PROPOSALS FOR IMPROVING THE ECONOMIC AND FINANCIAL STRENGTH OF THE WATER SECTOR IN UKRAINE THROUGH TARIFF REFORM

Funded by the European Union

EU4Environment
Water and Data in Eastern Partner Countries

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ABOUT THIS REPORT

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ABOUT EU4ENVIRONMENT – WATER RESOURCES AND ENVIRONMENTAL DATA

This Programme aims at improving people's wellbeing in EU's Eastern Partner Countries and enabling their green transformation in line with the European Green Deal and the Sustainable Development Goals (SDGs). The programme's activities are clustered around two specific objectives: 1) support a more sustainable use of water resources and 2) improve the use of sound environmental data and their availability for policy-makers and citizens. It ensures continuity of the Shared Environmental Information System Phase II and the EU Water Initiative Plus for Eastern Partnership programmes.

The programme is implemented by five Partner organisations: Environment Agency Austria (UBA), Austrian Development Agency (ADA), International Office for Water (OiEau) (France), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE). The programme is principally funded by the European Union and co-funded by the Austrian Development Cooperation and the French Artois-Picardie Water Agency based on a budget of EUR 12,75 million (EUR 12 million EU contribution). The implementation period is 2021-2024.

https://eu4waterdata.eu

Abstract

This paper provides an overview of the current functionality of Ukraine's water tariff and provides suggestions for potentially reforming how it is calculated, while contextualising it within wider discussions of Ukraine's water security challenges. The first section discusses the use of economic instruments in Ukraine's water sector, the current state of the water sector, and how existing challenges have been worsened by Russia's war of aggression. The second section looks specifically at the water tariff and concludes that the current approach to setting it is not fit for purpose. The third section provides three models for potentially reforming how the water tariff is calculated to increase its ability to fund needed investment in the water sector. The final section makes recommendations while noting that tariff reform is one piece of broader reforms needed in Ukraine's water sector.

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List of abbreviations

ADA	Austrian Development Agency
BQE	Biological Quality Elements
DoA	Description of Action
DG NEAR	Directorate-General for Neighbourhood and Enlargement Negotiations of the European Commission
EaP	Eastern Partners
EC	European Commission
EECCA	Eastern Europe, the Caucasus and Central Asia
EMBLAS	Environmental Monitoring in the Black Sea
EPIRB	Environmental Protection of International River Basins
ESCS	Ecological Status Classification Systems
EU	European Union
EUWI+	European Union Water Initiative Plus
GEF	Global Environmental Fund
ICPDR	International Commission for the Protection of the Danube River
INBO	International Network of Basin Organisations
IOW/OIEau	International Office for Water, France
IWRM	Integrated Water Resources Management
NESB	National Executive Steering Board
NFP	National Focal Point
NGOs	Non-Governmental Organisations
NPD	National Policy Dialogue
OECD	Organisation for Economic Cooperation and Development
RBD	River Basin District
RBMP	River Basin Management Plan
Reps	Representatives (the local project staff in each country)
ROM	Result Oriented Monitoring
ToR	Terms of References
UBA	Umweltbundesamt GmbH, Environment Agency Austria
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
WFD	Water Framework Directive

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Executive Summary

There is an urgent need in Ukraine to reform how water supply and sanitation is financed. With Ukraine's water sector already beset by strained and aging infrastructure, Russia's war of aggression has dramatically exacerbated the challenges faced. The need to develop a more sustainable financing model for rebuilding and operating the sector is more urgent than ever. This report looks at options for reforming Ukraine's water tariffs. It explores how the tariffs are calculated and governed within the broader context of direct and indirect subsidies related to water, and makes recommendations for how tariffs could be reformed to support long-term sustainable rehabilitation of Ukraine's water supply and sanitation infrastructure.

Ukraine's urgent water finance challenges have been worsened by Russia's war of aggression

Since the onset of Russia's war against Ukraine in February 2022, significant infrastructure, including 125 centralised sewage system facilities and over 110 kilometres of sewerage networks has been destroyed (Cabinet of Ministers, Government of Ukraine, 2025). This damage has had social and environmental impacts, restricting access to essential water supply and sanitation services and causing widespread pollution and public health challenges. Forced migration and displacement of the population has exacerbated the challenges of utility operators, leaving infrastructure underutilised in some regions and stressed in others. In the face of these challenges, Ukraine is experiencing an increase in financing demands to restore or replace damaged infrastructure and to support increased operational costs as a direct result of the war of aggression.

Financing water security in a sustainable manner is a challenge for all countries. Global capital expenditures for the maintenance and development of water supply and sanitation infrastructure in OECD countries are estimated to be between 0.2-1% of their GDP (OECD, 2020), while in Ukraine, expenditure prior to the war of aggression was estimated at only 0.2% (World Bank Group, 2021). In Ukraine, the need to maintain and modernise the existing water supply and sanitation infrastructure is made more challenging by institutional inefficiencies and the long-term deterioration of the asset base. The need to upgrade infrastructure in line with EU-standards and practice as part of Ukraine's EU-accession process adds expectation and costs (OECD, 2021). These costs require careful planning and linkage to sustainable financing and infrastructure development plans to strengthen the water sector in the long-term.

Well designed and implemented economic instruments can help to manage water demand and boost economic activity in line with environmental and water policy objectives. A key function of tariffs is to send price signals to consumers on the value of water, to change behaviours and contribute to the efficient management and use of water resources. Economic instruments are also tools for raising revenues to finance water management or water-related services. This presents an opportunity for Ukraine as it looks towards alignment with the EU Green Deal and adherence to water related EU-directives.

Tariff reform in the context of institutional reform and alignment with the EU's water acquis

The OECD has been working with Ukraine through its GREEN Action Task Force for over 25 years. This GREEN Growth Paper aims to contribute to Ukraine's discussion around reforming water and sanitation tariffs. Noting that strengthening the economic and financial dimensions of water management requires a broader perspective than increasing tariffs, the paper considers the wider context of ensuring that Ukraine is equipped to finance its water security as it recovers from the war of aggression, progresses its EU aspirations and ensures the long-term sustainability of Ukraine's water sector.

While this discussion has been radically refocussed in Ukraine by the ongoing war of aggression, it is highly relevant to Ukraine's ambitions to become a European Union Member State. Alignment with the EU's water acquis will require significant investment and financing of both capital and operational costs. For example, alignment with the EU Water

Framework Directive will require Ukraine to achieve good qualitative and quantitative status i.e. through reducing and removing pollution and on ensuring that there is enough water to support ecosystem and human needs. This will require significant investment in infrastructure, monitoring and human capacity.

The background analysis for this paper was conducted as part of the EU-funded EU4Environment Water Resources and Environmental Data Programme between 2022-2024. In partnership with local experts, the work was consulted at a National Policy Dialogue on Integrated Water Resources Management on 19 June 2024 and as part of dedicated Workshop on Financing Water Security on 20 June 2024. The analysis formed part of three studies implemented by the OECD as part of this Programme which considered challenges of financing Ukraine's water sector. The supporting studies reviewed the enabling environment for financing water security in the EU's Eastern Partner countries including Ukraine and a study on revitalisation of water ecosystems in Ukraine and the role of economic instruments. These studies are available on the EU4Environment Water Resources and Environmental Data website.

The discussion on tariff reform is a long-standing issue in Ukraine and the country is not alone in assessing the delicate balance between the political, social and environmental objectives of water and wastewater tariffs. The OECD supports its member countries on a continual basis on these issues, and in recent years has supported all Eastern Partner countries with analysis and capacity building to progress reform in this area.

The current approach to tariff setting does not generate sufficient revenue nor incentivise efficient water use

In Ukraine, tariffs for large utilities and municipalities are set annually by the National Energy and Utilities Regulatory Commission (NEURC), calculated through a "cost plus" methodology. This involves summing the operational costs required to provide water and sanitation services and adding a margin ("plus") to provide a regulated return for the utility. However, utilities typically struggle to cover even their minimal operational costs under the current approach. Since the tariffs are calculated based on pricing data from the previous year, they lag behind price increases – electricity costs in particular fluctuate significantly – further reducing cost recovery for utilities.

The tariff calculation is complex and is difficult to communicate beyond the water community. This is a common challenge with water tariffs in other jurisdictions as well (OECD, 2023). Low public awareness makes tariffs difficult for consumers to understand and judge what price is "fair" or acceptable. Reviewing tariffs on an annual basis makes it challenging for utilities to make long term investment plans, limiting investment and innovation in the sector. The goal of tariff reform for the water sector would be to ensure that tariffs are better linked to real prices, have long-term stability and can therefore support long term investment and planning for utilities while supporting policy priorities.

Since Ukraine's independence in 1991, the increase in tariffs for water services has not correlated with average incomes. Instead, the cost of inputs and consumables such as labour, energy, and fuel, drive how the tariff is set, and thus any changes in policy related to inputs including energy and wages affects the cost of centralised water supply and sanitation services and the efficiency of enterprises.

Reforming tariffs to support access to finance for utilities to invest back into the water system

The process of EU approximation creates an opportunity for Ukraine to reform its approach to water finance to ensure long-term water security. However, permanent tariff increases will not solve the problems of water supply and sanitation alone. Instead, what is needed is a balanced combination of tariffs, taxes and transfers (Referred to by the OECD as "The 3Ts" (OECD, 2009)) based on the strategy for the development of water supply and sanitation, that includes updates to direct and indirect subsidies to ensure alignment with overall goals for the water sector. Water supply and sanitation regulation need to be embedded in an adequate and coherent institutional framework to have a positive impact on service productivity that supports necessary long-term investment in infrastructure maintenance and expansion. Effective implementation of any model of tariff regulation requires an appropriate regulatory environment, transparency, stability and consistency of public policy. The OECD's Council Recommendation on Water provides a framework to support countries in tackling these sensitive matters. The OECD is actively working with Ukraine under the OECD-Ukraine country programme to look at alignment between Ukraine's legal and regulatory framework and the OECD Recommendation.

Under Ukraine's current water tariff approach, utilities are expected to make investments based on their regulated rate of return (the "plus"). However, as indicated, tariffs do not cover operational costs, let alone supporting further

investment needs. This paper proposes including an explicit “investment” component into the tariff, in addition to the regulated rate of return. The report proposes three models for structuring the investment component:

1. calculating the investment component as an increased version of the current rate of return component;
2. structuring the investment component to include accessing finance from domestic banks; and
3. structuring the investment component to include finance from international financial institutions.

Analysis of these three options concluded that maintaining the existing approach of a regulated rate of return will never raise sufficient finance to bridge the investment gap, even if tariffs were increased significantly. For the second option, domestic financial institutions offer limited access to finance, high interest rates, and have been severely impacted by the war. It is recommended that the third options, working with IFIs, provides both lower interest rates and longer repayment terms, and that it makes sense to take advantage of the finance available through these channels to improve Ukraine’s infrastructure and long-term water security.

Water tariff reform as part of a broader approach to sustainable water finance and EU alignment

This Green Growth Paper presents options for reform of water and sanitation tariffs in Ukraine and is presented for further discussion with stakeholders. The analysis conducted, the workshops hosted and the options presented recognise the political, social, economic and environmental challenges faced by Ukraine at this moment in time. The options presented also recognise that tariff reform is not an easy path requiring political will, vision and resilience, supported by a clear strategy, communication and human and technical capacity to implement the proposed reform.

A balanced tariff policy is part of a coordinated and consistent process of creating a regulatory environment, transparency, and stability, to enable financing water security. This will be a complex task, requiring not just regulatory reforms but also strengthened capacity of institutions. The OECD has committed to working with Ukraine on a roadmap for tariff reform through future EU-funded actions, as well as an action plan to improve the overall enabling environment for water finance. Long term stability, better linked to real prices, allow financial planning and investment. Ukraine’s EU aspirations present a unique opportunity and momentum to further these reforms in an inclusive, evidence based and phased manner and the OECD is on hand to support Ukraine on this journey towards a financially sound and economically robust water sector.

1. The challenges of water-related economic instruments in Ukraine

1.1. Introduction

Water tariffs are complex instruments that aim to accomplish multiple goals, some of which work against each other. At their base, water tariffs are a tool for utilities to cover the cost of water provision, including capital expenditures to renew and maintain infrastructure. However, they are also intended to support utilities with future expenditures, to incentivise more efficient water use, and to prioritise environmental policy objectives, while remaining affordable for users. Balancing these goals makes setting effective water tariffs challenging, and underlines why they should be seen as one tool amongst many in Ukraine's overall approach to financing water security (OECD, 2023).

