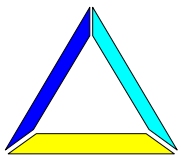
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Reform of Water Sector in Ukraine

Summary and Policy Recommendations

This paper proposes a strategy to reform and regulate water supply in Ukraine. We mainly concentrate on water supply and sewage for housing, which is one of the main consumers of water (24.4% of total 5.3 billion cubic meters supplied).[1] A special feature of water supply for housing is dispersed consumers and higher quality requirements. Those factors increase the costs of supplying water and cause difficult problems for regulation of the sector, as reforming water supply is often not accepted on ideological grounds, since water is perceived as essential for life and health.

The water-supply sector is haunted by three heavy problems: *deteriorated infrastructure*, *low quality of services* and *poor payments* for the consumed services. These problems form a vicious circle in which:

- Consumers are unwilling to pay high tariffs for low quality of supplied water.
- Water supply companies do not have incentives to improve quality of supply because they do not have the means to enforce higher tariffs and direct contracts with consumers.
- Local governments do not have incentives to enforce progressive tariffs setting procedures because of social opposition to higher tariffs.

Reforming the water sector in Ukraine does not mean immediate restructuring of companies and adjustment of water tariffs. We believe that this is a rather long-term perspective. Nevertheless, some full-fledged, consistent and persevering reforms should be introduced already in order to improve the situation of the sector, and this even more since otherwise, the infrastructure in the sector will be lost because of too low financing. Furthermore, reforming the sector does not necessarily require large public investments. Instead, various forms of participation of private capital appear to be possible.

We recommend concentrating such reforms on the following tasks:

- **Revision of tariff setting.** The effective formula for setting tariffs should be 100% cost driven. This however is currently not the case since cost of water supply has significantly exceeded water tariffs during the period from 1990 to 2000.
- **Devise a strategy for low-income consumers.** Initially, water tariffs should be adjusted depending on consumers income such that high-income consumers cross-

[1] Ukrainian National water Sector. Report and Action Plan, COWI, 2002.

subsidize poor households (household income can e.g. be approximated based on real estate values). In the long run, however, reforms should foresee the installation of metering equipment so that payments depend on both, a fixed component (to cover substantial fixed costs of water supply) as well as actually consumed volumes.

- **Design incentives to improve productive efficiency.** Efficiency of some water supply companies can be improved with demonopolization and restructuring of the sector. As empirical evidence suggests, some water distribution systems face diseconomies of scale where costs rise with the length of distribution networks. In such cases, breaking up the company will help to reduce costs. Furthermore, installation of water meters and direct contracts with consumers means that consumer payments cover only the costs of supplying actually consumed water, but not the costs of losses due to e.g. leakage. Therefore, water meter installation will further push companies to reduce losses on delivery. However, he problem of non-payments cannot be resolved without improvements in the judicial system and attracting of non-households financing to individual meters installation.
- **Introduce Yardstick Competition, including all regulatory and technical requirements.** Since direct competition between water suppliers is not possible, we suggest comparing relative efficiency of firms of similar characteristics based on production and cost estimates, and to base regulation on the results of such comparison ("Yardstick Competition"). This requires establishing a database of indicators for comparison of performance as well as establishing a regulatory body able to influence restructuring of water supply companies (e.g. through replacement of management of under-performing companies).

Improve governance structure for public water utilities. **Local governments typically represent both, owner as well as regulator of utility-supplying companies, giving rise to pervasive incentives in regulation. As a pragmatic solution, the existing Committee for Public Utilities could play a more substantial role in order to rule out potential conflicts of interest thereby protecting consumers from monopolistic pricing and inefficient services supply. In particular the Committee should be able to enforce specific forms of tariffs regulation, to restructure the most inefficient companies and to attract private companies for operation in the sector through open-bidding procedures.**

1. Facts about the Water Sector

1.1 Significant part of water supply and wastewater infrastructure is in the state of emergency

In 2000 the overall water supply coverage for centralized water supply was estimated to be 65%, while it was estimated to be 83% for urban population and 26% for rural areas. Water pipeline network composes up to 70% of total assets value. Of 91000 km of main and street pipes[2] 30% are in emergency condition. Out of 47000 km of wastewater pipelines 24% are in the state of emergency[3]. Of first level pumping capacity the rehabilitation is required for 25-40% of assets and of present treatment capacity rehabilitation is required for 40% of assets. Due to poor condition of water pumping and treatment assets the energy consumption is 20-50% higher than it was designed.

