PwC Advisory

Cost Plus Tariff Methodology in Water Sector

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Contents

Introduction

We provide wide range of Regulatory services to both government and business entities

We focus on the following aspects of the utilities regulation:

- Regulatory strategy
- Sector policy
- Competition policy
- Retail price regulation
- Cost modeling, losses modeling, investments modeling
- Comparative efficiency analysis
- Regulatory accounting, separation, unbundling support
- Legislation development

We have experience in various areas of the regulation, strategy and operations in the energy and utilities sector

Electricity

- Regulatory legislation
- Tariff setting
- Due diligence and independent review
- Risk assessment, business continuity and operations
- Alternative energy sources and energy efficiency
- EU Emission Trading System

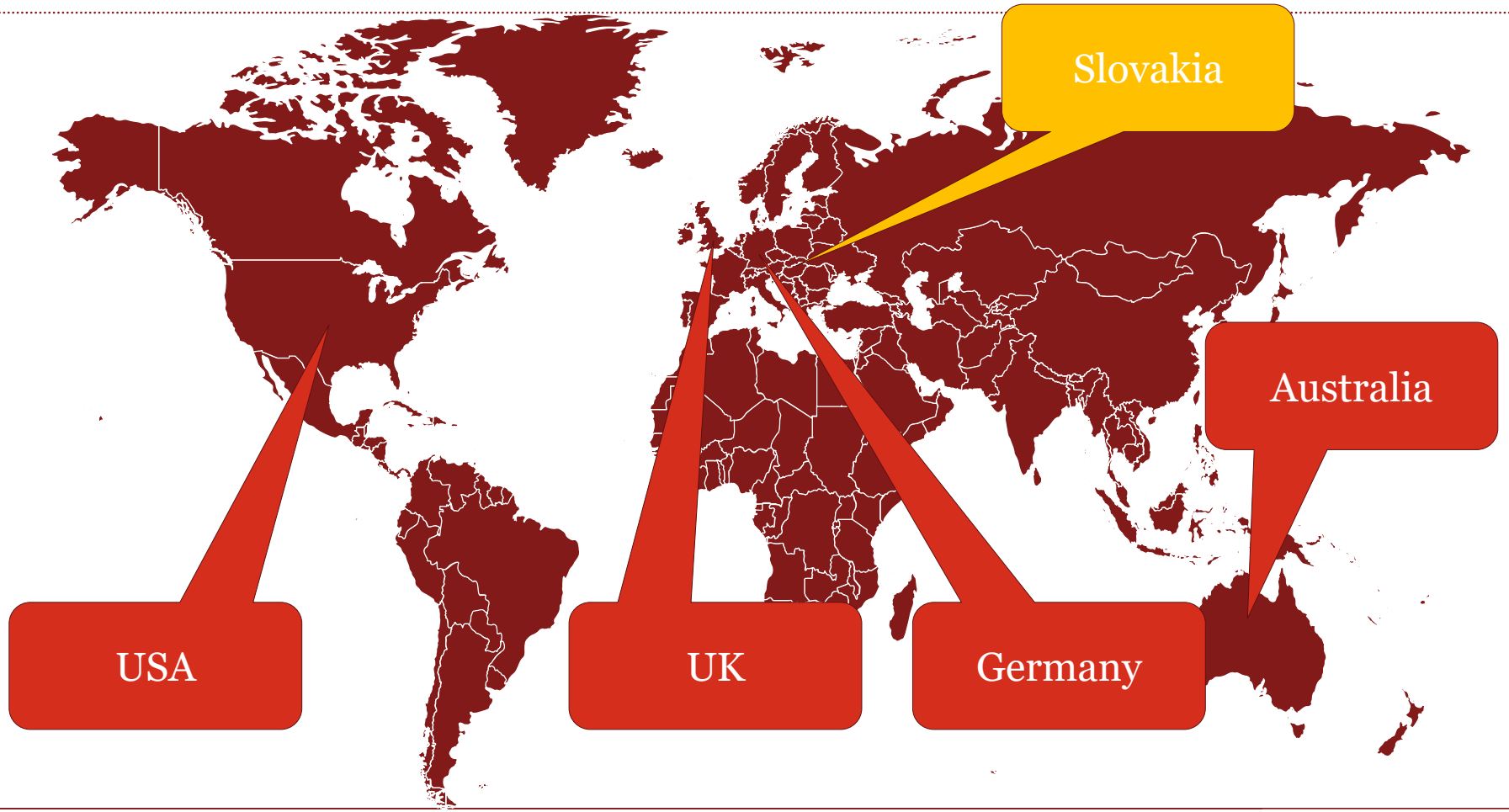
Gas

- Regulatory legislation
- Tariff setting
- Due diligence

Water

- Regulatory legislation
- Regulatory policy review
- Management reporting and KPIs

We have experience in various areas of the regulation, strategy and operations in the energy and utilities sector



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Ivo is Partner based in PwC's Bratislava office with 15 years of international experience assisting major companies and regulators in Europe, Asia and Australia.

He currently leads our Center of Excellence for the Economic regulation in CEE. Before joining PwC, Ivo worked as a manager responsible for Cost Accounting and Management Reporting in the Czech Telecom. Ivo's clients include major energy and utilities companies and regulators present across CEE including groups such as E.ON, RWE, EdF and CEZ and national regulatory authorities in Slovakia, Czech republic, Albania, Lithuania, Romania and in CIS countries. He also works directly for European Commission and other European Union bodies.

Ivo has specific skills in regulatory framework setting and cost modelling, management cost accounting, strategy management, performance improvement. He worked on projects of development and implementation of regulatory policies in energy sector, including the EC's Third Energy Package. Ivo also worked on regulatory due diligence assignments as part of the major transactions in the water, gas and electricity sectors.

Executive summary

Executive summary (1/2)
Overview

We have analyzed current water tariff methodology applied in Georgia, and compared it to the EU best practice. We identified several gaps between the EU best practice and current methodology, while we have also included preliminary suggestions of measures, which would align Georgian water tariff methodology with the EU best practice, while taking into account national specifics.

Basic principles

Basic principles of water tariff regulation in Georgia appear to be in line with the EU best practice, however the application significantly differs. There is also a lack of transparency over actual tariff calculation compared to the best practices.

Cost recovery principle

Full cost recovery principle as described in the relevant legislation should provide sufficient reimbursement of water company's costs incurred in provision of regulated services. This approach is aligned with EU water directives.

Regulatory period

Duration of the regulatory period is not fixed, which creates uncertainty and limits private investors appetite to invest. This is one of the major differences in comparison with the EU countries.

Allowed profit

The calculation of allowed profit applied in Georgia is not in line with standard practices in EU or other countries.

Environment protection

Water tariffs in Georgia include costs related to the environmental protection and pollution. These charges are present in the EU countries as well.

Losses

Technological and commercial losses in Georgia are allowed based on the norms, which are not supported by independent expert studies.

Social factors

Calculated water tariffs in Georgia should take into account the social situation of customers by specific allocation of cost of service. It is not clear how this principle is applied in practice as uniform tariffs apply to whole population.

Eligible costs

The extent of eligible costs included in the Georgian water tariff calculation can be considered in line with the EU standards, however some items are capped, which is not a common practice.

Investment and efficiency support

It is a common practice to support investments and efficiency improvements. We have not identified these measures in Georgian legislation.

Correction factors

Tariff correction factors described in Georgian regulation appear to be similar to the ones applied in EU countries, but are capped by thresholds, which prevent their application in practice.

Tariff structure

Tariffs in Georgia are set separately for the households and industry, similarly to the EU countries, but prices are very different.

Executive summary (2/3)
Country specifics

We have analyzed current water tariff methodology applied in Georgia, and compared it to the EU best practice. We identified several gaps between the EU best practice and current methodology, while we have also included preliminary suggestions of measures, which would align Georgian water tariff methodology with the EU best practice, while taking into account national specifics.

Infrastructure development needs

Only 78 percent of urban households are connected to a piped water and sewerage system, and only five out of 29 wastewater treatment plants have marginal functionality.

Supplies even in the urban areas are often interrupted.

Signature of EU association agreement creates new requirements driving the need for large investments in the area of:

- Water quality
- Water resources management
- Wastewater treatment
- Environmental protection

Efficient use of water resources

Until September 2010 the water metering was voluntarily for population.

Currently still large proportion of water users are not equipped with meters.

The current low water tariffs do not provide incentives for investments into the meters.

The low fines for water stealing do not discourage the potential misusers and contributes to the high level of commercial losses.

The underinvested infrastructure results into high technical losses.

Geographical challenges

Georgia is very mountainous country with very complex geographical setting.

Costs of supplying water to different areas varies significantly especially due to higher pumping costs to high elevation areas.

Cross-subsidy of business vs. residential segments

Currently the water tariffs for the business sector are 20 times higher than the similar tariffs for metered residential customers.

The low residential tariffs do not allow cost recovery and therefore are not in line with basic principles of tariff regulation.

Privatization agreement

The Share Purchase Agreement related to the privatization of GWP in 2008 set rules for regular tariff reviews and expected tariff increases.

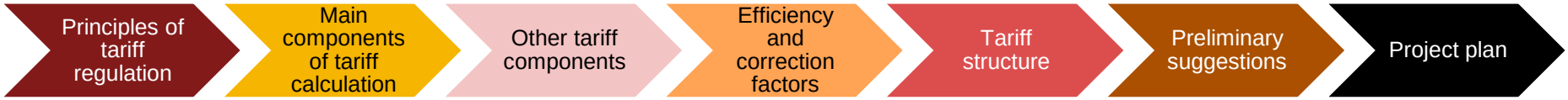
Executive summary (3/3)
Preliminary suggestions

We have analyzed current water tariff methodology applied in Georgia, and compared it to the EU best practice. We identified several gaps between the EU best practice and current methodology, while we have also included preliminary suggestions of measures, which would align Georgian water tariff methodology with the EU best practice, while taking into account national specifics.

