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Bajo, Anto; Filipović, Branimir

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P. O. Box 320; Phone: (385 1) 4886 444; Fax: 4819 365; e-mail: office@ijf.hr; www.ijf.hr

Anto Bajo and Branimir Filipović

The Efficiency of the Water Supply in Croatia

In the last three years the price of tap water has risen rather considerably. This price is set by the utility companies owned by the local government units (municipalities and cities). And yet this price rise is concomitant with large losses of water while it is being delivered to the end user. Thus in 2005 alone, about 440 million cubic metres were drawn and yet only 259 million cubic metres of water were actually delivered. The loss comes to 2.1 billion kuna, equivalent to about 0.9% of GDP. On the basis of the available data from 2005, in this article we shall analyse the efficiency of water supply by counties. The objective is to set off a public debate about the price of water, the cause of the rise in the price of water, and the possibilities of reducing the large costs in the water supply.

1. Introduction

Croatia lies on an area that is geologically rich in high quality water. According to estimates of the quantity of water per capita, we are fifth in Europe, and forty-second in the world. The per capita quantity of water comes to about 16,700 square metres, which is more than enough for our own consumption. However, only 75% of the population is connected to the mains water supply, and only 40% to mains sewage treatment facilities. A small percentage of effluent is collected and a still smaller percentage is sent to treatment plants and recycled. There is a constant danger of pollution of water together with reduced capacities for supplying the population with drinking water (as recently in Petrinja, for example).

Although in recent years increasing investments have been made into the development of the water supply and sewage infrastructure, because of the great losses there are problems in financing the supply of water, which might have consequences to the greater charges made to households and companies. Losses in the water network can be the result of poor maintenance, illegal tapping and losses of drinking water during delivery to the end user.

2. The number of utility companies distributing water

In Croatia there are 115 local economy utility agencies registered for the business of water supply, for collecting water fees and for pumping, financing and delivering water. On average, a single utility company supplies a population of 53,000 with water. The distribution of these firms among the counties is interesting.

Table 1. Utility companies distributing water per county

County	Number of utility firms	Ranking	Population size per utility firm	Ranking
City of Zagreb	3	13.	259,715	1.
Međimurska	1	21.	118,426	2.
Varaždinska	2	19.	92,385	3.
Brodsko-posavska	2	18.	88,383	4.
Istarska	3	14.	68,781	5.
Krapinsko-zagorska	3	15.	47,477	6.
Splitsko-dalmatinska	10	3.	46,367	7.
Zagrebačka	7	9.	44,242	8.
Pozesko-slavonska	2	20.	42,916	9.
Koprivničko-križevačka	3	16.	41,489	10.
Primorsko-goranska	9	5.	33,945	11.
Zadarska	5	11.	32,409	12.
Virovitičko-podravska	3	17.	31,130	13.
Osječko-baranjska	11	1.	30,046	14.
Šibensko-kninska	4	12.	28,245	15.
Sisačko-moslavačka	8	7.	23,173	16.
Vukovarsko-srijemska	9	4.	22,752	17.
Bjelovarsko-bilogorska	6	10.	22,180	18.
Karlovačka	7	6.	20,255	19.
Dubrovačko-neretvanska	10	2.	12,287	20.
Ličko-senjska	7	8.	7,668	21.
Total	115			
Average	*5,5*		*53,061*	

Source: authors' calculation on the basis of data supplied by the Croatian Water and Sewage Works Group. 2008

There are the most municipal economy (utility) firms in the Osječko-baranjska County, and after that in the Dubrovačko-neretvanska and Splitsko-dalmatinska counties, each of which has ten. Only in the Međimurje county is there just one utility firm. The number of persons supplied by a single utility firm ranges from 7,700 in the Ličko-senjska County to 260,000 in the city of Zagreb. In the Ličko-senjska County the population supplied by the utility firm is five times smaller than the all-Croatian average.

The large number of utilities, as compared with the small number of users, raises the issue of the efficiency of the water supply. There is clearly a chance for consolidation and for merging utilities to obtain greater economies. The Municipal Economy Law (Official Gazette 26/03) permits local government units to make use of this opportunity.

