69	94
	2018		63	62	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	31	29	62	n.a.
	2017		64	49	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.34	0.34	0.45	n.a.
	2017		0.49	0.55	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	71	67	67	n.a.
	2017		38	54	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	21	17	13	n.a.
	2017		0	12	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	8	16	20	n.a.
	2017		62	34	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	33	32	38	n.a.
	2017		59	50	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	10	9	23	n.a.
	2017		37	24	38	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] [€/m3]*	2013	(ADKOM, 2014)	0.59	0.57	1.32	n.a.
	2017	Expert estimate's	0.54	0.60	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	IBNet	0.93	1.02	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2008	Authors' elab.	0.9	0.7	0.9	n.a.
	2017		1.1	0.9	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2008	Authors' elab.	2.5	1.5	1.8	n.a.
	2017		2.4	1.9	2.3	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	2015	Authors' elab.	59	56	67	94
	2018		61	59	68	92

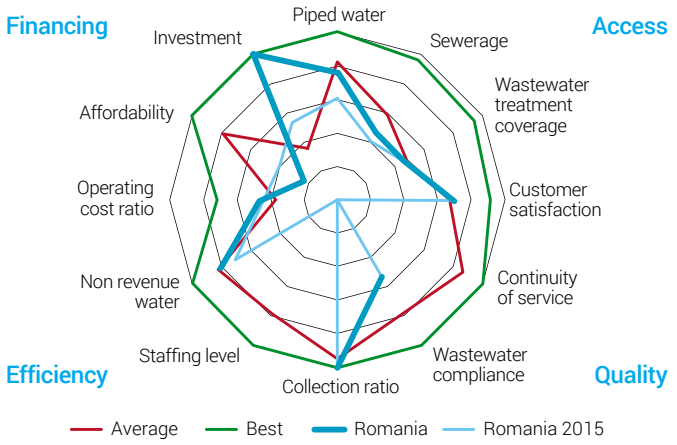
ROMANIA

EU Member State

Sector Sustainability Assessment

64 ↑ 2018

58 2015



Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	(World Bank, 2015)	19.983	8.481	8.451	n.a.
	2017	(World Bank, 2017)	19.583	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	-14	-4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	54	63	63	n.a.
	2017	(World Bank, 2017)	53	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	19,797	24,535	16,902	n.a.
	2017	(World Bank, 2017)	26,660	28,424	18,830	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.
	2017	Law no 215/2001 on local public administration	3,181	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	6,276	3,632	4,253	n.a.
	2017	Authors' elab.	6,157	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2012	(FAO Aquastat, 2015)	10,510	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2018)	10,773	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2002	(World Bank, 2015)	20	38	26	n.a.
	2013	(World Bank, 2018)	15	31	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	50	16	31	n.a.
	2017	ANAR	57	26	28	n.a.
Organization of Services						
Number of formal water service providers	2014	(ANRSC, 2015)	226	1,060	661	n.a.
	2019	(ANRSC, 2019)	283[48]	1,136	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	53,556	6,643	9,496	n.a.
	2017	Authors' elab.	53,096	6,385	8,490	n.a.
Dominant service provider type	Regional					
Service scope	Water and/or sanitation					
Ownership	Municipal and regional					

48 This value only reports for operators formally licensed by ANRSC. In fact, Romania declared (in 2018) 1,001 WSS operators, including 43 regional operators, two private operators and the rest small local operators which are not all licensed.