A number of water supply pipeline network breakdowns is 1-4 breakdowns per km per year, which is more than 5 times higher than in Western Europe. Average level of leakages and technical use of water is 30% and in some networks it reaches 50%. The water loss in urban network is very high – 10-70 m^3/km/day, compared to 2-10 m^3/km/day in Western Europe. The number of emergency incidents in wastewater pipelines is 1.4 per km per year, the infiltration rate is 20%.

1.2 Quality of water supply is low

Very poor conditions of the water supply and waste water systems just do not allow to comply with quality standards and often make substantial harm to the environment. According to the WHO poor water quality poses a health hazard for 25% of the Ukrainian population. Non-compliance for chemical and bacteriological parameters is almost constant (in centralised urban water network it is average 12% for chemical and average 5% for bacteriological pollution, in rural centralised water network it is 15% and 8% correspondingly with 25% of chemical non-compliance for water supply from open sources).

Another consequence of deteriorating water supply is scheduled water supply. In 2000 the scheduled supply in cities was in the range of 25-30%, when in small cities it is about 43%. Only 18 of 26 oblast centres have 24 hours water supply. In smaller towns a normal supply is 2 times 3 hours or 4 hours a day.

1.3 Sector indebtedness increases

The financial situation of water supply companies is also very poor. Indebtedness for water supply and sewage by households continues to steadily accumulate at rate average UAH 16 million per month. The total indebtedness for water supply and wastewater services has reached UAH 1.2 bn by the third quarter 2002. Payments collection is 70-80% for household consumers and 97-93% for enterprise consumers in 2000 and 2001. In July 2002 total receivables in all public utilities were UAH 8.49 bn and payables were UAH 8.13 bn rolling over from 2000. The receivables are 1.5 times higher than the yearly value of communal services. The largest debtor is households (UAH 7.6 bn)[4]. The share of households' indebtedness for water supply and sewage between September 2001 and September 2002 fluctuated between 11.8 in March 2002 and 12.6 in September 2002.

[2] Total water pipeline network is 180000 km.
[3] 23% of main collectors, 47% of street network, and 30% of district network.
[4] Speech of the Head of the State Committee for Public Utilities on situation in the sector and prospects of reforms, the Committee sittings, July 2002.

Since the cost of electricity is more than 30 percent of the total cost of water supply, water supply companies are the major debtors to electricity distribution companies. The indebtedness for electricity becomes a hot issue for electricity distribution companies; by the end of 2001 the total debt of public utility companies was UAH 760 m.

2. Problems of the Water Sector

2.1 Tariffs for Water are not Economically Justified

The cost of water supply has substantially increased from 1990 to 2000. First, the demand for water has declined from 36 to 18 million cubic meters. The demand in industry and agriculture has declined by 60% and 80% respectively, while in households it has declined by 15% only. Second, lack of finance for rehabilitation of water pumping and treatment facilities increased their electricity consumption by 20-50%. Between 1996 and 2000 prices for electricity has increased by more than twice compared to about three times increase of tariffs for water. This did not compensate for the increasing cost of water supply; the electricity for housing sector is continued to be cross-subsidized by the industry.

The effective formula for setting tariffs is 100% cost driven, i.e. is it is supposed to reflect the cost of water supply only. However, if fact the principle does not apply in two respects[5]. First, the regulation of tariff does not account for cost of capital. Second, even these "insufficient" tariffs appear to be too high to be paid because of very constrained incomes of Ukrainian households and the accumulated wage indebtedness[6]. As a result water tariffs are cross-subsidized by industry, where the tariff is 10-15 times higher then for the households. (Although the cost of water supply is much lower, because it is sold in bulk and the water quality standard is usually lower). Additionally, consumers are subsidized from local budgets – 20-30% of consumers are eligible for subsidies and/or privileges. On average the subsidy is 50% of the total water bill of those households.

Thus:

- Since tariffs do not cover the cost of capital the water supply assets deteriorate and further increase the cost of water supply through inefficient electricity usage and water leakage.
- Since tariffs are heavily subsidized they do not encourage rational water usage and do not create incentives to meter water demand.
- Since quality of water supply is low and is deteriorating consumers are likely to oppose any tariff increases.
- Since tariffs for water do not depend on incomes of households the water supply companies loose potential revenues.
- Since shadow incomes are substantial in Ukraine some households are subsidized even they should not be so.