3. Degree of connectedness to the water network

The degree to which the population is connected to the water network depends on the development of the counties, the gross social product, the lifestyle and the availability of sources of potable water. In areas in which potable water does not abound, greater investment in the infrastructure is required. There is a cause and effect relationship between the number of mains connections (or percentage of mains connections) to the water supply network and the average daily consumption of water. The more mains connections, the larger the population using the water, and hence the total daily consumption rises. In Croatia, in 2005, only 75% of the population was connected to mains water supply. In EU countries, save for Romania, the corresponding figure is 85%, and in some countries, such as Italy and the Netherlands, it rises to 100% (see Table I, annexe). Unfortunately, data concerning the extent to which the population is connected to mains water are not available in the counties in Croatia.

4. Quantities of water drawn and delivered

The difference between quantities of water drawn and delivered is the loss of water, that is, the water that does not reach the end user. Losses in the network can be expressed in volume, in cubic metres, or in percentage, as a ratio of delivered to drawn water. On average in Croatia, for every cubic metre of water drawn out of the ground, about 46% is lost during the distribution. From county to county, the differences are significant. Table 2 shows the losses of drawn water expressed in cubic metres and in percentages by county.

The water supply system in Croatia is clearly not efficient for when 1 cubic metre of water extra is delivered, losses of 0.89 m^3 are incurred.

The city of Zagreb delivers the most water, but also has the greatest losses, of as much as 65 million m^3. Then come the Splitsko-dalmatinska, Zadarska, Primorsko-goranska and Istarska counties. The smallest losses are to be found in the Koprivničko-križevačka County. The greatest losses in the percentage of water drawn are in Zadar, Šibensko-kninska, Karlovačka, Splitsko-dalmatinska, Brodsko-posavska, Krapinko-zagorska and Dubrovačko-neretvanska counties and in the city of Zagreb. The question arises as to how the utilities can work profitably with such great losses. The European Union considers losses of no more than 15 to 18% acceptable.

The utility companies are gradually bringing in a market price for water (in the city of Zagreb, for example, the price of water for households was 6.62 kuna per metre in 2005, and in 2008 it is 11.22 kuna per cubic metre), although they do not pay much attention to the great losses of drinking water on its way to the end user.

Table 2. Drawn and delivered water, and wastage in the network per county (in million cubic metres and in %)

Ranking	County	Drawn (1)	Delivered (2)	Losses (1-2)	Losses in %
1.	Zadarska	30.5	9.9	20.6	68
2.	Šibensko-kninska	23.3	9.4	14.0	60
3.	Karlovačka	15.8	6.5	9.4	59
4.	Splitsko-dalmatinska	73.3	35.8	37.5	51
5.	Brodsko-posavska	7.9	4.0	3.9	49
6.	Krapinsko-zagorska	8.2	4.2	4.0	49
7.	Dubrovačko-neretvanska	17.0	8.7	8.3	49
8.	City of Zagreb	137.3	71.7	65.6	48
9.	Vukovarsko-srijemska	12.7	7.1	5.6	44
10.	Međimurska	8.0	4.6	3.4	42
11.	Osječko-baranjska	24.1	14.1	10.0	42
12.	Ličko-senjska	4.6	2.7	1.9	41
13.	Virovitičko-podravska	4.8	2.9	1.9	39
14.	Istarska	29.7	19.0	10.7	36
15.	Bjelovarsko-bilogorska	4.6	3.1	1.5	32
16.	Primorsko-goranska	40.4	28.0	12.4	31
17.	Sisačko-moslavačka	9.9	7.0	3.0	30
18.	Varaždinska	12.2	8.7	3.5	28
19.	Požeško-slavonska	4.3	3.2	1.1	26
20.	Zagrebačka	5.7	4.5	1.2	21
21.	Koprivničko-krizevačka	4.7	4.3	0.4	8
	Total	478.9	259.2	219.6	46
	Average	*22.8*	*12.3*	*10.5*	*46*