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Geographic scope	Municipal and regional					
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Waters and Forests]					
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	WHO/JMP	62	88	83	100
	2016	HBS, 2016	76	93	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
	2015	Authors' elab.	68	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	88	93	88	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	WHO/JMP	40	62	58	94
	2015	WHO/JMP	46	65	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	57	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	43	62	45	95
	2015	(European Environment Agency 2019)	46	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	(INS, 2015a)	136	113	122	n.a.
	2017	ANRSC_ARA	157	114	118	n.a.
Water supply continuity *[hours/day]*	–	–	–	24	20	24
	–	–	–	24	23	24
Drinking water quality *[% of samples in full compliance]*	2010	(MS, 2010)	93	96	93	99.9
	–	–	–	99	98	100
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
	2018	(Gallup, 2018)	57	75	67	96
Efficiency						
Nonrevenue water *[%]*	2012	(ANRSC, 2015) & (ARA, 2015)	45	34	35	16
	2017	ANRSC_ARA	47	33	42	19
Nonrevenue water *[m3/km/day]*	2013	(INS, 2014b)	26	14	35	5
	2017	ANRSC_ARA	18	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2012	(ANRSC, 2015) & (ARA, 2015)	18	8.7	9.6	2.0
	–	–	–	6.1	5.0	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
	2017	ANRSC_ARA	111	96	89	111
Metering level *[metered connections/connections] [%]*	2012	(INS, 2015a)	89	96	84	100
	2017	ANRSC_ARA	95	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	68	80	69	94
	2018		75	83	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	87	101	62	n.a.
	2017		211	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.64	0.55	0.45	n.a.
	2017		0.76	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	55	65	67	n.a.
	2017		25	51	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	9	10	13	n.a.
	2017		2	8	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	36	25	20	n.a.
	2017		73	41	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	49	42	38	n.a.
	2017		75	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	43	42	23	n.a.
	2017		159	56	38	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] [€/m3]*	2013	Authors' elab.	1.60	2.18	1.32	n.a.
	2017	Expert's estimate	1.39	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	ANRSC_ARA	1.11	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	2	0.9	0.9	n.a.
	2017		2.4	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	4.5	1.8	1.8	n.a.
	2017		5.8	2.3	2.3	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	2015	Authors' elab.	58	77	67	94
	2018		64	77	68	92