Although the principle of tariffs is typically to cover the full cost of water, that rarely occurs, even in the European Union (EU). On average in the EU, revenues raised through tariffs cover approximately 70% of the cost of water – with the additional 30% covered through public financing (OECD, 2020). Because of the challenge of full cost recovery through tariffs alone, and the need to cover environmental and potential opportunity costs in the water sector as well, a more effective approach involves a broader conception of cost recovery that includes tariffs, taxes, transfers, abstraction and pollution charges, as well as charges for specific significant activities (such as hydropower and aquaculture) (OECD, 2020). Thus, although Ukraine's water tariffs are the focus of this paper, a broader selection of direct and indirect subsidies are also examined here.

Since the onset of Russia's war of aggression in February 2022, approximately 125 of Ukraine's centralised sewage system facilities and 110 kilometres of sewage networks have been destroyed (Cabinet of Ministers, Government of Ukraine, 2025). At the same time, tariff reform in the water sector continues to be an active discussion among utilities, the government, international financial institutions, regulators and civil society, compounded by this extreme damage and increase in financing needs and operational costs brought about by the war of aggression. This report aims to contribute to the ongoing debate on reforming Ukraine's water tariffs, in the wider context of ensuring that Ukraine is equipped to finance its water security as it recovers from the war, progresses its EU aspirations and ensures the long-term sustainability of its water sector beyond the current crisis.

Financing water security in a sustainable manner is complicated. Global capital expenditures for the maintenance and development of water supply and sanitation infrastructure in OECD countries are estimated to be between 0.2-1% of their GDP (OECD, 2020). In Ukraine, expenditure prior to the war was estimated at 0.2% of GDP (World Bank Group, 2021). The need to maintain and modernise the existing water supply and sanitation infrastructure is made more challenging by institutional inefficiencies and the long-term deterioration of the asset base (Box 1.1). The need to upgrade infrastructure in line with EU standards and practice as part of Ukraine's EU accession process also adds expectations and costs (OECD, 2021). Maintaining water supply and sanitation infrastructure requires constant capital investments, and its improvement requires a significant increase in these investments.

Regulators in Ukraine set tariffs on an annual basis through a complex procedure that incorporates many factors; its complexity makes it challenging to communicate to the broader public. This is a common challenge with water tariffs in other jurisdictions as well (OECD, 2023). However, this makes it difficult for consumers to understand tariffs and judge what price is "fair" or acceptable; it also makes it challenging for utilities to make long-term investment plans. There is an inherent lack of price signals for tariffs to support policy priorities, and there is a lack of enforced penalties for those who do not pay for water.

Box 1.1. Prior to the war, Ukraine already faced significant challenges in its water sector

In 2021, before Russia's large-scale invasion of Ukraine, the World Bank published an assessment of Ukraine's water sector which raised the following key challenges:

1. Approximately 20 million people lacked access to centralised wastewater collection and treatment services. Rural areas were particularly challenged, with less than one-third of rural residences having access to piped water supply.
2. Infrastructure for water supply and wastewater collection was in poor condition, with the Soviet-era water treatment facilities and networks in serious need of rehabilitation or upgrade in order to have the capacity for current use levels. Wastewater treatment facilities were constructed in the 1970s and 1980s, and are not capable of modern testing standards.
3. Ukraine's water and sanitation (WSS) governance framework is highly fragmented, with administrative and legislative shortcomings that limit co-ordination between national and local administration efforts, and reduce efficiency.
4. Utility ownership is heavily fragmented, involving many small local government-owned operators which have trouble providing a service, attracting funding, dealing with regulatory efficiencies, and conducting long-term planning.
5. The regulatory approach for setting tariffs is not independent and does not result in performance or service improvements. There is no coherence between governance and regulatory approaches, and tariff levels remain significantly below cost-recovery, contributing to a downward spiral of service and infrastructure.
6. Investment needs are substantial and significantly exceed available resources, while WSS sector financing continues to fall. Since tariffs are low, transfers and taxes need to cover the shortfall – but transfers to utilities are low, and thus there is a perpetual state of underfunding.
7. Water resources vary widely geographically as well as seasonally in Ukraine, and climate change will further exacerbate the situation. Climate-related risks such as droughts and floods are already causing substantial losses to the economy, and look likely to increase.
8. Water quality is low, due to both point pollution (factories, mining, landfill, agricultural, untreated and inadequately treated sewage), as well as pollution of groundwater from industry and mining.

Source: adapted from World Bank Group (Ukraine Water Supply and Sanitation Policy Note: Toward Improved, Inclusive, and Sustainable Water Supply and Sanitation Services, 2021), *Ukraine Water Supply and Sanitation Policy Note: Toward Improved, Inclusive, and Sustainable Water Supply and Sanitation Services*, http://documents.worldbank.org/curated/en/844681624034932176.

Since Ukraine's independence in 1991, the increase in tariffs for water services has not correlated with citizens' average income. Instead, the cost of inputs and consumables such as labour, energy, fuels, lubricants and reagents drive how the tariff is set, and thus any changes in policy related to energy, the chemical industry (production of reagents), fuels and lubricants, and wages affect the cost of centralised water supply and sanitation services and the efficiency of enterprises (see Chapter 2). Thus, the lack of co-ordination on government economic policy and the influence of energy and other business structures impact the decision-making process of the National Energy and Utilities Regulatory Commission (NEURC), which is responsible for setting tariffs for large utilities.

All these factors lead to potential distortions in Ukraine's tariff-setting process. The goal of tariff reform for the water sector should be to ensure that tariffs are better linked to real prices, have long-term stability and can therefore support long-term investment and planning for utilities.

Water supply and sanitation in Ukraine faces major issues (Box 1.1). NEURC acknowledges a range of problems, including significant water losses, insufficient revenue from tariffs, no clear path for optimising existing infrastructure or making operations more efficient, weak compliance enforcement, no monitoring or evaluation of improvements,

and low levels of water metering for industrial and household users. These problems are exacerbated by insufficient finance, and in recent years, the impacts of Russia's war of aggression. The following section looks into some of these challenges in greater detail against the backdrop of a focus on improving water tariffs.

Economic instruments in Ukraine's water sector

Economic instruments can help manage water demand and boost economic activity in a way that aligns with environmental and water policy objectives. A key function is to encourage economic agents to change their behaviour so that they contribute to the efficient management and use of water resources, as well as to the protection of water resources, the environment and public health. Economic instruments are also tools for obtaining revenues that can be used to finance water management or water-related services. Although this paper focuses on challenges in tariff reform in Ukraine and related direct and indirect subsidies, it is critical to put tariffs in the broader context of economic instruments in the water sector. These instruments can be divided into four main groups:

4. **Tariffs for water supply and sanitation services, and irrigation water.** Tariffs for water consumption are set by the NEURC for large municipalities, and by smaller municipalities directly, and are paid by water users at the same rate.
5. **Fiscal instruments (taxes and mandatory payments)** for the use of surface and groundwater are set for specific economic uses and vary by region within Ukraine. These include:
    - a tax rate applied to water use in power generation
    - a rental rate applied to water that is used for transport on rivers (with different rates applied for freight and passenger transportation)
    - a rental rate for the use of ground and surface water in mining and quarrying
    - a rental rate for the use of ground and surface water in aquaculture
    - a rental rate for the use of water in canals.
6. **Direct subsidies**: state support for the water sector through direct budget expenditures, including:
    - direct state support in the form of budget allocations to finance capital investments for the modernisation and development of hydraulic structures and systems of water supply and sanitation (irrigation, water supply and sanitation, etc.) under budget programmes and subventions
    - earmarked portions of environmental taxes transferred to regional and local budgets for financing environmental measures, including protection from agricultural runoff, reducing environmental pollution, and improving compliance with environmental standards to reduce the impact of pollution on human health
    - direct means-tested subsidies for households for water use.
7. **Indirect subsidies:** these include low tariffs that don't reflect the cost of use, the transfer of risks to the state for water-related disasters (including compensation to individuals and enterprises), and exempt activities.

Excessive regulation can negatively affect the investment attractiveness of an economy and certain sectors, causing excessive costs for administrative procedures. Examples of over-regulation are typical in many sectors of Ukraine's economy: in transport, agriculture and industry they are often related to pricing and tariffs. The instability of the regulatory environment adds risk and uncertainty and ultimately undermines Ukraine's image as a reliable partner and attractive investment destination, limiting the country's ability to raise funds for the long term and on attractive terms. An OECD study of the enabling environment for investment in water security found that there was a need to strengthen Ukraine's overall public investment framework overall, and for water in particular (Sanchez Trancon, Halpern, Smythe, & Smith, 2025). Taken as a whole, the biggest challenge for Ukraine's public investment framework is the lack of certainty it provides for investors. At a national level, a lack of standards in enterprise management and performance indicators related to financial activities creates uncertainty for investors. The study does note that regulatory frameworks are being progressively updated, in order to better align with the relevant EU directives, which will help in the longer term.

The impact of Russia's war of aggression on consumption patterns and revenue generation

Russia's war of aggression against Ukraine has affected the consumption of water supply and sanitation services through population displacement, both within the country and abroad. In areas directly impacted by Russia's war of aggression, water supply and sanitation infrastructure has been heavily damaged, and there has been a significant outflow of centralised WSS service consumers. Conversely, water utilities in the western regions of Ukraine are experiencing an increase in the number of consumers as displaced people from eastern Ukraine relocate, and an increase in the volume of water supply and sanitation, placing pressure on infrastructure. The war of aggression has also devasted water supply and sanitation infrastructure, with a cost of damage estimated at USD 4.6 billion through the end of 2024 (Himmelfarb, 2025), while attacks on energy infrastructure impact the day-to-day operation of remaining facilities such as pumping stations. However, the condition of the water supply and sanitation network in the country was poor even before the start of the war (Table 1.1).

A long-term issue, which has been exacerbated by Russia's war of aggression, is the ability of the population to pay for water services. Prior to 2022, the State Statistics Service of Ukraine monitored and published information on the solvency of households for housing and communal services, but this information ceased to be published after the introduction of martial law. Since the war began, the Ministry of Infrastructure has calculated the debt of the population for utilities, but the information is fragmented. Monitoring of prices and indebtedness of the population is carried out by individual (largest) business entities, so the information provided is a sample and does not reflect the total amount of debt in Ukraine.

In addition, in 2022 the Cabinet of Ministers of Ukraine banned the accrual and collection of fines, inflation charges, and annual interest accrued on debts caused by late and/or incomplete payments for housing and communal services by the population, all of which contributes to a lower level of payments.[1] This ban will remain in effect until the termination or abolition of martial law in Ukraine, and has been expanded to include a prohibition on the collection of debts formed since the beginning of the war for housing and communal services in areas of Ukraine where hostilities have or are currently taking place.

Table 1.1. The condition of water supply and sanitation infrastructure in Ukraine, 2018-2020

Indicator	Water supply	Sanitation
Length of networks, aggregate by licensees of the National Energy and Utilities Regulatory Commission	54 438 km	23 586 km
…of which, dilapidated and emergency networks	24 904 km	10 682 km
Share of dilapidated and emergency networks	46%	45%
Estimated cost of restoration	UAH 225 051 544 000 (EUR 4 757 126 034)	UAH 94 562 743 000 (EUR 1 998 861 588)
Depreciation amount for 1 year (according to the tariff structure)	UAH 393 088 000 (EUR 8 309 070)	UAH 400 552 000 (EUR 8 466 845)
Estimated duration of full restoration of networks due to depreciation	573 years	236 years

Note: UAH to EUR conversions done at a rate of UAH 1 to EUR 0.021
Source: (Ministry of Development of Ukraine, 2022), *National Report on the Quality of Drinking Water and the State of Drinking Water Supply in Ukraine in 2021*, https://mindev.gov.ua/storage/app/sites/1/uploaded-files/nacionalna-dopovid-pro-iakist-pitnoyi-vodi-ta-stan-pitnogo-vodopostacannia-v-ukrayini-u-2021-roci.pdf

It is estimated that 91% of networks are in need of complete replacement (service life is over 25 years) (Ministry for Development of Communities and Territories of Ukraine, 2023). The average percentage of network replacement by utility companies is 2% per year. The cost of restoring water supply and sanitation networks is so high that at the current rate of available funds, the restoration would take hundreds of years. As a simple illustration, the total length of the water supply networks of the NEURC licensees is 54 400 km, of which approximately 46% is in dilapidated condition (Ministry of Development of Ukraine, 2022). Utilities' available funds that can be used for rehabilitation purposes amounts to about UAH 393 million – the estimated cost of restoration is more than 500 times higher (Ministry of Development of Ukraine, 2022).

