CHERNIVTSIVODOKANAL

2018-2022 BUSINESS PLAN
and
TARIFF ADJUSTMENT PLAN

A report on planned activities and expected outcomes in the provision of water supply services for the period 2018 to 2022, including financial and tariff adjustment plans

Chernivtsi, December 2017

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POLICY STATEMENT

The direction and boundaries of this business plan follows a strategic policy statement from the directors and key managers of Chernivtsivodokanal. The foundations of our policy objectives comprise our mission and vision statements. These are the guiding principles for the future development of our services, as well as the corporate philosophy that we integrate into everything we do.

Our mission statement provides guidance to everyone in our organization and reminds them of our purpose. Our mission mirrors our primary focus, our services, standards and limitations.

Our Mission

Providing customers reliable water and sewerage services at high quality and affordable costs.

Building on this mission statement our future vision for the next sets out our goals for the five-year plan and beyond. Accordingly, the vision we have formulated for Chernivtsivodokanal defines what goal our organisation is working towards, where we see ourselves by the end of the 5-year planning horizon of this strategic plan. .

Our Vision

We are a trusted, reliable, successful and financially sustainable water and sewerage service provider, contributing to environment protection and social wellbeing.

CHERNIVTSIVODOKANAL
2018-2022 BUSINESS PLAN and TARIFF ADJUSTMENT PLAN

WATER SUPPLY ACTIVITIES

CONTENTS

Message from the Director iv

Key activities and outcomes v

1 Introduction 1

1.1 Chernivtsivodokanal 1
1.2 Our obligations and consumer expectations 2
1.3 Challenges for the future 3
1.4 Why we have produced a five year plan 6

2 Our future operational activities 7

2.1 Asset management 7
2.2 Improved maintenance and repair management 8
2.3 Water loss reduction strategy 8
2.4 Energy efficiency strategy 9
2.5 Head office and administration activities plan 10
2.6 Human resources plan 10
2.7 Operational cost projections 10

3 Our future commercial activities 12

3.1 Metering and billing strategy 12
3.2 Customer services plan 13

4 Our future investment activities 14

4.1 Investment activities 14
4.2 KfW loan financing 15
4.3 Chernivtsivodokanal and Chernivtsi city budget financing 15
4.4 Impact on capital value 15
4.5 Impacts of inflation 16
4.6 Investment activities and long term expectations 16

5 Tariff adjustment plan 18

5.1 Tariff projection using the '*cost plus*' method 18
5.2 Tariff projection using the alternative '*incentive regulation'* method 21

6 Projected financial statements 24

6.1 Accounting conventions applied 24
6.2 Profit and loss projections 24
6.3 Cash flow projections 26

ANNEX 1 Inflation in our cost projections 27

Figures

Figure 1 – Chernivtsivodokanal cost structure 2016 (incl. water and wastewater costs) 2
Figure 2 – Projected annual operating costs (water) at mid-2017 price levels.....11
Figure 3 – Projected annual operating costs (water) at projected nominal price levels 11
Figure 4 – Projected tariffs using '*cost plus*' method with and without adjustment for NRW norms 21
Figure 5 – Projected tariffs using '*incentive regulation*' method (incl. modified alternative) 23
Figure 6 – Projected cumulative cash flow for all four tariff options.....26

Tables

Table 1 – Chernivtsivodokanal at a glance 1
Table 2 – Improved asset management activities.....7
Table 3 – Improved maintenance and repair activities.....8
Table 4 – Water loss reduction strategy 9
Table 5 – Energy efficiency strategy.....10
Table 6 – Metering and billing strategy 12
Table 7 – Customer services plan.....13
Table 8 – Water services investment programme 2018- 2022 (at mid-2017 price levels) 14
Table 9 – Projected profit and loss: 1a '*cost plus*' method (with adjustment for NRW norms) 24
Table 10 – Projected profit and loss: 1b '*cost plus*' method (without adjustment for NRW norms).....25
Table 11 – Projected profit and loss: 2a '*incentive regulation*' method (full MEAV and 12,5% return) 25
Table 12 – Projected profit and loss: 2b '*incentive regulation*' method (reduced opening RAV and 5% return) ..25
Table 13 – Rationale for treatment of past and projected inflation in planning models.....27

Acronyms and abbreviations

CVK	Chernivtsivodokanal (the company responsible for the provision of water supply and wastewater services in Chernivtsi city and Zastavna village)
EU	European Union
EUR	Euro (currency of the majority of European Union states)
GSM	Global System for Mobile (digital mobile telephony system that is widely used in Europe and other parts of the world)
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
MEAV	Modern equivalent asset value, the estimated cost to replace assets (adjusted for depreciation). A simplified method to determine the MEAV is to apply inflation indexation to the asset register.
MINREGION	Ministry of Regional Development, Construction and Housing
NBU	National Bank of Ukraine
NEURC	National Energy and Utilities Regulatory Commission (also referred to as 'the Regulator')
NPV	Net present value, a term to describe the current value of costs and revenues including a discount rate to reflect the time value of money
NRW	Non-revenue water
RAB	Regulatory asset base (a value of the utility's assets in accordance with the Regulator's definition upon which a return on capital can be earned)
RAV	Regulatory asset value (alternative terminology for RAB)
RCV	Regulatory capital value (alternative terminology for RAB)
UAH	Ukraine Hryvnia (national currency of Ukraine)
VAT	Value Added Tax

MESSAGE FROM THE DIRECTOR

We are pleased to present our first five-year business plan and tariff adjustment plan for the Municipal Enterprise Chernivtsivodokanal. Over the next five years we are planning to undertake major changes in the way we provide our water supply services. This includes a major investment programme of nearly UAH 700 million, much of which is thanks to the support of KfW, the German Development Bank, who are lending us, through the Government of Ukraine, EUR 17 million (over UAH 500 million).

This programme of investment plus the many changes in our operational practices, including customer services, will provide significant tangible benefits to water consumers in Chernivtsi. This investment has arrived just in time as our water supply infrastructure is fast approaching crisis levels where system failure may soon reach intolerable levels.

Over the next few years you will see many activities happening such as pipes being replaced, pumping stations refurbished and new customer facing services. During this process it is inevitable that many consumers will have to tolerate the inconvenience that construction brings but we ask that you bear with us over this period. The end result in improved services will outweigh any short-term inconvenience.

All this investment has to be paid for. Until recently the City Council has supported our investment but the scale of this programme demands higher consumer contributions. This plan presents a projection for the adjustment of water supply tariffs necessary to meet these investment costs. These tariffs assume a zero contribution from the city budget. Obviously, if the City Council supports us financially, the tariffs will be lower.

The current regulatory regime in Ukraine sets water tariffs on the basis of what we believe to be a flawed system. It deprives us of the income we need to properly operate and maintain our assets making us ever more reliant on support from the City Council. In this plan we have proposed an alternative approach to setting tariffs that better serves our needs and, we believe, ensures that consumers pay their fair share of the costs of water supply. We appeal to the *National Energy and Utilities Regulatory Commission* who approves our tariffs, to give due consideration to the proposals we present in this plan.

We believe that the water supply system in Chernivtsi is at a turning point and the quality and reliability of services are set to improve greatly over the next five years. We need the support of the Regulator, the Chernivtsi City Council, our investors, our employees and above all else, our customers, to make this plan work. We look forward to a bright and exciting future for the water supply services in Chernivtsi.

Lastly, we would like to express our sincere gratitude for the generous and valuable financial grant support we receive from the European Union Neighbourhood Investment Facility through the German Development Bank (KfW). We also thank the German GFA Consulting Group GmbH and the Ukrainian Municipal Development Institute (MDI) who provided us with the professional expertise that made the creation of this business plan possible.

Anatolii Chaban

Head of Chernivtsivodokanal

December 2017

KEY ACTIVITIES AND OUTCOMES

Levels of service

- Significant investment in major repairs to networks resulting in a reduction of water losses from the current level of 18 million m^3 per year to 10 million m^3 per year by 2022.
- Reduced inconvenience to consumers through reduced repair activities and faster response times. Annual emergency repair incidents will fall from 2 600 in 2016 to about 2 000 per year by 2021.
- Improved consumer experience: electronic billing and payment systems, better metering systems leading to improved accuracy of bills and consumer confidence, telephone help lines, improved information to consumers and speedier new connections.

Efficiency improvement expectations

- Improved investment decision making and asset maintenance from a well-functioning asset management planning framework.
- Reduced costs of repairs (savings of UAH 0,3 million (materials only) per year on current budget levels expected by 2022).
- Energy consumption to fall from the current level of 30 000 MWh per year to 22 000 MWh per year by 2022. This together with changes to the way we manage energy consumption will deliver annual operating cost savings of UAH 20 million per year by 2022 (at 2017 price levels).
- Improved reporting of system incidents from the public (e.g. bursts and leaks).
- Systematic detection and repair of small, invisible leaks and illegal connections.

Environmental benefits

- The significant reduction in energy consumption will be a major contribution to reduced carbon emissions and the global effort against climate change.

Capital investment

- An investment programme of UAH 677 million (at 2017 price levels) over the next five years largely dedicated to the major repair and/or replacement of ageing infrastructure plus investment in modern technology for our consumer facing activities including new offices and information technology systems. KfW, the German Development Bank, has provided a loan of UAH 502 million for much of this investment.

Tariffs

- Depending on the calculation method applied and subject to regulatory approval of our application for tariff adjustments we expect tariffs to increase from currently UAH 8,7 per m^3 to nearly UAH 15 in 2018 rising to just over UAH 16 in 2022 (at 2017 price levels, including VAT). For a typical consumer using about 10 m^3 per month this will add about UAH 60 to their monthly water bill. This increase is necessary to deliver all the benefits set out in the business plan. Without this increase, levels of service will fall and the burden on the city budget will increase.

Financial performance

- 18% increase in water sales resulting from improved metering and solved contractual issues with consumers in unmanaged multi-apartment buildings.
- Major financial savings in operating costs (energy cost savings in particular).
- More timely receipt of payments from consumers.
- A return to profitability (subject to regulatory approval of tariffs) that reduces or eliminates the need for increased financial support from the city budget.
- Future long-term viability that can properly provide a high level of services to our customers for many years to come.

1 INTRODUCTION

1.1 Chernivtsivodokanal

Water supply services have been provided to the citizens, businesses and institutions of Chernivtsi since 1895. The provision of water supply and wastewater services in Ukraine is currently a municipal responsibility as set out in the Law of Ukraine on Local Self-Governance[1]. Chernivtsivodokanal is a municipal enterprise owned by the city of Chernivtsi and assigned to provide these services on the city's behalf.[2] For this, we are licensed by the *National Energy and Utilities Regulatory Commission* (hereinafter also referred to as "Regulator"). Although we report to the City Council, being the body representing the owners, and our director is appointed by the City Council we have autonomy in our day-to-day operational and management activities.

Since our establishment as a municipal enterprise, we are expected to operate as a commercial entity. We are expected to finance our activities through the tariffs we charge consumers plus some financial support from the city budget for a portion of our capital investment needs. Our activities are primarily:

- The collection of raw water, treatment, distribution and delivery of wholesome water to all the consumers in our service area, and
- The collection, treatment and safe disposal to the environment of wastewater from all consumers in our service area that are connected to our wastewater network.
- The production of accurate bills for customers and the collection of payments.

These activities require significant financial and human resources to design, build, operate, maintain and replace major assets such as treatment plants, pumping stations, reservoirs and pipe networks (see Table 1). We also deal with consumers on a daily basis which imposes demands on consumer services such as meter reading, billing, revenue collection and resolving consumer issues.