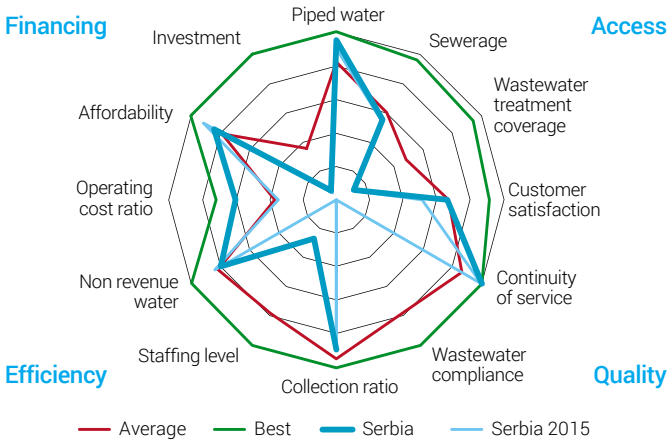
SERBIA

EU Candidate Country

Sector Sustainability Assessment

61 ↑ 2018

55 2015



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.
	2017	(World Bank, 2017)	7.022	2.990	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	3	9	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	55	51	63	n.a.
	2017	(World Bank, 2017)	56	52	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	12,374	11,154	16,902	n.a.
	2017	(World Bank, 2017)	14,049	12,772	18,830	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.
	2017	(SORS, 2018)	168	85	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	42,643	35,850	4,253	n.a.
	2017	Authors' elab.	41,799	35,106	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	16,979	8,128	7,070	n.a.
	2014	(FAO AquaStat, 2014)	18,326	10,408	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	17	18	26	n.a.
	–	–		41	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	27	42	31	n.a.
	2017	Statistical Agency	41	29	28	n.a.
Organization of Services						
Number of formal water service providers	2012	(RZS, 2012b)	152	75	661	n.a.
	2017	(MOE, 2017)	184	78	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	35,583	28,963	9,496	n.a.
	2017	Authors' elab.	32,363	30,171	8,490	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					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
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	WHO/JMP	91	89	83	100
	2015	WHO/JMP	95	92	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
	2015	Authors' elab.	85	81	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	88	84	88	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	WHO/JMP	54	58	58	94
	2015	WHO/JMP	55	60	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	24	37	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	10	9	45	95
	2015	(European Environment Agency 2019)	12	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2011	(RZS, 2012a) & (RZS, 2012b)	203	165	122	n.a.
	2017	UTVSI	176	131	118	n.a.
Water supply continuity *[hours/day]*	2015	UTSVI	23.9	19	20	24
	2017	UTVSI	24	22	23	24
Drinking water quality *[% of samples in full compliance]*	2010	(Batut, 2010)	73	83	93	99.9
	2017	Health Stat.	94.7	97	98	100
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
	2018	(Gallup, 2018)	68	64	67	96
Efficiency						
Nonrevenue water *[%]*	2011	(RZS, 2012a) & (RZS, 2012b)	32	50	35	16
	2017	UTVSI	35	55	42	19
Nonrevenue water *[m3/km/day]*	2011	(RZS, 2012a) & (RZS, 2012b)	16	41	35	5
	2017	UTVSI	19	43	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2011	(RZS, 2012b)	11.9	11.5	9.6	2.0
	2017	UTVSI	4.6	6.1	5.0	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
	2017	UTVSI	89	81	89	111
Metering level *[metered connections/connections] [%]*	2011	(RZS, 2012a) & (RZS, 2012b)	84	81	84	100
	2017	UTVSI	94	87	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	65	59	69	94
	2018		73	62	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	27	29	62	n.a.
	2017		22	49	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.30	0.34	0.45	n.a.
	2017		0.44	0.55	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	81	67	67	n.a.
	2017		100	54	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	6	17	13	n.a.
	2017		0	12	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	12	16	20	n.a.
	2017		0	34	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	14	32	38	n.a.
	2017		23	50	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	4	9	23	n.a.
	2017		5	24	38	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] [€/m3]*	2012	(PKS, 2013)	0.48	0.57	1.32	n.a.
	2017	UTVSI	0.53	0.60	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	UTVSI	1.28	1.02	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	0.7	0.7	0.9	n.a.
	2017		0.9	0.9	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	1.8	1.5	1.8	n.a.
	2017		2.4	1.9	2.3	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	2015	Authors' elab.	55	56	67	94
	2018		61	59	68	92

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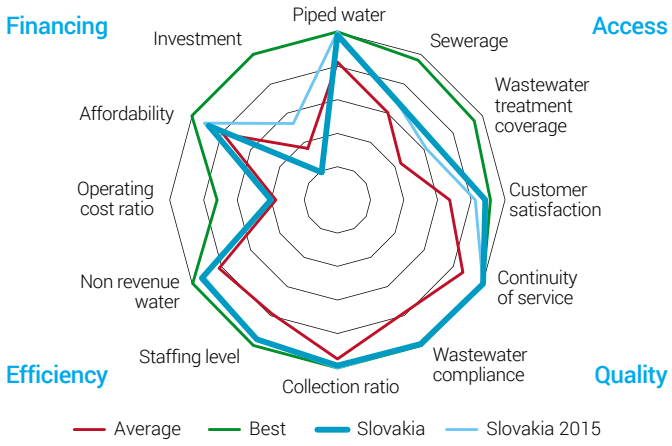