[1] Resolution of 5 March 2022: "Some Issues of Payment for Housing and Communal Services during Martial Law".

1.2. Reform is needed to Ukraine's water tariffs and other direct and indirect subsidies in the water sector

Reforms are needed to ensure that both direct and indirect subsidies in the water sector support the efficient use of water and policy objectives, including environmental improvements, while maintaining access for vulnerable users. Currently, the need for subsidies in Ukraine's water sector is driven by a number of factors and apply to the following main areas:

- Household water supply: to support financial accessibility to services by vulnerable groups, coupled with the need to achieve Sustainable Development Goals 6.1 and 6.2 (universal access to safe drinking water and universal access to sanitation and hygiene respectively). These services are a combination of private and public goods, with budget support needed for capital investment in modernising and developing centralised water supply and sanitation systems, especially in villages and small towns.
- Agricultural water supply: to ensure that rising irrigation water costs for farmers do not impact food security or reduce the competitiveness of domestic agricultural products in foreign markets.
- Water infrastructure broadly: water is critical for households and industrial users and utilities and public authorities cannot rely on fees alone to finance it. However, challenges exist around the identification and accurate valuation of positive and negative externalities (i.e. reduced health costs due to better water quality, or disruption of natural flood regimes by dams) and their inclusion in the costs or financial results of investors in projects.

The existence of indirect subsidies has consequences at both the micro and macro levels. It can be an indicator of the lack of deep structural reforms at the utility level; for example, budgetary support from the state and donors ensure that utilities continue to face only soft budget constraints (European Water Regulators, 2024). Subsidies are a way to support troubled sectors of the economy and inefficient enterprises, which in turn can slow down their reform, restructuring and real growth.

In addition to the economic consequences, implicit subsidies have fiscal consequences. Reducing indirect tax subsidies could increase budget revenues by expanding the tax base, and as a result help improve the government's performance in providing public goods and services and ensuring greater transparency in the budget process. Implicit subsidies in the form of tax breaks and tax arrears should be reflected in budget documents and submitted in a separate memorandum or report to provide a clearer picture of the government's financial situation. Subsidies should be transparent, and used to provide incentives for reform and achieve overarching economic, environmental and social policy objectives.

Subsidies also have environmental impacts. For example, state support for highly polluting industries makes them more profitable than they should be and reduces their need to address externalities. Related to that, there are political implications – the search for rent becomes extremely attractive when implicit subsidies are available. These subsidies exist in a number of sectors in Ukraine, including the energy sector, ferrous metallurgy and agriculture. Opportunities for reform may exist to protect the environment and encourage sectoral improvements aligned with objectives such as EU approximation.

Understanding the social consequences of indirect subsidies can be more complicated, and modifications can lead to disruption. Reducing direct or indirect subsidies can lead to business closures and thus increase unemployment and the need to retrain workers, or relocate them from one region to another (Petkova, 2023). Therefore, subsidy reform needs to be well planned and be part of a wider programme of economic reforms in which assessments allow the impacts of decisions to be clearly understood. Reforming water tariffs is a critical part of these efforts.

2. How water tariffs currently work in Ukraine and why they need reform

2.1. Introduction

Well-designed and implemented tariffs can help to manage water demand and boost economic activity in line with environmental and water policy objectives. A key function of tariffs is to send price signals to consumers on the value of water, to change behaviours and contribute to the efficient management and use of water resources. Tariffs are also tools for raising revenues to finance water management or water-related services. This chapter explores how water tariffs are currently calculated and function in Ukraine, concluding that the tariff system is failing to support well maintained water and sanitation infrastructure and that how they are calculated is at the heart of the problem.

2.2. Tariff calculation is complex and disconnected from the real costs of inputs

Water tariffs in Ukraine are set by the National Energy and Utilities Regulatory Commission (NEURC) and local governments. According to Article 6 of Ukraine's Law on State Regulation in the Field of Public Utilities, the NEURC sets tariffs for utilities for natural monopoly entities and business entities in related markets – water services being classified as a natural monopoly. NEURC sets tariffs for all large municipalities, including Kyiv and Sevastopol, despite their special status under Ukrainian law. NEURC is responsible for licensing economic activities linked to the centralised water supply (production, transportation and supply of drinking water to consumers) and sanitation system (disposal and treatment of wastewater) for utilities serving settlements with a total population that exceeds 100 000 people, and/or volumes of use which exceed 300 000 cubic metres (m^3) per year for the centralised water supply and 200 000 m^3 per year for centralised sewage treatment. This would equate to communes of 6 000 people or less, based on an average per capita annual consumption of 50 m^3.

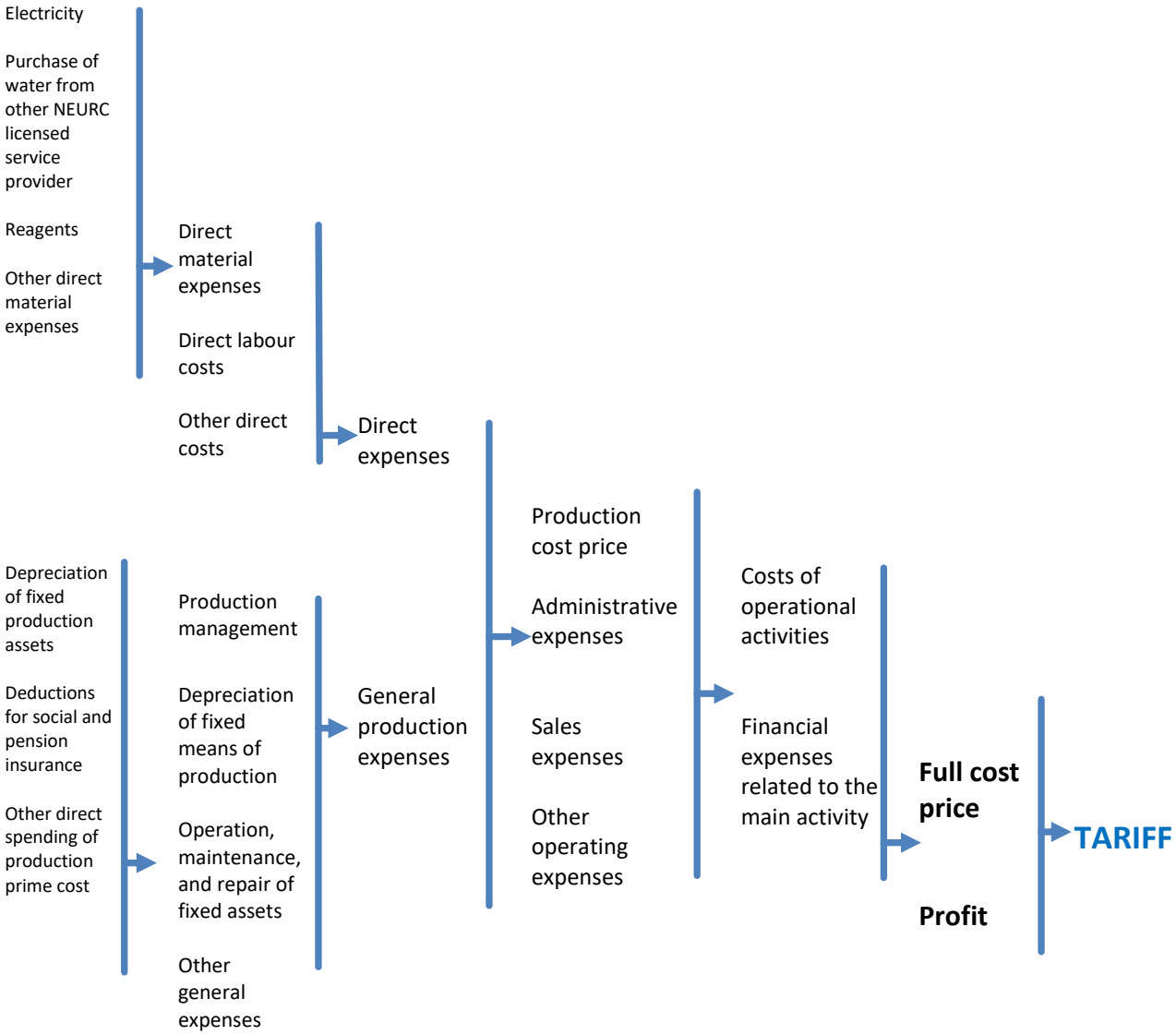
Water supply tariffs for settlements falling below these limits are governed under Article 28 of the Law on Local Self-Government in Ukraine, Article 13 of the Law on Drinking Water and Drinking Water Supply, and Article 12 of the Law on Water Disposal and Wastewater Treatment, which gives local self-government bodies a range of responsibilities for drinking water and drinking water supply. These include establishing tariffs for centralised water supply and sanitation. Thus, local governments set tariffs for the utilities that are too small to be regulated by the NEURC. In total, the NEURC sets tariffs for approximately 74% of all users, and local governments set tariffs for the remaining 26% (National Energy and Utilities Regulatory Commission, 2021).

To ensure transparency around the NEURC's decisions on setting tariffs, licensees hold open discussions on the intention to change (adjust) the current tariffs for centralised water supply and sanitation services, as required by the relevant protocols.[2] Tariffs are adjusted on an annual basis. Following approval of the NEURC's decisions, drafts are published on NEURC's official website for open consultations with the public. After receiving the minutes of open discussions on the ground of the approved decisions of the NEURC, the drafts of the relevant resolutions are considered at an open meeting of the NEURC, during which decisions on setting tariffs are made. Based on these standards, the tariff for centralised water supply and sanitation is defined as the cost of supplying 1 m^3 of water to each home, and of discharging 1 m^3 of wastewater. This is the price of the service (tariff) for water supply and sanitation, for which the consumer pays – whether they are an individual or a legal entity.

[2] Article 16 of the Law of Ukraine "On the National Energy and Utilities Regulatory Commission", Resolution of the NEURC dated 30.06.2017 No.866 "On Approval Procedure for Holding an Open Discussion of Draft Decisions of NEURC".