2.2 Efficiency of Water Supply is Low

Improvement of energy inefficiency of water supply could reduce the cost by approximately one third. Energy improvement is determined to be one of major directions of reforms in the sector in Ukraine. However, the cost could be reduced by one third through reduction of water leakage. Taking into account the value of water pipeline system, its repairment is expected to be more costly then repairment of water pumping and treatment equipment. But does that mean that mean energy improvement is more efficient measure than leakage reduction? If it is taken account the cost of the harm to the environment both from energy

[5] There are no estimations known to the authors which would estimate to which extend tariffs cover the costs in Ukraine.
[6] Average income in 2000 is UAH 200 (equivalent of USD 36), wage arrears amount about UAH 6 billion.

production and water leakage, the answer will not be that simple. Most probably leakage reduction is a superior alternative if financial possibilities are constrained.

Besides, in contrast to water pumping and treatment capacity the water pipelines network is less likely to be reduced even if consumption of water declines. And the decline in water demand related to improved water pricing is difficult to forecast. That is why reduction of leakage is a more attractive investment. However, both ways of possible improvements are generally undermined by lack of incentives.

Thus:

- Since payments of consumers depend on the norms of water consumption and "insufficient" tariff, but not on the volume of water consumed, the water supply companies just add losses to the norms.
- Since the system of compensation for water supply is very complicated and local governments would never allow local water companies to get bankrupt, the companies do not have hard budget constraints and do not care about efficiency.
- Since improvement of energy efficiency and reduction of leakage require substantial investments, under non-payments by consumer and local budget deficits they are practically not feasible.

2.3 Regulatory Incentives are Poor

The situation in water sector is spinning down because all sides do not have incentives to break the circle. Consumers do not want to pay for deteriorating water supply and to meter the consumed water usage because they have no legal mechanisms to force the water companies to improve water supply or to reduce fees. Water supply companies do not have incentives to conclude contracts with consumers, to improve water quality supply, and to raise tariffs, because of inability to enforce payments[7] and opportunities for rent seeking for management of water supply companies when the situation is indefinite. The local governments do not have incentives to enforce progressive tariffs setting procedures, because of social opposition to raising tariffs. The behavior of local governments is rational if to take into account the fact that they pursue short-term goals between elections.

About 90% of water supply companies are in communal ownership. The respective central government body in the sector is mandated only to form strategy of reforming the sector and to provide methodological support to the enterprises. Ownership, regulation and control of water supply companies are left for local communities, which can and do create substantial disincentives to reform the sector at the municipal level. For instance, the new methodology, effective from June 2001 and provisioning introduction of tariffs covering the capital cost[8], is slack to be introduced.

Thus:

- Since regulation of water supply is totally decentralized, weak local governments are not able to balance interests of consumers and water supply companies.
- Since local budgets are very constrained the local governments cannot help water companies out without raising cost to local communities.

3. Pricing Water in Ukraine

[7] Non-paying consumers cannot be disconnected according to the Law "On Drinking Water and Drinking Water Supply", No. 2918-III, January 10, 2002

[8] Order of the Committee on Construction, Architecture and Housing Policy "On Approval of the Procedure of Tariffs Determination for Centralized Water Supply and Sewage Services", #139, June 27, 2001.

The market economies reforming their water sectors discuss the need of moving away from fixed charges to volumetric pricing and metering. Economically justified water tariffs should cover the long run social marginal cost of water supply[9]. Second, tariffs should reflect water quality, time and location of consumption, because it influences the cost of water supply. Third, tariffs should stimulate conservation of water resources. Even though reforms of water sector received lot of attention in many countries the last decade, even simple cost covering of water supply and sewage is rather an exception than a rule. Still very few countries have achieved recovering of capital costs from consumers (e.g. Israel[10], Australia and Brazil).

Water utilities are often required to provide services at low or no cost to households as part of government programs of welfare. In such a case the government is supposed to compensate the losses, but utilities rarely receive direct government contributions for these services, and the companies finance them through cross-subsidization. For example, prices per cubic meter in agricultural and household sectors are relatively similar across countries, while prices for industrial water vary widely. It is because in some countries the industry is viewed as an easy source of revenues, capable of subsidizing other sectors.

In Ukraine the problem of financing of water supply is now treated as more acute than the problem of optimal water pricing. Most policy makers say the cost of water supply cannot be covered without raising tariffs[11]. Although this is difficult to controvert, we would like to stress that improvement of water pricing could mitigate the problems of tariffs raising. One way is to make consumers paying depending on the volume of water consumed, the other way is to make consumers paying depending on their income.

3.1 Introduction of Volumetric Charges

Tariffs in Ukraine are not only cost driven, they are also uniform and flat. Most individual consumers pay according to the norms the same amount of money independently of their water consumption and income. Fixed charges for water and unconstrained water consumption on one hand means higher cost of water supply (including higher environmental cost), on the other hand it does not encourage water conservation. Uniform tariffs for all consumers mean very heavy burden for small consumers and encourage water overconsumption from all consumers.