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	(World Bank, 2015)	5.414	8.481	8.451	n.a.
	2017	(World Bank, 2017)	5.440	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	-2	-4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	54	63	63	n.a.
	2017	(World Bank, 2017)	53	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	26,114	24,535	16,902	n.a.
	2017	(World Bank, 2017)	30,155	28,424	18,830	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.
	2017	(MinV, 2018)	2,890	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	1,878	3,632	4,253	n.a.
	2017	Authors' elab.	1,882	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	9,199	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2014)	9,233	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	47	38	26	n.a.
	2012	(World Bank, 2018)	46	31	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	17	16	31	n.a.
	2017	(Ministry of the Environment, 2017)	15	26	28	n.a.
Organization of Services						
Number of formal water service providers	2012	Expert estimate	17	1,060	661	n.a.
	2017	(Regulatory Office for Network Industries 2017)	137	1,136	748	n.a.
Average population served *[inhabitants]*	2012	Authors' elab.	277,074	6,643	9,496	n.a.
	2017	Authors' elab.	35,316	6,385	8,490	n.a.
Dominant service provider type	Mixed capital companies					
Service scope	Water, wastewater					
Ownership	Municipalities					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
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					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	WHO/JMP	98	88	83	100
	2015	WHO/JMP	98	93	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
	2015	Authors' elab.	89	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	93	93	88	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	WHO/JMP	69	62	60	94
	2015	WHO/JMP	69	65	62	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	82	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(MINZP, 2014)	61	62	45	95
	2015	(European Environment Agency 2019)	–	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2012	(MINZP, 2013)	81	113	122	n.a.
	2017	Enviroportal	78	114	118	n.a.
Water supply continuity *[hours/day]*	2013	(IBNet, 2015)	24	24	20	24
		Enviroportal	24	24	23	24
Drinking water quality *[% of samples in full compliance]*	2012	(MINZP, 2014)	99	96	93	99.9
	2017	Enviroportal	98	99	98	100
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
	2017	(Gallup, 2018)	85	75	67	96
Efficiency						
Nonrevenue water *[%]*	2012	(MINZP, 2013)	32	34	35	16
	2017	Enviroportal	33	33	42	19
Nonrevenue water *[m3/km/day]*	2012	(MINZP, 2013)	9.3	14	35	5
	2016	Enviroportal	8	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	2013	(IBNet, 2015)	7.65	8.7	9.6	2.0
	—	—	—	6.1	5.0	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
	2017	URSO	99	96	89	111
Metering level *[metered connections/connections] [%]*	2012	(MINZP, 2013)	100	96	84	100
	2016	ENviroportal	100	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	84	80	69	94
	2018		81	83	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	100	101	62	n.a.
	2017		59	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.51	0.55	0.45	n.a.
	2017		0.31	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	59	65	67	n.a.
	2017		75	51	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	6	10	13	n.a.
	2017		8	8	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	36	25	20	n.a.
	2017		17	41	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	42	42	38	n.a.
	2017		26	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	42	42	23	n.a.
	2017		15	56	38	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] [€/m3]*	2012	(MINZP, 2013)	2.29	2.18	1.32	n.a.
	2016	Enviroportal	2.00	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	URSO	1.01	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	0.7	0.9	0.9	n.a.
	2017		0.8	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1.2	1.8	1.8	n.a.
	2017		1.4	2.3	2.3	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	2015	Authors' elab.	82	77	67	94
	2018		79	77	68	92

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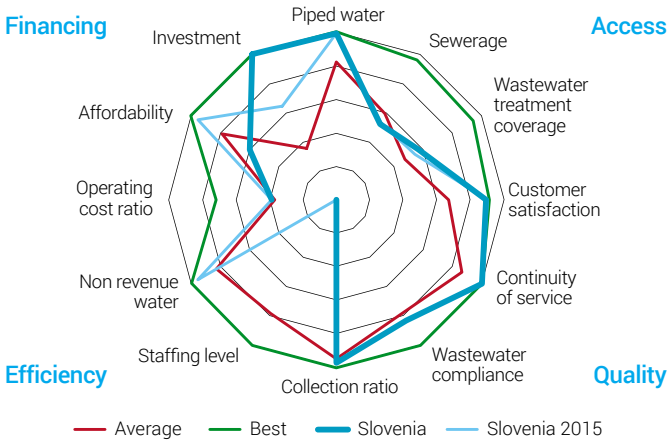