Table 1 – Chernivtsivodokanal at a glance

Population served	264 700
Connections (water)	67 198
Connections (wastewater)	14 032
Volume of water sold to consumers per year	8,7 million m^3
Treatment plants (water)	4
Treatment plants (wastewater)	1
Pumping stations (water)	34
Pumping stations (wastewater)	13
Water pipe network	422 km
Wastewater pipe network	297 km
Total value of assets (at 2017 price levels)	UAH 305 million[3]
Employees (water)	537
Employees (wastewater)	291
Annual turnover 2016 (water)	UAH 49 399 300
Annual turnover 2016 (wastewater)	UAH 27 227 300
Annual turnover 2016 (other)	UAH 35 927 000

[1] Law of Ukraine on Local Self-Governance #280/97-BP dated 21.05.1997.

[2] According to the Law of Ukraine on Public Utilities Services #1875-IV dated 24.06.2004 and the Law of Ukraine on Drinking Water and Drinking Water Supply #2918-III dated 10.01.2002.

[3] The current valuation of assets is estimated from the accounting book value of assets adjusted for inflation between purchase date and mid-2017.

As we are a natural local monopoly the prices we charge consumers for our services are subject to detailed scrutiny by the Regulator. Where the Regulator considers our proposals to be unjustified they may be amended accordingly.

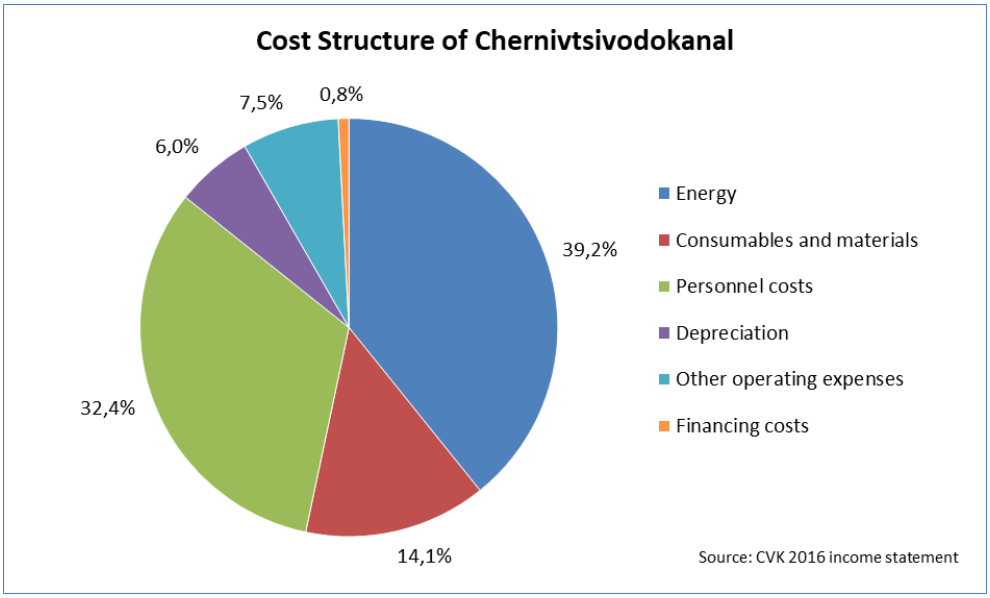

Figure 1 – Chernivtsivodokanal cost structure 2016 (incl. water and wastewater costs)

Our costs are predominantly energy, labour, and other consumables (see Figure 1 above**Ошибка! Источник ссылки не найден.**). Our business plan addresses these three items as the areas that warrant the greatest attention, in particular energy and labour costs, which together account for more than 70% of the total.

1.2 Our obligations and consumer expectations

We are expected to provide our services in accordance with legislation, industry codes and licence obligations. These include:

- Meeting national standards of service including:
  - Drinking water quality[4]
  - Minimum pressure
  - Wastewater discharge quality
  - Safe water supply and wastewater sludge disposal
- Compliance with the regulatory requirements for tariff submissions
- Compliance with our licence conditions as set by the Regulator
- National accounting standards[5]

As well as meeting our obligations as set out in these legal instruments we have a duty to satisfy our consumers. These include meeting their expectations of what they consider to be an efficient and quality service. This includes, above all else, ensuring that we operate our services as efficiently as practicably possible and eliminating waste. Consumers should also expect timely and accurate meter reading and billing procedures, timely responses to complaints and other issues raised, and ensuring our activities provide the minimum disruption to the citizens, for example when undertaking construction works and emergency repairs.

[4] According to the Law of Ukraine on Natural Monopolies #1682-III dated 20.04.2000 and the Law of Ukraine on Drinking Water and Drinking Water Supply #2918-III dated 10.01.2002.

[5] As approved by the cabinet of ministers and promulgated by the Ministry of Finance.

As a responsible public body we are expected to make our contribution to the protection of the environment. This is not confined to our need to protect water resources but also the wider environment including measures to combat climate change.

Lastly, as a responsible employer we have a duty of care to our employees to ensure that they are able to safely carry out their functions and that they are rewarded fairly for their efforts.

1.3 Challenges for the future

1.3.1 Past under-investment and resulting deterioration of the infrastructure assets

The earliest water supply and wastewater services in Chernivtsi were originally constructed in the late 19th century. Even today some of these assets are still in service. Although the facilities and networks have expanded as the city has grown the systems are suffering from a prolonged period of significant under-investment in capital maintenance[6].

One of the causes of this under-investment is the current regulatory process that applies non-revenue water norms for losses which reduces our planned revenues[7]. Although our tariff adjustment applications include funding for investment, the tariff is reduced with the net effect that, after operating costs are taken into consideration, our remaining cash available for investment is significantly reduced. Depreciation calculated on a historic cost accounting basis, a source of financing for capital maintenance, is regarded by the Regulator as a minimum expectation of capital investment but we are unable to meet this expectation because of the reduced revenues created by the adjustments of losses by norms. Consequently, the Regulator considers the fact that we did not invest as planned, not even to the level of depreciation. This results in further regulatory sanctions for future years, reducing revenue even further. Unless we can break out of this downward spiral of reduced tariffs and under-investment the performance of our infrastructure is going to steadily worsen to crisis levels.

Even the minimum level of investment as measured by the historic cost accounting convention is a major under-reporting of our actual investment needs if we are to properly maintain our infrastructure because:

- the assets are generally long life assets (50 years or more) and the effect of inflation means that the depreciation provisions are insufficient to finance asset replacement; and,
- many assets that are still in service have long since exceeded their accounting useful lives and although they may need replacement in the near future there is no provision for any depreciation on these assets to contribute to the investment budget.

A simple comparison of inflation adjusted (current cost) depreciation with historic cost depreciation suggests that the difference is substantial. For 2017 we estimate the historic cost depreciation for water supply assets amounts to approximately UAH 4,2 million per year yet when adjusted for past inflation this amounts increases to more than UAH 43 million per year, over ten times higher[8]. With future inflation further eroding the purchasing power of historic cost depreciation provisions this gap will widen. This difference is not unexpected considering many of our assets are twenty years old or more and compounded inflation over the last 20 years was over 1 600%.

[6] We define capital maintenance as the major repair and replacement of assets when they are at the end of their useful lives or are no longer able to deliver the performance expected of them.

[7] The *'cost plus'* tariff method effectively inflates sales volumes to reflect a maximum permissible level of NRW. This depresses tariffs to levels below the required revenue. More details on this practice are discussed in Section 5.1.

[8] This calculation is based upon a simple comparison of historic cost inflation and current cost depreciation using inflation indices. A more thorough evaluation of current capital maintenance investment requirements would consider a more detailed engineering evaluation of actual needs and take into account:

- changes in investment costs due to new technology;
- replacement of current oversized assets (resulting from falling population) with smaller assets; and
- capital maintenance on assets that are fully depreciated that do not currently incur a depreciation charge.

Although these factors will have an impact on the overall assessment of what we need to maintain our infrastructure a simple inflation indexation of depreciation provides a reasonable first estimate of the scale of the difference between our actual needs and the current investment constraint.

Figure 1 above shows that **Ошибка! Источник ссылки не найден.**for our water supply and wastewater activities depreciation accounts for roughly 6% of our total costs. This equals to UAH 7,58 million per year. If this was to increase ten-fold, as suggested by our current cost depreciation estimates, depreciation would account for approximately 33% of total costs. This is very much in line with well managed and well financed water supply utilities elsewhere in the world where capital maintenance provisions account for about 25% to 35% of total annual expenditure.

1.3.2 Meeting European Union (EU) standards of service

In line with the Government's longer term objective of greater cooperation with the EU, utility services are expected to improve to be more in line with EU standards. Not only do we need to invest in capital maintenance to maintain the current levels of service we also have to invest, as far as practicably possible, to enhance our levels of service to those applied in the EU, especially in the area of wastewater management and environmental compliance.

1.3.3 Financial support from the Chernivtsi City Council cannot be assured indefinitely

To overcome the financing gap between investment needs and the regulatory constraints imposed on us we have relied heavily on financial support from the Chernivtsi city budget and national budgets. Without this support the level of service would have undoubtedly fallen resulting in wide scale infrastructure failure and disruptions to services. We no longer receive support from the national budget and the burden of supporting the provision of basic services now falls upon the citizens of Chernivtsi. Consumers currently pay for this shortfall through their contributions (taxes) to the city budget. Financial support from the City Council cannot be assured to continue indefinitely and the cost burden for improvement in services will need to shift from taxes to tariffs. This will undoubtedly result in upward pressure on tariffs but will ease the burden on the city budget.

1.3.4 Operational activities not as efficient as they could be

We accept that our operational performance could be improved and that there is scope for efficiency improvements in the way we do things. Areas where we believe there is scope for improvement include:

- Reduction in water losses that can save treatment and energy costs.
- Changes to our pumping patterns to take advantage of cheaper off-peak electricity costs.
- Paying more attention to proper maintenance of our infrastructure to reduce the cost and frequency of service interruptions and associated consumer inconvenience.
- Improvements to our metering, billing and payment systems to make use of latest technology.
- Changing the way we manage our human resources to improve productivity and quality.

We are committed to improve our performance in these areas and more so that we can deliver best value to our consumers.

1.3.5 Recruitment and retention of highly skilled and motivated employees

The Chernivtsi area being close to the border of the European Union means that we have to compete with more lucrative opportunities available elsewhere. We are finding it increasingly harder to recruit people with the skills we need to reinvigorate our organisation into one which can meet the challenges of the 21st century. We are facing challenges in two principal areas:

- Many of our employees have traditional water supply skills such as pipe repairs, pumping station operation etc. but this workforce is getting older and many will be retiring in the near future. We need to recruit and train younger staff to replace them but this work is less attractive to a younger generation. These skills are generally taught and learned 'on the job' or in industry-specific training.
- Modern water supply services, from design and planning of infrastructure development through to consumer facing activities such as billing and payment systems, rely on

modern technology. To meet this challenge we need to compete with many other sectors for highly skilled and technology literate individuals. The demand for people with these skills drive up their salary expectations to a level that is difficult for us to satisfy within our regulated budget constraints.

1.3.6 Affordability of tariffs

We recognise that the future demands on our services will impose upward pressure on tariffs. For some vulnerable consumers this may result in increased hardship. We support the current arrangements where the government provides subsidies to us to reduce bills for vulnerable consumers. We are committed to helping all consumers to pay no more than they need to, although a reduction in support from municipal and national budgets may result in reduced revenues and increased costs for Chernivtsivodokanal (CVK) and, ultimately, higher consumer bills. We cannot comment on any effects this may have on local and national taxation as this is a matter for the City Council and the national government.