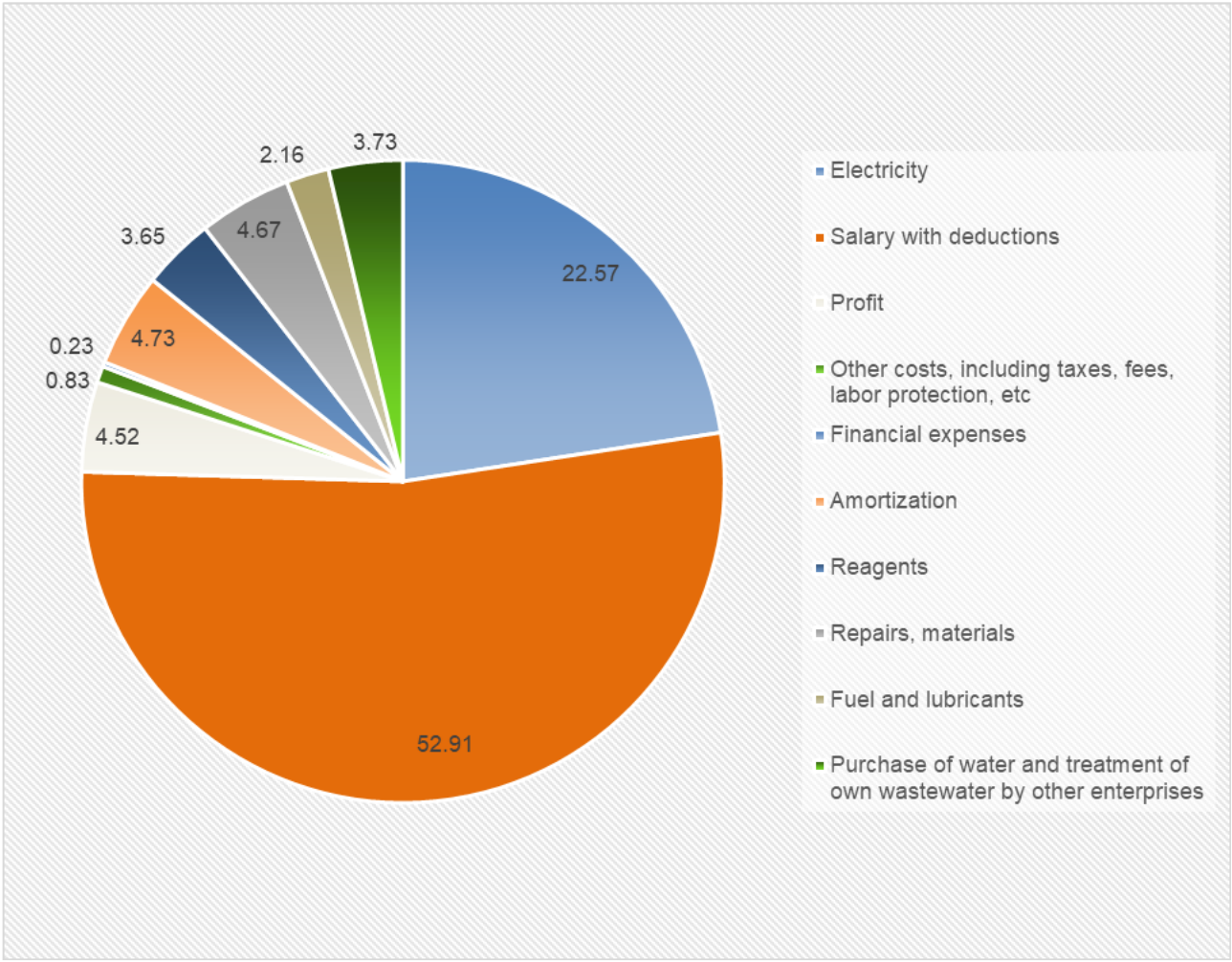
In the field of water supply and sanitation in Ukraine, the method of tariff setting – known as "cost plus" – is calculated by summing the operational costs required to provide water and sanitation services and adding a margin ("plus"), a regulated profit or return for the utility. However, many utilities struggle to cover even their minimal operational costs under the current "cost plus" regime. The main components of the tariff structure for centralised water supply and sanitation are shown in Figure 2.1:

Figure 2.1. Elements contributing to tariff setting in Ukraine



In terms of proportion in the structure of the weighted average cost of centralised water supply and sanitation services in Ukraine (below, Figure 2.2), the main items are labour costs (with social benefits including pensions) and electricity. The cost of electricity in particular poses challenges for accurately calculating the tariff – damage to infrastructure continues to push prices higher, with rapid fluctuations. Although tariff structures vary substantially across OECD and EaP member countries, for most countries electricity constitutes an important component of costs.

Figure 2.2. Structure of the weighted average tariff for centralised water consumption (water supply + water disposal), 2020



Source: National Commission for State Regulation in the Energy and Utilities Sector of Ukraine (2020), https://www.nerc.gov.ua/storage/app/sites/1/Docs/Byuleten_do_richnogo_zvitu/byuleten_do_richnogo_zvitu_nkrekp-2021.pdf

2.3. The approach undermines efficiency and long-term planning

In the method described above, tariffs are revised and adjusted through a complex and relatively non-transparent approach which does not keep pace with changes in the costs of inputs, such as electricity and wages, or consumables such as reagents. Tariffs are determined based on the actual costs of previous periods. Costs associated with the use of electricity for technological needs are determined without taking into account the norms of specific consumption of fuel and energy resources established in accordance with industry standards and legal requirements. When setting tariffs, the cost of electricity is accepted by the regulator at the level of actual electricity consumption for the previous year and the tariffs that were in effect at the time of calculation, taking into account the forecast price index of manufacturers of industrial products. There is room for error at every step of this calculation methodology.

When drawing up investment programmes, utility companies give priority to measures aimed at reducing the energy consumption of facilities, increasing the reliability of water supply and sanitation, and restoring the operational characteristics of amortised equipment and networks, based on previously prepared plans for the implementation of state and regional programmes. Reducing energy consumption is a particular focus, because of its significant component of costs and the lag between the tariff and real costs. Because regulators control tariff prices based on this inaccurate calculation and on an annual basis, utilities cannot undertake long-term planning with confidence concerning cash flow for financing investment in infrastructure. This unpredictability, combined with tariffs that do not even cover operational costs – let alone an investment component – makes planning very challenging.

Efficiencies are further discouraged by the use of the “cost plus” method in tariff calculation, according to which utilities’ profits represent a certain fixed percentage of their operating costs. This approach does not encourage enterprises to reduce inefficient costs, because the amount of profit calculated according to the cost plus method does not actually depend on the efficiency of the enterprise. In short, inefficiency is rewarded, whereas a core principle of economic regulation is to drive efficiency of operators and improve service and value for consumers.

3. Potential reforms to boost Ukraine's water infrastructure

The lack of capital investment and insufficient operating costs due to the overly low tariff are behind the current poor state of the networks (World Bank Group, 2021). Ukraine's water sector finds itself trapped in a vicious circle where operation is becoming more and more expensive, and the quality of service is declining. It is difficult to justify raising tariffs to water users when the quality of service is declining.

Utilities also lack the economic incentive to improve efficiency of water distribution because water is insufficiently valued. This leads to a lack of interest in long-term planning for the development and modernisation of infrastructure, a lack of effort to reduce production costs, and lack of motivation on the part of utilities to introduce innovations. An additional complicating factor is the historical legacy of low-cost energy under the Soviet Union, which reduced the focus on energy conservation and resource efficiency, leaving utilities exposed as energy prices have risen over recent years.

The lack of both finance and incentives for maintenance and upkeep of infrastructure has significant impacts. The technical condition of the country's water supply and sanitation system is the result of inefficient management over many years. The majority of Ukraine's water supply and sanitation facilities were built between 1960 and 1980 and the legal and regulatory framework at that time required appropriate operation, maintenance, timely repairs, replacements, and modernisations. However, the gap between needed and available finance has continued to widen. The unsatisfactory state of technical repairs leads to negative consequences – rather than investing in a modern system, the limited funds that are available are devoted to constant repairs on outdated equipment. Consequently, the consumers of water supply and drainage services are funding a slowly degrading service with increasing costs and lower performance for citizens and the environment.

An analysis of the sector reforms ongoing since the 1990s shows that:

- tariffs are frozen or set "low" mainly for political rather than operational purposes, which has been and remains a significant obstacle to the effective reimbursement of operators' costs
- the level of tariffs does not positively impact the quality of centralised water supply and sanitation services; nor is it related to "availability" of or "access" to the service
- customer satisfaction is not the main focus for centralised water supply and sanitation operators
- centralised water supply and sanitation operators focus on day-to-day issues and do not have a vision or strategy for the development of urban water supply and sanitation infrastructure. There is no link to the development strategy of the city or region for which investment programmes would be formed
- in most territorial communities, there is no interest or assumed responsibility for developing and implementing a vision for infrastructure for water supply and sanitation in settlements
- there is no incentive for resource-saving policies
- the regulatory framework, which should ensure a balance of interests in the markets of natural monopolies, tends to protect the interests of business structures (in particular, energy enterprises) at the expense of communal enterprises and consumers.

Tariff-setting practices have contradictory effects on the goals of different stakeholders: consumers need affordable and reliable services, utilities need stable revenues for cost recovery and cost-effectiveness, regulators want greater efficiency of water use and governments and society want improved environmental performance and public health

objectives. But these goals are not necessarily aligned: for example, if consumers become more efficient and use less water, there is less revenue for the utility (Farnault, 2024).

As such, the tariff structure in Ukraine is not able to cover all the needs of centralised water supply and sanitation utilities, yet the tariff is almost the only source of funding and investment. One of the principles of effective tariff setting is that the tariff should not be lower than the level required to reimburse the operators' costs, and should ideally take into account capital expenditures. However, World Bank research shows that only 30% of water and wastewater companies worldwide and only 50% of companies in developed countries generate sufficient revenue to cover the costs of operation, maintenance and partial capital expenditures (Andrés, 2021). This means that without external support in the form of direct and indirect state aid, credit or other possible sources of financing, centralised water supply and sanitation companies will not be able to ensure the stability and reliability of services.

State price regulation of water supply and sanitation should provide opportunities for the development of the sector, but tariffs for services should not become a heavy burden on the population and the economy. Thus, the degree of balance of the country's socio-economic system depends on the effectiveness of state price regulation. Targeted social support schemes, implemented in parallel to tariff reforms, are the most effective way to protect vulnerable members of the population while ensuring that tariffs better reflect the real cost of water (Leflaive, 2020).

As indicated in Chapter 2, the existing model of tariff formation is based on a complex methodology which does not reflect real costs, is open to politicisation rather than tackling real sectoral issues, and suffers from weak co-ordination between institutions. This results in the deterioration of the financial and technical condition of water supply and sanitation companies and infrastructure, the risks of corruption, and social injustice. The existing model does not improve the efficiency of operators or the quality of service, or lead to environmental or public health benefits. It is therefore not aligned with the ambition of Ukraine's environmental, economic and social policy objectives or its EU-aspirations.

This chapter uses modelling analysis to explore potential reforms to how tariffs could be calculated to enable finance to be available for maintenance and investment.

3.1. Changing how the investment component of the tariff is calculated to ensure long-term sustainability of the water system

As infrastructure assets continue to degrade in Ukraine's water system, increasing inefficiencies and non-revenue water are contributing to a ride in the cost of services. The current system involves regular tariff increass to finance inefficient activities has shown itself to be ineffective. The tariff rate for utilities will never provide the revenues needed to bridge such a significant investment gap. Mass renewal of the water supply and sanitation infrastructure requires sustained and focused investment to achieve new levels of service aligned with EU good practice, its legal and regulatory framework and the principles of the EU's Green Deal. The inclusion of an investment component in a future tariff structure and the identification of instruments available on the market for financing development will be prerequisites for expanding and accelerating reform and creating sustainable financial investment plans.

Economic regulation of public utilities aims to find a balance or compromise between the sector's development strategy and the financial realities of and opportunities for development. Key inputs into this complex decision-making process include:

- the budget for financing critical assets
- the structure of financing and the cost of attracting additional resources
- the horizon for strategic planning (since, other parameters being equal, the horizon will determine the rate of growth of tariffs)
- the tariff growth rate
- the rate of tariff increase in intervals after large-scale investments
- the profitability of the development projects
- the real and perceived value of the product and consumers' willingness and ability to pay for it.

This also requires understanding elements such as the costs of service provision and of future service provision, including expanding and renewing the asset base; the opportunities for introducing efficiency measures; the likely revenues to be raised from tariffs; the policy objectives that need to be incentivised; and the social support schemes

that may be required to ensure fair implementation. The aim is to introduce a financial policy and enabling environment that: 1) attracts financial resources to the industry from all available sources; 2) guarantees the protection of the financial interests of the population (including social protection), utilities and other industry stakeholders; 3) introduces and supports stakeholder co-operation in determining the strategic socio-environmental and financial goals of the development of communal services.

This study proposes three models for calculating the investment component of the tariff for centralised water supply and sanitation services. These models calculate the level of the tariff for services taking into account various indicators, elements that affect the possibility of attracting funds, and financing conditions for a period of 30 years (this is both a strategic length of time and also the generally accepted average life of operation of water supply and sewage assets).

The calculation of the tariff in these scenarios (and, accordingly, deductions for the investment component of the tariff) is established according to the following indicators: household income and expenses, changes in the number of households, changes in the volume of drinking water consumption, changes in the weighted average tariff for water supply and sanitation, the inflation rate, the level of availability of services, and the index rising prices for construction and assembly works. Indicators are calculated in dynamic terms over 30 years.

The key indicator for the tariff calculation is the availability of water supply and sanitation services. The coefficient of availability of drinking water supply and sanitation services is an estimated value, which is defined as a percentage or ratio of the main costs of water supply and sanitation in the individual income of the household. In Ukraine, this indicator has not been established.

Affordability in this exercise means a level of service tariffs that ensures the financial stability of water supply and sewage utilities and is acceptable to society from an economic, social and political perspective. Lowering tariffs to ensure they are affordable for the poorest households generally means that they are set lower than they should be – the most appropriate way to ensure access and affordability is therefore to provide targeted support to impacted households, since affordability of water tariffs is one part of a broader question of affordability of general cost of living (Leflaive, 2020).