These problems can be solved if volumetric charges rather than fixed charges are applied. Volumetric charges can rise with larger water consumption thus reflecting increasing costs and discouraging water overconsumption. However, exclusively volumetric pricing is not optimal from economic point of view and not practical for water suppliers. It does not allow to recover the fixed cost of water supply under marginal cost pricing or when users do not consume water temporarily.

It is advisable, therefore, to combine fixed and volumetric charges, in other words to apply two-part tariff. But how the optimal levels of fixed and volumetric charges could be determined? An optimal two-part pricing can be designed if price elasticities for fixed charges and volumetric charges are estimated. Both of them could deviate from their

[9] The "social cost" of water supply means accounting for externalities such as the environmental cost of supplying water and treating wastewater. The "long run marginal cost" means the water supply should be sustainable in the long run, i.e. it should be reflecting the capital cost of water supply (construction and maintenance cost of water supply and sewage infrastructure).

[10] An example of successful reformer is Israel. There the cost of water supply is fully covered and cross-subsidization is insignificant. Industry pays USD 0.26 per cubic meter and city residents pay USD 0.35 per cubic meter.

[11] In Ukraine water sector only 2-3% of expenditures are financed from the governments and 97-98% of expenditures are financed from tariff revenue of water supply companies.

respective marginal cost and the magnitude of deviation should be inversely related to the relevant elasticity of demand. For example, if the price elasticity for fixed charges was estimated to be larger than the elasticity for variable charges, the fixed charge should be set close to the marginal cost, while the volumetric charge should deviate by a relatively larger amount from the marginal cost of supply (Brown and Sibley, 1986). Of cause, such mechanism is very difficult to implement especially due to lack of the data on price elasticities, but this approach could serve a rule of thumb in designing tariffs for water utilities. For example, in Belgium under a two-part system in order to guarantee social security the fixed charge was set to zero and the price did not deviate much from the marginal cost for low-volume consumers.

3.2 Differentiated, but Flat Tariffs

The consumer charges can be flat, but not uniform. This is an extreme case of fixed charges when volumetric charges do not apply. A consumer with higher income will have higher willingness to pay for water supply independently of the amount of water he or she consumes. Then higher income consumers can be charged higher fees and will continue to have the water supply service. In this way higher income consumers may cross-subsidize lower income consumers.

Of course this approach is inferior to volumetric charges approach presented above, but it is superior to the approach currently implemented in Ukraine. The advantage is that there is no need to do water metering, the problem is that consumers should be differentiated by their incomes. This is difficult to implement in a country with large shadow economy and very weak tax reporting system. In market economies the households were differentiated based on property values of the utility consumers and now they gradually transfer to volumetric pricing and two-part tariffs. In Ukraine the flat rate could also be based on the market value of real estate, which in principle can be derived from the information obtained from already emerged real estate markets.

The problem is if it is efficient to establish a new system of fixed charges first and then to transfer to the system of two-part tariff pricing or it is better to jump into the system of volumetric charges and two-part tariffs through development of water metering. Analysis of the situation with reforms in water sector in Ukraine reveals that more evolutionary approach can be more appropriate. Optimal two-part pricing is a very information intensive process relying on substantial analytical capacities. Both these components are still to be developed in Ukraine. With lack of financing from the government it can take very long time. On the other hand establishing a system of real estate evaluation is not very costly because of economies of scope; it is needed also for taxation and housing reform purposes.

Introduction of charges based on property value will potentially target owners of large apartments or apartments located in prestigious areas. In Ukraine this will not automatically target rich people, because traditionally distribution of houses did not depend on incomes of their owners. According to the surveys below among large apartment owners there are a lot of large households and lonely pensioners. Low income, but large households, may not be hurt by such policy, because according to the same surveys they are also large water consumers with high willingness to pay[12]. Low-income households with pensioners would not be hurt substantially only if they were charged based on metered consumption. Therefore, it could be efficient for local budgets to finance water meters installation mainly in this category of households.

[12] It would be optimal for local governments to concentrate primarily on social support for such households especially targeted to children and disabled, rather then on price subsidization.

3.3 Water Metering

Introduction of volumetric charges and volumetric pricing is impossible without metering of water consumption. Installation of water meters is a substantial cost by itself (installation of the cheapest water meter in Ukraine is equivalent to the current cost of yearly water consumption). Installation of meters often faces opposition both on ideological (universal right, health and hygiene for low income families) and economical grounds (doubt that reduction in demand will be significant) [13].