Preliminary suggestions:

- **Tariff calculation transparency –** Robust methodology to calculate the Weighted Average Cost of Capital should be introduced. The calculation and the underlying parameters should be made transparent.
- **Multi-year regulatory period introduction** – Switch to the multi-year regulatory period for which some components of the tariff are frozen should incentives company to improve efficiency.
- **Changes in the calculation of reasonable profit -** Modern regulatory practice considers calculation of Reasonable profit by using WACC and RAB, to be the most appropriate approach.
- **WACC setting –** Robust methodology to calculate the Weighted Average Cost of Capital should be introduced. The calculation and the underlying parameters should be made transparent
- **Tariff rebalancing** – the unmetered tariff for households should be gradually increased together with schemes to support meters installation. A roadmap to narrow the gap between residential and business tariffs should be introduced to gradually align tariffs with underlying costs.
- **Multi-component tariff introduction -** We suggest to introduce multi-component tariff, which would comprise of fixed charge and volumetric component.
- **Move to zonal tariffs –** Given the geographical challenges the zonal tariffs should provide better alignment with the underlying cost drivers and make the tariffs more equitable. At least a form of surcharge for the high elevation areas should be considered. This would drive better prioritization of the investments.

The analysis is split into several main sections



Principles of tariff regulation

High level principles of effective regulation

Principle	Implication for regulation
Clarity of objectives	Economic regulators should have clearly specified and prioritized objectives concentrated on protecting the long-term interests of end users of infrastructure services.
Efficiency/cost effectiveness	Applied regulatory interventions should promote cost-effectiveness of the service provider.
Consistency/ predictability	The framework for economic regulation should provide a stable and objective environment (e.g. well-defined decision making criteria and clear timetables) enabling all those affected to anticipate the context for future decisions and to make long term investment decisions with confidence.
Transparency	Applied regulatory instruments principles should be transparent clearly articulated and publicly available
Adaptability/ flexibility	The framework of economic regulation needs capacity to evolve to respond to changing circumstances and continue to be relevant and effective over time. Where possible use a goals-based approach, giving businesses flexibility to decide how best to achieve clear targets.
Coherence	Regulatory frameworks should form a logical part of the Government's broader policy context, consistent with established priorities. Regulatory frameworks should enable cross-sector delivery of policy goals where appropriate.

Basic principles of water tariff regulation in are consistent with the EU best practice in the area of water tariff regulation, however differences exist in their application

Basic principles of water tariff regulation in Georgia

Effectiveness and investments

- Increase of effectiveness of the operation of supply systems
- Improvement of the service quality
- Attraction of local and foreign investments

Coverage of relevant expenses

- Operational expenses of water supply
- Current expenses and overhaul expenses
- Interest payments
- Taxes and duties related to the relevant activity

Return on investment

- Achievement of reasonable return on capital employed

Customer protection

- Protection of customers from monopolistic prices

Taking into account country specifies

- State policy in the sector of tariff privileges
- Social and economic situation in the country
- Solvency level of population

Basic principles of water tariff regulation in EU countries

Stability of regulation

- Applied regulatory methods should be consistent over the time

Cost reflectivity

- All efficiently incurred costs are allowed (including equity returns)

Transparency of process

- Established multi-stage, public consultative process with stakeholders
- Ability to challenge regulatory decisions

Efficiency of business operations

- Applied regulatory methods should drive increase of efficiency of business operations

Security of investment return

- Ensure the regulated entity receives sufficient revenue to finance the function
- Ensure the regulated can retain comfortable investment grade rating

Full cost recovery tariff principle applied in Georgia should provide sufficient reimbursement of water company's costs incurred in provision of regulated services

Cost recovery principles applied in Georgia

Water tariffs should be calculated based on the *Resolution no. 18 of the Georgian National Energy and Water Supply Regulatory Commission, from August 29, 2008 On Approval of Tariff Setting Methodology for Water Supply, and should* reflect full range of eligible costs incurred in the provision of regulated services.

The Resolution does not define any additional sources of financing for the costs incurred in the provision of regulated services, therefore the calculated tariffs should provide **full cost recovery.**

However the **lack of transparency** of current tariff setting process do not allow us to validate, whether this principle is applied in practice.

Cost recovery principles applied in chosen EU and CIS countries

France (No Full Cost Recovery)

In France, 95% of operating costs are covered by customers, while 30% of capital investments are financed by subsidies. The government finances public sector water services with taxes included in water tariffs paid by customers.

Germany (Full Cost Recovery)

Water tariffs are based on full cost recovery principle, therefore the calculated tariffs cover both the fixed and variable costs of water supply and sanitation, and reflect the amount used.

England and Wales (No Full Cost Recovery)

The water industry in UK is financed by customer bills and by outside investment. Additional capital is obtained in the form of long-term loans.

Slovakia (Full Cost Recovery)

Water tariffs are constructed in the way that allows full recovery.

Estonia (No Full Cost Recovery)

Costs are fully covered for households with self-supply and largely covered in case of small collective systems and industrial consumers.

Full cost recovery tariff principle applied in Georgia should provide sufficient reimbursement of water company's costs incurred in provision of regulated services

Cost recovery principles applied in chosen EU and CIS countries

Latvia (Full Cost Recovery)

Water tariffs are based on full cost recovery plus a profit margin limited to 7% of total expenses. Tariff includes depreciation of fixed assets, OPEX including personnel, maintenance and economic costs (materials, energy), environmental costs and expenses related to security, transport maintenance, insurance and communications.

Lithuania (Full Cost Recovery)

Charges for water supply and sewerage services for households generally include the operation costs, depreciation costs, investment costs, environmental charges (water abstraction and wastewater disposal), taxes and profit.

Kazakhstan (Full Cost Recovery)

The tariff is differentiated according to level of consumption:

- 30 % of households with lowest consumption – tariff covers only OPEX
- Next 40 % of households with lowest consumption and thermal energy companies – tariff covers all expenses except interest on borrowings, depreciation and amortization
- Other consumers – tariff covers all expenses, including costs not covered in tariff for first 2 groups and reasonable profit.

Moldova (No Full Cost Recovery)

Utility revenues cover 99 % of the operating costs and maintenance. Water tariffs calculation decentralized to each local authority. Starting from 2015 new Water Supply policy has been implemented – a price range is set by ANRE (National Agency for Energy Regulation) for each municipality, the specific tariff level within the range is then adopted by each local public authority.

Azerbaijan (not determined)

Full cost recovery is not specifically determined in Azerbaijani regulations. Water tariffs are determined by the Tariff Council based on information from the water infrastructure operators considering other relevant factors, such as socioeconomic situation.

Armenia (No Full Cost Recovery)

Water tariffs are variable, set according to water consumption. Currently, according to 2015 World Bank report, tariffs are insufficient to cover costs of utilities. Armenia plans to transition to full cost recovery by 2019.

No specific regulatory period is applied in Georgia which is a major difference in comparison with most EU countries

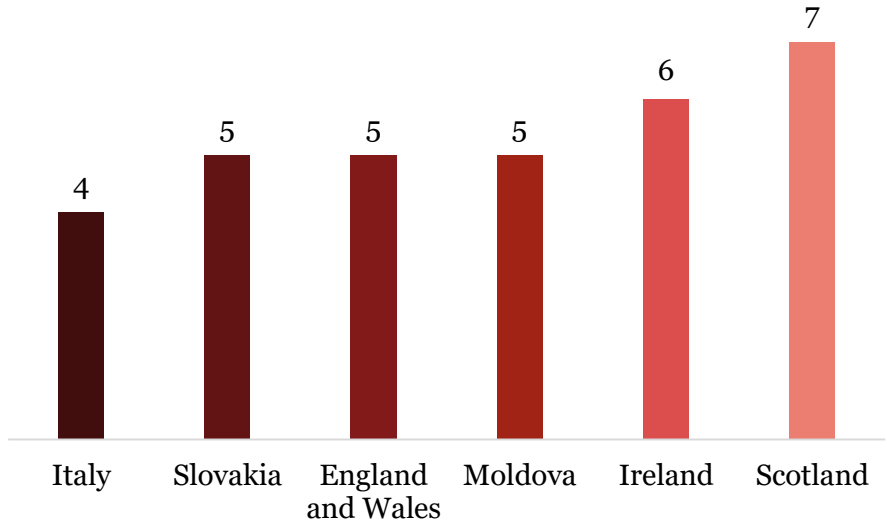
Regulatory period applied in Georgia

There is **no specific length of the regulatory period** applied in Georgia. When new tariff is set/or updated, it is applicable for the next years without limitation of period, until the companies will claim next change to GNERC.

Regulatory period applied in chosen EU and CIS countries

The length of regulatory period in selected countries:

Regulatory period (years)



Source: NRAs of chosen countries

Tariffs for GWP are set per SPA terms, which is considered a direct tariff setting, while mostly price cap or revenue cap regulation is applied in the EU countries

Tariff Controls in Georgia

According to the *Resolution no. 18 of the Georgian National Energy and Water Supply Regulatory Commission, from August 29, 2008 On Approval of Tariff Setting Methodology for Water Supply,* calculation of water supply tariffs should be performed as follows:

Drinking water supply tariff:

T1 = A1 / V1

Where:

A1 – Predicted annual revenue of the enterprise from water supply

V1 – Predicted annual volume of water supplied by the enterprise to the customer, including normative losses

Waste water tariff:

T2 = A2 / V2

A2 – Predicted annual revenue of the enterprise from wastewater

V2 – Predicted annual volume of wastewater

Water supply tariff:

T= T1 – T2

Tariff Controls in chosen EU and CIS countries

Tariff controls applied in various EU countries differ, while most common approaches are Revenue Cap and Price Cap.