European Parliament Resolution of 8 September 2015, on the follow-up to the European Public Initiative Right2Water (2014/2239 INI), states that "3% of household income should be considered as the maximum for water charges where charges apply".[3] No EU country exceeds this "threshold value of the affordability ratio", but charges in countries in the east of Europe are relatively less accessible than in their western, northern and southern neighbours. For example, in Hungary, the indicator is approaching the affordability threshold (2.51%), in Bulgaria it is 2.44%, in the Czech Republic 2.3%, Slovakia 2.18% and Romania 1.67%. This means that water in these countries could become unaffordable if the price of water or other essential expenditures was to increase. At the opposite end of the spectrum are Italy, Great Britain, Spain, Portugal and Malta: each of these countries has an indicator below 0.7%. In Ukraine, household expenditure on water supply and sanitation services as a share of total expenditure was 3.07%, and the availability of water supply and sanitation services in Ukraine was rated as relatively low (State Statistics Service of Ukraine, 2022). The World Bank and the European Bank for Reconstruction and Development (EBRD) recommend keeping water supply and sewage fees at no more than 4% of the average household income for Central and Eastern European and CIS countries (Danish Ministry of Environment, 2002).

The proposed tariff calculation models for this exercise use an affordability threshold value of no more than 4%, calculated as a transition from 2% to 4% over 30 years (the strategic time period for replacing water supply and sanitation assets) (0.02/30=0.001). The proposed models presented below for calculating the investment component of the tariff are based on general indicators (coefficients) established and calculated by formulas from which it is possible to calculate the investment component of the tariff for replacing (updating) any funds, any water supply and sanitation utility, under any changing conditions by inserting the relevant input data into Tables A.1 and A.2 in Annex A.

To more accurately calculate depreciation and renewal costs, the fixed assets of the utility should be grouped according to the life of operation (buildings, structures, networks, equipment, etc.), and depending on their renewal costs, the norms for deductions for capital investments must be established. For example, water and sewerage networks have a small rate of depreciation, but a high level of wear and tear and high costs of renewal. The limit of the investment component for the renewal of fixed assets should be determined taking into account indices that

[3] http://www.europarl.europa.eu/doceo/document/TA-8-20150294_EN.html?redirect

include depreciation, wear and tear, inflation rate, changes in the cost of construction and installation works, rate of return, volume of water consumption, number of households, and availability of services.

Model One: "Business as usual"

The first model for calculating the investment component is based on the existing method for setting tariffs for centralised water supply and sanitation services, namely the "costs plus" model. Model one demonstrates the futility of this tariff formation method, which, according to calculations, will never provide sufficient revenue to enable the water supply and sanitation utility to renew its asset base (Figure 3.1; Annex A, Table A.3).

As discussed earlier, a key problem in Ukraine's water supply and sanitation sector is the increase in the cost of services as a result of insufficient investment in the renewal of assets. The system of constant tariff rate increases to finance inefficient day-to-day activities and the slow renewal of assets has demonstrated its ineffectiveness. It is therefore clear that the tariff for communal services is unable to allow investment resources to accumulate to cover significant financial needs.

Model Two: Accessing finance from domestic financial institutions

The second model for calculating the investment component explores attracting credit by the water supply and sanitation utilities from domestic banks (Annex A, Table A.4). The conditions for attracting loans from domestic banks in 2020 are indicated in Table A.5. As domestic banks do not allow utility companies to take the required loan for a period of 30 years, this model is calculated assuming that the company takes a loan every 10 years for 30 years (Annex A, Table A.5). In Ukraine, prior to 2022, the most common intervention by domestic banks was to grant short-term loans to replenish working capital to cover utilities' current payments (purchase of cars, equipment, etc.). These loans were at an average rate of 22% per annum and their size was strictly limited. Loans for business development (capital investment, implementation of investment projects, etc.) were provided by domestic banks at an average rate of 22-25% per annum (as of 2019) for up to 10 years.

This model is characterised by high lending risks due to the high cost of loans. The main reasons for the lack of domestic bank lending for investment projects in the field of water supply and sanitation up until now have been their high interest rates on loans; the need for collateral security (which is challenging when utility companies generally operate facilities that are the property of local municipalities, and there is a legal barrier on privatisation in the most important areas of the utility industry); the financial unattractiveness of utility sector companies due to their unprofitable business activity; and the long payback periods for capital investments related to the design, build and operational life of water and sanitation assets. In addition, the domestic banking sector has been significantly affected by Russia's war of aggression in 2022, compounding existing problems with access to financial and credit resources. It therefore appears that Model Two is unlikely to provide effective investment resources for the renewal of significant utility assets (**Error! Reference source not found.** and Figure 3.1).

Model Three: Accessing finance from international financial institutions

The third model explores the use of loans from international financial organisations (IFIs) for a maximum term of 20 years (Table A.5 in Annex A). Unlike domestic banks IFIs are ready to finance investment projects in Ukraine in various areas, including water supply and sanitation. They offer a general interest rate of 5-7% per annum for a period of 10-20 years, with a preferential period and the possibility of receiving supporting grants.

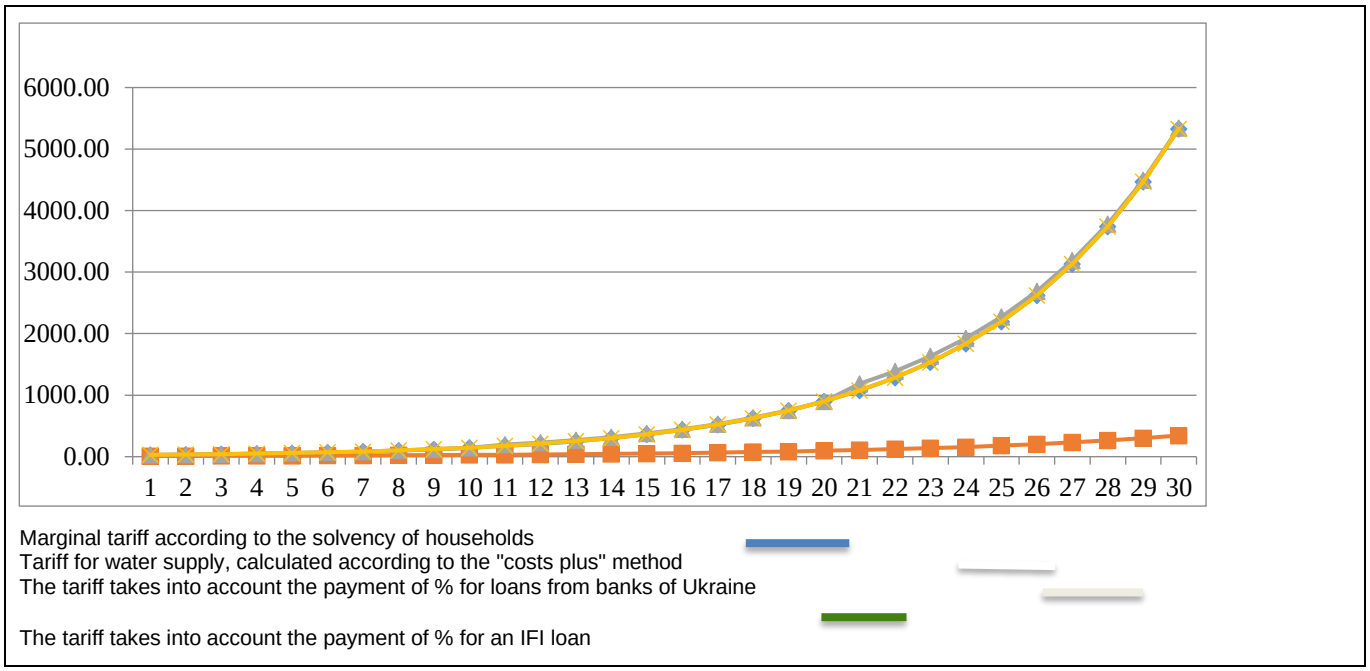
Conditions for attracting loans from IFIs vary. For example, the interest rate charged by EBRD when granting loans is related to the cost of obtaining funds on the capital market and may change every six months. EBRD loans are usually granted for a term of 15–20 years.[4] World Bank loans are an attractive source of external financing. According to the classification of the World Bank (based on average level of income), Ukraine has access to loans with repayment terms of 15-20 years and a grace period of 5 years, during which only interest is paid. The interest rate can be fixed or variable with reference to the LIBOR (London Interbank Offered Rate). Interest on World Bank loans, which Ukraine has received so far, is paid at a variable rate. The interest rate for Ukraine is about 6.5% per annum.

Table A.6 in Annex A compares these three models for calculating the investment component of the tariff. **Error! Reference source not found.** and Figure 3.1 visualise the trends for the three models over 30 years, comparing the

[4] The conditions for attracting EBRD and EIB loans are shown in Figure A.1 in Annex A.

impact on from on the use of the company's own funds (business as usual), loans from Ukrainian banks (Model 2), or loans from IFIs (Model 3) and the dynamics of increasing tariffs for services, taking into account household solvency, changes in the volume of water consumption, and inflation rates over 30 years.

Figure 3.1. The dynamics of the increase in tariffs for centralised water supply and sewage services, taking into account household solvency, changes in water consumption, and the inflation rate over 30 years



4. Conclusions and recommendations

4.1. Finance from IFIs will be essential for rebuilding and modernising Ukraine's water network

It is clear from these three models that if finance from IFIs is available, the approach in model three for calculating the investment component of the water tariff would be the most effective to support the progressive renewal and modernisation of the water supply and sanitation asset base. This assumes IFIs' willingness to invest, their ability to provide favourable lending rates, the inclusion of any grace periods, and the possibility of receiving grants and technical assistance.

This model shows it is possible to achieve the strategic goal of updating water supply and sanitation assets over 30 years while maintaining the service availability ratio (starting at 2% and increasing it to 4%), provided that the upper limit of the investment component of the tariff is observed, which will be directed exclusively to achieving strategic goals. Modernising and rebuilding the water networks are the key to solving problems with the quality of services, non-revenue water, and efficient use of resources.

At the same time, implementing investment projects with loans from IFIs or other institutional lenders raises institutional and practical challenges and risks, such as: 1) lack of co-ordination and institutional memory within ministries (co-ordinators of international projects); 2) delays in project execution; 3) ineffective use of budget funds; 4) low capacity of the beneficiaries to identify, prepare and plan projects; 5) violation of terms of credit agreements; 6) lengthy procedures for obtaining credit funds; 7) duration and complexity of procedures for approving documents within the framework of project implementation; 8) lengthy duration of the periods for bidding, preparing tender documentation, evaluating the tender offer; and 9) exchange rate fluctuations.

These problems should be solved at the state level by providing an attractive enabling environment for investment and establishing a clear strategic plan for the water supply and sanitation sector, taking into account service availability, a practical investment component and control over its use. In particular: in the need to create conditions for an effective investment state policy (in terms of improving the investment climate and providing the most competitive conditions for doing business, reducing/simplifying taxes, providing benefits, creating a database of investment projects, ensuring the rule of law, etc.), improving tariff regulation of services of centralised water supply and sewage (in terms of moderate deregulation, determination of the maximum rate of deduction of the investment component and state control over its intended use, determination of long-term (for example, 30 years), medium-term and short-term strategic goals).

4.1. Tariff reform is a critical part of sustainably financing Ukraine's water security

Ukraine's WSS faces significant challenges related to finance, aging infrastructure, and water quality and quantity, and the war has made these significantly worse. The process of EU approximation creates an opportunity for Ukraine to reform its approach to water finance to ensure long-term water security. Increasing the tariff and integrating more finance from IFIs to ensure the sustainability of Ukraine's water sector, will help. However, tariff increases will not solve the problems facing water supply and sanitation. Rather, they are one part of a balanced combination of tariffs, taxes and transfers, as well as reforms to direct and indirect subsidies to ensure alignment with the overall goals for the water sector. Together the approach should be aligned with the strategy for developing water supply and sanitation. In addition, water supply and sanitation regulation should be embedded in an adequate and coherent

institutional framework if it is to have a positive impact on service productivity. Without significant changes to state policy for water enterprises, the supporting institutions and standard instruments of state regulation will not be effective.

