THE CONCEPT OF SUSTAINABLE MANAGEMENT OF PRICING IN THE REGION'S WATER SUPPLY AND WATER DISPOSAL FACILITIES

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This paper describes the essentials of the concept of sustainable management of pricing in the regional public utility complex, based on the example of the Samara Region.

At present the establishment of tariffs for housing and public utility services is based, as a rule, on the "costs plus profitability" principle; i.e., a certain percentage of profit margin is added to the estimated cost of products (services), and based on the above the final values of tariffs for consumer groups are generated. In its turn the profit-value calculated as a percentage of the cost may be insufficient to finance the expenses required. Alternatively, a utility enterprise may make an unjustifiably high profit.

The overall success, however, of reforming the Russian public utility complex largely depends on the efficacy of tariff regulation of communal facilities. The methodology of tariff regulation (i.e. the accumulated principles and methods of regulation), is, in essence, a system of "game rules" in the public utilities market, predetermining the investment attractiveness of the industry under regulation.

As a rule the existing pricing system considers progress in providing a given housing and public utility service to be the work of a single organization which fulfills most of the provision of services, not the sum of the interactions of several business entities.

The introduction of a dual tariff is one of the ways of improving tariff regulation. The common practice of establishing flat tariffs based on standard consumption of resources, in the absence of meters, does not encourage their rational use. It's quite often that the consumer either pays for unutilized resources or actually consumes more than is stipulated by the normative standards. If a consumer is connected to the utilities but does not use the service, the utility provider does not generate any revenues even for the activities related to the proper maintenance of its utilities. Dual tariffs largely resolve these issues and promote greater financial sustainability of utility companies by mitigating the risk of losses related to the fluctuations in resource consumption.

The application of a dual tariff enables the tariff structure to be brought into line with the expense structure, allowing a utility company to improve sustainability while also meeting the interests of consumers who pay a connection fee for the access to the utilities and then pay only for the volume of products actually consumed, in line with the applicable tariff. In addition, the introduction of a dual tariff encourages consumers to install water meters and to use water economically, since the rational use of utility services and the provision of connecting devices in good repair enable the reduction of payments for relatively high unsubsidized rates per unit of services.

Methods of solving these and related problems of tariff regulation are reflected in this paper in the attached project methodology for the formation of water supply and water disposal tariffs.

The introduction of the proposed approaches would improve significantly the financial sustainability and investment attractiveness of utility enterprises, and would allow cross-subsidization gradually to be eliminated and the goals of the reforms of the housing and public utility complex to be realized.

A transition to payment by households for water supply services based on actual consumption at the current average rates would immediately lead to a sharp decline in utility company revenues. If payments for services actually consumed cease to cover semi-fixed costs, then the utility provider's costs would be assigned to the lowest volume of productive water supply in the calculation of the mean average tariff for the next regulated period, and a significant

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increase in the tariff would be inevitable. This in its turn would impact upon those consumers who had failed to install flow meters, and would increase the level of consumer non-payments.

An increase in the tariffs concerning payment for actual consumption would stimulate more rational, resource-saving consumer behavior, reduced consumption and, correspondingly, reduced payments for products (services). As a result, utility companies would once again find themselves in a situation of financial imbalance, given that the fixed costs would nevertheless have to be incurred regardless of the volume of actual consumption and the level of payments.

In other words, because of the price level or the volume of real sales, or, as a rule, both these factors at the same time, utility operators risk ending up with losses from sales instead of profit.

If the aforementioned factors lead to the generation of losses from sales, an increase of revenues from sales to the required critical size is possible, given the differentiated application of discrete factors which are subject to real change in the concrete conditions in which an enterprise operates. In the majority of cases price adjustment must be applied simultaneously with the adjustment of real sales volume.

Fig. 1 shows the *profitability threshold* of a municipal unitary water supply utility (Krasnoyarsk Utility Company).

The problem of determining the critical volume of the services sales is many-sided and has a number of nuances. The correct accounting of all factors and conditions which ensure that sales break even under the conditions of reduced demand for a company's products, makes well-substantiated planning of revenues and of financial outcomes from service sales possible, and helps to avoid (or at least minimize) the losses from core activities.

Thus the requirements in the tariff regulation methodology under development may be set forth as follows:

1. A dual tariff should be established for consumers with metering devices and, as a result, the total payment for water supply (water disposal) services according to the methodology should be not higher than the payment which is calculated based on current standards of consumption of services using flat tariffs (i.e. without the meters).

2. The new methodology should enable coverage of a utility company's fixed costs with regard to water transportation (disposal) regardless of the actual volume of water sold.

3. The methodology should encourage consumers of water supply services to install metering devices.

The development of a dual tariff methodology is related to a number of theoretical and practical issues. There follows below a proposed complex solution for these issues, formulated from the recent research on Samara Region public utility companies.