Estonia

Revenue cap: The allowed sales revenue in the regulation period serves as the basis for the calculation of the prices for water service.

Allowed sales revenues = OPEX + CAPEX + Justified profit (based on WACC)

Italy

Revenue cap: depreciation + financial costs + OPEX + component for financing new investments + environmental costs + revenue balance with previous year

Slovakia

Price cap: NRA sets the methodology, each operator calculates tariff according to methodology and submits to NRA for approval and final decision.

Scotland

Price cap: Price cap based on CAPEX, maintenance CAPEX, total enhancement investment and financial ratios.

Tariffs for GWP are set per SPA terms, which is considered a direct tariff setting, while mostly price cap or revenue cap regulation is applied in the EU countries

Tariff Controls in chosen EU and CIS countries

England and Wales

Price cap: RPI – K formula (k is the efficiency factor) with forecasts of expected RAB, new investments, OPEX, and volumes

Ireland

Revenue cap: RPI – X formula (X is productivity gain) with forecasts of expected RAB, new investments, OPEX, volumes

Lithuania

Revenue cap: Rate of profit – 5 % of necessary cost.

After 1st January 2016, rate of return will be WACC based on RAB.

Latvia

Price Cap: Non-frontier TFP method (Total Factor Productivity)

Cost-of-service based calculation:
Full costs (depreciation + OPEX + taxes + interest payments + allowed profit (up to 7%)) divided by the quantity of water supplied to the water supply network.

Tariff Controls in chosen EU and CIS countries

Azerbaijan

Azerbaijan does not apply price cap or revenue cap. In the Resolution of the Tariff Council from 6.1.2007, no. 04, amended by Resolution of the Tariff Council from 31.1.2011, no. 1, tariffs for water supply and wastewater transportation are specifically determined per cubic meter.

Moldova

Revenue cap: OPEX + profitability factor + tariff deviation from the previous regulatory period

Tariffs are regulated through a revenue cap methodology. Tariffs may be reviewed after request of utilities, which submit a new tariff proposal.

Kazakhstan

Price cap: Maximum price defined at the level of OPEX for low consumption households and at the level of total expenses less interest, depreciation and amortization for medium consumption households and special companies.

Maximum price for high consumption households and industry includes admissible profit level (net income) defined as the profit rate in % on Adjustable asset base of the involved assets (similar to RAB).

Tariffs for GWP are set per SPA terms, which is considered a direct tariff setting, while mostly price cap or revenue cap regulation is applied in the EU countries

Tariff Controls in chosen EU and CIS countries

Armenia

New and reformed tariff design is currently under development. The stakeholders in Armenia have agreed that the tariff should be based on certain criteria – provide adequate and stable revenues, should be based on capital employed in infrastructure, calculation should be simple and promote water savings and the methodology should be according to current legal framework.

Main components of tariff calculation

The extent of eligible costs included in the Georgian water tariff calculation may be considered in line with the EU standards, except for the 10% cap on other costs

Components of the tariff calculation in Georgia (OPEX)

- Cost of purchase of electricity
- Wage fund of the personnel engaged at the enterprise
- Costs of, Producing, Pumping, Treatment, Transportation of drinking water to customers
- Cost of materials and chemical agents used during the process of wastewater discharge
- Royalty for mining and obtaining natural resources
- Cost of quality control of drinking water and waste water
- Expense related to the environmental pollution with wastewater
- Outsourcing costs
- Costs for operation and maintenance of machinery and equipment
- Business visit expenses
- Rent
- Interest rates on current loans for current assets
- Costs connected to fire prevention and technical safety
- Office expenses
- Enterprise protection costs
- Personnel training costs
- Insurance costs
- Regulatory costs
- Depreciation of fixed assets
- Other costs (up to 10% of total costs)

Components of the tariff calculation in EU countries

- Cost of acquisition of water from underground and surface water sources
- Technological costs
- Personnel costs
- Depreciation of non-current tangible assets (except assets financed from public resources – EU, State budget etc.)
- Rent for the leased tangible and intangible assets used in the regulated activity
- Maintenance costs related to the assets used in regulated activities
- Interests on bank loans used for the acquisition of tangible or intangible assets used in the regulated activities
- Overhead costs of regulated activities
- Cost of discharge of waste water to the surface waters
- Insurance
- Local taxes and fees

The calculation of allowed profit applied in Georgia does not match the WACC approach applied in the EU

Allowed profit calculation in Georgia

Allowed profit:

1. Alternative of calculation:

Allowed profit = Total Costs * Rate of return (%)

2. Alternative of calculation:

Allowed profit = Debt * Cost of Debt (%) + Equity * Cost of equity (%)

- **State and local taxes** - Applicable state and local taxes represent an expense that should be covered by the calculated tariff

Allowed profit calculation in EU countries

Allowed profit = RAB x WACC

Where:

RAB – Regulatory Asset Base (Net book value of assets use in regulated activities)

WACC – Weighted Average Cost of Capital

***WACC = Kd x Gearing + Ke x (1 - Gearing)**

Where:

K_d: Cost of debt (pre-tax)

K_e: Cost of Equity

W_d: Weight of debt

W_e: Weight of equity

t: Corporate tax rate

Typically pre-tax WACC is used

Gearing = D/(D+E)

Where:

D:Debt

E: Equity

* See detailed calculation in the Annex

Other tariff components

Technological and commercial losses treatment in Georgia is similar to the EU best practices

Treatment of technological and commercial losses in Georgia

Water tariffs calculated based on the *Resolution no. 18 of the Georgian National Energy and Water Supply Regulatory Commission, from August 29, 2008 On Approval of Tariff Setting Methodology for Water Supply,* should not include cost of water losses, which exceed allowed norms.

The Resolution therefore indicates that **water losses up to set technical norms are included in the water tariff calculation.**

At the same time in order to improve efficiency of water supply system the Commission is authorized to use different reasonable forms of incentives, including leaving the economy from the reduction of water loss at disposal of the enterprise.

Treatment of technological and commercial losses in chosen EU and CIS countries

The costs related to water losses are typically considered eligible for the water tariff calculation, the amount of these costs is capped.

Slovakia

Own consumption of losses of water are considered to be an eligible costs maximally up to 25% of supplied water, proportionally divided in all cases of acquisition.

Scotland

A new leakage incentive scheme has been included in the final determination that will challenge Scottish Water to accelerate reductions in its level of leakage. Under this scheme, Scottish Water will be permitted to recover in the next regulatory period the £10 million of one-off transition costs required to reach the lower end of the assessed range of the 'economic level of leakage'* , provided this is achieved by 2019-20. The incentive scheme allows for an additional £5 million of recoverable costs if the target is achieved a year earlier, or a reduction of £5 million if it is a year later.

*The 'economic level of leakage' is the point at which further activity to reduce leakage would incur higher costs than the value of the water saved. For the purposes of the incentive scheme, the lower end of the range is taken to be 500 Megalitres per day, subject to adjustments for truly exceptional weather

Technological and commercial losses treatment in Georgia is standard however more incentive schemes starting to be applied

Treatment of technological and commercial losses in chosen EU and CIS countries

Latvia

Water loss costs are included in the formula of operating costs as part of the tariff calculation, but the the tariffs do not include the costs associated with water losses of buildings and constructions of the internal water supply.

Moldova

Tariff calculation accounts for water losses, however the level needs to be approved by the National Agency for Energy Regulation for each regulatory period.

Armenia

The costs of technical losses (leaks) are allowed in the tariff up to the certain level set by expert estimate or benchmarking.

Water tariffs in Georgia include costs related to the environment protection and pollution, while pollution charges are present in the EU countries as well

Environmental treatment in Georgia

According to the *Resolution no. 18 of the Georgian National Energy and Water Supply Regulatory Commission, from August 29, 2008 On Approval of Tariff Setting Methodology for Water Supply,* one of the basic principles applied in the water tariff regulation is:

"Total recovery of expenses related to the operation of water supply system, supply of drinking water, its distribution, passing-discharge and treatment of domestic waste water, as well as ***expenses related to the protection of the environment in this sector****"*

Resolution also defines that annual predicted income should provide reimbursement of **expenses related to the environmental pollution with wastewater**, as well.

Environmental costs treatment in EU and CIS countries

Abstraction charges are in place in some EU Member States. They target households and industry.

Similarly, **pollution taxes and charges** are applied in most EU Member States, and are directed at both point and non-point sources. Common instruments regulating point pollution sources include wastewater charges and water effluent charges.

In some cases, such charges are already **included in the water tariffs,** e.g. **Latvia, Denmark, France and Spain**, while in others they are levied separately. They might also be associated with fines for non-compliance when charges are associated with permits and/or thresholds.

France

French effluent charges are designed to incentivize reduced water pollution in domestic, industrial and agricultural sectors. **For households**, water **agencies charge both for pollution and for the maintenance of the wastewater network** within limits delineated in state-level legislations. **Agricultural** water pollution is either managed as domestic wastewater or through charges **added to the price** of water services in the case of ranching run-off.