1.3.7 Regulatory uncertainty

We are subject to economic regulation (tariff approval) by the Regulator. The Regulator is bound by strict legal procedures for determining and approving tariffs. We agree with many commentators, consultants, academics and other experts that the past framework (referred to as *'cost plus'*[9]) is not delivering the intended outcomes of improved performance and efficiency and may even be restricting the ability of the utilities to provide the services expected of them.

The Regulator has approved a radical change to the framework that is more in line with conventional regulatory practices that consider realistic projections of costs, performance and investment financing determined on a current cost accounting basis[10]. This is referred to as *'incentive regulation'* method. Although the legal instruments (legislation and regulations) exist for the application of the new *'incentive regulation'* method to be adopted it has yet to be fully tested and its longer term effectiveness is still uncertain.

Utilities can only apply this new framework if they undergo a comprehensive asset revaluation exercise at considerable cost[11]. We have not yet gone through this process and we are obliged to apply the earlier *'cost plus'* method. We have no immediate plans to undertake this revaluation exercise and we cannot say with any certainty when or if this will be done within the period of this five year business plan.

This leaves us in an uncertain regulatory environment where we cannot effectively plan for the future with any degree of confidence that we will secure the revenues necessary for our plans to be implemented, in particular our investment plans. Despite the activities we have set out in this plan, what we will actually be able to achieve will depend on future regulatory decisions and their timing. We can say that the current *'cost plus'* method will significantly inhibit our ability to deliver the plan's activities unless we receive significant financial support from the city budget.

In this business plan we set out our plans and associated costs for meeting the future challenges. This plan estimates the future tariffs that will be determined through the current *'cost plus'* method and the resulting revenue shortfall. We also estimate the tariffs that will result from the adoption of the options

[9] The Law of Ukraine on Natural Monopolies stipulates two public services tariff regulation systems applicable for Ukraine. These are:

- "*Incentive regulation*" framework, and
- "Other" tariff regulation.

While the incentive-based tariff regulation system has so far failed to be successfully implemented anywhere in the centralized water supply sector in Ukraine, its methodology has recently undergone a thorough revision and a new incentive-based regulation method has been approved in 2017 and will become effective in January 2018.

While no official name has been assigned to the system referred to in the law as "Other", this system is commonly referred to as the '*cost plus'* tariff method and so far continues to be the most commonly applied tariff calculation method in the municipal centralized water supply sector of Ukraine. For the purpose of this document we refer to this method as '*cost plus'*.

[10] The '*incentive regulation*' method has been developed with the support of the United States Agency for International Development. It effectively adopts the concept of tariffs being determined through a process securing a revenue requirement comprised of: operational costs, depreciation (determined on a current cost accounting basis) and a return on a defined regulatory asset value (RAV), sometimes referred to as a regulatory asset base (RAB).

[11] A requirement of the Law of Ukraine on Natural Monopolies (2000).

we propose for the *'incentive regulation'* method based on assumptions of asset valuations using inflation indexation as the principal revaluation method.

Although we agree that the new '*incentive regulation*' method adopted by the Regulator is a significant improvement we have concerns that some elements may not be in the best interest of consumers and the utilities, in particular the determination of the regulatory asset value (RAV) and the level of return on the RAV that is applied. Our plan presents alternative modifications to this framework that we believe serve better the interests of our consumers, yet will require changes in the relevant legal framework.

1.3.8 An uncertain political and economic environment

We live in a time of significant uncertainty, especially the continuation of the global financial crisis and, closer to home, the political tensions in the East of the country. These and other, as yet unknown, events will affect us over the next five years or more. These wider influences may affect the outcomes of our business plan expectations and include:

- Inflation, especially in areas such as energy costs, labour wage demands and the knock-on effect on exchange rates which will affect prices of imported goods and services.
- The local economy and related social constraints of affordability.
- The national and municipal budgets which may limit the degree to which we may be able to access additional financial support.

1.3.9 Climate change and environmental expectations

Our role in the protection of the environment is not confined to water related environmental issues but also the wider environment including measures to combat climate change. A major component of our plan is water loss reduction which offers the dual benefits of protection of our water resources plus a reduction in carbon emissions through the resulting reduction in electricity consumption. Our ability to contribute towards the protection of the environment is limited by the financing available to implement the necessary measures.

1.4 Why we have produced a five year plan

Until recently our planning has largely been limited to an annual plan setting out the following year's budget proposals together with an annual tariff submission in accordance with the current *'cost plus'* method. This short term planning approach has restricted our ability to make effective and efficient decisions for the best interests of our business and the consumers we serve, in particular our ability to plan for our mid-term needs.

We have recently secured a significant loan from KfW, the German Development Bank, to the amount of EUR 17 million. The loan is intended to finance major rehabilitation of our water infrastructure including water treatment works, pumping stations, large transmission mains and our water supply networks. A condition of this loan is that we are required to develop a five-year business plan including tariff projections. We support this requirement as we recognise that for these new financial commitments to be properly managed, we need to be more disciplined in our commercial and financial management.

Longer term plans help to provide a stable and predictable environment for our management and staff that will allow them to more efficiently plan and execute their functions.

A longer term approach to planning provides greater stability and predictability of tariffs which, in turn, provides benefits to consumers, especially businesses which need such information for their own financial planning. This plan may also help to inform the Regulator about the impacts of the tariff determination methods and help guide improvements to them for the future.

Lastly, we recognise the need for our activities to be more transparent. This plan will inform consumers, investors and other parties of our planned activities.

2 OUR FUTURE OPERATIONAL ACTIVITIES

Our core water supply operational activities of collection, treatment, distribution and billing will continue as business as usual. How we manage our resources to efficiently deliver this service could be improved. We set out below our plans to improve our operational management. These activities will result in financial savings and improvements in system and commercial performance. These benefits will be passed through to consumers through:

- tariffs lower than they would otherwise be,
- improved levels of service, and
- wider environmental benefits.

Water supply and wastewater tariffs will need to increase to meet the challenges described in the previous chapter but our plan is to limit these increases by improving productivity and eliminating inefficiency.

Investment in physical and human capital is needed to deliver these benefits. This will be supported by loans for capital investment in the short term, although additional long-term financing is needed to ensure the longer term benefits. Though this may result in short-term tariff increases, in the longer term tariffs will be lower than they would otherwise be.

We set out below a summary of our planned operational activities and expected benefits. A more comprehensive plan setting out more detailed activities, costs, benefits and other supporting information is provided as an MS Excel workbook accompanying this plan.

2.1 Asset management

Until recently our asset management planning has been reactive with activities undertaken in response to events such as system failure. We recognise the need to undertake a more systematic approach to asset management planning, identifying in advance where our efforts and financial resources should be targeted for optimum operational efficiency. This includes investing in technology to understand better our systems, applying that knowledge to identify assets at risk and the consequences of failure, and to prepare well-structured investment programmes. Table 2 below sets out how we intend to establish our asset management capability over the next five years. The benefits of this plan will not be realised immediately but rather in the longer term with improvements in investment efficiency and reduced system failure.

Table 2 – Improved asset management activities

Activity	Inputs and costs	Benefits (financial)	Benefits (non-financial)
Establishment of an 'Asset management unit' in CVK.	• Preparation of job descriptions and recruitment of suitably qualified professional staff. • Computer hardware and software. • Expert training and development staff in asset management activities.	• Improved investment decision making through optimum design and investment timing. • Reduced costs of repairs. • Reduced operational costs, e.g. energy cost savings.	• Improved level of services. • Reduced risk of system disruption. • Reduced inconvenience to consumers and society through reduced repair activities.
Data entry into asset management database inventory.	• Staff costs supported by expert training.		
Detailed analysis of asset management data and production of well-structured asset management plans.	• Staff costs supported by expert training.		
Organisation of data exchange and provision to relevant managers.	• Updated internal standard operating procedures.		

2.2 Improved maintenance and repair management

One of our major ongoing costs is the maintenance and repair of our assets. On emergency repairs we currently spend about UAH 1,3 million per year on materials alone. Add to this the cost of vehicles, equipment and labour, the total costs are much higher.

Our repair work is normally emergency in nature such as fixing pipe bursts and pump failures. When these incidents happen we not only incur the costs of repair but we also lose money through lost water and lost sales. Consumers also suffer from supply disruptions and inconvenience caused through repair activities. Through a combination of asset management (described above), investment in new assets (discussed in the capital investment component of this plan) and improved management of our repair activities, including a focus on prevention rather than cure, we intend to reduce these incidents. Table 3 ниже outlines our planned improvements to our maintenance and repair practices. As a result, in the longer term, we expect costs to fall and levels of service to improve, both outcomes to the benefit of consumers. We also intend to spend nearly UAH 1 million per year to clean water intakes, reservoirs and boreholes to improve the performance of our systems.

Table 3 – Improved maintenance and repair activities

Activity	Inputs and costs	Benefits (financial)	Benefits (non-financial)
Replacement of old and failing assets (described in more detail in the capital investment plan).	• Capital investment programme financed by supported by KfW loans plus investment from CVK and city budgets.	• Reduced costs of repairs (savings of UAH 0,3 million (materials only) per year on current budget levels expected by 2021). • Further savings on labour, vehicles and equipment are expected. • Reduced operational costs, e.g. energy cost savings. • Improved revenues from fewer interruptions to supply. • Customers more willing to pay for improved services.	• Improved level of services. • Reduced risk of system disruption. • Incidents expected to fall from 2 600 in 2016 to about 2 000 per year by 2021. • Reduced inconvenience to consumers and society through reduced repair activities.
Focus on preventative maintenance.	• Guidance from asset management team. • Repair activities identified as necessary to prevent asset failure (based on detailed risk assessments) (approx. cost provision of UAH 0,4 million in 2018 increasing to approx. UAH 1 million by 2020).		
Leak detection and repair.	• Establishment of leak detection team and procurement of leak detection equipment (provided as grant from EU). • Training in leak detection and repair techniques. • Budget for leak detection and repair approx. UAH 0,2 million in 2018 rising to UAH 0,5 million in 2022.		

2.3 Water loss reduction strategy

Our water supply system loses nearly 18 million m^3 of treated water per year. This equates to over 700 litres per connection[12] per day. This rate of leakage is regarded as very high and according to international benchmarks our network falls into the category of *'Very Bad – requires immediate water loss reduction interventions*[13]*'*. We have developed an intensive loss reduction strategy where we expect to

[12] We define connections as a metered or un-metered connection and in the case of multiple occupancy buildings each dwelling, unless managed through an owner's association or other management body in which case it is regarded as a single consumer.

[13] CJ Seago, RS McKenzie: International Benchmarking of Leakage from Water Reticulation Systems (http://www.miya-water.com/user_files/Data_and_Research/miyas_experts_articles/2_NRW/06_International%20Benchmarking%20of%20Leakage%20from%20Water%20Reticulation%20Systems.pdf).

reduce losses from their current level to less than 10 million m^3 per year by 2022. This loss reduction will come from a combination of several activities:

- Replacement of ageing pipes as a major component of the KfW loan financed investment programme plus investment from our own budgetary resources (described in more detail in the capital investment plan).
- Pressure management (creation of pressure zones and reducing the pressure where it is too high which in turn reduces the rate of leakage).
- Active leakage detection and repair (described in the *'Improved maintenance and repair'* section above).

Table 4 ниже summarises our water loss reduction strategy for the next five years.