Consumers of water supply- and water-and-sewage facilities in Samara Region may be divided into two groups: physical persons (Group 1) and organizations (Group 2).

In accordance with the new methodology, the tariff for consumers with meters is composed of two parts: the cost of resource supply (tariff for utility access) and the tariff per unit of services consumed.

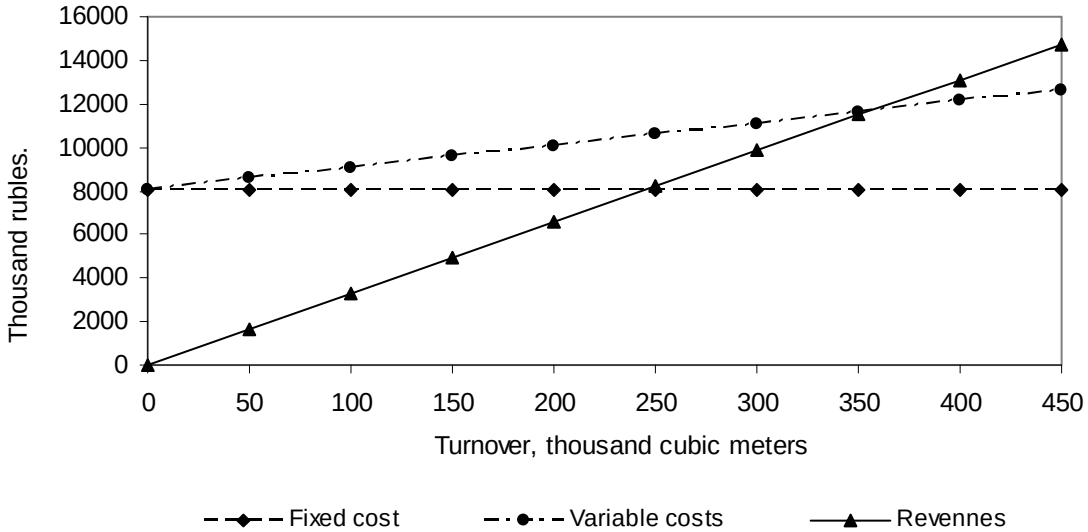

Fig. 1. **Determination of profitability threshold of water supply quality control department**

The cost of resource supply is calculated on the basis of the estimated regulated period and is subject to payment in equal parts on a monthly basis.

The tariff per unit of consumed services is established as a flat tariff for all consumer groups, and is calculated based on the costs incurred in the lifting and treatment of water (sewage water) and the variable costs related to resource transportation with regard to the required profit margin (or in relation to the required profit margin in the productive water supply), using the following formula:

$$T_{Д}^{м^3} = \frac{(З^{под} + З^{оч} + П_{р}^{тр} + Н_{р} + П_{п})}{V} + \frac{П_{р}}{V}. \quad (1)$$

where $T_{Д}^{м^3}$ - tariff in Russian rubles per 1 cubic meter of water (sewage), RUB/m³; - volume of productive water supply to consumers (Groups 1 and 2), thousand m³; - water lifting expenses, RUB thousand; $З^{оч}$ - water (sewage) treatment costs, RUB thousand; $П_{р}^{тр}$ - variable costs related to water (sewage) transportation; $Н_{р}$ - general operating expenses, RUB thousand; $В_{н}$ - water tax, RUB thousand; $Р_{оч}$ - water treatment expenses, RUB thousand; $П_{п}$ - other direct costs, RUB thousand; $П_{р}$ - estimated profit for a utility company required to perform its production and investment targets, RUB thousand.

The cost of resource supply is calculated and established within the parameters of the regional standard for payment by citizens as approved by the executive or legislative municipal authorities (depending on the local procedure for tariff regulation).

Its size depends on consumer capacity.

$$S_{ПВ} = \frac{HBB - T_{Д}^{м^3} \cdot V}{V},$$

where A - cost of resource supply per unit of subscriber capacity, RUB/m³ per month; HBB - required gross revenues, RUB thousand; $T_{Од}^{м^3}$ - cost of one cubic meter of water (discharge liquid) using flat tariff, RUB/m³.

The total cost of water (discharge liquid) for one consumer per month should be calculated as follows:

where $S_{ПВ}$ - cost of water consumed per month, RUB/month; v - actual monthly volume of consumed water according to meter readings, m³/month; - current standard for water consumption (discharge liquid) that corresponds to this type of public services for the said residential house; λ - number of residents in a household, persons; - capacity of a household/organization (in case of Group 2 of consumers this parameter is defined based on standards consumption only).

The results of the comparison of the current and the new methodologies of tariff regulation relating to water supply and water discharge are presented in table 1.