Water tariffs in Georgia include costs related to the environment protection and pollution, while pollution charges are present in the EU countries as well

Environmental costs treatment in EU and CIS countries

Latvia

Maintaining the state of the environment is included in the operating costs section of tariff calculation.

In case of water pollution, the non-compliance fee is to be paid for discharges exceeding the permitted level. The fee is 3 times the basic rate for the given pollutants. For illegal and unreported discharges, the fee is 12 times as high. Polluters can be granted an allowance to finance projects that aim at decreasing water pollution.

Lithuania

Charges are applied for abstraction of water from water resources and for disposal of wastewater to a receiving water. These fees are included in the tariff for water supply and sewerage services.

Kazakhstan

The calculation of allowed profit rate in water sector includes the risk of accidents occurring on the under-maintained water infrastructure in the country. However, specific environmental accidents are not mentioned in the law.

Special tariff setting procedure motivates households to save water.

Calculated water tariffs in Georgia should take into account the social situation of customers by specific allocation of cost of service, while EU countries apply also many other approaches

Social costs treatment in Georgia

According to the *Resolution no. 18 of the Georgian National Energy and Water Supply Regulatory Commission, from August 29, 2008 On Approval of Tariff Setting Methodology for Water Supply,* one of the basic principles applied in the water tariff regulation is:

"Water supply tariffs shall be set on the basis of taking into interests of supplier and consumers. For this purpose ***existing social and economic situation in the country*** *shall be considered."*

Commission is authorized to allocate cost of service rendered by each enterprise individually according to the customer categories.

Social costs treatment in EU and CIS countries

Generally, it was found that in each of the examined EU Member States, the issue of ensuring access to water for those in precarious **economic situations is taken into account**.

Netherlands

Most municipalities provide the possibility of a sewage charge remission for households that cannot afford to pay it. For low-income households, a remission is also possible for the purification, pollution and water system charges.

Germany

People with no or low income get support from social welfare that usually includes an allowance for the cost for water service.

Scotland

Water charges for households in Scotland are levied according to Council Tax Bands, with rates increasing with the value of the dwelling.

England and Wales

Affordability of water services is ensured to low-income metered customers with a high essential use of water by the Government's national WaterSure tariff. This mechanism caps the bills of these customers in receipt of a qualifying means-tested benefit for the average bill for their company.

Calculated water tariffs in Georgia should take into account the social situation of customers by specific allocation of cost of service, while EU countries apply also many other approaches

Social costs treatment in EU and CIS countries

Estonia

As social assistance of last resort, the low income households receive housing allowances which are supposed to cover specific costs (water supply, heating, etc.).

Lithuania

Low income households and solitary people receive additional specific support to cover heating and water. Entitlement for water and sanitation compensation if household expenses for drinking water and sanitation exceed 2 % of income.

Latvia

Merchant may calculate different draft tariffs for water management services for separated water-supply networks and drainage networks in case there is objective economic or technical substantiation for doing it.

Azerbaijan

Water supply tariffs are regionally differentiated for residential users, with residents of Baku, Sumqait, Ganja,Ali-Bayramli, Xirdalan citiesand Absheron Districts paying 20 % more for cubic meter of water supplied.

Armenia

Currently no specific subsidy program for water tariffs.

Social costs treatment in EU and CIS countries

Kazakhstan

Differentiation of tariff for consumer groups based on level of consumption:

- Lowest tariff – for households with consumption lower than average consumption of 30 % of households with lowest water consumption
- Medium tariff – for households with higher consumption than 1st group but lower than average consumption of 70 % of households with lowest water consumption. Includes also industries in thermal energy sector and budgetary organizations.
- Highest tariff – other households and other industries.

At the same time, in case payments for housing and utilities (incl. water supply and sanitation services) exceed 20 % of total household income, the rest is subsidized by the state.

Moldova

While there is a basic recognition of the need to make water and sanitation more affordable, no specific measures are in place in order to achieve affordability. Local public authorities are responsible for social payments provided to the most vulnerable within the limits of available resources.

Efficiency and correction factors

No efficiency adjustments were identified in the Georgian water tariff calculation methodology, which is a major deviance from the majority of EU countries

Efficiency elements in Georgia

According to the *Resolution no. 18 of the Georgian National Energy and Water Supply Regulatory Commission, from August 29, 2008 On Approval of Tariff Setting Methodology for Water Supply,* calculated tariffs should:

"*encourage increase of financial results of the producer through* ***improving operation and management and reduction of service expenses****, taking into consideration that the enterprise meets the quality requirements for service"*

No efficiency adjustments in the calculation were identified.

Efficiency elements in EU

Operating and capital expenditures are under efficiency valuations scrutiny in e.g.. England & Wales and Ireland, operating expenditures efficiency is evaluated in Denmark and Italy.

Application of efficiency elements in chosen countries is summarised below:

Denmark

OPEX is calculated using **benchmarking**.

England and Wales

Price cap is calculated as RPI – K formula (**K is the efficiency factor**) with forecasts of expected RAB, new investments, OPEX, and volumes

Valuation on OPEX, CAPEX and quality of services efficiency (by **benchmarking and industry expert reviews**).

Ireland

Revenue cap: RPI – X formula (X is productivity gain) with forecasts of expected RAB, new investments, OPEX and volumes.

No efficiency adjustments were identified in the Georgian water tariff calculation methodology, which is a major deviance from the majority of EU countries

Efficiency elements in EU

Ireland (continued)

Valuation on OPEX , CAPEX and quality of services efficiency (by **benchmarking and industry expert reviews**)

RPI used for RAB, CAPEX and OPEX

Italy

Valuation on OPEX efficiency (**profit sharing in place between users and companies**).

Fixed deflator used for RAB and capex, RPI used for OPEX.

Tariff correction factors applied in Georgia appear to be similar to the ones applied in EU countries, but they are applied differently

Tariff correction factors in Georgia

According to the *Resolution no. 18 of the Georgian National Energy and Water Supply Regulatory Commission, from August 29, 2008 On Approval of Tariff Setting Methodology for Water Supply,* basis for adjusting the tariff may be:

- **Inflation** only if according to official data of the authorized state body exceeds +-10%;
- Changes in **electricity tariffs** and State fees for obtaining water;
- Amendments in the existing **legislative acts** of Georgia.

Tariff correction factors in EU and CIS

Scotland

For household customers, Scottish Water will be permitted to increase its charges over the period 2015-21 by no more than **CPI** minus 1.8%. For the three-year period from 2015-16 to 2017-18 its charges will increase by 1.6% per year in nominal terms (in other words, irrespective of inflation). For the subsequent three-year period 2018-19 to 2020-21, prices will rise at CPI minus 0.3%, subject to the overall requirement for prices over the six-year period to rise by no more than CPI minus 1.8%.

For non-household customers, Scottish Water will be permitted to increase its wholesale charges at no more than CPI minus 0.3% per year over the period 2015-21

Slovakia

Some cost categories included in the tariff calculation, such as personnel costs, or overheads, may be adjusted by the value of core inflation.

The value of core inflation is also one of the components included in the calculation of price cap of production and supply of drinking water.

Tariff correction factors applied in Georgia appear to be similar to the ones applied in EU countries

Tariff correction factors in EU and CIS

Slovakia (continued)

Price cap $_t$ = Price cap $_{t-1}$ * $(1+\frac{\text{Core inflation} - \text{Efficiency factor})}{100})$ + Investment development factor + Yearly change of the capacity utilisation factor + Factor expressing change of economical parameters.

Moldova

Based on the first year of the 5-year regulatory period, expenses are calculated for subsequent years. For year 2, 3, 4 and 5 the correction factors based on current CPIs, changes in the length of public water supply network and changes in the number of consumers are accounted for.

Tariff structure

Tariffs in Georgia are set separately for the households and industry, similarly to the EU countries, however the differences between these categories are not as significant

Tariff components in Georgia

Tariffs are set for residential sector (**Households**) and for **Industry**.

There are 2 types of tariffs for residential sector. **Customers who have meters are paying per metered water**. **Customers without meters are paying per head of person.**

Businesses are paying based on **actual consumption**, metered water.

There is no multi-component in tariffs.

Tariff components in EU and CIS

Country	Drinking water	Sewage / sanitation	Irrigation
England and Wales	**Households:** fixed + rateable value (if unmetered) or fixed + volumetric **Industry:** fixed + volumetric	**Households:** fixed + rateable value (if unmetered) or fixed + volumetric **Industry:** small users pay volumetric; large users pay fixed + higher volumetric rate	Abstraction charges (fixed + volumetric)
Scotland	**Households:** fixed (based on tax bracket) **Industry:** fixed + volumetric (based on size of meter)	**Households:** fixed (based on tax bracket) **Industry:** fixed + volumetric (based on size of meter)	Abstraction charges apply
Germany	**Households:** fixed + volumetric **Industry:** fixed + volumetric	**Households:** fixed + volumetric + run-off charge based on land cover **Industry:** N/A	N/A

Tariffs in Georgia are set separately for the households and industry, similarly to the EU countries, however the differences between these categories are not as significant

Tariff components in EU and CIS

Country	Drinking water	Sewage/sanitation	Irrigation
Spain	**Households:** fixed + volumetric (sometimes block rates) **Industry:** fixed + volumetric (sometimes block rates)	**Households:** fixed + (often volumetric) **Industry:** fixed + (often) volumetric	Several models: • based on land area • fixed (based on area) + variable (based on hours of irrigation or volume) • per application (independent of volume) • per flow rate over a period of time • volumetric (only for drip irrigation) (Ministerio de Medio Ambiente, 2007)
Slovenia	**Households:** fixed + volumetric (sometimes solely volumetric) **Industry:** fixed + volumetric	**Households:** fixed + volumetric **Industry:** fixed + volumetric	No pricing aside from water abstraction charge

Tariff components in EU and CIS

Country	Drinking water	Sewage/sanitation	Irrigation
Lithuania	**Households:** Fixed (Flat rate), volumetric, or two-part tariff (30 % of total charge is fixed) **Idustry:** Fixed (Flat rate), volumetric, or two-part tariff (30 % of total charge is fixed)	**Households:** Fixed (Flat rate), volumetric, or two-part tariff (30 % of total charge is fixed) **Idustry:** Fixed (Flat rate), volumetric, or two-part tariff (30 % of total charge is fixed)	N/A
Latvia	**Households:** flat volumetric* **Industry:** flat volumetric)*	**Households:** flat volumetric* **Industry:** flat volumetric*	N/A
Estonia	**Households:** uniform volumetric, or flat for inhabitants without water meters	**Households:** uniform volumetric, or flat for inhabitants without water meters	N/A

* Flat volumetric tariff: Water abstraction volumetric charge depending on the source of the water (groundwater, surface water, mineral water) (=natural resource tax). In case of use of natural resources over permitted (limited) amounts, the base rates and extra rates (three times higher than the respective base rates) are applied.