Table 4 – Water loss reduction strategy

Activity	Inputs and costs	Benefits (financial)	Benefits (non-financial)
Replacement of old and failing assets (described in more detail in the capital investment plan).	• Capital investment programme financed by supported by KfW loans plus investment from CVK and city budget.	• Savings in the cost of water production and delivery. • Energy consumption reduction of approximately 8 000 MWh per year relative to current energy consumption levels (this includes energy reductions resulting from more efficient pumping equipment – see 'Energy reduction strategy' below). • This equates to annual cost savings of about UAH 11 million per year[14] by 2022 at current electricity prices.	• Reduced electricity demand thereby contributing to reduced carbon emissions. • Reduced consumer disruption from pipeline repair activities.
Pressure management.	• Changes to network operational arrangements and the installation of pressure reducing apparatus.		
Leak detection and repair.	• Refer to 'Improved maintenance and repair management' section above.		

2.4 Energy efficiency strategy

The reduction of losses goes a long way to reducing our energy consumption. We can reduce this further by improving the energy efficiency of our facilities and how we run them.

As part of the KfW loan financed project we will be making major repairs and replacement to eight pumping stations and we plan to decommission 25 small booster pumping stations located around the city. The new pumping equipment will be more energy efficient than they are now which will result in significant energy savings.

We have also examined our pumping patterns and we can reduce our energy bills further by shifting our energy demand to cheaper off-peak periods (night time). In the longer run, with further investment in storage facilities, we will be able to shift even more of our energy demand to off-peak periods.

Table 5 ниже summarises our energy efficiency strategy for the next five years. Throughout this five year period and beyond we shall be searching for other energy efficiency measures that can be applied throughout our operations, for example we are currently replacing lighting in all of our facilities with energy efficient lighting bulbs.

[14] Our expected projected total energy savings amount to just over UAH 20 million per year (at current electricity prices) of which we expect UAH 11 million to be attributable to reduced pumping throughput resulting from reduced water demand and the remaining UAH 9 million from other energy saving measures.

Table 5 – Energy efficiency strategy

Activity	Inputs and costs	Benefits (financial)	Benefits (non-financial)
Repair and replacement of old and failing pumping apparatus in eight principal pumping stations (described in more detail in the capital investment plan).	• Capital investment programme financed by KfW loans plus investment from CVK and city budget.	• Savings in the cost of water delivery. • Changes to pumping patterns and other efficiency measures will result in energy cost savings of approximately UAH 9 million per year by 2022 at current electricity prices.	• Reduced electricity demand from more efficient pumping equipment thereby contributing to reduced carbon emissions. • Improved levels of service (pressure).
Decommission 25 booster pumping stations.	• Investments into improved pressure management in the distribution network.		
Changes to pumping regime to shift electricity demand to cheaper off-peak periods.	• Training in pump operation practices.		

2.5 Head office and administration activities plan

The principal changes to our head office and administration activities focus on the introduction of new technology (computers, printers etc.) in all areas of the business including wastewater services. The bulk of this plan is the procurement of the hardware and software at a total cost of just over UAH 5 million over the next five years. Further details are provided in the capital investment plan (Chapter 4 of this business plan). Costs for these investments will be allocated proportionally to water and wastewater tariffs.

2.6 Human resources plan

As of 31.05.2017 we employed 745 people although our staffing structure allows for 828, i.e. 83 places are unfilled. In the water side of our business we employed 474 staff with 63 places unfilled[15]. The majority of the unfilled places are in the technical skilled and semi-skilled labour activities (pipe repairs pumping station operators, treatment plant operators etc.) and less so in the professional and administrative areas. With many of our technical staff approaching retirement and with such work being less attractive to a younger generation this shortage will only worsen. This situation becomes more acute as we have to compete with other businesses for skilled labour and professionally qualified individuals.

Over the next five years we intend to address these issues through finding ways to improve the way we reward our staff and to improve our skills through training and development. We shall also seek ways to ensure that our total remuneration packages are attractive enough to recruit new and retain existing staff.

We intend to undertake a detailed human resources analysis in 2018 with a view to meeting these challenges. This business plan currently reflects the status quo until this review is finalised following which we shall revise our plans accordingly.

2.7 Operational cost projections

Our projected operational costs excluding depreciation, financing costs and tax for the next five years are summarised in Figure 2 ниже. We expect operating costs to rise marginally in 2019 but to fall thereafter in real terms (excluding the effects of general inflation) predominantly as a result of improved energy efficiency from reduced losses and taking advantage of cheaper off-peak electricity prices.

[15] A common measure of labour productivity for water supply and wastewater utilities is staff per 1 000 connections. For Chernivtsivodokanal this indicator is 7,1 for water supply and 4,0 for wastewater. These values are based on actual employment levels but they will rise to 8,0 for water supply and 4,3 for wastewater services if the vacancies are filled. As part of our loan agreement with KfW we are expected to maintain this indicator below 10. We already satisfy this condition.

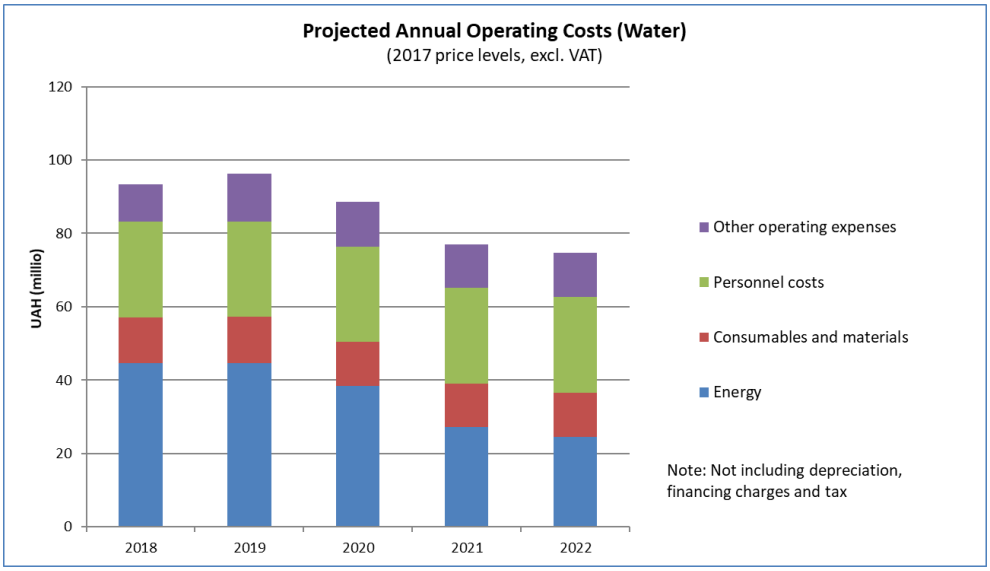

Figure 2 – Projected annual operating costs (water) at mid-2017 price levels

If future inflation is as projected by the National Bank of Ukraine (NBU) the net effect is that costs will rise in 2019 but by 2022 they will return to their 2018 levels (see Figure 3). Annex 1 sets out how we have treated inflation in our analyses.

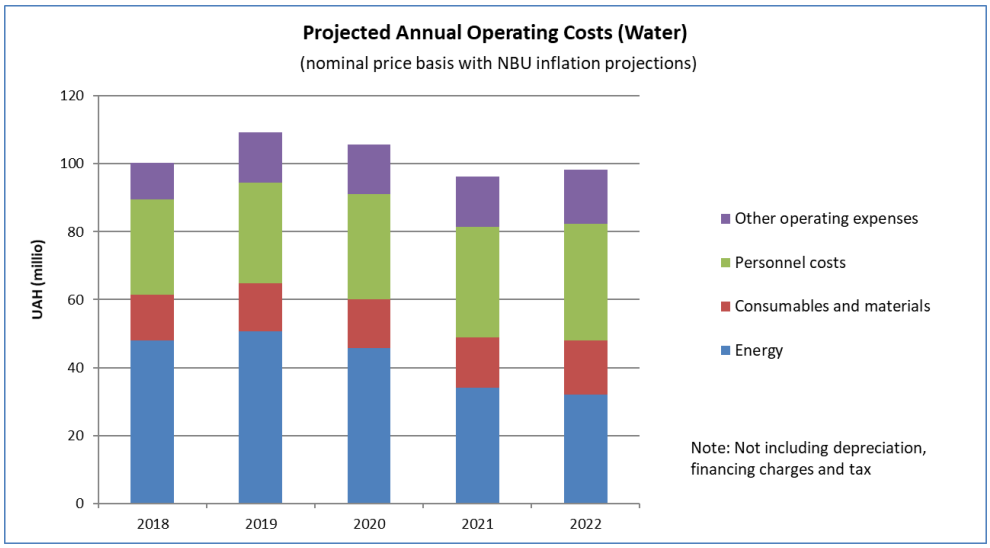

Figure 3 – Projected annual operating costs (water) at projected nominal price levels

3 OUR FUTURE COMMERCIAL ACTIVITIES

We are a consumer facing organisation. We depend on income received from consumers to meet the costs of the services we provide. We need to make sure that we are billing correctly and that we are paid. Any shortfall in billing and collection will result in reduced levels of service and increased cost burdens on the city budget. We recognise the need to improve our systems to make sure all of our consumers pay their fair share. We set out here our commercial plan comprising: improved metering and billing practices with a corresponding reduction in commercial losses, and improvements to our consumer facing activities, notably customer services, communications and complaints handling.

3.1 Metering and billing strategy

Our strategy for improving our metering and billing practices comprises:

- Improvement of consumption data management.
- Increasing the metering rate including meter calibration and anti-fraud measures (we are legally obliged[16] to undertake regular meter inspections).
- Changes to meter reading frequencies.
- Improved billing systems including the use of electronic billing and payment systems.

Table 6 sets out our metering and billing strategy for the next five years.

Table 6 – Metering and billing strategy

Activity	Inputs and costs	Benefits (financial)	Benefits (non-financial)
Improvement of consumption data management.	• Development of options for meter reading submission, e.g. through the internet. • Improved consumption estimates for un-metered consumers. • Communications with social offices.	• Reduction of commercial losses. • Reduction in waste from current un-metered consumers thereby reducing costs of supply. • Improved sales estimated to be in the order of nearly 18% greater than current sales of which more than half is estimated to be derived from changes to bulk billing of multi-apartment buildings.	• Compliance with legislation related to metering obligations. • Convenience for consumers using electronic billing and payment systems. • Improved accuracy of bills and consumer confidence.
Increase the metering rate.	• Automatic GSM meters for large consumers (approx. 5 000 meters to be installed by 2021). • Meters for un-metered premises (approx. 6 000 meters by 2022).		
Repair and calibration (or replacement) of existing meters.	• Approx. 14 000 meters per year to be calibrated (costs for this activity are not included in the tariff). • Anti-fraud measures (UAH 0,5 million over 3 years).		
Changes to meter reading frequencies.	• Bulk meters to be read less frequently from 2020.		
Improved billing.	• Printing and posting of bills to all consumers (UAH 0,13 million per year). • Electronic billing and payment systems.		

[16] According to Law of Ukraine on Commercial Accounting of Heating Energy and Water Supply #2119-VIII dated 22.06.2017.

3.2 Customer services plan

As with all businesses we need to take our customers' needs and concerns seriously. We recognise that our current consumer facing activities are not as good as they could be.

In the first instance we shall undertake an internal review of our current procedures and identify areas where improvements can be made. This review shall also be informed by household surveys and other outreach activities. We will then develop a comprehensive *'Customer relationship management manual'* that will become our guiding principles for our future customer services activities. From this we envisage the creation of a 'one-stop shop' type service where customers can approach a single point of contact for any queries.