Besides the problem of justification of meters installation there is a problem of identification of corresponding sources of financing. Water meters installation is usually subsidized by local governments or private operators in the sector. For water supply companies installation of meters can be justified by reductions in demand and delayed development of water infrastructure. For local governments installation of meters reduces environmental costs by creating incentives for water supply companies to reduce inefficiencies and water leakage. For instance, in Canada water charges are at jurisdiction of municipal water agencies. Those municipalities that undertake reforms in municipal water pricing have to take responsibility (regulatory and financial) for assuring that all establishments are equipped with water meters.
In the UK notwithstanding possible significant gains from water metering the government did not make it compulsory. Installation of meters would mean significant immediate cost to be paid by consumers. Therefore, private meters were gradually installed from sources of private companies, operators in the sector, which in the first place targeted peak users such as sprinkler users and swimming pool owners. In some cases customers pay for meters installation in exchange for subsidized rates in other cases the meters are installed free of charge. From 1991 to 1996 the percentage of households with meters in the UK has grown from 2.8 percent to 7 percent. According to estimations in different cities of the UK water demand fell from 11 to 25 percent.

In Ukraine there were adopted a number of regulations concerning metering of water consumption. Financing of meters installation is to be financed from local budgets. However, the implementation of the programs has failed because of lack of funds in local budgets fot that purpose. In 2000 of total number of apartments and individual houses with central water supply (12.8 million) only 8% were metered and 2.7% had individual meters. As we will see below the reason is not only lack of funds, but also low incentives for local governments to install meters. Incentives for individual consumers are also very low[14]. The strongest incentive would be charging cost covering tariffs for water, while guaranteeing that the tariff does not cover inefficient costs. The implications for low-income households we have already discussed in the previous section.

As an alternative to individual water consumption metering it was proposed to install collective metering in blocks of apartments. Even collective metering has very positive effects of both production inefficiency and environmental cost reduction. Of course this is a suboptimal solution. It can be an effective substitute for individual metering only in blocks of apartments with homogenous households. Nevertheless, it does not exclude the system of fixed charges based on property value. In this way a two-part tariff system could be replicated.

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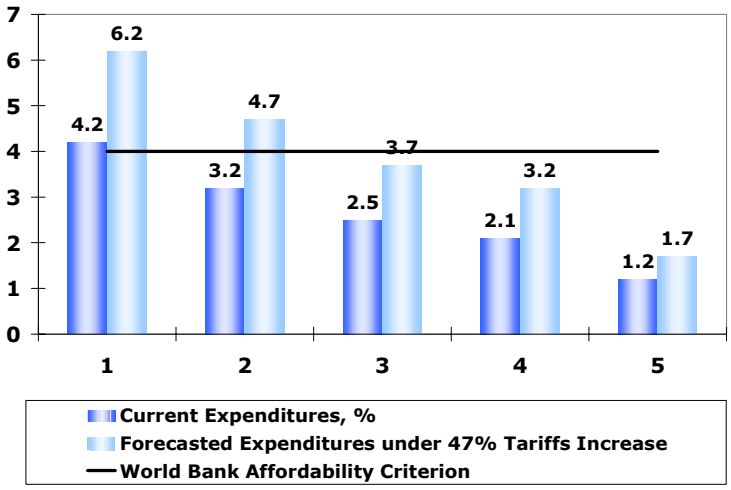
13 In many high-income countries metering is about 30-70 percent. In 1992 in the UK only 7% of households and 72% of industry metered water consumption. In Canada many homes and apartment buildings lack water meters and this is a barrier to introducing volumetric charges.

14 If an individual in Kyiv consumes 7 cubic meters of water per month instead of a norm of 9 cubic meters with price UAH 0.8 he or she would save only UAH 19. The cheapest meters are UAH 150, which will pay back only in 13 years with discount rate of 10%. This is longer then the lifetime of the meter.

3.4 Willingness to Pay by Consumers

A possibility to raise tariffs crucially depends on ability to pay by consumers. According to the World Bank affordability criterion the water and wastewater services should not amount more than 4% of average income of a household. Household survey findings indicate that most households in Ukraine spend somewhere in the range of 2-4% of their average income on water bills. However, in should be taken into account that income profiles are skewed. In Kyiv, for instance, it was found that more than 45% of households paid on water and wastewater services more than 4% of their total expenditure. According to the surveys it appears that households are generally willing to pay somewhere in the range of 20-100% more for improved services. A first willingness to pay study in Ukraine was conducted by PADCO in December 2001[15]. In Khmelnytsky city after 47% tariffs increase[16] about 40% of consumers will have to be supported, while for 20% of consumers there is still affordable a substantial increase in tariffs for water supply (see Figure 1).