Tariffs in Georgia are set separately for the households and industry, similarly to the EU countries, however the differences between these categories are not as significant

Tariff components in EU and CIS

Country	Water supply	Wastewater transportation	
Kazakhstan	**Group 1 (low consumption households):** volumetric **Group 2 (medium consumption households and special industry):** volumetric **Group 3 (other households and other industry):** Volumetric	**Group 1 (low consumption households):** volumetric **Group 2 (medium consumption households and special industry):** volumetric **Group 3 (other households and other industry):** Volumetric	N/A

Tariff components in EU and CIS

Country	Water supply	Wastewater transportation	
Moldova	**Households:** variable volumetric** **Industry:** flat variable volumetric**	**Households:** variable volumetric** **Industry:** variable volumetric**	N/A
Azerbaijan	**Households:** volumetric (if unmetered, fixed consumption of 6 m^3 is assumed) **Industry general:** volumetric **Industry using water as raw material:** volumetric	**Households:** volumetric (if unmetered, fixed consumption of 6 m^3 is assumed) **Industry:** volumetric	N/A

** Tariffs are variable as the price levels differ among respective municipalities.

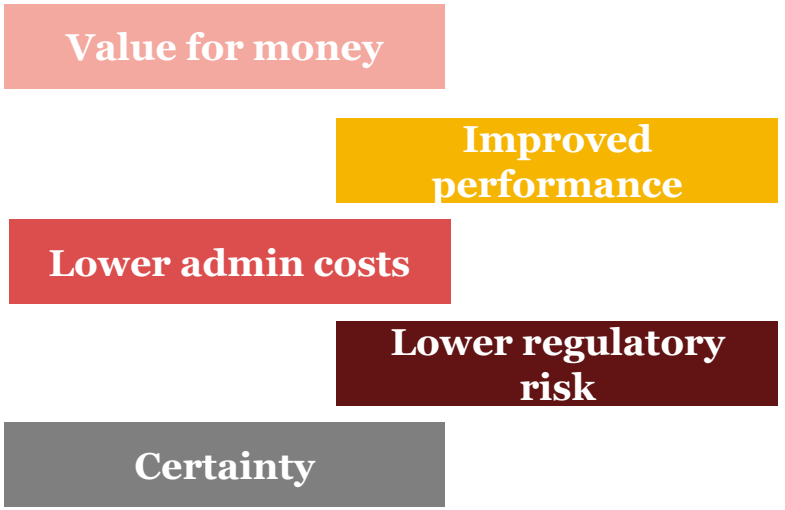
Preliminary Suggestions

Multi-year regulatory period introduction

We propose to introduce the multi-year regulatory period, as the length of the regulatory period must be long enough to allow the firm **to implement initiatives to reduce cost** and enjoy the resulting profits for a reasonable length of time.

Advantages of the Multi-year regulatory period:

- Promote **value for money** over the longer term – Multi-year regulatory period positively affects company's incentives to improve its cost effectiveness and consequently its financiability, as it allows the company to perform accurate planning over the longer time period.
- Greater incentives to **improve performance** – The longer a company is able to retain efficiency gains the greater the incentive to achieve improvements. Additionally, this may, over the long run, reduce the firm's expenditure requirements.
- **Lower administrative costs** – If price reviews are undertaken less frequently it is likely that administrative costs will also fall. However, this would be offset to some extent by the fact that more resources may be needed to closely monitor the firm's performance between price reviews.
- **Lower regulatory risk** – the longer a price control period, in force, the longer the regulator commits to the set rules. This can be perceived as lower regulatory risk and it can lead to lower overall financing costs.
- Certainty over **investment program** – as the price control review is used to establish the future investment program, a longer price control period may enable the investment program to be updated in a timely manner.

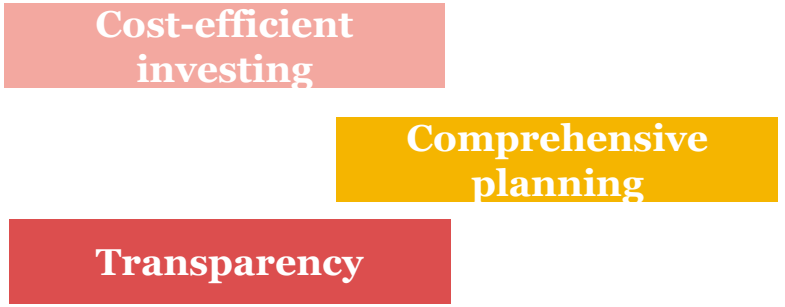


Efficiency factor application

We propose the application of efficiency factor in the calculation of water tariffs, in order to ensure the water and sewerage sector will attract **low-cost financing in the asset intensive parts** of the value chain.

Application of efficiency factor appears to be one of the most appropriate and transparent tools, which are supposed to motivate water companies to invest in an efficient manner. It **prevents water companies from over-investing** and consequent increasing of depreciation costs, and return on investment entering the calculation of water tariffs.

Efficiency factor is applied in the form of clear **mathematical formula**, which appears to be more transparent approach, compared to other possibilities of efficiency incentivisation. Water company is therefore able to relatively exactly calculate the effect of cost-efficient investing on its revenues. This fact, in combination with the multi-year regulatory period is one of the essentials of **comprehensive planning**.



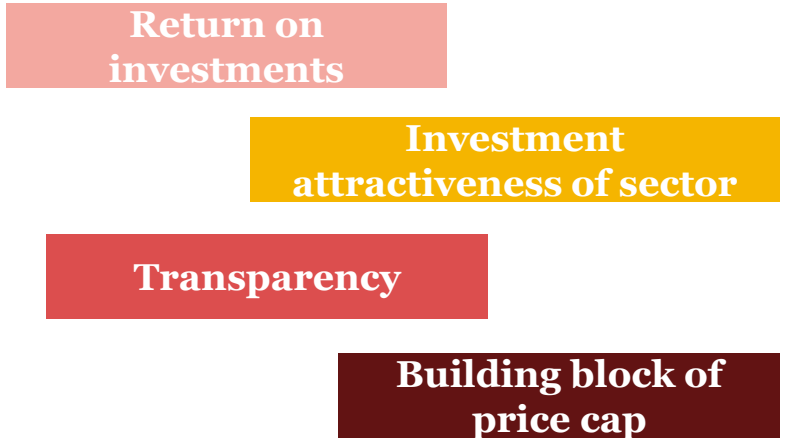
Standard WACC calculation, RAB definition and calculation of Reasonable profit

Modern regulatory practice considers calculation of Reasonable profit by using **WACC and RAB**, to be the most appropriate approach.

Proper definition of RAB ensures that only **assets which are used in the provision of regulated services** are taken into account in the process of water tariff calculation. It is therefore one of the major building blocks of the price cap determination.

WACC represents standard approach to the calculation of cost of capital, and is often used for the purpose of calculation of Reasonable profit in the regulated industries within the EU.

Once WACC is calculated and RAB is defined, water company is able to calculate Reasonable profit (rate of return on investments into assets used in the provision of regulated services), estimate envisaged return on investments during the regulatory period and **assess the investment attractiveness of the industry.**

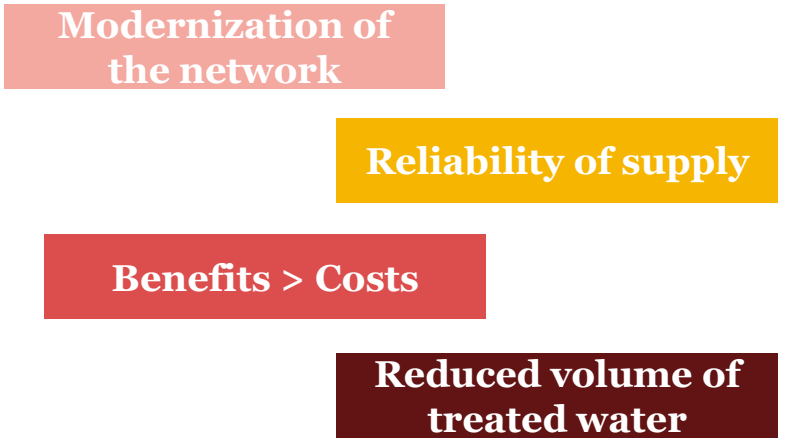


Incentive scheme of losses treatment

We propose conduct independent expert study to measure the actual level of losses and to introduce **incentive scheme** on technical losses treatment, in order to support investments into the modernization of the water pipeline network.