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Context for Services						
Socioeconomic Situation						
Population *[M. inhabitants]*	2013	(World Bank, 2015)	2.060	8.481	8.451	n.a.
	2017	(World Bank, 2017)	2.067	8.435	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	11	-4	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	50	63	63	n.a.
	2017	(World Bank, 2017)	50	63	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	28,298	24,535	16,902	n.a.
	2017	(World Bank, 2017)	31,401	28,424	18,830	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.
	2017	Association of Municipalities and Towns in Slovenia 2015	212	2,326	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	9,719	3,632	4,253	n.a.
	2017	Authors' elab.	9,749	3,626	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	15,623	10,142	7,070	n.a.
	2014	(FAO AquaStat, 2014)	15,411	10,533	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	18	38	26	n.a.
	2013	(World Bank, 2018)	14	31	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	3	16	31	n.a.
	2018	Water Statistics	1	26	28	n.a.
Organization of Services						
Number of formal water service providers	2014	Expert estimate	98	1,060	661	n.a.
	2017	MESP, IJSVO, 2018	102	1,136	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	18,502	6,643	9,496	n.a.
	2017	Authors' elab.	20,060	6,385	8,490	n.a.
Dominant service provider type	Local / municipal utility companies					
Service scope	Water and sanitation					
Ownership	Municipality					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
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	Yes					
Access to Services						
Water Supply						
Piped supply – average *[%]*	2012	WHO/JMP	99	88	83	100
	2015	WHO/JMP	99	93	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
	2015	Authors' elab.	90	89	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	98	93	88	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	WHO/JMP	53	62	58	94
	2015	WHO/JMP	52	65	60	96
People using safely managed sanitation services *[%]*	2015	WHO/JMP	76	72	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2012	(European Environment Agency 2019)	55	62	45	95
	2015	(European Environment Agency 2019)	58	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2014	(SURS, 2014)	114	113	122	n.a.
	2016	SURS, 2018	149	114	118	n.a.
Water supply continuity *[hours/day]*	24	Expert estimate	24	24	20	24
		MESP, 2018	24	24	23	24
Drinking water quality *[% of samples in full compliance]*	2013	(ARSO, 2015)	92	96	93	99.9
	2017	NIJZ, 2018	100	99	98	100
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
	2018	(Gallup, 2018)	96	75	67	96
Efficiency						
Nonrevenue water *[%]*	2011	(SURS, 2012)	31	34	35	16
	2017	Water Stat.	31	33	42	19
Nonrevenue water *[m3/km/day]*	2011	(SURS, 2012)	6.7	14	35	5
	2017	Water Stat.	4.5	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	–	–	–	8.7	9.6	2.0
	–	–	–	6.1	5.0	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
	–	–	–	96	89	111
Metering level *[metered connections/connections] [%]*	2013	Expert estimate	95	96	84	100
	2017	Expert estimate	95	99	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	80	80	69	94
	2018		–	83	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	113	101	62	n.a.
	2017		210	121	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.55	0.55	0.45	n.a.
	2017		0.53	0.52	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	55	65	67	n.a.
	2017		55	51	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	7	10	13	n.a.
	2017		0	8	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	38	25	20	n.a.
	2017		45	41	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	45	42	38	n.a.
	2017		45	54	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	51	42	23	n.a.
	2017		94	56	38	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] [€/m3]*	2013	Expert estimate	2.14	2.18	1.32	n.a.
	2016	MOP, 2018	3.03	2.13	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2016	MESP, 2016	1	1.08	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2012	Authors' elab.	0.6	0.9	0.9	n.a.
	2017		1.5	1.2	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2012	Authors' elab.	1	1.8	1.8	n.a.
	2017		2.5	2.3	2.3	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	2015	Authors' elab.	79	77	67	94
	2018		79	77	68	92