Figure 1. Expenditures on Water Supply and Sewage as a Share of Total Income of Households



Source: PADCO

Therefore, water pricing can be improved especially if water charges account for incomes of consumers. For instance, for setting differentiated tariffs it could help to at least differentiate households depending on the value of real estate as it is currently done in many market economies. Introduction of such a system may encounter some difficulties. Surprisingly in Khmelnytsky it was found that the poorest consumers live in larger apartments (consequences of apartments distribution system in the Soviet Union). However, because lower-income households living in larger apartments are also large households and households with children. According to the same survey readiness of households with 3.4 and more people to pay is above average 30%. This creates a potential possibility to introduce charges based on value of apartments without significant opposition from large households and households with children.

4. Water Supply Efficiency Improvement

In general substantial raising of tariffs could be avoided if there would be substantial improvement in efficiency of water supply. Even if it is obvious that tariffs should be raised,

[15] Romanik Olga et. al. 2002. "Are Households Ready to Pay More if the Quality of Service is Improved?", PADCO, Kyiv.
[16] From UAH 0.92 to UAH 1.35 per cubic meter.

there is still a problem to determine the extend of the increase (even if consumers were able to pay they would not favor if the tariff would cover inefficient costs). Besides, nobody knows better the costs of water supply companies than their management. This complicates determining of an efficient level of cost for a given level of water supply. On one hand the problem of water supply efficiency can be attacked with help of the regulation through yardstick competition[17]. On the other hand the efficiency can be improved with demonopolisation of the sector and introduction of market competition where it is possible.

4.2 Regulation through Yardstick Competition

The yardstick competition approach is based on comparison of a number of parameters of a large number of enterprises. If for two enterprises with absolutely similar characteristics the level of production is lower, than this enterprise is regarded as being less efficient. Traditionally for comparison of water supply enterprises there were used productivity indicators, e.g. number of workers per client or connection. However, such indicators did not provide enough information on actual situation in an enterprise. Production and cost estimates recognize more complicated relationships[18]. The *cost estimates* show the costs as a function of the level of output and the prices of inputs. They are very useful to regulators who are supposed to assess the wedge between tariff and minimum costs. The *production estimates* reveal technical relations between inputs and outputs of companies[19].

Once the function has been estimated, the efficiency of a specific operator can be assessed in relation of the performance of the best operators in the industry when these are confronted with the same factors constraining the performance of the operator being assessed. After the least efficient water supply companies were detected, they may undergo in-depth study and further restructuring. The company can be broken up into several separate companies. The management of the companies can be changed through management or concession contracts in open biddings.

In Ukraine introduction of yardstick competition is currently constrained by absence of, first, a database of indicators for comparison of performance of water supply companies, and , second, regulations empowering a regulatory body to influence restructuring of water supply companies and replacement of management of those companies. The problem is that water supply is almost completely decentralized and completely depends on regulations of local communities.

4.3 Demonopolization and Companies Restructuring

In current programs the restructuring and unbundling of the public utility enterprises is regarded as a minor issue. Most attention is paid to introduction of private sector participation through open bidding. It is disputable what may go first restructuring or private sector participation; possibly this should be a part of the negotiation process during finalization of management or concession contracts. The restructuring has two aspects. The first one includes separation of ancillary businesses, which should not necessarily be a part of a water supply monopoly. For instance, these activities are construction and maintenance of water infrastructure, which can be contracted out through open tenders. The second aspect is optimization of water abstraction and distribution.

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[17] Shleifer, Andrei. 1985 "A Theory of Yardstick Competition". *Rand Journal of Economics*, Vol.16, No.3, Autumn: 319-327.