Effective implementation of any tariff regulation model requires an appropriate regulatory environment, transparency, stability and consistency of public policy, as outlined in the OECD Council Recommendation on Water. OECD Member Countries' development pathways can provide lessons for Ukraine's tariff reform journey. One example is the restoration of water supply and sanitation fixed assets in Germany after the fall of the Berlin Wall. The water supply and sanitation facilities of the former German Democratic Republic (GDR) were in a poor condition, and the number of sewage treatment plants were limited. Under the prevailing economy, water tariffs did not cover operators' costs. Following the reunification of Germany, it was necessary to rehabilitate and rebuild the water supply and sanitation systems. Municipalities decided to introduce full cost recovery (FCR), which included investment and operating costs. After 30 years, this method led to the water supply and sanitation system being completely restored and modernised, and tariffs becoming affordable However, at the time of introduction, it led to civil protests and political issues (Marcellino, 2011). As Ukraine reforms its approach to water finance, transparency with water users and the public is critical.

A balanced tariff policy is part of a coordinated and consistent process of creating a regulatory environment, transparency, and stability, to enable financing water security. This will be a complex task, requiring not just regulatory reforms but also strengthened capacity of institutions. The OECD has committed to working with Ukraine on a roadmap for tariff reform through future EU-funded actions, as well as an action plan to improve the overall enabling environment for water finance. Long term stability, better linked to real prices, allow financial planning and investment. Ukraine's EU aspirations present a unique opportunity and momentum to further these reforms in an inclusive, evidence based and phased manner and the OECD is on hand to support Ukraine on this journey towards a financially sound and economically robust water sector.

Annex A. Modelling data

Table A.1. General indicators (coefficients) used in models for calculating the investment component of the tariff for centralised water supply and sewage services

№	Indicator	Formula	Unit
1	Service availability rate from 2-4% over 30 years (0.001%)	Calculated with a transition from 2% to 4% (0.02/30=0.001)	%
2	Average household income change rate (14.28%)	Based on the average annual forecast level of 14.3% (data from the State Statistics Service for 2010-2018)	%
3	Coefficient of change in the price index for construction works (14.02%)	Based on the average annual forecast level of 14.0% (data from the State Statistics Service for 2015-2019)	%
4	Water Consumption Reduction Rate (2.9%)	According to National Drinking Water Quality Report 2017	%
5	Percentage decrease in households (0.33%)	According to the State Statistics Service in 2018	%
6	**Interest on bank deposits**		%
7	**National Bank of Ukraine discount rate (from 13.12.2019 - 13.50%)**	Expert forecast (calculation: the first 10 years - 13.5%, every 5 subsequent years by 1% less than the previous five-year plan)	%
8	**Expected rate of return of water supply and sanitation enterprises**	The analytical norm is taken at the level of the average bank deposit rate of 25% (17% * 1.5 - expert figure) + the calculated reference to the National Bank of Ukraine discount rate	%
9	Network Update Percentage	Calculated (length of networks / 104.1)	%
10	Inflation rate (10%)	according to the State Statistics Service 2009-2019.	%

Continuation of Table A.1

№	Indicator	Years									
		1	2	3	4	5	6	7	8	9	10
1	Service availability rate from 2-4% over 30 years (0.001%)	2,0%	2,1%	2,1%	2,2%	2,3%	2,3%	2,4%	2,5%	2,5%	2,6%
2	Average household income change rate (14.28%)	100%	114%	114%	114%	114%	114%	114%	114%	114%	114%
3	Coefficient of change in the price index for construction works (14.02%)	100%	114%	114%	114%	114%	114%	114%	114%	114%	114%
4	Water Consumption Reduction Rate (2.9%)	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%
5	Percentage decrease in households (0.33%)	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%
6	**Interest on bank deposits**	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
7	**National Bank of Ukraine discount rate (from 13.12.2019 - 13.50%)**	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%

8	**Expected rate of return of water supply and sanitation enterprises**	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
9	Network Update Percentage	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%
10	Inflation rate (10%)	100%	110%	110%	110%	110%	110%	110%	110%	110%	110%

Continuation of Table A.1

№	Indicator	Years									
		11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
1	Service availability rate from 2-4% over 30 years (0.001%)	2,7%	2,7%	2,8%	2,9%	2,9%	3,0%	3,1%	3,1%	3,2%	3,3%
2	Average household income change rate (14.28%)	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%
3	Coefficient of change in the price index for construction works (14.02%)	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%
4	Water Consumption Reduction Rate (2.9%)	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%
5	Percentage decrease in households (0.33%)	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%
6	**Interest on bank deposits**	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
7	**National Bank of Ukraine discount rate (from 13.12.2019 - 13.50%)**	13%	13%	13%	13%	13%	12%	12%	12%	12%	12%
8	**Expected rate of return of water supply and sanitation enterprises**	21%	21%	21%	21%	21%	20%	20%	20%	20%	20%
9	Network Update Percentage	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%
10	Inflation rate (10%)	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%

Continuation of Table A.1

№	Indicator	Years									
		21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
1	Service availability rate from 2-4% over 30 years (0.001%)	3,3%	3,4%	3,5%	3,5%	3,6%	3,7%	3,7%	3,8%	3,9%	3,9%
2	Average household income change rate (14.28%)	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%
3	Coefficient of change in the price index for construction works (14.02%)	114%	114%	114%	114%	114%	114%	114%	114%	114%	114%
4	Water Consumption Reduction Rate (2.9%)	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%	2,9%
5	Percentage decrease in households (0.33%)	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%	0,33%
6	**Interest on bank deposits**	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
7	**National Bank of Ukraine discount rate (from 13.12.2019 - 13.50%)**	11%	11%	11%	11%	11%	10%	10%	10%	10%	10%
8	**Expected rate of return of water supply and sanitation enterprises**	19%	19%	19%	19%	19%	18%	18%	18%	18%	18%
9	Network Update Percentage	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%	3,3%
10	Inflation rate (10%)	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%

Table A.2. General indicators (coefficients) used in the models for calculating the investment component of the tariff for centralised water supply and sanitation services (second group)

№	Indicator	Formula	Unit
1	Average household income in the country (UAH 118,848 thousand)	(UAH 118.8 thousand, for 2018, data from the State Statistics Service, 2018)	UAH
2	Household solvency of the country for centralized water supply and sanitation services (from 2% to 4% of average annual income)	Calculation (average income X solvency ratio 2%)	UAH
3	**Volume of products sold**	According to National Drinking Water Quality Report 2017, taking into account the reduction factor of water consumption	**million m^3**
4	Number of households (thousands)	According to the State Statistics Service in 2018.	thousand unit
5	**Volume of products sold per 1 household**	Calculation (volume of products sold / number of households)	m^3
6	**Average cost of replacing 1 km pipe (diameter 100 mm) (0.75)**	The cost of construction work to replace 1 km of pipe with a diameter of 100 mm varies from 300 thousand to 1.5 million UAH. The calculations take into account the average cost of construction work of 750 thousand UAH, taking into account the coefficient of the level of annual growth of the price index for construction works	**million UAH**
7	Length of water supply networks (total) requiring replacement within 30 years (104.1)	Data National Drinking Water Quality Reports 2017 (104.1 thousand km / 30 years = needs to be replaced per year thousand km)	thousand km
8	**Investment fund for the replacement of networks (full replacement cycle in 30 years)**	Calculated (104.1*0.75*1000)	**million UAH /m3**

Continuation of Table A.2

№	Indicator	Unit	Years									
			1	2	3	4	5	6	7	8	9	10
1	Average household income in the country (UAH 118,848 thousand)	UAH	118 848	135819	155215	177379	202709	231656	264736	302540	345743	395115
2	Household solvency of the country for centralized water supply and sanitation services (from 2% to 4% of average annual income)	UAH	2 377	2 807	3 311	3 902	4 595	5 405	6 354	7 463	8 759	10 273
3	**Volume of products sold**	**million m^3**	1341,2	1302,3	1264,5	1227,9	1192,3	1157,7	1124,1	1091,5	1059,9	1029,1
4	Number of households (thousands)	thousand unit	14 935	14 886	14 837	14 788	14 739	14 691	14 642	14 594	14 546	14 498
5	**Volume of products sold per 1 household**	m^3	89,8	87,5	85,2	83,0	80,9	78,8	76,8	74,8	72,9	71,0
6	**Average cost of replacing 1 km pipe (diameter 100 mm) (0.75)**	**million UAH**	0,750	0,855	0,975	1,112	1,268	1,445	1,648	1,879	2,142	2,443
7	Length of water supply networks (total) requiring replacement within 30 years (104.1)	thousand km	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470
8	**Investment fund for the replacement of networks (full replacement cycle in 30 years)**	**million UAH /m3**	2 602,5	2 967,4	3 383,4	3 857,7	4 398,6	5 015,3	5 718,4	6 520,2	7 434,3	8 476,6

Continuation of Table A.2

№	Indicator	Unit	Years									
			11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
1	Average household income in the country (UAH 118,848 thousand)	UAH	451538	516017	589705	673915	770150	880127	1005809	1149439	1313 579	1501158
2	Household solvency of the country for centralized water supply and sanitation services (from 2% to 4% of average annual income)	UAH	12 041	14 104	16 512	19 319	22 591	26 404	30 845	36 016	42 035	49038
3	**Volume of products sold**	**million m^3**	999,3	970,3	942,2	914,8	888,3	862,5	837,5	813,2	789,7	766,8
4	Number of households (thousands)	thousand unit	14 451	14 403	14 356	14 308	14 261	14 214	14 168	14 121	14074	14028
5	**Volume of products sold per 1 household**	km^3	69,2	67,4	65,6	63,9	62,3	60,7	59,1	57,6	56,1	54,7
6	**Average cost of replacing 1 km pipe (diameter 100 mm) (0.75)**	**million UAH**	2,785	3,176	3,621	4,129	4,708	5,368	6,120	6,978	7,956	9,072
7	Length of water supply networks (total) requiring replacement within 30 years (104.1)	thousand km	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470
8	**Investment fund for the replacement of networks (full replacement cycle in 30 years)**	**million UAH /m^3**	9 665	11020	12 565	14 326	16 335	18 625	21 236	24 214	27608	31479,7

Continuation of Table A.2

№	Indicator	Unit	Years									
			21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
1	Average household income in the country (UAH 118,848 thousand)	UAH	1715523	1960500	2240459	2560396	2926021	3343857	3821360	4367050	499664	5703331
2	Household solvency of the country for centralized water supply and sanitation services (from 2% to 4% of average annual income)	UAH	57 184	66 657	77 669	90 467	105 337	122 608	142 664	165 948	192 972	224 331
3	**Volume of products sold**	**million m^3**	744,5	722,9	702,0	681,6	661,8	642,6	624,0	605,9	588,3	571,3
4	Number of households (thousands)	thousand unit	13 982	13 936	13 890	13 844	13 799	13 753	13 708	13 663	13 618	13 573
5	**Volume of products sold per 1 household**	km^3	53,2	51,9	50,5	49,2	48,0	46,7	45,5	44,3	43,2	42,1
6	**Average cost of replacing 1 km pipe (diameter 100 mm) (0.75)**	**million UAH**	10,344	11,794	13,448	15,333	17,483	19,934	22,728	25,915	29,548	33,691
7	Length of water supply networks (total) requiring replacement within 30 years (104.1)	thousand km	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470	3,470
8	**Investment fund for the replacement of networks (full replacement cycle in 30 years)**	**million UAH /m^3**	35893	40925	46663	53205	60664	69169	78867	89924	102532	116907

Table A.3. 1st model for calculating the investment component of the tariff for centralized water supply and sanitation services using the "cost +" tariff setting method

№	Indicator	Formula	Unit
1	**Water supply tariff according to the 2018 report of the National Energy and Utilities Regulatory Commission (NEURC), taking into account the inflation index (7.502)**	The tariff, which covers only the cost price without profitability (according to the Report of the National Energy and Utilities Regulatory Commission 2018, is calculated from the average aggregate tariff (13.64 * 0.55 = 7.502)	UAH
2	The rate of profitability of the enterprise	The rate of return is directed to the development of the enterprise	UAH
3	**Investment component in the tariff for network replacement (without depreciation)**	The investment component is calculated	UAH/m^3
4	**Investment fund for the replacement of networks at the tariff of the 1st model (the "cost+" method)**		**million UAH**
5	**Volume of products sold in the country**		**million UAH**
6	Length of water supply networks (total), which can be repaired at the expense of the investment component		thousand km
7	**The tariff for water supply is calculated according to the "cost +" method**	**Tariff = cost of 1 m3 + investment component + rate of return**	**UAH/m^3**
8	**The marginal tariff for water supply is calculated based on the solvency of households**	**Marginal tariff to be (expert calculated tariff)**	UAH