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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)	45.490	24.524	8.451	n.a.
	2017	(World Bank, 2017)	44.831	24.190	8.362	n.a.
Population evolution *[1990 – 2017] [%]*	1990-2017	Authors' elab.	-10	-10	-6	n.a.
Share of urban population *[%]*	2013	(World Bank, 2015)	69	67	63	n.a.
	2017	(World Bank, 2017)	70	68	64	n.a.
GDP per capita, PPP *[current international $]*	2013	(World Bank, 2015)	8,788	8,489	16,902	n.a.
	2017	(World Bank, 2017)	7,894	7,696	18,830	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.
	2017	(Verhovna Rada UA, 2018)	10,224	5,603	1,895	n.a.
Av. size of local government units *[inhabitants]*	2013	Authors' elab.	3,913	3,891	4,253	n.a.
	2017	Authors' elab.	9,749	4,318	4,412	n.a.
Water Resources						
Total renewable water availability *[m3/cap/year]*	2008-2012	(FAO Aquastat, 2015)	3,066	9,156	7,070	n.a.
	2014	(FAO AquaStat, 2014)	3,911	3,463	9,488	n.a.
Annual freshwater withdrawals, domestic *[% of total withdrawal]*	2013	(World Bank, 2015)	24	20	26	n.a.
	2010	(World Bank, 2018)	22	18	32	n.a.
Share of surface water as drinking water source *[%]*	2014	(ICPDR, 2015)	35	27	31	n.a.
	2016	Ministry Reg. Dvpt	13	23	28	n.a.
Organization of Services						
Number of formal water service providers	2013	(NKREKP, 2013)	1,595	824	661	n.a.
	2017	MinRegion 2018	2,360	1,206	748	n.a.
Average population served *[inhabitants]*	2013	Authors' elab.	18,538	18,882	9,496	n.a.
	2017	Authors' elab.	11,569	12,246	8,490	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					

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Water services law?	Yes					
Single line ministry?	Yes [Ministry of Regional Development, Construction and Housing and Communal Services]					
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	WHO/JMP	69	68	81	100
	2015	WHO/JMP	66	66	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
	2015	Authors' elab.	61	62	83	99
People using safely managed drinking water services *[%]*	2015	WHO/JMP	92	81	88	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	WHO/JMP	53	51	58	94
	2015	WHO/JMP	53	51	60	96
People using safely managed sanitation services *[%]*	–	–	–	–	63	97
Wastewater Treatment						
Connected to wastewater treatment plant *[%]*	2000	(COWI A/S, 2015)	37	36	45	95
	–	–	–	–	–	95
Performance of Services						
Service Quality						
Residential water consumption *[liters/capita/day]*	2013	(NKREKP, 2013)	115	116	122	n.a.
	2017	MinRegion, 2017	86	92	118	n.a.
Water supply continuity *[hours/day]*	2012	(MinRegion, 2013b)	17	17	20	24
	–	–	–	23	23	24
Drinking water quality *[% of samples in full compliance]*	2010	(MinEnv, 2010)	87	86	93	99.9
	–	–	–	99.9	98	100
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
	2018	(Gallup, 2018)	34	43	67	96
Efficiency						
Nonrevenue water *[%]*	2013	(Ukrstat, 2013)	30	31	35	16
	2017	MinRegion, 2017	44	43	42	19
Nonrevenue water *[m3/km/day]*	2013	(Ukrstat, 2013)	14	59	35	5
	2017	MinRegion, 2017	15	20	28	3