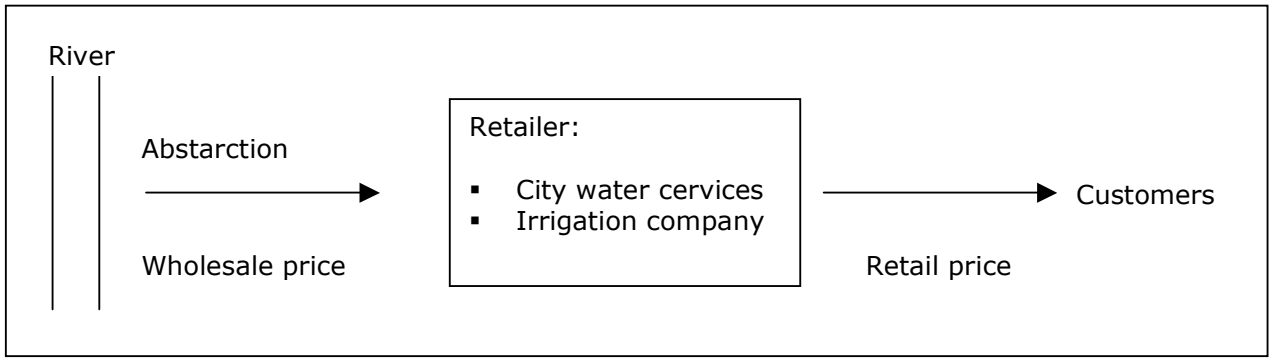
[18] The estimations are produced in two stages. In the first stages it is studied the influence of major factors and in the second stage it is studies the influence of factors explaining efficiency. One of first cost functions for water supply was estimated by Stewart for the UK water regulator (OFWAT) in 1993.

[19] Estache, Antonio and Rossi, Martin. 1999. "Comparing the Performance of Public and Private Water Companies in Asia and Pacific Region: what a Stochastic Frontier Shows". Policy Research Working Paper No. 2152, World Bank.

The separation of water abstraction and distribution becomes an increasingly common practice. Australia, Canada, France, New Zealand, the UK and the USA are few examples to mention. An abstraction company delivers water to the distribution networks and charges the wholesale price, which covers the water right, the cost of pumping and transportation. A distribution company delivers water to consumers at retailer price, covering the wholesale price and the cost of transportation. In Figure 2 we can see a water marketing scheme used in New Zealand (Figure 1).

One may consider water abstraction and delivery as an integrated natural monopoly, separation of which will lead to diseconomies of scale. However, we should stress that this may be not the case and a water regulator should do a careful study before designing his or her policy. Particular attention should be paid to components of the water supply system as storage and treatment, distribution and water delivery, service-oriented aspects of water supply.

Figure 2. Water Marketing Scheme in New Zealand



Source: Dinar, 1997.

According to studies economies of scale are found in water supply for industry, but water supply for residential housing is characterized with diseconomies of scale (Kim, 1987). Boisvert and Schmidt (1997) found economies of scale in storage and abstraction of rural water utilities, which are offset by diseconomies in those utilities' distribution networks. Diseconomies of scale in some water supply systems may be significant because the costs rise with distance (length of distribution networks), which can be due to difficulty to maintain pressure and chlorine levels. Costs also significantly rise during peak demand periods due to higher pumping costs, e.g. summer months.

Therefore, operational efficiencies are not likely to come from the scale of water delivery systems. Rather, changing water agencies' structures and operations may be necessary to improve service quality. This could be accomplished by breaking up water monopolies in smaller regional units (distribution network to be more compact with abstraction sources). These water delivery units can be managed by private companies under management or concession contracts under supervision of regulatory bodies. In most countries mentioned above the monopoly suppliers of water to retailers are operated by governments, but the retailers are companies of different forms of co-operation between the public and the private sectors.

5. Regulation in Water Supply Sector

Current programs[20] of reforming of the water supply sector correctly attack the major problems in the sector as pricing of services, improvement of production efficiency, introduction of competition in the sector, attraction of private capital, selection of suppliers on the basis of open tenders and safeguarding low-income households from abrupt tariffs increase. The short-run problems are determined as introduction of contract relationships in the sector (between utilities suppliers and intermediaries, between the intermediaries and final consumers), restructuring of debts and improvement of financial soundness of the sector, and improvement of contract enforcement (metering services consumption and payments enforcement).

5.1 Weak Regulatory Environment in the Sector

One important flaw in current regulations is that they fail to introduce mechanisms of control of public utility companies. A month after the Program was adopted there was created a State Committee in Public Utilities by its separation from the State Committee in Housing. This signals some progress towards separated regulation of public utilities. However, the impact of such a reform is quite limited so far because the committee does not have a status of a regulatory body. The Committee deals with more than 30 industries, among which are not only two natural monopolies. In water and wastewater industry the Committee is provisioned to both develop government's policy and to regulate water supply and water treatment companies. In fact the Committee regulates the industry only through licensing for quality standards of water. Since local governments both represent local communities owing the utilities and regulate water supply companies, it leads to pervasive incentives in regulation[21]. The local regulators do not introduce regulations designed by the central government as, for instance, implementation of the Procedure of tariffs formation in centralized water supply and wastewater treatment[22] or the Procedure of bidding for servicing of houses[23]. Legal uncertainty as well as weak regulations are the major factors blocking introduction into the sector of private capital or capital international financial institutions.