Source: authors' calculation on the basis of Croatian Waters PC figures, 2008

5. The price of water

Life depends on water, for which reason it is the duty of every state to ensure it is available to its citizens and its economy. The price of water paid by households and corporations should be looked at on the basis of the economic and social characteristics. The economic price of water is the market price that should cover the fixed costs and ensure the water company a profit. The price should finance the real costs of maintaining the system, the costs of energy, business expenditure, labour costs, depreciation of fixed assets and investment in new plant, as well as create a profit. But because of the high costs of the development of the water infrastructure, and the high standards laid down by EU water guidelines, the economic price of water is growing, and is as a rule very high. Because of the high prices of water, most OECD countries (and local government units) additionally co-finance the costs of water supply with funds from the central government budget and the budgets of local units (see Table II in the annexe). From the budget it is on the whole groups of the population the welfare of which is at risk that are subsidised, the difference being paid for them up to the economic price of water. It is possible directly to finance the supply of water from local budgets, for the development and construction of the water infrastructure. Unfortunately, there is little information about the size of subsidies to household with lower incomes and concerning whether local units in Croatia subsidise the price of water for citizens with the lowest incomes. Only a small quantity of information is available, on the Internet sites of some of the utility firms.

The subsidized price for water: The case of utility firm Vodovod i kanalizacija d.d. of Rijeka

During 2006 in the municipalities and cities that this utility firm supplied with water, 4,285 persons were able to claim assistance for meeting the costs of water supply and sewage services. The subsidies amount to 822 kuna – 626 for drinking water and 196 kuna for sewage; when augmented by VAT, these subsidies came to one million kuna. The city of Rijeka provided 90% of the subsidy, and the cities and municipalities 10% (available at http://www.kdvik-rijeka.hr/)

Basic water price

Potable water as delivered to the end user has a certain price. This is the basic price augmented by the water charges. The price of water is multiplied by the amount of water delivered, and the total price of drinking water paid by the end users (corporate and household together).

On the basis of the Croatian Waterworks and Sewage Works Group, the total price of water per cubic metre contains the basic price of water, for drainage, concession, VAT, additional charges for special investments, and charges for the protection and use of water. For this paper, although the total price of water is known, information about the detailed pricing structure was not available.

Water charges

The charge for the use of water is paid for the drawing and use of water, and for using water power. Natural and legal persons pay the charge when they draw or pump water from watercourses, lakes, reservoirs, underwater and other natural reserves of water, including mineral and thermal waters used for drinking, driving, process, municipal and other purposes, as well as legal entities that use water power for the production of electrical energy. The charge is used for the collection and keeping of data about reserves of water and its use and for research into water. The basis for the payment is a cubic metre of water drawn and used or water delivered via the water supply system.

The water protection charge is paid for the prevention of water pollution. It is paid by legal and natural entities that release effluent and that sell or import for their own purposes mineral fertilisers and pest control agents. The charge is paid according to quantity and the degree of pollution of the effluent discharged (according to the quantity of mineral fertiliser and/or pest control agents that are sold or imported for own use). The resources obtained from this charge are used for the construction of water facilities used to protect water.

Charges may be statutorily prescribed and mandatory or brought in ad hoc for the financing of the water infrastructure. The product of the total price and the quantity of water delivered constitutes the price paid for water.

There is a considerably difference in the price of water for households and that for business, and there are also seasonal differences. In seasons of greater water consumption, companies in local units with shortages of drinking water introduce higher prices in order to discourage large seasonal consumption.

The calculation and collection of the price for drinking water are carried out by the municipal economy firms owned by municipalities and cities, and some of the sums collected are transferred to the Croatian Waters PC. In 2005, the average price of water for households was 8.44 kuna.