Continuation of Table A.3

№	Indicator	Unit	Years									
			1	2	3	4	5	6	7	8	9	10
1	**Water supply tariff according to the 2018 report of the National Energy and Utilities Regulatory Commission (NEURC), taking into account the inflation index (7.502)**	UAH	7,50	8,25	9,08	9,99	10,98	12,08	13,29	14,62	16,08	17,69
2	The rate of profitability of the enterprise	UAH	1,61	1,77	1,95	2,15	2,36	2,60	2,86	3,14	3,46	3,80
3	**Investment component in the tariff for network replacement (without depreciation)**	UAH/m^3	1,94	2,28	2,68	3,14	3,69	4,33	5,09	5,97	7,01	8,24
4	**Investment fund for the replacement of networks at the tariff of the 1st model (the "cost+" method)**	**million UAH**	2 603	2 967	3 383	3 858	4 399	5 015	5 718	6 520	7 434	8 477
5	**Volume of products sold in the country**	**million UAH**	14827	16025	1330	18754	20309	22010	23870	25908	28142	30595
6	Length of water supply networks (total), which can be repaired at the expense of the investment component	thousand km	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47
7	**The tariff for water supply is calculated according to the "cost +" method**	**UAH/m^3**	11,06	12,30	13,70	15,27	17,03	19,01	21,23	23,74	26,55	29,73
8	**The marginal tariff for water supply is calculated based on the solvency of households**	UAH	26,47	32,08	38,85	47,00	56,80	68,59	82,76	99,78	120,21	144,73

Continuation of Table A.3

№	Indicator	Unit	Years									
			11	12	13	14	15	16	17	18	19	20
1	**Water supply tariff according to the 2018 report of the National Energy and Utilities Regulatory Commission (NEURC), taking into account the inflation index (7.502)**	UAH	19,46	21,40	23,54	25,90	28,49	31,34	34,47	37,92	41,71	45,88
2	The rate of profitability of the enterprise	UAH	3,99	4,39	4,83	5,31	5,84	6,11	6,72	7,39	8,13	8,95
3	**Investment component in the tariff for network replacement (without depreciation)**	UAH/m^3	9,67	11,36	13,34	15,66	18,39	21,59	25,36	29,77	34,96	41,06
4	**Investment fund for the replacement of networks at the tariff of the 1st model (the "cost+" method)**	**million UAH**	9 665	11 020	12 565	14 327	16 335	18 625	21 237	24 214	27 609	31 480
5	**Volume of products sold in the country**	**million UAH**	33095	36046	39295	42877	46830	50927	55738	61064	66969	73520
6	Length of water supply networks (total), which can be repaired at the expense of the investment component	thousand km	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47
7	**The tariff for water supply is calculated according to the "cost +" method**	**UAH/m^3**	33,12	37,15	41,71	46,87	52,72	59,04	66,55	75,09	84,81	95,88
8	**The marginal tariff for water supply is calculated based on the solvency of households**	UAH	174,13	209,37	251,59	302,15	362,69	435,12	521,77	625,37	749,20	897,16

Continuation of table A.3

№	Indicator	Unit	Years									
			21	22	23	24	25	26	27	28	29	30
1	**Water supply tariff according to the 2018 report of the National Energy and Utilities Regulatory Commission (NEURC), taking into account the inflation index (7.502)**	UAH	50,47	55,52	61,07	67,18	73,89	81,28	89,41	98,35	108,19	119,00
2	The rate of profitability of the enterprise	UAH	9,34	10,27	11,30	12,43	13,67	14,22	15,65	17,21	18,93	20,83
3	**Investment component in the tariff for network replacement (without depreciation)**	UAH/m^3	48,21	56,61	66,47	78,06	91,66	107,63	126,39	148,41	174,27	204,64
4	**Investment fund for the replacement of networks at the tariff of the 1st model (the "cost+" method)**	**million UAH**	35893	40925	46663	53205	60665	69170	78867	89925	102532	116907
5	**Volume of products sold in the country**	**million UAH**	80421	88485	97462	107463	118618	130547	144424	159946	177322	196790
6	Length of water supply networks (total), which can be repaired at the expense of the investment component	thousand km	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47	3,47
7	**The tariff for water supply is calculated according to the "cost +" method**	**UAH/m^3**	108,02	122,40	138,84	157,66	179,22	203,14	231,44	263,97	301,39	344,47
8	**The marginal tariff for water supply is calculated based on the solvency of households**	UAH	1073,90	1284,94	1536,86	1837,50	2196,16	2623,93	3133,98	3741,99	4466,58	5329,88

Table A.4. 2nd Model for calculating the investment component of the tariff for centralized water supply and sanitation services, based on attracting loans from Ukrainian banks

№	Average rate of bank loans in Ukraine for enterprises (23% per annum for 10 years)	Unit	10 years									
1	Loan balance at the beginning of the year without interest	million UAH	26 025	23 423	20 820	18 218	15 615	13 013	10 410	7 808	5 205	2 603
2	Repayment of the principal amount of the loan	million UAH	2 603	2 603	2 603	2 603	2 603	2 603	2 603	2 603	2 603	2 603
3	% for a loan for 10 years	million UAH	5 986	5 387	4 789	4 190	3 591	2 993	2 394	1 796	1 197	599
4	Total Costs	million UAH	8 588	7 990	7 391	6 793	6 194	5 595	4 997	4 398	3 800	3 201
5	Current investment costs +% for the loan	million UAH	8 588	8 355	8 172	8 048	7 990	8 008	8 113	8 316	8 631	9 075
6	Interest on the renewal of funds (network) from the sale of products	%	24,2%	20,0%	16,6%	13,9%	11,8%	10,1%	8,7%	7,6%	6,8%	6,1%
7	**Investment component in the tariff**	UAH	6,40	6,42	6,46	6,55	6,70	6,92	7,22	7,62	8,14	8,82
8	**Tariff including payment of % for the loan of Ukrainian banks**	UAH	30,93	36,22	42,64	50,41	59,81	71,18	84,89	101,43	121,34	145,31

Continuation of Table A.4

№	Average rate of bank loans in Ukraine for enterprises (23% per annum for 10 years)	Unit	next 10 years									
1	Loan balance at the beginning of the year without interest	million UAH	96 650	86 985	77 320	67 655	57 990	48 325	38 660	28 995	19 330	9 665
2	Repayment of the principal amount of the loan	million UAH	9 665	9 665	9 665	9 665	9 665	9 665	9 665	9 665	9 665	9 665
3	% for a loan for 10 years	million UAH	22 229	20 007	17 784	15 561	13 338	11 115	8 892	6 669	4 446	2 223
4	Total Costs	million UAH	31 894	29 671	27 449	25 226	23 003	20 780	18 557	16 334	14 111	11 888
5	Current investment costs +% for the loan	million UAH	31 894	31 027	30 349	29 887	29 673	29 740	30 128	30 883	32 055	33 703
6	Interest on the renewal of funds (network) from the sale of products	%	18,3%	15,3%	12,8%	10,8%	9,2%	7,9%	6,9%	6,1%	5,4%	4,9%
7	**Investment component in the tariff**	UAH	31,92	31,98	32,21	32,67	33,40	34,48	35,97	37,98	40,59	43,95
8	**Tariff including payment of % for the loan of Ukrainian banks**	UAH	196,37	229,98	270,46	319,16	377,70	448,01	532,38	633,57	754,83	900,06

Continuation of Table A.4

№	**Average rate of bank loans in Ukraine for enterprises (23% per annum for 10 years)**	million UAH	**next 10 years**									
1	Loan balance at the beginning of the year without interest	million UAH	358 931	323 038	287 145	251 252	215 359	179 466	143 573	107 679	71 786	35 893
2	Repayment of the principal amount of the loan	million UAH	35 893	35 893	35 893	35 893	35 893	35 893	35 893	35 893	35 893	35 893
3	% for a loan for 10 years	million UAH	82 554	74 299	66 043	57 788	49 533	41 277	33 022	24 766	16 511	8 255
4	Total Costs	million UAH	118 447	110 192	101 937	93 681	85 426	77 170	68 915	60 659	52 404	44 149
5	Current investment costs +% for the loan	%	118 447	115 224	112 706	110 993	110 197	110 447	111 889	114 691	119 043	125 162
6	Interest on the renewal of funds (network) from the sale of products	UAH	14,8%	12,4%	10,4%	8,9%	7,6%	6,5%	5,7%	5,1%	4,5%	4,1%
7	**Investment component in the tariff**	UAH	159,09	159,38	160,56	162,84	166,50	171,86	179,31	189,29	202,34	219,09
8	**Tariff including payment of % for the loan of Ukrainian banks**	million UAH	1184,78	1387,72	1630,95	1922,28	2271,00	2688,16	3186,90	3782,86	4494,64	5344,33

Figure A.1 Conditions for attracting EBRD and EIB loans

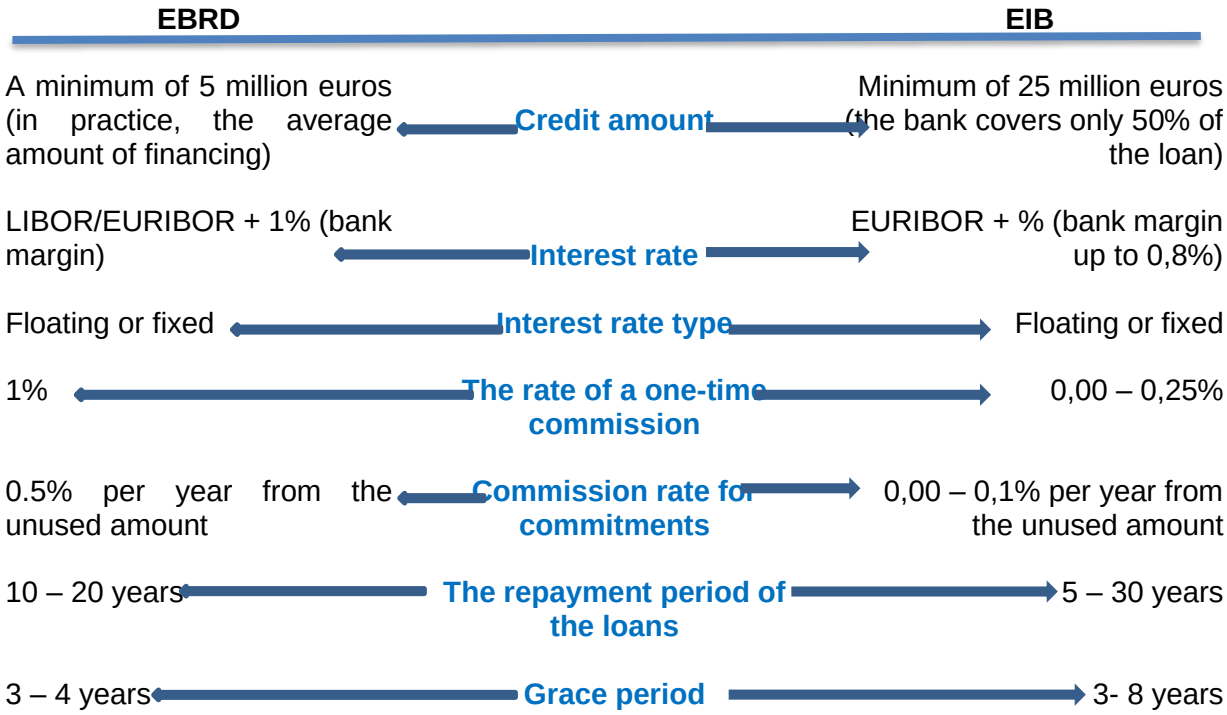


Table A.5. 3rd model for calculating the investment component of the tariff for centralized water supply and sanitation services based on attracting loans from IFIs