We recognise that a current major customer concern is that they need better advance notice of any planned supply interruptions. As well as providing such information in the mainstream media we intend to set up a system where registered customers can receive interruption notices by SMS messages.

Our customer services plan for the next five years is set out in Table 7 ниже.

Table 7 – Customer services plan

Activity	Inputs and costs	Benefits (financial)	Benefits (non-financial)
Review organisation of customer department.	• Review organisation and develop customer services manual. • Create customer hotline (UAH 0,3 million).	• More timely receipt of payments. • Sensitisation of consumers for future tariff changes. • Improved reporting of system incidents from the public (e.g. bursts and leaks). • Greater understanding of consumer needs that may inform better investment planning and operational activities, e.g. water pressure issues.	• Speedier new connections. • Improved corporate reputation and visibility. • Improved service quality. • Improved convenience for dealing with CVK (e.g. quicker telephone response times, access to CVK representatives in the office etc.). • Access to technical advice when requested, e.g. commercial consumers enquiring about water quality issues.
Household surveys.	• Conduct regular household surveys (UAH 125 000 over five years).		
Establish one-stop shop for customer CVK interface.	• New fully staffed offices (set up costs of UAH 0,5 million plus UAH 0,7 million per year plus staff costs). • Training of staff. • Publicity.		
Other communications activities.	• Use of mainstream media for supply interruption notification. • Use of SMS messages for supply interruption notification (UAH 0,4 million).		

4 OUR FUTURE INVESTMENT ACTIVITIES

We set out below our planned investment programme for the next five years. The Government of Ukraine has secured a loan from KfW of EUR 17 million (equivalent to UAH 503 million at the mid-2017 exchange rate). The Government has on-lent this amount to us. This loan is for major rehabilitation of infrastructure that has been suffering from under-investment for a prolonged period. This investment will improve the levels of service (water quality, pressure, and reduced supply interruptions) and deliver significant operational cost savings through reduced losses and improved operational efficiency.

On top of this we plan to invest, from our own financial resources and with support from the city budget, UAH 175 million (at mid-2017 price levels) over the next five years.

4.1 Investment activities

A summary of the investment programme is set out in Table 8 ниже.

Table 8 – Water services investment programme 2018- 2022 (at mid-2017 price levels)

Activity	KfW funds (UAH x 1 000)*	CVK / City funds (UAH x 1 000)
Major capital investments	**502 840**	**24 437**
Mytkiv raw water Intake	30 175	
Vikno water treatment plant	42 440	
Transmission main from Shubranets to Popova	122 796	
Popov storage reservoir	16 084	
Rohizna	5 019	
Replacement of water distribution system pipes and pressure zoning	299 148	
SCADA	11 615	
Adjustment for CVK financing to satisfy loan ceiling**	-24 437	24 437
Water supply system optimisation investments		**9 426**
Replace valves (D100 to D500)		4 375
System monitoring devices and communications apparatus		3 447
Replace / additional network meters		1 604
Loss reduction and energy efficiency investments		**51 578**
Replace / rehabilitate pipes, valves etc.		18 192
Replace / additional pumps, cables and associated works		1 958
Bulk meters for unmanaged MAB		22 428
Other measures		9 000
Operating equipment* **		**83 362**
Network accessories (hydrants, anti-theft covers etc.)		2 000
Water hammer prevention equipment		1 800
Vehicles and equipment		79 562
Information technology* **		**5 204**
Information technology hardware		836
Information technology software		4 368
TOTAL	**502 840**	**174 006**
Total per year (average over 5 years)	**100 568**	**34 801**

* The KfW financed investments are estimated in EUR and converted at the mid-market exchange rate as at 30 June 2017 where EUR 1,00 = UAH 29,5788.

**The adjustment to maintain the KfW loan financed activities to the EUR 17 million cap may differ substantially from this estimate depending upon the final expenditure amounts and the prevailing exchange rate at the time of the investments.

***Many of these assets are shared with wastewater services. The total expenditure amounts on these assets have been adjusted to reflect their contribution to water supply services.

The expenditure presented here is our best estimate. Any ex-post estimation errors will be reflected in adjustments to the investment activities. The current estimates for the KfW financed activities

exceed the loan ceiling of EUR 17 million where we have assumed that we will find alternative funding for this additional amount.

4.2 KfW loan financing

The amount that we are able to borrow from KfW, through the Government, is capped at EUR 17 million. The terms of the agreement are that the loan shall be repaid over a period 20 years from 2025. We shall pay loan commitment charges of 0,25% and a total of 4%[17] interest on the outstanding balances from the first loan disbursement until the loan is repaid in full. The loan is denominated in EUR and we therefore bear exchange rate risk, i.e. if the UAH devalues against the EUR we will need to pay more in UAH to meet this commitment. These financing costs will be passed through to consumers through tariffs.

In accordance with conventional accounting procedures we will capitalise interest during construction up to the point that the asset is commissioned and add such charges to the capital value of the assets when they are entered in our asset register. An exception to this rule is the expenditure related to the refurbishment of pipelines. Much of this work shall be commissioned as the work progresses, i.e. there will be very little time between receiving disbursements and refurbished pipelines placed in service. The only capitalised interest charges on pipelines relate to advance payments and, for accounting simplicity in our business plan forecasts, such interest charges are spread uniformly over all pipeline construction activities, regardless of when they were executed.

4.3 Chernivtsivodokanal and Chernivtsi city budget financing

Until we are permitted to apply the new *'incentive regulation'* method, tariffs will be set on the basis that our allowance for capital investment is restricted to the level of depreciation plus additional funding subject to regulatory approval which cannot be assured. We recognise that the level of depreciation alone is insufficient to maintain the minimum levels of service expected. Our analysis assumes that the city budget shall make up for any decisions by the Regulator that reduces our proposals for capital investment that were intended to be financed by tariffs. At this stage we do not have any commitments from the Executive Committee of the City Council that they will meet this expectation. Should they choose not to meet our requests, some investment activities will have to be postponed or cancelled altogether and the expected levels of service may not be met.

Our analysis examines the tariff effects if all the required investments were able to be financed from the tariffs using a simplified version of the *'incentive regulation'* method. This will result in higher tariffs but a significantly reduced burden on the city budget.

4.4 Impact on capital value

In accordance with the historic cost accounting convention the water supply assets (plus 70% of shared assets) have a book written down value of UAH 29 million (UAH 420/connection). Adjusted for inflation we estimate the modern equivalent asset value (MEAV) to be just over UAH 169 million (UAH 2,400/connection). The MEAV (at 2017 price levels) is expected to climb to UAH 600 million (UAH 8 500/connection) by 2022 as a result of the new investments. This equates to about EUR 260 per connection and although low by world standards it is not exceptionally so[18].

This increase in the asset value will, in the *'incentive regulation'* method, result in the return on capital component of our required revenues to climb. This is necessary to finance future investments.

[17] KfW lends to the Government of Ukraine at an interest rate of 2%. The loan is on-lent to Chernivtsivodokanal at an interest rate of 4%.

[18] The Water and Sanitation Regulatory Authority in Kosovo set the opening regulatory asset base for the seven regional water companies in 2008 at EUR 200 (UAH 6 000) per water connection and EUR 100 (UAH 3 000) per wastewater connection. With investment in the sector and allowing for inflation this value has increased. In the United Kingdom the industry average regulatory capital value of water supply assets per consumer is approximately GBP 600 or EUR 680 (for wastewater assets this is about GBP 800 or EUR 900 per consumer)

4.5 Impacts of inflation

The capital investment programme as presented above is based on mid-2017 price levels. We anticipate inflation over the next five years that will inflate construction prices over that period and contribute to a degree of currency devaluation. This will have several consequences:

i. Construction costs will increase over the five year period but the additional UAH that the KfW loan will realise from currency devaluation may not necessarily compensate for these increased costs. Although inflation will have the impact of devaluing the UAH against the EUR the amount of devaluation, in the long run, is related to differences in inflation rather than the absolute value of inflation, e.g. if Ukraine inflation is 5% and Euro area inflation is 2% the devaluation is expected to be 3% and the additional UAH from devaluation will be less than the additional construction costs[19].

ii. This will mean that over the period of the business plan we believe it is more probable that the degree to which construction costs currently exceeds the loan ceiling of EUR 17 million will grow and thereby increase the contributions from us and the city budget.

iii. Inflation will have the effect of devaluing the depreciation provisions which will, in the historic cost accounting convention, give the impression of increased profits and will result in additional taxation. We believe this effect to be illusory; the real value of depreciation is much greater and would, in a current cost accounting convention, cancel out any additional profit[20]. The tax regime, however, does not recognise current cost accounting and additional taxation charges may result.

4.6 Investment activities and long term expectations

In a long-run steady-state condition with no demand growth and no change in level of service the net present value (NPV) of depreciation calculated on a current cost accounting basis should equal the NPV of investment in capital maintenance (the major repair and/or replacement of assets at the end of their useful lives). This concept is referred to in regulatory circles as 'broad equivalence'.

Although the KfW investment programme is largely concerned with investment in capital maintenance that is many years overdue it is not considered normative annual capital maintenance. This is referred to as 'backlog' capital maintenance and it is expected to restore the basic level of service from its current low levels. We refer to investment to improve beyond current levels of service as capital enhancement and additional to what we would normally expect to do on an annual basis if these levels of service are to be maintained.

We do not have sufficient data to accurately determine the 'correct' level of expenditure on capital maintenance. We can make a first estimate by looking at our current asset register and depreciation allowances to determine the level of depreciation calculated on a current cost accounting basis. We believe that the annual expenditure necessary to maintain service levels to be somewhere between UAH 43 million and UAH 59 million with our most probable estimate being approximately UAH 50 million[21]. This is over ten

[19] https://www.ecb.europa.eu/pub/pdf/other/ecb.ecbstaffprojections201709.en.pdf EUR area inflation is forecast to be 1,5% in 2017, 1,2% in 2018 and 1,5% in 2019. We have assumed a forecast of 1,5% thereafter.

[20] The convention of applying the historic cost convention of depreciation for tax purposes is common in most tax regimes worldwide and for business planning we have to take a view on future inflation expectations to estimate future tax liabilities. Businesses that operate in a high inflationary environment and/or are based on long life assets (such as utilities) would be expected to report their accounts on a historic cost basis for tax purposes and in addition report on a current cost accounting basis for the benefit of shareholders and regulators to provide a fair reflection of the performance of the business.

[21] A simple inflation indexation of depreciation suggests that our annual expenditure on capital maintenance should be in the order UAH 43 million based on 2017 depreciation figures. Projecting forward, however, this figure falls to just over UAH 5 million by 2022 (excluding depreciation on new investment in the period 2018 to 2022) because many assets reach the end of their accounting lives in this period. Furthermore, we employ many assets that have exceeded their useful lives but are still in use and will, at some stage, result in capital maintenance expenditure to repair or replace them. At first, we calculated depreciation on expired assets as the inflation adjusted value of depreciation according to their accounting lives. This suggested that the annual expenditure on capital maintenance should be in the order of UAH 59 million. But this calculation assumes that the actual asset lives correspond to the accounting asset lives. This is not necessarily true, especially as they are still in service long after their accounting lives. We therefore

times the historic cost accounting depreciation provision for capital maintenance of less than UAH 5 million per year. Over the last 10 years or more we have invested on average just over UAH 7 million per year, substantially less than the UAH 50 million we believe is necessary. Consequently, levels of service have fallen and although they may not have affected consumers directly they have resulted in increased losses and higher incidences of pipe and system failures. The KfW project is necessary to meet immediate needs but in the longer term we need to invest regularly in capital maintenance at a much higher level than we have done in the past to ensure that we can meet government policy objectives and the high standards our consumers expect of us.