Table 3. Average total price of water per cubic metre for households (in kuna)

Ranking	County	Croatian Waters (1)	Utility firms (2)	Total price (1 + 2)
1.	Istarska	4.22	7.55	11.77
2.	Zadarska	3.75	7.85	11.60
3.	Primorsko-goranska	3.96	7.16	11.12
4.	Ličko senjska	3.28	6.85	10.12
5.	Međimurska	4.42	5.67	10.09
6.	Dubrovačko-neretvanska	3.31	6.66	9.97
7.	Krapinsko-zagorska	3.69	5.57	9.26
8.	Varaždinska	3.90	5.06	8.96
9.	Splitsko-dalmatinska	3.56	4.82	8.38
10.	Koprivničko-križevačka	2.97	5.21	8.17
11.	Bjelovarsko-bilogorska	3.18	4.85	8.03
12.	Sisačko-moslavačka	3.24	4.78	8.01
13.	Šibensko-kninska	3.30	4.47	7.76
14.	Brodsko-posavska	3.84	3.89	7.73
15.	Karlovačka	2.82	4.67	7.49
16.	Osječko-baranjska	2.99	4.42	7.41
17.	Požeško-slavonska	3.54	3.45	6.99
18.	City of Zagreb	2.82	3.79	6.62
19.	Zagrebačka	2.65	3.64	6.28
20.	Vukovarsko-srijemska	2.83	3.11	5.94
21.	Virovitičko-podravska	2.41	3.14	5.55
	Average	*3.36*	*5.08*	*8.44*

Source: authors' calculation on the basis of data supplied by Croatian Waters PC

The highest unit prices for water supplied to households are in the Istarska, Zadarska, Primorsko-goranska, Ličko-senjska and Međimurska and Dubrovačko-neretvanska counties. The lowest prices for water are in the Vukovarsko-srijemska and Virovitičko-podravska counties.

The average price per cubic metre for industry is 12.89 kuna (Table 4).

The lowest price for water supplied to industry is in the Vukovarsko-srijemska County, where it comes to 8.89 kuna, and the highest in Istarska County, 20.24 kuna per cubic metre.

The price of water differs between the industrial and the household sector (Table 5). On average, the price of water for households is 4.45 kuna lower than that for industry.

Table 4. Average total price of water per cubic metre for business (industry) (in kuna)

Ranking	County	Croatian Waters (1)	Utility firms (2)	Total price (1 + 2)
1.	Istarska	10.98	9.26	20.24
2.	Primorsko-goranska	8.28	7.47	15.75
3.	Zadarska	8.76	6.89	15.65
4.	Međimurska	4.91	9.92	14.83
5.	Ličko-senjska	7.46	6.88	14.33
6.	City of Zagreb	4.73	8.98	13.71
7.	Koprivničko-križevačka	5.84	7.65	13.49
8.	Karlovačka	9.07	4.18	13.25
9.	Dubrovačko-neretvanska	8.55	4.69	13.24
10.	Brodsko-posavska	6.55	6.58	13.13
11.	Osječko-baranjska	6.14	6.59	12.73
12.	Varaždinska	3.85	8.41	12.26
13.	Krapinsko-zagorska	6.62	5.45	12.07
14.	Splitsko-dalmatinska	6.75	4.99	11.73
15.	Sisačko-moslavačka	6.59	5.08	11.67
16.	Bjelovarsko-bilogorska	6.79	4.78	11.57
17.	Požeško-slavonska	5.10	6.31	11.40
18.	Šibensko-kninska	6.28	4.59	10.87
19.	Zagrebačka	7.48	3.37	10.85
20.	Virovitičko-podravska	5.76	3.35	9.11
21.	Vukovarsko-srijemska	4.83	4.06	8.89
	Average	*6.73*	*6.16*	*12.89*

Source: authors' calculation on the basis of data supplied by Croatian Waters PC

Table 5. Difference in average price of water for households and industry per cubic metre (in kuna)