Incentive scheme comparable to the one applied in the Scotland motivates water companies to modernize its water pipeline network, as **benefits resulting from the modernization of the network exceed the amount of additional costs**.

Lower levels of losses will bring **benefits for the environment** and for customers by reducing the volume of water extracted and treated, and by increasing the reliability of supply.



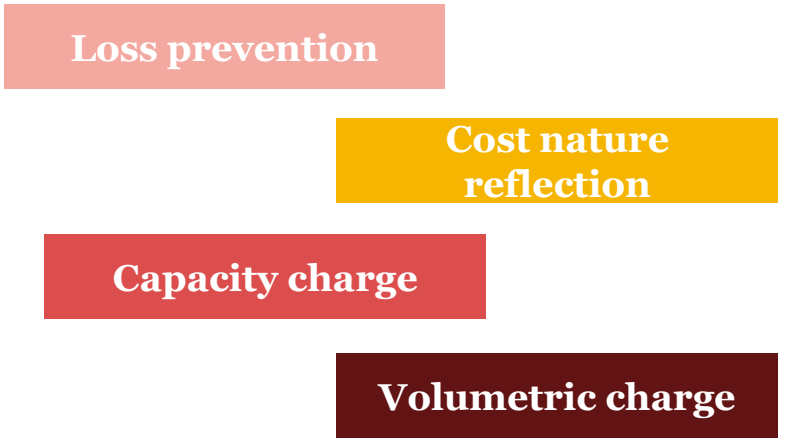
Multi-component tariff introduction

The costs which are incurred by water companies do not have exclusively variable nature. Especially infrastructure costs occur irrespective of the actual volume of water flow.

Taking into account above mentioned, we suggest to introduce multi-component tariff, which would include **capacity charge and volumetric charge**.

Capacity charge would be fixed and independent of the actual volume offtake. The amount of collected **capacity charges would cover water company's fixed costs**, while volumetric charge would cover the costs dependent on the actual volume of water offtake.

Water company's fixed costs should be therefore reimbursed irrespective of the actual volume of water offtake, which should prevent company from incurring loss in case of lower offtake than expected.



Questions & Answers

Annexes - WACC and RAB

WACC calculation in detail

- Companies raise money from a number of sources of debt and equity.
- The WACC is calculated taking into account the relative weights of each component of the capital structure and their returns

WACC = Kd x Gearing + Ke x (1 - Gearing)

Where:

K_d: Cost of debt (pre-tax)

K_e: Cost of Equity

W_d: Weight of debt

W_e: Weight of equity

t: Corporate tax rate

Gearing = D/(D+E)

Where:

D: Debt

E: Equity

Peer Group
- Select group of similar companies, which are publicly traded
- The group should reflect the type of business for which we are calculating WACC

Cost of Debt
- Government or corporate bonds rate of return
- Tax shield

Cost of Equity
- Risk free rate
- Risk premium
- Beta coefficient
- Markup for size

Capital Structure
- Based on the peer group analysis define the typical capital structure

Cost of Debt Calculation

Debt can be defined as interest bearing capital

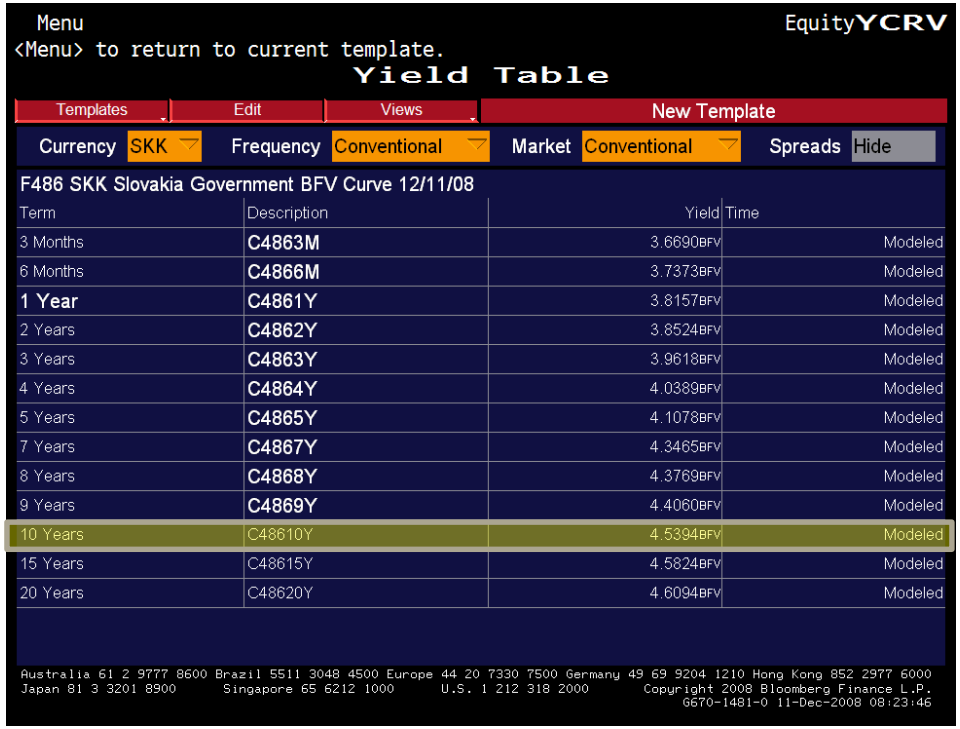
Calculation formula:

$$Kd = (Rf + M) * (1 - T)$$

where:

Kd	Cost of debt,
Rf	Risk free rate,
M	Risk premium
T	Corporate tax rate

Rf – Risk free rate is derived from the asset without the risk of insolvency, usually government bonds



Cost of Debt Calculation

Debt can be defined as interest bearing capital

Calculation formula:

$$Kd = (Rf + M) * (1 - T)$$

where:

Kd	Cost of debt,
Rf	Risk free rate,
M	Risk premium
T	Corporate tax rate

M – Risk premium can be defined as a difference between the government bonds and corporate bonds

M

Market data – Industrial BBB bonds

Yield Table

Templates | Edit | Views | New Template

Currency EUR | Frequency Conventional | Market Conventional | Spreads Hide

Term	F468 EUR Industrial BBB BFV Curve 12/11/08 Yield	F467 EUR Industrial BBB+ BFV Curve 12/11/08 Yield	F469 EUR Industrial BBB- BFV Curve 12/11/08 Yield
3 Months	5.6896BFV	4.7819BFV	6.5379BFV
6 Months	5.8773BFV	4.8930BFV	6.6563BFV
1 Year	5.7866BFV	4.8661BFV	6.7181BFV
2 Years	6.1019BFV	5.1165BFV	7.1831BFV
3 Years	6.7887BFV	5.3036BFV	7.9780BFV
4 Years	7.4704BFV	5.8528BFV	8.5037BFV
5 Years	7.9864BFV	6.5094BFV	8.9642BFV
7 Years	8.4625BFV	6.8785BFV	9.2974BFV
8 Years	8.6636BFV	6.9765BFV	9.3877BFV
9 Years	8.7708BFV	7.1228BFV	9.5496BFV
10 Years	8.7854BFV	7.3256BFV	9.6372BFV

Market data – Government bonds

Yield Table

Templates | Edit | Views | New Template

Currency EUR | Frequency Conventional | Market Conventional | Spreads Hide

F960 EUR Government Benchmark BFV Curve 12/11/08

Term	Description	Yield	Time
3 Months	C9603M	1.7859BFV	Modeled
6 Months	C9606M	1.9978BFV	Modeled
1 Year	C9601Y	2.1486BFV	Modeled
2 Years	C9602Y	2.3853BFV	Modeled
3 Years	C9603Y	2.5843BFV	Modeled
4 Years	C9604Y	2.8394BFV	Modeled
5 Years	C9605Y	2.9350BFV	Modeled
7 Years	C9607Y	3.1518BFV	Modeled
8 Years	C9608Y	3.2850BFV	Modeled
9 Years	C9609Y	3.3716BFV	Modeled
10 Years	C96010Y	3.4127BFV	Modeled

Cost of Equity calculation

We will use Capital Asset Pricing Model (CAPM)

Calculation formula:

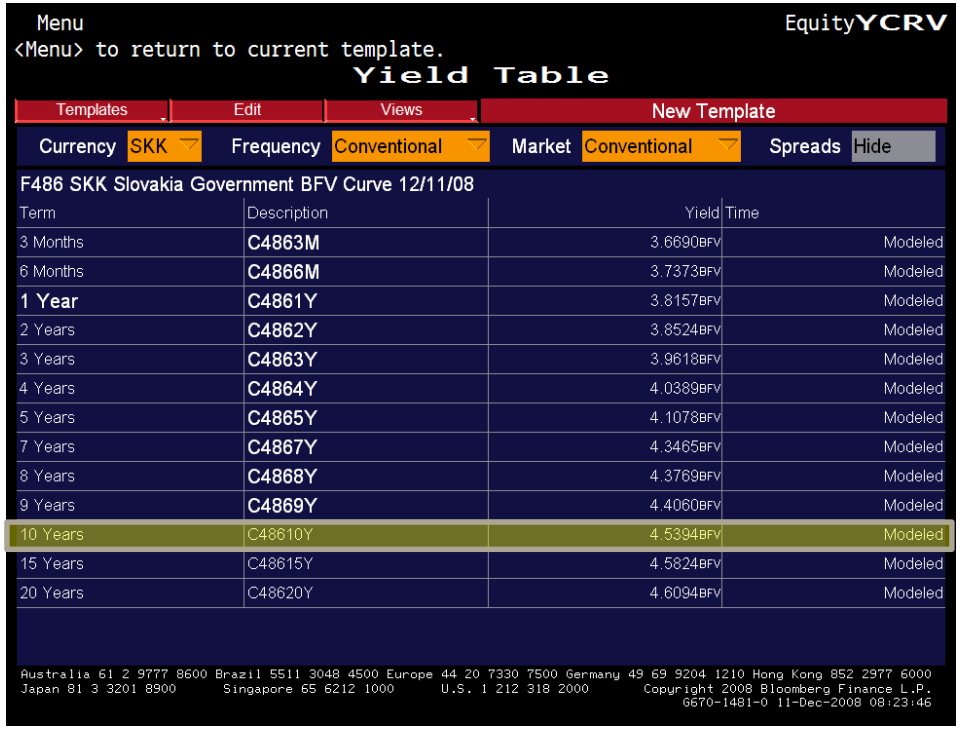
$$Ke = Rf + \beta * (Rm - Rf) + SP$$

Equity risk premium

where:

Ke	Cost of equity
Rf	Risk free rate
β	Beta coefficient
Rm	Market rate
SP	Size premium

Rf – Risk free rate is derived from the asset without the risk of insolvency, usually government bonds



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Calculation formula:

$$Ke = Rf + \beta * (Rm - Rf) + SP$$

where:

Ke	Cost of equity
Rf	Risk free rate
β	Beta coefficient
Rm	Market rate
SP	Size premium

Equity risk premium

Equity risk premium

Equity risk premium is calculated as a difference between the return of equity market portfolio and risk free investment.

It is the rate investor requires above the rate of a risk free investment to motivate him to invest into equities instead of risk free government bonds.

It is derived using the statistical analysis of the long term history of the equity markets.

Alternative ways of setting Equity risk premium

1) Analysis of historical performance
2) Adjusted historical risk-premium
3) Survey of forward-looking expectations of the market participants
4) Benchmarking
5) Implied premium (dividend growth model)

Cost of Equity calculation

We will use Capital Asset Pricing Model (CAPM)

Calculation formula:

$$Ke = Rf + \beta * (Rm - Rf) + SP$$

Equity risk premium

where:

Ke	Cost of equity
Rf	Risk free rate
β	Beta coefficient
Rm	Market rate
SP	Size premium

Beta coefficient

Beta coefficient represents the risk rate of individual assets in a diversified portfolio.

Correlation coefficient defines the ratio, how the expect returns of a given portfolio or specific asset relates to the overall return of the equity market.

β = 1 - the equity price follows the market trend

β < 1 - lower volatility compared to the market (both directions)

β > 1 - higher volatility compared to the market (both directions)

Beta leveraged

Financial leverage amplifies business risk . In general, when leverage is positive, $\beta_{levered} > \beta_{unlevered.}$ It is crucial to distinguish between leveraged and unleveraged betas

The unleveraging/re-leveraging relationship:

- Ignoring taxes: $\beta_{unleveraged}$ = (Equity/Capital) $\beta_{leveraged}$
- With taxes: $\beta_{unleveraged} = \beta_{leveraged} / [1+(1-t)(D/E)]$
- Excess cash should be netted against interest-bearing debt to obtain a measure of "net debt" for use in this formula.

Regulatory Asset Base (RAB)

Regulatory asset base (RAB) is a proxy value of the company's regulated operating assets, upon which the owners of the company earn a return. It is one of the major building blocks of the price cap determination.

If the **revenue receipts** from sales are **insufficient** to cover **maintenance renewals** and **new investment** sufficient to maintain the supply of goods and services, the supply capacity of the **physical capital stock** (and typically the value of the operating capital maintenance) **will erode** unless topped up from subsidies of one kind or another.

Conversely, if the revenue receipts are insufficient to cover depreciation and earn a normal rate of return on the replacement cost of the assets, the value of the financial capital maintenance will erode, again, unless the government provides some **explicit or implicit subsidy** or other financial input.

The RAB thus becomes crucial as a mechanism for financial capital maintenance protection of private investors in infrastructure industries. In general terms, a starting point for the value of the **RAB can be expressed as**:

RAB = Net book value

RAB value directly influences the value of return earned on employed assets

Well defined RAB contributes to the sufficient financing of renewals and new investments

RAB is crucial mechanism for financial capital maintenance protection of investors

Annexes - Example of complex approach to tariff setting

England and Wales price setting model introduces separated controls of wholesale and retail activities

The publication "***Setting price controls for 2015-20– final methodology and expectations for companies' business plans"*** defines that for the first time, the **separation** of controls for companies' **wholesale and retail activities** allowing to set more effective incentives for the different parts of the value chain, and support and facilitate the development of the proposed competitive market is taking place.

Adopted **financial model** allows conducting of the **risk-based review** of business plans, to assess **financeability** at the appointee level of a company, to **determine price controls** for wholesale water and wastewater services, and to determine the retail price controls.

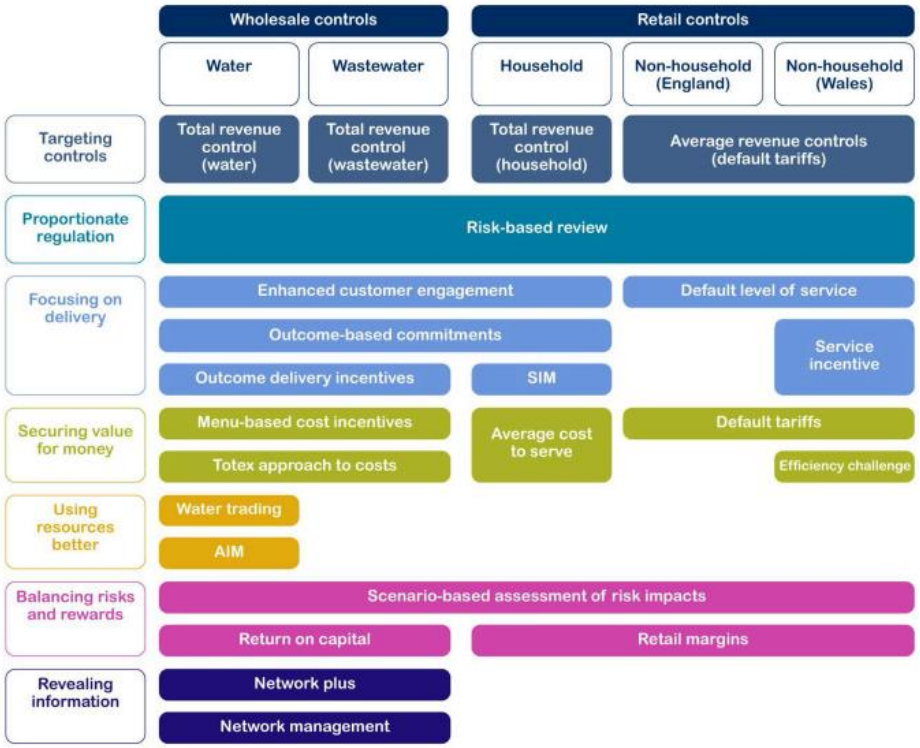
The **general principle** of setting price controls is that **charges to customers are sufficient** to allow an efficient company to operate its existing assets, fund new obligations and provide a reasonable return on equity and debt capital.

Financial model inputs

The financial model inputs come from the following sources:

- supporting business plan templates;
- supporting models in modelling suite; and
- manual input assumptions.

Overall framework for setting price controls for 2015-20



The model calculates price controls for the periodic review period

Price controls calculated by the model:

- **wholesale price controls** for water and wastewater services, embodied in service specific initial **allowed revenues** and associated '**K factors**'; and
- **retail price controls** for household and non-household customers, embodied in **allowed revenues** from 'average cost to serve' and expected **revenues from 'default tariffs'** approaches respectively.

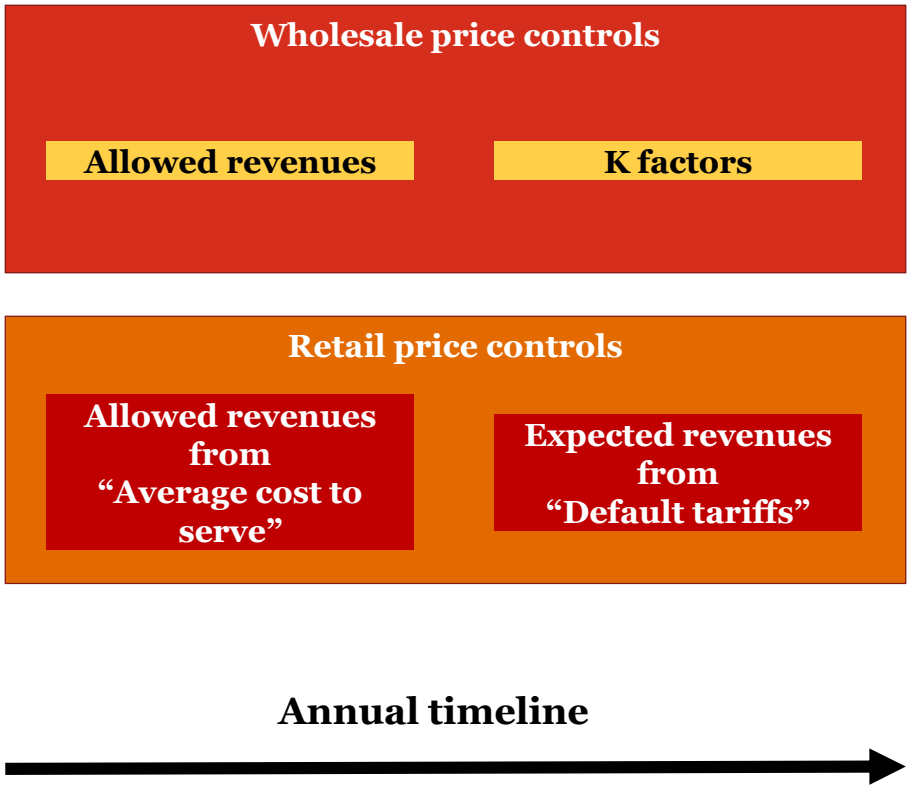
The model constitutes **two components** – the **wholesale module** and the **retail module**. The outputs of both components are combined to produce integrated financial statements for the appointee for the purposes of financeability testing.