Although the inclusion of the effects of our planned investment increases current cost depreciation by about UAH 27 million per year by 2022, the current cost depreciation of the existing assets fall from its current level of UAH 43 million to just over UAH 5 million by 2022 as a result of many existing assets reaching the end of their accounting lives during this period. The net effect is that by 2022 current cost depreciation will be just over UAH 32 million in 2022 (at mid-2017 price levels). This is still below what we believe is necessary for the longer term sustainability of a well-functioning water supply system. There is no escaping the reality that meeting our future capital maintenance needs will result in upward pressure on tariffs.

modified this calculation by adjusting the asset lives on those assets that have exceeded their accounting lives to the time between their original purchase date and now. This suggests capital maintenance should be in the order of UAH 51 million.

5 TARIFF ADJUSTMENT PLAN

We have estimated tariffs on the basis of the current *'cost plus'* method and also in accordance with the new *'incentive regulation'* method. To apply the 'incentive regulation' method without having to go through the complex and costly asset revaluation exercise required by law, we have based our calculations on assumptions of asset valuations using inflation indexation on our asset register as the principal revaluation method.

For each of the two methods, we have calculated alternative scenarios based on modifications of the regulatory framework we deem necessary to deliver the best benefit to our customers and technical and economic long-term sustainability in maintaining and improving our levels of service. We have determined the tariffs on the basis of costs set to satisfy our revenue requirements.

In our analysis we have just considered water supply tariffs based on the costs and sales of water in the period of the business plan. We currently hold a significant level of accounts payable, largely outstanding electricity bills. We have plans over the next five years to resolve these outstanding accounts but they are not included in the calculations that form the basis for this business plan and our projected financial statements. In accounting terms these costs have already been incurred and their settlement is expected to come from future profits. A failure to generate sufficient profits could threaten our plans in this regard.

Important:

- **In our analysis below we present tariffs in 2017 price levels. The actual tariffs that will be applied will need to be adjusted for future inflation.**
- **All tariffs presented here exclude Value Added Tax (VAT).**

5.1 Tariff projection using the '*cost plus*' method

We are currently only permitted to determine tariffs using the prescribed 'cost plus' method which allows for depreciation but only in accordance with the historic cost accounting convention. This calculation is based upon our best estimates of future costs and sales projections. We have also considered the Regulator's process that adjusts sales upwards to reflect a maximum permissible level of NRW. As is presented in this chapter, the financial consequences of this approach are severe and in our case, with ageing water supply infrastructure in need of rehabilitation, result in significant financial losses and a lack of available funding for investment. To maintain even the most basic level of service we rely heavily on financial support from the City Council.

5.1.1 The '*cost plus*' method

We are a natural monopoly and as such our activities are governed by many legal and regulatory provisions, the principal one being the Law of Ukraine on Natural Monopolies[22]. This law states that, the prices (tariffs) for goods produced (sold) by utilities that are considered to be natural monopolies are subject to state regulation. This means that we are obliged to determine our tariffs in line with the procedures for tariff formation as stipulated by the relevant national regulatory authority, the '*Commission for State Regulation of Energy and Public Utilities'*, (the Regulator) [23]. Our tariff applications are subject to regulatory approval.

The '*cost plus*' method relies on the use of standardised norms for specific calculation parameters. In exceptional circumstances where parameters cannot be readily defined through norms they are determined on the basis of economically justifiable data from prior years.

[22] Law of Ukraine on Natural Monopolies #1682-III dated 20.04.2000.

[23] The Order of '*cost plus*' tariff calculation was approved in NEURC Resolution #302 dated 03.10.2016 "On approval of the Order of formation of tariffs for centralized water supply and wastewater" and NEURC Resolution #364 dated 24.03.2016 approving the procedure for setting tariffs for centralized water supply and wastewater.

For us, the application of norms for non-revenue water (NRW) is our biggest challenge. These norms require that the total NRW (including physical, operational and commercial losses) that is taken into account when calculating tariffs must not exceed specified approved limitations. These NRW limitations are specified in two national decrees[24] promulgated by the Ministry of Regional Development, Construction and Housing (MINREGION). Based on these decrees, the Regulator determines for each of its licensees '*Individual Technical Norms for Drinking Water*' (the 'NRW norms'). They are set out in specific resolutions for each Vodokanal. For us the NRW norms were approved in NEURC Resolution #1441 dated 19.08.2016[25].

The application of these norms means that, regardless of the actual volume of water losses, the annual projected volume of water sales is determined from the amount of water abstracted less the NRW norms. For us the allowable volume of NRW currently amounts to a maximum of 420 m^3 per 1 000 $m^3$of raw water abstraction[26]. In recent years the actual volume of water losses was nearly 60% greater than the maximum allowable as set by the Regulator.

The application of these NRW norms results in a tariff calculation that is based on inflated sales volumes. In recent years (2014 to 2017) actual annual sales averaged 8,8 million m^3 whereas tariffs were determined on an assumed annual average of 14,7 million m^3 (water abstraction less the maximum permissible level of NRW). This unrealistic inflation of sales volumes depresses tariffs well below costs resulting in significant financial shortfalls.

The application of regulated norms is not confined to NRW. The Regulator considers actual prior years' expenditure on items such as energy, chemicals, staffing and many more besides. This means that we are limited in our ability to undertake new activities (or greatly enhance them) if our earlier provisions for them were nil or very small. For example, if our training budget was very small in previous years this will set the allowance for future training budgets even though we recognise that our training budget has to be increased. Although we expect the Regulator to challenge our submission over many items, including but not limited to the training budget example above, we shall present arguments to persuade the Regulator to accept our proposals. The tariff projections as set out in this business plan assume that the Regulator is sympathetic to our arguments and our proposals are permitted to be included in future tariff applications. If the Regulator is unresponsive and tariffs are depressed even further the level of service will undoubtedly fall and /or the CVK will need to call upon the City Council for significant financial support.

5.1.2 Investment planning under the '*cost plus*' method

The '*cost plus*' method obliges utilities to submit an annual investment programme as part of their tariff application to the Regulator. The sources of finance for these investment programmes include[27]:

- licensee's own funds[28],
- borrowed funds - bond issues, bank loans,

[24] MINREGION Decrees #180 on "Approval of the method for the calculation of drinking water losses by utilities providing centralized water supply services" dated 25.06.2014 and #181 on "Approval of the method for the calculation of technological water use by utilities providing centralized water supply and/or sewerage services".

[25] Before the current NRW norms were established by the Regulator, other norms were in place that were approved by the Executive Committee of the Chernivtsi City Council. The amount of maximum allowable NRW is nearly identical in both sets of norms.

[26] This is broken down into:

- Physical and commercial water losses in the water supply system: max. 300 m3 per 1 000 m3 of raw water extracted.
- Operational water losses in the water supply system: max. 120 m3 per 1 000 m3 of raw water extracted (these operational losses are commonly referred to as "technological use". They include for example water used by a Vodokanal to flush pipes, or clean filters in treatment plants, etc.) and
- Operational water losses in the sewage system: max. 0,34 m3 per 1 000 m3 of wastewater discharged.

[27] Up until 10.10.2017, to develop their annual investment programmes, licensees of NEURC used the *"Procedure for development, coordination and approval of investment programs of entities in the water supply and sanitation sector"* (Approved in MINREGION Decree #630 on 14.12.2012 and NEURC Decision #381 dated 14.12.2012). Starting 11.10.2017, a new procedure is applicable, approved in NEURC Resolution #1131 dated 14.09.2017 ("*Procedure for 'cost plus' investment programme*").

[28] Funds received by the licensee from its licensed activities from which investments can be financed from provisions for: depreciation of fixed and intangible assets, industrial investments with profits funds to the extent provided in prescribed fees for the investment program, and other income derived from the economic activities related and not related to the licensed activity.

- attracted funds - cash received from sale of shares, attracted under financial leasing, mutual and other contributions from individuals and legal entities, investors, grants, and
- budget.

We are expected, as a minimum, to invest to a level equivalent to our annual depreciation. We can invest beyond this level using funds from planned profits and other sources. Planned profits may additionally include budgets to:

- repay loans;
- provide a return on capital for equity owners; and
- reimburse profit tax.

Our investment programme needs to be approved by the Executive Committee of Chernivtsi City Council. It is submitted as part of the annual tariff application to the Regulator for approval. If our submission is late we could be penalised by the Regulator by a reduction in the allowable planned operational expenditures (repair costs) by the amount of planned depreciation in the approved tariffs.

In recent years we have chosen to limit our planned investment to the level of depreciation due to our weak financial circumstances and that any application for additional profit was most likely going to be rejected by the Regulator.

Since the new procedure for '*cost plus*' investment programme preparation, applicable from 11.10.2017, we are only allowed to include profit for reinvestment in our submissions if:

- we have implemented at least 90% of our prior year's planned investment programme,
- we kept losses within the levels stipulated by the NRW norms, and
- we have the written support of the City Council.[29]

This new requirement and the continued use of the '*cost plus*' method, including the application of the NRW norms, prevents us from including profit for reinvestment into our future tariff applications and annual investment programmes.

We are concerned that by setting tariffs on the basis of limiting investment expenditure to the value of depreciation or allowing it to exceed this value under the title of 'profit for investment', which is planned investment less depreciation, effectively restricts our ability to repay loans, in particular the KfW loan. Guidance from the Regulator is unclear on this issue. Consequently, without an allowable return on equity included in the tariffs (which will allow us to build up cash reserves from which we can repay loans) we shall be faced with little choice but to forego capital maintenance (funded from depreciation provisions) and /or cut costs in other areas which would have a serious adverse impact on levels of service. The alternative *'incentive regulation'* method provides for a return on equity and effectively resolves this issue.

5.1.3 Tariff adjustment plan 2018-2022 following the '*cost plus*' method

We present our tariff proposals using the '*cost plus*' method below. We have considered two scenarios:

- **Option 1a**: Tariffs set on the basis of unrealistically inflated sales projections (sales calculated as the difference between water abstraction and the Regulator's limit of NRW to 42% of water extraction), and,
- **Option 1 b**: Tariffs set on the basis of our realistic projections of sales.

We have calculated estimated tariffs for the period 2018 to 2022, see Figure 4.

Important: The tariffs as presented here are based on mid 2017 price levels and the actual tariffs that will be applied will be increased according to inflation. The tariff rates presented here exclude VAT.

[29] Excluding funds for repayment of debt under agreements with international financial institutions.