Ranking	County	Industry (1)	Households (2)	Difference (1-2)
1.	Istarska	20.24	11.77	8.47
2.	City of Zagreb	13.71	6.62	7.09
3.	Karlovačka	13.25	7.49	5.76
4.	Brodsko-posavska	13.13	7.73	5.40
5.	Koprivničko-križevačka	13.49	8.17	5.32
6.	Osječko-baranjska	12.73	7.41	5.32
7.	Međimurska	14.83	10.09	4.74
8.	Primorsko-goranska	15.75	11.12	4.63
9.	Zagrebačka	10.85	6.28	4.56
10.	Požeško-slavonska	11.40	6.99	4.42
11.	Ličko-senjska	14.33	10.12	4.21
12.	Zadarska	15.65	11.60	4.05
13.	Sisačko-moslavačka	11.67	8.01	3.66
14.	Virovitičko-podravska	9.11	5.55	3.56
15.	Bjelovarsko-bilogorska	11.57	8.03	3.54
16.	Splitsko-dalmatinska	11.73	8.38	3.35
17.	Varaždinska	12.26	8.96	3.30
18.	Šibensko-kninska	10.87	7.76	3.10
19.	Dubrovačko-neretvanska	13.24	9.97	3.27
20.	Vukovarsko-srijemska	8.89	5.94	2.95
21.	Krapinsko-zagorska	12.07	9.26	2.81
	Average	*12.89*	*8.44*	*4.45*

Source: authors' calculations on the basis of data supplied by Croatian Waters PC

The smallest differences in the price of water are in the Krapinsko-zagorska County, only 2.81 kuna per cubic metre, and they are three times greater in Istria, where they come to 8.47 kuna per cubic metre.

6. Water costs paid

The cost of households and firms for water delivered is the product of the total water delivered in cubic metres and the price per cubic metre. Here we divided this value by the number of people in a given county. We should mention that this data is of a statistical nature and does not reflect the real situation, for it covers the total population, irrespective of whether all the inhabitants are connected to mains supplies (Table 6).

The biggest water costs, about 1000 kuna, are charged to households and economic agents in Istarska County (more than 1,400 kuna), Primorsko-goranska County and the city of Zagreb (about 1,000 kuna). Less than 200 kuna is paid in the Zagrebačka, Virovitičko-podravska and Brodsko-posavska counties. It should be said that in 16 counties, more money is collected from households than from industry. Only in the Istarska, Primorsko-goranska, Koprvničko-križevačka and Požeško-slavonska counties and in the city of Zagreb is more revenue collected from industry. The biggest differences are in the Ličko-senjska, Međimurska, Zadarska, Dubrovačko-neretvanska, Vukovarsko-srijemska and Varaždinska counties. The big differences between households and industry in revenue collected raises the issue of the reason for this, and the effectiveness of the collection of the water charge from industry. On average, collection from households is much better than from industry. Hence it is justified to seek the reasons in the utility firms owned by local units that are able to exempt some parts of the business sector (hotels, restaurants, companies) from payment of the full price of water. This refers in particular to the five counties ranked highest.

Table 6. Costs paid for water per capita (in kuna)

County	Industry (1)	Households (2)	Total (1+2)	Ranking	Difference (1-2)	Ranking
Ličko-senjska	163	346	509	8.	-183	1.
Međimurska	131	301	432	12.	-171	2.
Zadarska	241	409	650	7.	-168	3.
Dubrovačko-neretvanska	276	428	704	5.	-152	4.
Vukovarsko-srijemska	61	210	271	17.	-149	5.
Varaždinska	165	297	462	9.	-133	6.
Osječko-baranjska	135	255	390	13.	-120	7.
Krapinsko-zagorska	106	225	331	16.	-119	8.
Šibensko-kninska	328	436	764	4.	-107	9.
Brodsko-posavska	75	138	213	18.	-62	10.
Splitsko-dalmatinska	302	362	664	6.	-59	11.
Virovitičko-podravska	78	134	212	20.	-56	12.
Sisačko-moslavačka	204	235	439	10.	-31	13.
Bjelovarsko-bilogorska	108	116	223	19.	-8	14.
Karlovačka	217	221	438	11.	-4	15.
Zagrebačka	59	63	122	21.	-3	16.
Pozesko-slavonska	191	180	371	14.	11	17.
City of Zagreb	503	453	956	3.	50	18.
Koprivničko-križevačka	227	126	354	15.	101	19.
Primorsko-goranska	595	478	1,073	2.	117	20.
Istarska	851	587	1,439	1.	264	21.
Average	*239*	*286*	*525*		*-47*	