Model timeframe

The model is based on and calculated on an **annual timeline**. It works on the financial year, that is, from 1 April to 31 March.

The base year for indexation purposes is 2012-13

The model produces financial statements for the periodic review period and the following periodic review period. This covers a ten-year period for the given set of inputs



In order to separate retail and wholesale controls, clear definition of retail services is necessary

Wholesale form of control

We now confirm that we will set **two binding wholesale controls** for

- **water** services, and
- **wastewater** services.

Price controls are indexed to the Retail Price Index (RPI), using an **RPI ± K** approach.

The form of the wholesale controls will be **total revenue controls** that cover all revenues from wholesale activities, including revenue and cash receipts from connection charges.

Retail form of controls

Household controls are based on **total revenue controls** with an **annual revenue adjustment factor** to reflect the cost differences arising from differences between actual and expected customer numbers and levels of metering.

Non-household controls are based on **average revenue controls per customer type**, so the non-household controls will set limits on the average revenue per customer for each customer type – for a 'default tariff'.

Definition of retail services

Customer services including:

- billing;
- payment handling;
- remittance and cash handling;
- vulnerable customer schemes; and
- network and non-network customer enquiries and complaints.

Debt management and doubtful debts

Meter reading

Other operating costs including:

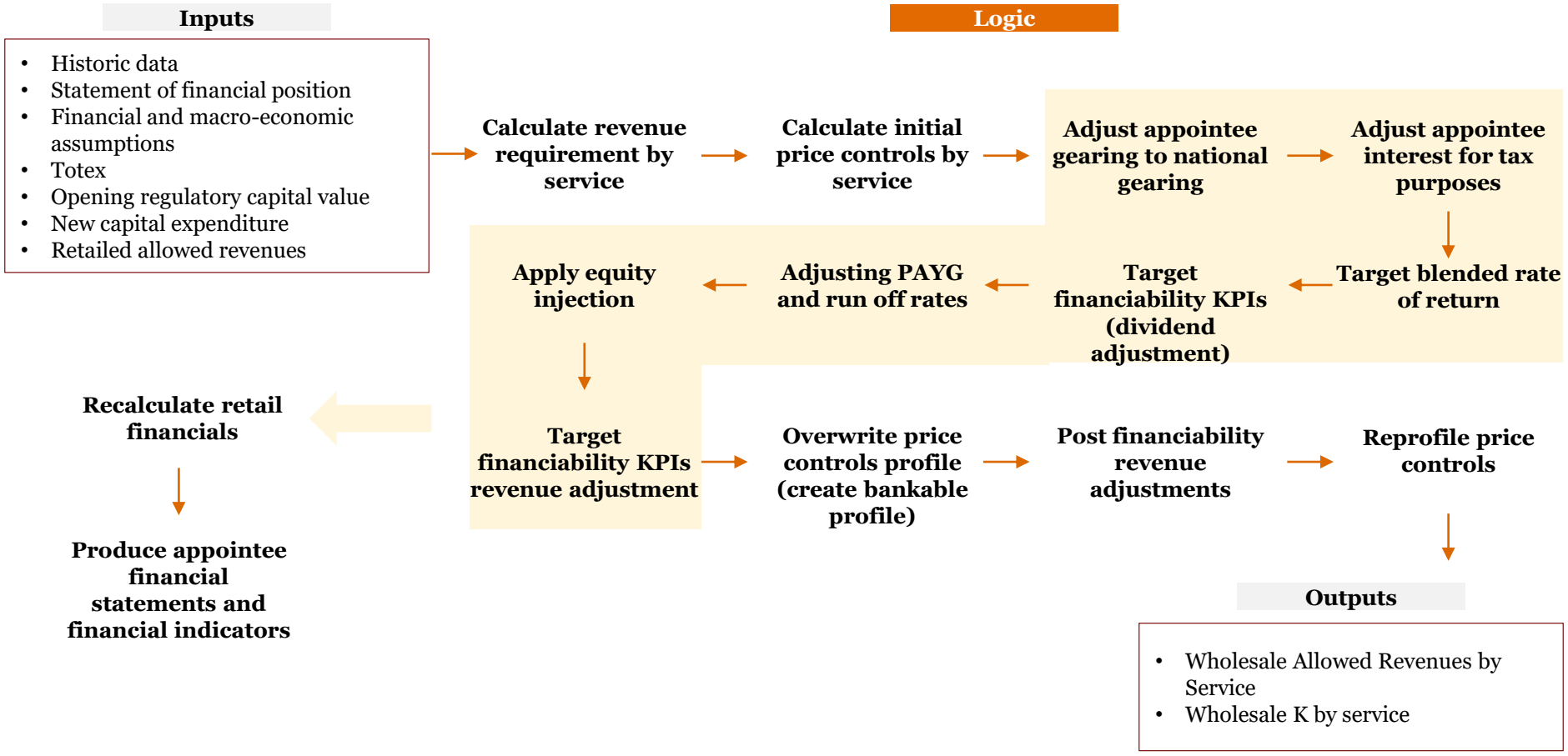
- decision and administration of disconnections and reconnections;
- demand-side water efficiency initiatives;
- customer-side leaks;
- other direct costs;
- general and support expenditure;
- scientific services; and
- other business activities.

Developer services

- providing developer information; and
- administration for new connections.

Local authority rates

Wholesale financial model overview

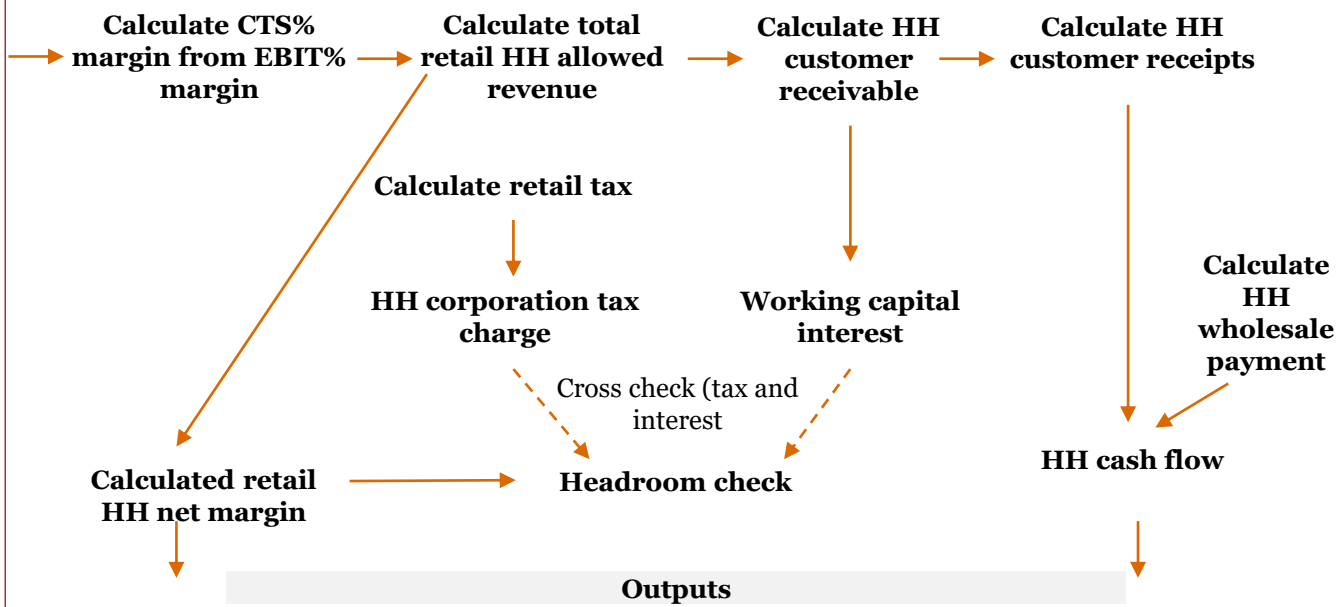


Retail household allowed revenues calculation overview

Inputs

- Cost to serve per customer by customer type
- HH EBIT net margin by tariff band
- HHs connected for each service
- Total HH retail service cost
- Company forecast wholesale revenue water and wastewater
- Projected wholesale revenue from HHs
- HH trade debtor
- Annual wholesale charge
- HH working capital interest rate
- Tax rate
- HH advance receipt creditor days
- HH measured income accrual rate
- Wholesale unmeasured charge
- Wholesale measured charge
- Weighted average debtor days
- Retail service revenue
- Apportioned wholesale charge
- HH dividend assumption (%)

Logic



Outputs

- Allowed retail service revenue per customer
- Total allowed HH revenue

- Financial statements