№	Average rate of IFI loans for enterprises (5% per annum for 20 years)	Unit	Years									
			1	2	3	4	5	6	7	8	9	10
1	Loan balance at the beginning of the year without interest	million UAH	78 075,0	74 171,3	70 267,5	66 363,8	62 460,0	58 556,3	54 652,5	50 748,8	46 845,0	42 941,3
2	Repayment of the principal amount of the loan	million UAH	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8
3	% for the loan (20 years)	million UAH	3 903,8	3 708,6	3 513,4	3 318,2	3 123,0	2 927,8	2 732,6	2 537,4	2 342,3	2 147,1
4	Total Costs	million UAH	7 807,5	7 612,3	7 417,1	7 221,9	7 026,8	6 831,6	6 636,4	6 441,2	6 246,0	6 050,8
5	Current investment costs +% for the loan	million UAH	6 506,3	6 675,9	6 896,8	7 175,9	7 521,6	7 943,1	8 451,1	9 057,6	9 776,5	10 623,6
6	Interest on the renewal of funds (networks) from the sale of products	%	18,3%	16,0%	14,0%	12,4%	11,1%	10,0%	9,1%	8,3%	7,7%	7,1%
7	**Investment component in the tariff**	UAH	4,85	5,13	5,45	5,84	6,31	6,86	7,52	8,30	9,22	10,32
8	**Tariff taking into account the payment of % for an IFI loan**	UAH	29,38	34,93	41,63	49,70	59,42	71,12	85,19	102,11	122,42	146,81

Continuation of Table A.5

№	Average rate of IFI loans for enterprises (5% per annum for 20 years)	Unit	Years										
			11	12	13	14	15	16	17	18	19	20	21
1	Loan balance at the beginning of the year without interest	million UAH	39037,5	35133,8	31230,0	27326,3	23422,5	19518,8	15615,0	11711,3	7 807,5	3903,8	0,0
2	Repayment of the principal amount of the loan	million UAH	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	3 903,8	
3	% for the loan (20 years)	million UAH	1 951,9	1 756,7	1 561,5	1 366,3	1 171,1	975,9	780,8	585,6	390,4	195,2	
4	Total Costs	million UAH	5 855,6	5 660,4	5 465,3	5 270,1	5 074,9	4 879,7	4 684,5	4 489,3	4 294,1	4 098,9	
5	Current investment costs +% for the loan	million UAH	11616,9	12776,7	14126,5	15692,9	17506,4	19601,4	22017,5	24799,7	27999,3	31674,9	35893,1
6	Interest on the renewal of funds (networks) from the sale of products	%	6,7%	6,3%	6,0%	5,7%	5,4%	5,2%	5,0%	4,9%	4,7%	4,6%	4,5%
7	**Investment component in the tariff**	UAH	11,63	13,17	14,99	17,15	19,71	22,73	26,29	30,49	35,46	41,31	48,21
8	**Tariff taking into account the payment of % for an IFI loan**	UAH	176,08	211,18	253,25	303,65	364,01	436,25	522,70	626,09	749,69	897,42	1073,90

Table A.6

Table A.6. Comparison of the three models for calculating the investment component of the tariff for centralized water supply and sanitation services

№	Tariff	Formula	Unit
1	"Affordable" tariff (taking into account the solvency of consumers)	Calculated according to the percentage of consumers' solvency (from 2% to 4%)	UAH
2	Investment component in the tariff (without attracting a loan)	Calculated in the model using the "cost +" method	UAH
3	Investment component in the tariff (with the attraction of a loan from Ukrainian banks 23%)	It is calculated in the model of attracting loans from Ukrainian banks	UAH
4	Investment component in the tariff (with the attraction of a loan from an IFI of 5%)	Calculated in the model of attracting loans from IFIs	UAH
5	**Analysis for 1 household**	Volume of products sold per 1 household * tariff according to the "cost +" method: (cost of 1 m3 + investment component + rate of return)	UAH
6	**Service availability limit (calculated)**	Calculation: (average household income * solvency ratio 2% (from 2 to 4%)	UAH
7	Difference		UAH

Continuation of Table A.6

№	Tariff	Unit	Years									
			1	2	3	4	5	6	7	8	9	10
1	"Affordable" tariff (taking into account the solvency of consumers)	UAH	26,47	32,08	38,85	47,00	56,80	68,59	82,76	99,78	120,21	144,73
2	Investment component in the tariff (without attracting a loan)	UAH	1,94	2,28	2,68	3,14	3,69	4,33	5,09	5,97	7,01	8,24
3	Investment component in the tariff (with the attraction of a loan from Ukrainian banks 23%)	UAH	6,40	6,42	6,46	6,55	6,70	6,92	7,22	7,62	8,14	8,82
4	Investment component in the tariff (with the attraction of a loan from an IFI of 5%)	UAH	4,85	5,13	5,45	5,84	6,31	6,86	7,52	8,30	9,22	10,32
5	**Analysis for 1 household**	UAH	**992,80**	**1 076,52**	**1 168,04**	**1 268,20**	**1 377,91**	**1 498,2**	**1 630,20**	**1 775,22**	**1 934,69**	**2 110,24**
6	**Service availability limit (calculated)**	UAH	**2 376,9**	**2 806,94**	**3 311,24**	**3 902,34**	**4 594,73**	**5 405,3**	**6 353,67**	**7 462,67**	**8 758,83**	**10 273,00**
7	Difference (between 6 and 5 terms)	UAH	1 384,2	1 730,42	2 143,20	2 634,14	3 216,82	3 907,1	4 723,46	5 687,44	6 824,13	8 162,76

Continuation of Table A.6

№	Tariff	Unit	Years									
			11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
1	"Affordable" tariff (taking into account the solvency of consumers)	UAH	174,13	209,37	251,59	302,15	362,69	435,12	521,77	625,37	749,20	897,16
2	Investment component in the tariff (without attracting a loan)	UAH	9,67	11,36	13,34	15,66	18,39	21,59	25,36	29,77	34,96	41,06
3	Investment component in the tariff (with the attraction of a loan from Ukrainian banks 23%)	UAH	31,92	31,98	32,21	32,67	33,40	34,48	35,97	37,98	40,59	43,95
4	Investment component in the tariff (with the attraction of a loan from an IFI of 5%)	UAH	11,63	13,17	14,99	17,15	19,71	22,73	26,29	30,49	35,46	41,31
5	**Analysis for 1 household**	UAH	**2 290,23**	**2 502,66**	**2 737,26**	**2 996,64**	**3 283,71**	**3 582,76**	**3 934,17**	**4 324,40**	**4 758,19**	**5 240,90**
6	**Service availability limit (calculated)**	UAH	**12 041,0**	**14 104,4**	**16 511,7**	**19 318,8**	**22 591,0**	**26 403,8**	**30 844,8**	**36 015,7**	**42 034,5**	**49 037,81**
7	Difference (between 6 and 5 terms)	UAH	9 750,78	11 601,82	13 774,5	16 322,2	19 307,3	22 821,0	26 910,6	31 691,4	37 276,3	43 796,91

Continuation of Table A.6

№	Tariff	Unit	Years									
			21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
1	"Affordable" tariff (taking into account the solvency of consumers)	UAH	1073,90	1284,94	1536,86	1837,50	2196,16	2623,93	3133,98	3741,99	4466,58	5329,88
2	Investment component in the tariff (without attracting a loan)	UAH	48,21	56,61	66,47	78,06	91,66	107,63	126,39	148,41	174,27	204,64
3	Investment component in the tariff (with the attraction of a loan from Ukrainian banks 23%)	UAH	159,09	159,38	160,56	162,84	166,50	171,86	179,31	189,29	202,34	219,09
4	Investment component in the tariff (with the attraction of a loan from an IFI of 5%)	UAH	48,21	56,61	66,47	78,06	91,66	107,63	126,39	148,41	174,27	204,64
5	**Analysis for 1 household**	UAH	**5751,8**	**6349,4**	**7016,7**	**7762,3**	**8596,3**	**9492,04**	**10535,7**	**11706,0**	**13 021,1**	**14498,51**

6	**Service availability limit (calculated)**	UAH	**57184,1**	**66656,9**	**77669,2**	**90467,3**	**105336,7**	**122608,1**	**142 664,1**	**165947,9**	**192972,3**	**224331,03**
7	Difference (between 6 and 5 terms)	UAH	51432,3	60307,6	70652,6	82705,0	96740,5	113116,0	132128,3	154241,3	179951,2	209832,52

References

Andrés, L. A. (2021). *Troubled Tariffs: Revisiting Water Pricing for Affordable and sustainable water services.* https://documents1.worldbank.org/curated/en/568291635871410812/pdf/Troubled-Tariffs-Revisiting-Water-Pricing-for-Affordable-and-Sustainable-Water-Services.pdf: World Bank Group.

Cabinet of Ministers, Government of Ukraine. (2025). *State Targeted Environmental Program for Technical Modernization of Wastewater Disposal and Wastewater Treatment Enterprises in State or Communal Ownership for the Period up to 2034*. Retrieved from https://zakon.rada.gov.ua/laws/show/91-2025-%D1%80#Text

Danish Ministry of Environment. (2002). *A Toolkit for Assessing Willingness to Pay, Affordability and Political Acceptability.* doi:https://www2.mst.dk/udgiv/publications/2002/87-7972-228-8/pdf/87-7972-217-2.pdf

European Water Regulators. (2024). *Ukraine introduces measures to support water utilities in times of war.* doi:https://www.wareg.org/articles/ukraine-introduces-measures-to-support-water-utilitiesin-times-of-war/

Farnault, A. a. (2024). *Cost recovery for water services under the Water Framework Directive .*

Himmelfarb, A. (2025). *Ukraine - Fourth Rapid Damage and Needs Assessment (RDNA4) : February 2022 - December 2024.* http://documents.worldbank.org/curated/en/099022025114040022: World Bank Group.

Leflaive, X. a. (2020). *Addressing the social consequences of tariffs for water supply and sanitation .* doi:https://doi.org/10.1787/afede7d6-en

Marcellino, D. a. (2011). *The German Experience with Full Cost Recovery in the Water Sector: Practice and Problems.* doi:https://www.ecologic.eu/4132

Ministry for Development of Communities and Territories of Ukraine. (2023). *National report on the quality of drinking water and the state of drinking water supply and wastewater disposal in Ukraine in 2023.* doi:https://mindev.gov.ua/storage/app/sites/1/uploaded-files/nacionalna-dopovid-pro-iakist-pitnoyi-vodi-ta-stan-pitnogo-vodopostacannia-ta-vodovidvedennia-v-ukrayini-u-2023-r.pdf

Ministry of Development of Ukraine. (2022). *National report on the quality of drinking water and the state of drinking water supply in Ukraine in 2021.* doi:https://mindev.gov.ua/storage/app/sites/1/uploaded-files/nacionalna-dopovid-pro-iakist-pitnoyi-vodi-ta-stan-pitnogo-vodopostacannia-v-ukrayini-u-2021-roci.pdf

National Energy and Utilities Regulatory Commission. (2021). *Bulletin.* doi:https://www.nerc.gov.ua/storage/app/sites/1/Docs/Byuleten_do_richnogo_zvitu/byuleten_do_richnogo_zvitu_nkrekp-2021.pdf

OECD. (2009). Managing Water for All: An OECD Perspective on Pricing and Financing. In *OECD Studies on Water.* OECD Publishing, Paris. doi:10.1787/9789264059498-en

OECD. (2020). *Financing Water Supply, Sanitation and Flood Protection: Challenges in EU.* doi:https://dx.doi.org/10.1787/6893cdac-en

OECD. (2021). *Developing a Water Policy Outlook for Georgia, the Republic of Moldova and Ukraine.* doi:https://doi.org/10.1787/512a52aa-en

OECD. (2023). *Implementing Water Economics in the EU Water Framework Directive.* doi:https://doi.org/10.1787/d6abda81-en

Petkova, N. K. (2023). *Review of energy subsidies in the context of energy sector reforms in Ukraine.* doi:https://doi.org/10.1787/0fdb33b3-en.

Sanchez Trancon, D., Halpern, G., Smythe, H., & Smith, L. M. (2025). *Assessing the Enabling environment for investment in water security in the EU's Eastern Partner countries.* OECD Publishing.

State Statistics Service of Ukraine. (2022). *Expenditures and Resources of Households of Ukraine 2021.* doi:https://csrv2.ukrstat.gov.ua/druk/publicat/kat_u/2022/zb/07/zb_vrd_21.pdf

World Bank Group. (2021). *Ukraine Water Supply and Sanitation Policy Note: Toward Improved, Inclusive, and Sustainable Water Supply and Sanitation Services*. doi:http://documents.worldbank.org/curated/en/844681624034932176

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