Indicator	Year	Source	Value	EU cand. average	Danube average	Danube best
Staff productivity *[water and wastewater] [number of employees/1,000 connections]*	–	–	–	13.3	9.6	2.0
	–	–	–	3.2	5.0	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
	2017	MinRegion, 2017	97	98	89	111
Metering level *[metered connections/connections] [%]*	2013	(Ukrstat, 2013)	70	70	84	100
	2017	MinRegion, 2017	42	67	90	100
Water Utility Performance Index *[WUPI]*	2015	Authors' elab.	59	59	69	94
	2018		73	69	72	94
Financing of Services						
Sources of Financing						
Overall sector financing *[€/capita/year]*	2014	Authors' elab.	22	21	62	n.a.
	2017		12	15	81	n.a.
Overall sector financing *[share of GDP] [%]*	2014	Authors' elab.	0.33	0.35	0.45	n.a.
	2017		0.53	0.53	0.52	n.a.
Percentage of service cost financed from tariffs	2014	Authors' elab.	63	65	67	n.a.
	2017		78	75	52	n.a.
Percentage of service cost financed from taxes	2014	Authors' elab.	32	30	13	n.a.
	2017		21	22	9	n.a.
Percentage of service cost financed from transfers	2014	Authors' elab.	5	5	20	n.a.
	2017		1	4	39	n.a.
Service Expenditure						
Average annual investment *[share of overall sector financing] [%]*	2014	Authors' elab.	14	14	38	n.a.
	2017		8	14	51	n.a.
Average annual investment *[€/capita/year]*	2014	Authors' elab.	3	3	23	n.a.
	2017		1	6	38	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] [€/m3]*	2013	(MinRegion, 2013a)	0.48	0.51	1.32	n.a.
	2017	MinRegion, 2017	0.52	0.57	1.36	n.a.
Operation and maintenance unit cost *[€/m3]*	2014	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
	2017	MinRegion, 2017	0.85	0.97	1.06	1.43
Affordability						
Share of potential WSS expenditures over average income *[%]*	2010	Authors' elab.	0.4	0.7	0.9	n.a.
	2017		0.4	0.6	1.2	n.a.
Share of potential WSS expenditures over bottom 40% income *[%]*	2010	Authors' elab.	0.7	1.3	1.8	n.a.
	2017		0.7	1	2.3	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	2015	Authors' elab.	59	58	67	94
	2018		59	60	68	92

METHODOLOGICAL NOTES

A. Access data

114. Due to the difficulty in accessing national household survey statistics, this updated report uses access statistics as reported by the World Health Organization/UNICEF Joint Monitoring Program (JMP) country reports for 2017. This means that access data reported in the 2015 SoS is not fully comparable with the ones reported in this report. For this reason, trends in access levels through the years are analyzed only using JMP statistics. The WHO/UNICEF JMP global database includes estimates of progress in household drinking water, sanitation and hygiene since 2000. JMP estimates are calculated from data produced by national authorities.

115. For a full description of the methods used to estimate access levels, please visit https://washdata.org/monitoring/methods.

On the definition for safely managed water services:

116. Improved drinking water sources are those which, by nature of their design and construction, have the potential to deliver safe water. The JMP subdivides the population using improved sources into three groups according to the level of service provided. In order to meet the criteria for a safely managed drinking water service, people must use an improved source meeting three criteria:

- it should be accessible on premises,
- water should be available when needed, and
- the water supplied should be free from contamination.

117. If the improved source does not meet any one of these criteria but a round trip to collect water takes 30 minutes or less, then it will be classified as a basic drinking water service. If water collection from an improved source exceeds 30 minutes it will be categorized as a limited service. The JMP also differentiates populations using unimproved sources such as unprotected wells or springs, and populations drinking surface water collected directly from a river, dam, lake, stream or irrigation canal.

On the definition for safely managed sanitation services:

118. Improved sanitation facilities are those designed to hygienically separate excreta from human contact. There are three main ways to meet the criteria for having a safely managed sanitation service (SDG 6.2). People should use improved sanitation facilities which are not shared with other households, and the excreta produced should either be:

- treated and disposed in situ,
- stored temporarily and then emptied and transported to treatment off-site, or
- transported through a sewer with wastewater and then treated off-site.