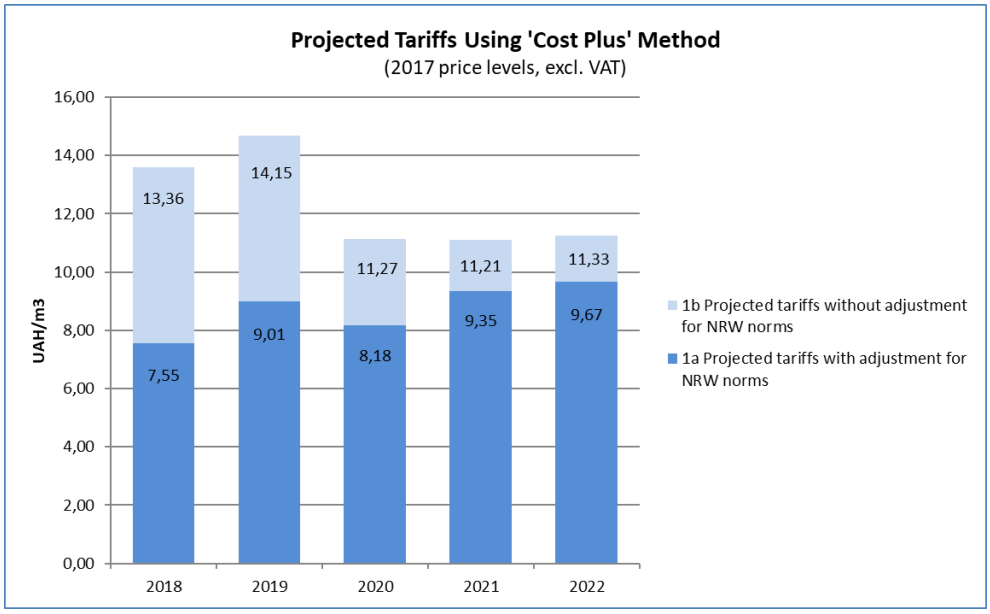

Figure 4 – Projected tariffs using '*cost plus*' method with and without adjustment for NRW norms

In Chapter 6 we examine the resulting profitability and cash flows of these two scenarios as well as those resulting from the alternative '*incentive regulation*' method. The difference between the two options is stark. The practice of inflating sales values according to the Regulator's norms results in significant and prolonged financial losses, on average nearly UAH 35 million per year (see Table 9). Even without adjusting sales according to the NRW norms the profitability starts off positive but becomes loss making once the interest charges to KfW materialise.

The application of the NRW norms in the '*cost plus*' method effectively depresses tariffs to levels well below the required revenue. While we understand that this method is intended to provide an incentive to reduce losses, in reality it has an opposite effect by starving utilities like ours of the finance we need to repair our infrastructure, resulting in increased NRW and low levels of service. Although our business plan includes a significant investment in water loss reduction activities we will not satisfy the Regulator's minimum expectation, and adjusted tariffs in 2022 will still be below the revenue we require to cover our costs. In summary, without substantial financial support from the City Council we will be unable to fulfil this plan.

5.2 Tariff projection using the alternative '*incentive regulation*' method

The Regulator has established an alternative method for determining tariffs based loosely on internationally accepted regulatory principles of setting tariffs based on the recovery of a revenue requirement ('*incentive regulation*' method). This revenue requirement is made up of operational costs, capital maintenance and a return on capital.

The operational costs are self-evident and include all the direct and indirect operational costs of providing the service, but exclude depreciation and finance charges.

Capital maintenance is regular investment in the major repair and/or replacement of assets at the end of their useful lives. There are many ways to determine capital maintenance[30] expenditure, the most common of which is to apply current cost depreciation (depreciation adjusted for inflation). We have

[30] An alternative method of determining capital maintenance requirements is to employ 'infrastructure renewals accounting'. This involves a forward looking approach to estimate projected actual expenditure necessary to maintain levels of service rather than rely on a depreciation provision. This approach is normally confined to the network assets, pipelines in general, where their useful lives are largely indeterminate. We understand that the Regulator has not adopted the concept of infrastructure renewals accounting' in its alternative approach.

examined our asset register and have determined a first estimate of current cost depreciation to be in the order of UAH 43 million per year although we believe the actual needs to maintain (or improve) levels of service to be nearer UAH 50 million per year.

Return on capital is a subject of significant debate in regulatory circles. This is dependent on two principal numbers: the regulatory asset value (RAV), and the rate of return on capital. We understand that the Regulator will determine the MEAV at the start of the incentive regulation process which will be based on a revaluation of the utility's assets. This value will be adopted as the opening RAV. This revaluation exercise is time consuming and expensive requiring extensive professional input. For our calculations in this business plan we have estimated the MEAV by applying an inflation indexation adjustment to the asset values as set out in the asset register. This results in an opening RAV (start 2017) of UAH 169 million, but this is expected to increase significantly with new investment throughout the business planning period. Although this approach appears logical it may not necessarily reflect the true value of the utility and how the assets were financed. In many other regulated regimes the opening RAV does not necessarily bear any relation to the MEAV[31]. To illustrate how this approach may work we have considered an alternative approach of setting the opening RAV to a lower level than the MEAV. We have tested tariffs with an opening value of UAH 1 000 per connection giving an opening RAV of approximately UAH 70 million, UAH 100 million less than our preliminary estimate of the MEAV. With new assets entering our asset register this opening RAV will, in our example, converge over time towards the actual MEAV. This process has the advantage of avoiding short term tariff shocks although, as new investment is added to the RAV, tariffs will increase over time. This process will result in reduced cash flows for CVK and an increased dependence on borrowing until the RAV reaches a level sufficient to finance investment from our own financial resources.

We understand that the Regulator has directed that the return on the RAV be set at 12.5% (real) as a reflection of current bank rates. We have applied this rate to the model and it realises very generous returns but at higher tariffs. We have applied an alternative return on capital of 5% real[32] (to our modified opening RAV) and have determined that this will realise tariffs sufficient to meet our needs but not so high as to impose potential hardship on our consumers. As mentioned earlier we have a significant level of accounts payable which may need to be settled within the period of this business plan. Once we have determined the cash implications of this settlement we may need to reconsider this return on RAV to ensure positive cash flows sufficient to settle these dues.

The Regulator's assessed return on capital is post-tax. Consequently we have adjusted the pre-tax cost of capital used in the model that returns a post-tax return in accordance with the Regulator's specified rate of return.

The outcome of the '*incentive regulation*' method (at mid-2017 price levels and excluding VAT) using the Regulator's criteria and our adjusted criteria are illustrated in Figure 5 ниже.

[31] When the water industry in England and Wales was privatised the opening regulatory capital value (RCV) was set at the 200 day average of market capitalisation thereby letting the market determine the value of the utilities. This resulted in an opening RCV of 1/10th of the MEAV. In Kosovo the opening regulatory asset base (RAB) was set at EUR 200 per connection for water and EUR 100 per connection for wastewater. No attempt was made to determine the values based on revaluation of assets. In Northern Ireland the opening RCV was debated within a range of GBP 0 to GBP 3 billion and the regulator ultimately settled on GBP 1 billion exactly as the opening RCV.

[32] A 5% real return on capital is more in line with returns allowed for by utility regulators and many other countries, e.g. UK water regulators have applied returns ranging from 3,5% real to 5,5% real over the last 20 years, and Kosovo has applied rates of 5,3% and 4% in recent years. Ofwat, the water industry regulator in England and Wales, is currently reviewing the allowed return on capital and although no official announcement has been made at the time of preparing this business plan, the expectation is that it will be set at 2,4% (real) reflecting the current low and persistent real interest rates.

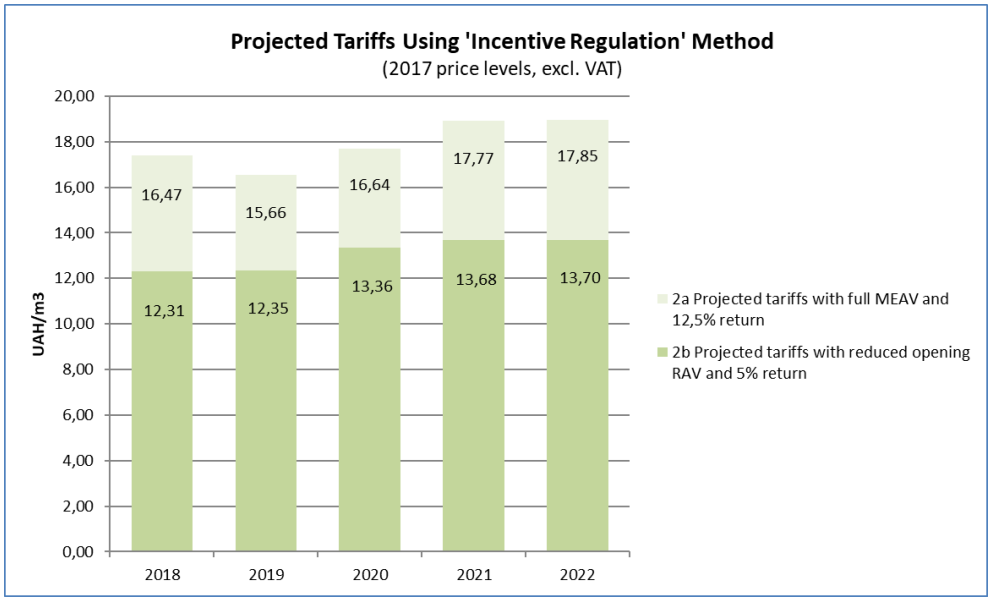

Figure 5 – Projected tariffs using '*incentive regulation*' method (incl. modified alternative)

Our alternative approach of a lower opening RAV and a reduced return on capital provides a lesser price shock to consumers in the early years and even with the new investments the tariffs are relatively stable in real terms throughout the business planning period. Although the Regulator's approach to determining the RAV and the return on capital will be good for us as a business we are not convinced it is in the best interests of our consumers. We therefore propose an opening RAV that is substantially lower than the MEAV and a real return on capital of 5% as opposed to the 12.5% as currently suggested by the Regulator.

Chapter 6 examines profitability and cash flow for these two options.

6 PROJECTED FINANCIAL STATEMENTS

In this section we present our projected financial statements of profit and loss and cash flow for the water side of our business.

6.1 Accounting conventions applied

In preparing these forecast statements we have applied the following conventions:

6.1.1 Water only business

We have prepared these financial statements for the water supply side of our business. We have not produced a similar business plan for our wastewater activities.

6.1.2 Nominal prices, depreciation and taxation

Although our tariff analysis is based on real (2017 base year) as opposed to nominal prices we have prepared our projected financial statements on nominal prices using NBU inflation projections. This is necessary to determine our potential tax liabilities which are based on the historic cost accounting convention.

We have assumed that net income after costs, depreciation and finance charges will be subject to taxation. We have made no provision for any carry forward of past losses to offset tax liabilities.

Tax is determined on the basis of the business as a whole (water supply and wastewater) and any losses on our wastewater activities will offset any profits on our water supply activities. Consequently, we expect that we may have overstated to some degree our tax liabilities in this plan but at this stage we cannot determine by how much. Our analyses exclude VAT.

6.1.3 Exceptional income and expenditure

Although we have plans for settling accounts payable we have disregarded these with respect to the profit and loss and cash flow statements. These settlements will have an impact on the cash flow and, and subject to the approval of the Regulator, we may need to adjust tariffs to both meet these settlements and still deliver everything we have set out to do in our business plan.

6.2 Profit and loss projections

Our summarised projected profit and loss statements for the four scenarios (Options 1a, 1b, 2a and 2b) are presented in Table 9 to Table 12 below. All figures are adjusted according to NBU inflation projections and expressed in UAH x 1 000.