For reforms in the sector to be implemented the Committee should play a larger role, protecting consumers from monopolistic pricing and inefficient services supply. In particular it should be able to enforce methodologies of tariffs regulation, to restructure most inefficient companies and to attract private companies for operation in the sector through open bidding. It would be advisable already if not to create a separate regulatory body in water supply, then at least to increase the authority of the principle government body in the sector.

Currently the regulation of the industry is complicated by legal uncertainty. Regulation of tariffs and the norms of consumption is a responsibility of both local state administrations (appointed by the President) and executive bodies of local communities (local

[20] Decree of the Cabinet of Ministers "On the reform and developments of the utility sector in 2002-2005 and until 2010", No.139, February 14, 2002.
[21] Most water supply companies are in ownership of local communities (216 of 249 companies).
[22] Order of the Sate Committee of Construction, Architecture and Housing Policy "On Approval of the Procedure of tariffs formation in centralized water supply and wastewater treatment" No. 139, June 26, 2001.
[23] Order of the Sate Committee of Construction, Architecture and Housing Policy "On Approval of the Procedure of Bidding for Servicing of Houses and Approval of a Standardized Contract on Servicing of Houses" No. 194, September 7, 1998.

governments)[24]. The regulators have to compensate for losses if the tariffs for services deviate from cost covering levels. Overlapping responsibilities of the governing bodies introduce inconsistency into regulation of tariffs for water services.

5.2 Contract Enforcement

Improvement of the contracts enforcement is one of the major short-term measures to be implemented in the sector. In most countries financial penalties and disconnections are a realistic threat. It is either possible technically or an inspector is regulated to be allowed to disconnect water supply in the apartment. Otherwise the apartment owner is a subject to financial penalties. This makes contracts for water supply enforceable. Sometimes, in case the water is regarded as a social good and water supplier is not permitted to cut water services, in order to enforce payment of water bills the authorities can cut electricity supply instead (e.g. Namibia). This approach is proving to be effective, but primitive mean of enforcing water charges.

According to the legislation non-paying consumers of water cannot be disconnected from water supply in Ukraine. Any attempts of private electricity distribution companies to disconnect non-paying water supply companies are blocked by local governments. Current attempts of electricity distribution companies to take into operation some water supply companies may improve payments enforceability, but they cannot solve the problem stemming from income distribution of the households (poor households cannot afford water payments and the situation does not improve with overall real income growth). Instead it may even worsen the problem at the macro level because of cost manipulation of electricity distribution companies[25].

In Ukraine water is regarded as a social good and the problem of users disconnection[26] raises a large number of conflicts. Due to absence of technical possibilities to disconnect users and a weak judicial system there are almost no means to enforce payments for water in blocks of apartments. The disconnection of a whole block of apartments hurts diligent payers and eventually extends the problem of non-payments. It is expected that installation of metering for blocks of apartments improves incentives only for water supply companies and does not alter incentives for final consumers.

Judging from experiences in other countries the problem of non-payments cannot be resolved without improvements in the judicial system and attracting of non-households financing to individual meters installation. Installation of collective meters should be designed very carefully. According to COWI the duplication of collective and individual meters implies significant cost and would not be feasible[27]. It would be preferable to rely on individual meters installation. Low-income households with pensioners could be supported with government subsidies for meters installation. Other consumer could be stimulated if they were charged full cost of water supply.

P.S., Lector: F.P., C.v.H., January 2003

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[24] From speech of Hryhoriy Semchuk, Head of the Committee for Public Utilities, July 23, 2002 also see Law "On Local Self Government in Ukraine", No. 280/97, May 21, 1997 and Law "On Local State Administrations", No. 586-XIV, April 9, 1999.

[25] So far attempts of electricity distribution companies to take into operation water supply companies were blocked by the Antimonopoly Committee.

[26] Law "On Drinking Water and Drinking Water Supply", No. 2918-III, January 10, 2002.

[27] In the Household Water Metering and Conservation Study (COWI) the payback period of installation of apartment block meters (cold and hot water) would be 2.3 years, if water consumption is reduced by to 40 lcd and applying a 10% interest rate. Installation of individual meters together with block meters would not be feasible as the payback period would be longer than the lifetime of the meters. Only, if additional savings of about 100 lcd could be achieved the payback period for individual meters would be 5-6 years.