119. If the excreta from improved sanitation facilities are not safely managed then people using those facilities will be classed as having a basic sanitation service (SDG 1.4). People using improved facilities which are shared with other households will be classified as having a limited service. The JMP will also continue to monitor the population practicing open defecation which is an explicit focus of SDG target 6.2.

B. Water Utility Performance Index

120. 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).

121. **WUPI construction.** The WUPI is constructed in a simple and robust manner. A set of 10 indicators, selected among the IBNET[49] indicators, is used to calculate the WUPI (Table 19). 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 18); 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 18: 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%

122. **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 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.

123. **WUPI robustness and validation.** Due to its construction, the WUPI is a best practice indicator. For given cost/

49 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.

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, Utility performance in the Danube Region: a review of trends and drivers 2015).

TABLE 19: 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)[50]	%
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	%

124. **Representativeness of IBnet data.** As shown in the following Table 21, coverage of IBnet varies strongly across countries. Moreover, in some countries the information from IBnet is already quite dated. This suggests that conclusions, particularly on the country level, need to be seen against the backdrop of the respective country. Particularly in cross-country comparisons, we tend to keep also older utility information as otherwise several countries with higher performance (WUPI) would have to be discarded. This would affect also the picture and conclusions. In comparisons over time, countries/utilities for which no new data is available are not part of the analysis.

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

TABLE 20: REPRESENTATIVENESS OF IBNET DATA, WUPI SCORE AND GDP, BY COUNTRY 2017

Country	Last available year	Number of utilities	Share of population
Czech Republic	2013	16	58%
Hungary	2007	20	48%
Croatia	2015	[1]	1%
Slovak Republic	2013	9	64%
Romania	2010	18	24%
Bulgaria	2016	30	95%
Ukraine	2015	13	6%
Serbia	2017	108	75%
Kosovo	2016	7	85%
Bosnia and Herzegovina	2017	22	21%
North Macedonia	2016	23	51%
Moldova	2017	37	36%
Montenegro	2016	2	7%
Albania	2015	55	94%

SOURCE: WORLD BANK ELABORATION OF IBNET.

NOTE: NUMBER OF UTILITIES AND SHARE OF POPULATION REFERS TO LAST AVAILABLE YEAR IN IBNET.

C. Sector financing

125. 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 latest available data, depending on the available information per year. 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.

126. **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.

127. **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).

128. **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.

129. **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.

D. Affordability calculation

130. **Affordability analysis, using average water consumption and average tariff, as collected through SoS data collection. In order to assess the potential affordability constraints for average household incomes, the following sets of data were used.** The online World Bank Dataset provided data regarding the mean consumption or income per capita for total population and for bottom 40% of population (2011 PPP $ per day). Data from EUSILD (2017) and from the World Bank Dataset (2014; 2017) were used to assess the number of persons per household. The average consumption expressed in liter per capita per day, as collected by the Danube Water Program State of the Sector, was then used to assess the average yearly water consumption of a household in each country. This value was then multiplied by the average water and wastewater tariff, as collected by the Danube Water Program State of the Sector, and compared to the household yearly mean consumption or income for both total population and bottom 40%. For comparison and consistency purposes, this methodology was applied backwards to DWP SoS 2015 data. 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

131. 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. The WASCO ratings reported in the 2015 SoS are not fully comparable with the ones reported in this report because of different data sources, different methodology used to estimate affordability and back calculations with more reliable data obtained for previous years.

132. **Services sustainability assessment construction.** The services sustainability assessment was constructed from four dimensions (access, quality, efficiency, and financing), each measured through three indicators (Table 22). 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 21); 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.

TABLE 21: 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€

133. **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.

134. **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 22: 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	%

N°	Indicator	Definition	Unit
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 2018 UPDATE

WORLD BANK GROUP

IAWD International Association of Water Service 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.

IAWD DANUBE WATER PROGRAM

Smart policies, strong utilities, sustainable services

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