Table 9 – Projected profit and loss: 1a '*cost plus*' method (with adjustment for NRW norms)

(all figures nominal UAH x 1 000)	2018	2019	2020	2021	2022
Income					
Income from water sales	73 514	100 414	97 716	118 634	130 267
Expenditure					
Operating costs	(100 309)	(109 226)	(105 576)	(96 183)	(98 249)
Financing costs excluding interest	(4 775)	(896)	(473)	(105)	(11)
Earnings before depreciation, interest and tax (EBDIT)	(31 570)	(9 708)	(8 334)	22 345	32 006
Depreciation	(4 551)	(9 914)	(20 898)	(31 115)	(32 741)
Earnings before interest and tax (EBIT)	(36 121)	(19 622)	(29 232)	(8 770)	(735)
Interest		(1 945)	(9 377)	(27 797)	(39 501)
Earnings before tax (EBT)	(36 121)	(21 567)	(38 609)	(36 568)	(40 235)
Taxation					
Net earnings	(36 121)	(21 567)	(38 609)	(36 568)	(40 235)

Table 10 – Projected profit and loss: 1b '*cost plus*' method (without adjustment for NRW norms)

(all figures nominal UAH x 1 000)	2018	2019	2020	2021	2022
Income					
Income from water sales	132 305	163 710	133 236	140 941	151 550
Expenditure					
Operating costs	(100 309)	(109 226)	(105 576)	(96 183)	(98 249)
Financing costs excluding interest	(4 775)	(896)	(473)	(105)	(11)
Earnings before depreciation, interest and tax (EBDIT)	27 221	53 587	27 186	44 652	53 290
Depreciation	(4 551)	(9 914)	(20 898)	(31 115)	(32 741)
Earnings before interest and tax (EBIT)	22 669	43 674	6 288	13 537	20 549
Interest		(1 945)	(9 377)	(27 797)	(39 501)
Earnings before tax (EBT)	22 669	41 728	(3 089)	(14 261)	(18 952)
Taxation	(4 081)	(7 511)			
Net earnings	18 589	34 217	(3 089)	(14 261)	(18 952)

Table 11 – Projected profit and loss: 2a '*incentive regulation*' method (full MEAV and 12,5% return)

(all figures nominal UAH x 1 000)	2018	2019	2020	2021	2022
Income					
Income from water sales	169 298	184 341	211 318	240 148	255 489
Expenditure					
Operating costs	(100 309)	(109 226)	(105 576)	(96 183)	(98 249)
Financing costs excluding interest	(4 775)	(896)	(473)	(105)	(11)
Earnings before depreciation, interest and tax (EBDIT)	64 214	74 218	105 268	143 859	157 229
Depreciation	(4 551)	(9 914)	(20 898)	(31 115)	(32 741)
Earnings before interest and tax (EBIT)	59 663	64 305	84 370	112 744	124 488
Interest		(1 945)	(9 377)	(27 797)	(39 501)
Earnings before tax (EBT)	59 663	62 359	74 993	84 946	84 987
Taxation	(10 739)	(11 225)	(13 499)	(15 290)	(15 298)
Net earnings	48 924	51 135	61 494	69 656	69 690

Table 12 – Projected profit and loss: 2b '*incentive regulation*' method (reduced opening RAV and 5% return)

(all figures nominal UAH x 1 000)	2018	2019	2020	2021	2022
Income					
Income from water sales	119 759	137 696	159 720	173 616	184 512
Expenditure					
Operating costs	(100 309)	(109 226)	(105 576)	(96 183)	(98 249)
Financing costs excluding interest	(4 775)	(896)	(473)	(105)	(11)
Earnings before depreciation, interest and tax (EBDIT)	14 674	27 574	53 671	77 327	86 251
Depreciation	(4 551)	(9 914)	(20 898)	(31 115)	(32 741)
Earnings before interest and tax (EBIT)	10 123	17 660	32 773	46 211	53 510
Interest		(1 945)	(9 377)	(27 797)	(39 501)
Earnings before tax (EBT)	10 123	15 714	23 396	18 414	14 010
Taxation	(1 822)	(2 829)	(4 211)	(3 315)	(2 522)
Net earnings	8 301	12 886	19 184	15 099	11 488

In accordance with the accounting regulations the profit and loss for the *'cost plus'* arrangement is, by definition, nearly profit neutral, i.e. revenue is projected to approximately equal costs[33]. If tariffs are

[33] Revenue does not necessarily equal costs in this method as additional investment over and above depreciation levels does not get recorded as a cost and only the depreciation component of this investment is carried to the profit and loss statement.

adjusted in accordance with the process with respect to norms for losses we shall incur significant financial losses.

On the other hand, the *'incentive regulation'* method delivers significant profits but at the expense of high tariffs. By adjusting the RAV and the return on capital to levels that we consider more appropriate we can still generate profits but at much lower tariffs.

6.3 Cash flow projections

The profit and loss statements do not necessarily tell the complete picture. These statements do not capture the most important financial aspect of our business, i.e. cash flow. Out of these profits we are expected to finance investment, either from our own resources or being able to finance loans.

Our business plan examines cash flow as the net cash available after cash costs, excluding depreciation but including: loan income, investment expenditure, finance charges and taxation. We have examined cash flow from a starting point of zero for the start of 2018. We have not considered any cash flow position prior to this date. We have not included the cash flow implications of settling accounts payable, in particular our outstanding accounts for electricity charges. For the four models above the cumulative cash flow over the business plan period are illustrated in Figure 6 ниже.

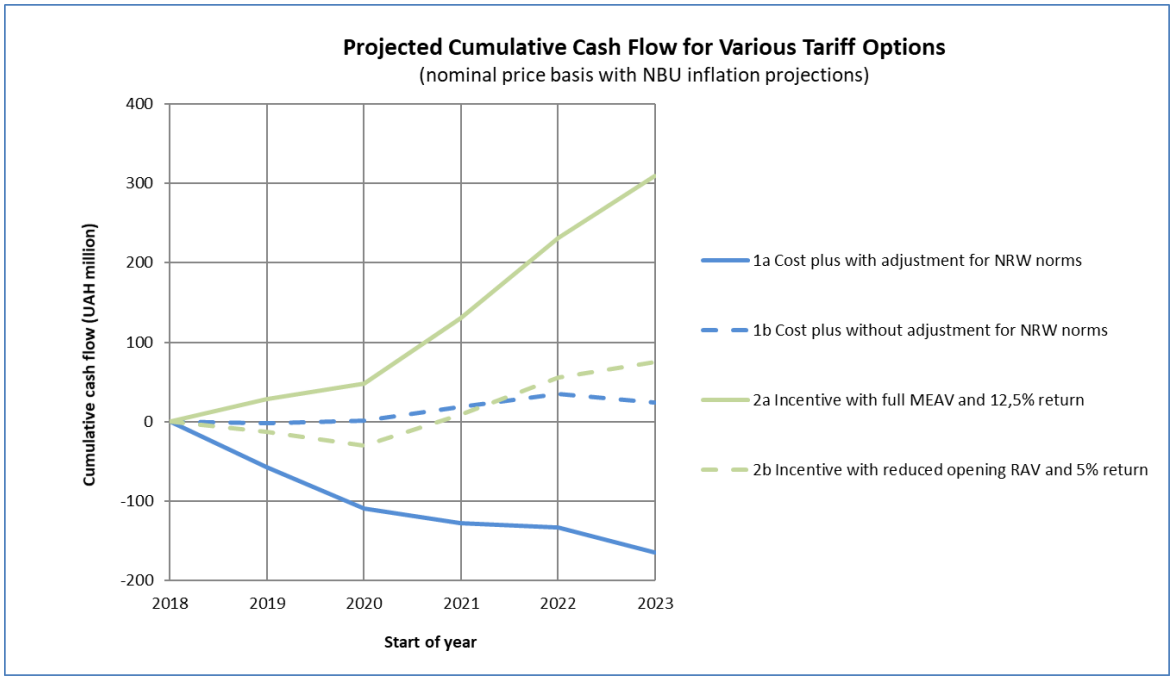

Figure 6 – Projected cumulative cash flow for all four tariff options

The '*cost plus'* method with the Regulator's adjustment for norms on losses will place a severe strain on our cash flow and we will have little choice but to seek financial support from the City Council or to abandon much of our planned investment programme which, in turn, will result in falling levels of service. At the other extreme the '*incentive regulation*' method will deliver a continual and growing positive cash flow, possibly in excess of our needs.

The '*cost plus'* method without adjustments for losses will, by definition, in the long run deliver a net neutral cash flow but this is likely to restrict our ability to invest and improve levels of service in the future.

The '*incentive regulation*' method with an adjusted RAV and a lower return on capital will generate longer term positive cash flows without imposing high tariffs on our consumers. We consider this approach to be in the best overall interests of our business and our consumers. We suggest to pilot our alternative proposal for the '*incentive regulation*' method in Chernivtsi with the intention to provide the Regulator with the evidence needed for the revision of the national regulatory framework.

ANNEX 1 INFLATION IN OUR COST PROJECTIONS

In determining costs we have to allow for past and future inflation. Our cost projections are both nominal (based on actual costs expected after making due allowance for expected inflation) and real (all costs fixed at base year price levels. Where we adjust costs from past levels to current base year price levels we use published inflation statistics from the *'State Statistics Service of Ukraine'* and for future inflation expectations we apply projections from the *'NBU's Inflation Report, July 2017'*[34].

Table 13 – Rationale for treatment of past and projected inflation in planning models

Expenditure item	Adjustment for real (2017 base year price levels)	Adjustment for nominal prices
Operating costs		
Cash operating costs	Where rates and costs for 2017 are known they are applied and they are assumed constant in real terms for the period of the plan. If rates and costs for 2017 are not known use 2016 rates and costs for 2016 and inflate them to 2017 price levels (the conversion factor we use is the mid-year to mid-year inflation which we calculate to be in 11,5%).	Real costs are converted to nominal price levels by applying projected mid-year to mid-year inflation projections from the NBU.
Depreciation of existing assets (2017 and earlier)	Real depreciation is determined by the indexation of depreciation from the year of purchase or construction using past inflation indices in accordance with the current cost accounting convention. Future depreciation on existing assets is based on the extrapolation of current cost depreciation but not adjusting for future inflation.	Nominal depreciation is calculated on the basis of extrapolation of the current depreciation calculation from our asset register where depreciation is calculated on the historic cost accounting convention.
Depreciation on new investments (2018 onwards)	New investments are projected at base year prices. Projected depreciation is based on these investments without inflation adjustments.	Future investment is adjusted for projected inflation using mid-year to mid-year inflation projections from the NBU. Depreciation is calculated from these inflated investment values.
Asset values on past investments (2017 and earlier)	Asset values are adjusted using past inflation indices in accordance with the current cost accounting convention.	Asset values based on historic cost accounting conventions and based upon an extrapolation of the asset register for future years.
Asset values on new investments (2018 onwards)	New investments are projected at base year prices.	Future investment is adjusted for projected inflation using mid-year to mid-year inflation projections from the NBU.
Interest and finance charges on KfW investments.	Interest and finance charges are fixed in EUR. We assume that exchange rate movements will reflect differences in EUR:UAH exchange rates and plus adjustments to reflect EUR area inflation projections to determine the real cost of interest and finance charges.	Interest and finance charges are set in EUR and converted to EUR on the basis of differences in EUR area and Ukraine differences in currency devaluation based on inflation expectations.

[34] https://bank.gov.ua/doccatalog/document?id=51889287 . The report states: *"The NBU left its inflation projections unchanged for 2017-2019 at 9,1%, 6,0%, and 5,0%, respectively. The inflation forecasts remain within the* ***target levels*** *(8% ± 2 pp for 2017, 6% ± 2 pp for 2018, and 5% ± 1 pp for 2019 and in future years) set in the Monetary Policy Guidelines for 2017 and the medium term."* We have adopted inflation for 2017 as 9,1%, 2018 6% and 5% thereafter. Mid-year to mid-year projected inflation rates are therefore: 2017-2018 (7,55%), 2018-2019 (5,5%) and thereafter (5%).