The distinctive aspect of the proposed method is the equality of payments calculated based on standard water consumption (discharge) by consumers.

The proposed approach also allows for differentiation of tariff by time of day. In order to

Table 1

Calculation of monthly water charge to consumers in the regulated period (excl. VAT)

Number of family members	Consumption by tariff by 1 person, m³/mo.	Dual Tariff, RUB				Flat Tariff, RUB	
		Monthly fee per household	Tariff per 1 m³	Monthly payment for consumed water	Monthly payment per all persons	Tariff per 1 m³	Monthly payment per all persons
1	5.7	61.43	22.02	125.52	186.95	32.80	186.95
2	5.7	122.87	22.02	251.03	373.90	32.80	373.90
3	5.7	184.30	22.02	376.55	560.85	32.80	560.85
4	5.7	245.73	22.02	502.07	747.80	32.80	747.80
5	5.7	307.16	22.02	627.59	934.75	32.80	934.75
6	5.7	368.60	22.02	753.10	1, 121.70	32.80	1, 121.70

define the parameters of allocation of water consumption throughout the day, there factual measurements were taken in Krasnoyarsk municipal district, in 20 apartment houses with 1,953 residents. Measurements were taken over four days. The average consumption in the said period by house is shown in fig. 2.

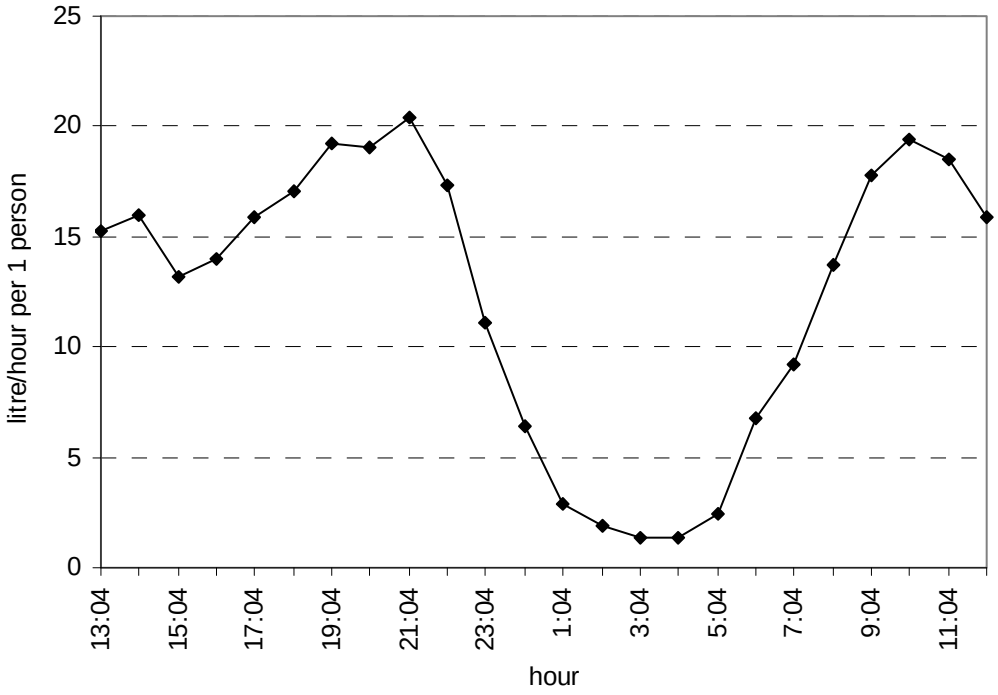

Fig. 2. **Average water consumption**

Table 2

Water supply and water disposal tariffs differentiated by time of day

Service Description	Tariff					
	Base Tariff		Day Zone		Night Zone	
	A	$T_{Д}^{м^3}$	*A*	$T_{Д}^{м^3}$	*A*	$T_{Д}^{м^3}$
Water Supply	10.78	22.02	10.78	24.22	10.78	19.82
Water Disposal	10.20	48.86	10.20	53.75	10.20	43.98

We propose the use of day and night tariffs in order to level out the daily consumption of water. The day zone tariff is 10% higher than the base tariff, and the night zone tariff is 10% lower.

The day zone lasts from 0700 to 2300 hours, and the night zone from 2300 to 0700 hours.

The introduction of a balanced economic vehicle is a precondition of overcoming the current systemic crisis in the housing and public utility complex; this would enable the financing of current and investment activities by way of regulation of prices (tariffs), i.e. in order to redirect the industry from its extensive growth model towards ensuring the efficiency and reliability of system operations. The key role in this economic vehicle is played by a sustainable pricing policy, which begins with the generation of tariffs for services, to their differentiation in order to stimulate sufficient sales volumes and the rational use of all resources. For this the supplier-consumer chain as a whole must be adequately equipped with flow meters.

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