Source: authors' calculation on the basis of data supplied by Croatian Waters PC

Table 7. Costs paid for water and losses in the distribution network (in million kuna)

Ranking	County	Paid (1)	Losses (2)	Total (1+2)	Losses as percentage of amount paid
1.	Zadarska	105	184	289	174
2.	Šibensko-kninska	86	107	193	124
3.	Brodsko-posavska	38	45	82	118
4.	Karlovačka	62	67	129	108
5.	Splitsko-dalmatinska	308	308	616	100
6.	City of Zagreb	745	722	1.467	97
7.	Međimurska	51	48	100	95
8.	Krapinsko-zagorska	47	37	84	79
9.	Vukovarsko-srijemska	55	43	99	78
10.	Dubrovačko-neretvanska	86	64	150	73
11.	Osječko-baranjska	129	87	216	68
12.	Virovitičko-podravska	20	13	33	65
13.	Ličko-senjska	27	15	43	56
14.	Istarska	297	151	448	51
15.	Varaždinska	85	34	120	40
16.	Bjelovarsko-bilogorska	30	11	41	38
17.	Primorsko-goranska	328	115	443	35
18.	Požeško-slavonska	32	10	42	32
19.	Sisačko-moslavačka	81	24	106	30
20.	Zagrebačka	38	8	46	21
21.	Koprivničko-križevačka	44	3	47	7
	Total	2.695	2.096	4.791	
	Average	*128*	*100*	*228*	*78*

Source: authors' calculation on the basis of data supplied by Croatian Waters PC, 2008

7. Costs paid and water losses

In the continuation of this article, the total amount of charges collected for water delivered per county is analysed, with the amount of water losses and the total revenue that could be collected if there were no losses. In so doing, the article observes the aggregate of the total amount of water delivered to industry and households (Table 7).

Total losses in 2005 came to the almost incredible sum of 2.1 billion kuna. In 2005, this was equivalent to 0.9% of GDP. The average loss per county is 100 million kuna per year.

Losses in the distribution network are not important for the amount of total charges to industry or households. The price of water is set arbitrarily, without any insight into the real costs of supply.

In the Zadarska, Šibensko-kninska, Brodsko-posavska and Karlovačka counties losses of water are greater in millions of kuna than the amounts collected from the sale of water. In the Splitsko-dalmatinska county and the city of Zagreb, revenues collected are practically equal to the value of the losses. The lowest losses of water are in the Koprivničko-križevačka and the Zagrebačka counties. Because of the important losses of revenue, the situation in the Zadarska County gives particular cause for concern.

For a better insight into the scale of the losses, it is worth looking at the amount of costs paid, the average losses and the total potential amount without losses, in kuna, per capita per county (Table 8).

The biggest revenue losses are in the Zadarska and Šibensko-kninska counties, the city of Zagreb, and then Istarska, Splitsko-dalmatinska and Dubrovačko-neretvanska counties. Interestingly, it is on the whole counties that are on the coast and because of the tourist industry have a greater seasonal consumption of water that are concerned. The lowest losses per capita are found in the Koprivničko-križevačka, Bjelovarsko-bilogorska, Zagrebačka and Požeško-slavonska counties.

8. Conclusion

Big losses of water are reflected in the financial operations of the municipal economy utility firms. Utility firms finance their losses by transfers from the budgets of local government units, and by increasing the price of water. In Croatia an economic price for water is gradually

Table 8. Average annual losses in kuna per capita per county

County	Paid (1)	Losses (2)	Ranking	Total (1+2)	Ranking
Zadarska	650	1.132	1.	1.782	3.
Šibensko-kninska	764	948	2.	1.712	4.
City of Zagreb	956	927	3.	1.883	2.
Istarska	1.439	731	4.	2.170	1.
Splitsko-dalmatinska	664	663	5.	1.328	6.
Dubrovačko-neretvanska	704	517	6.	1.220	7.
Karlovačka	438	472	7.	910	8.
Međimurska	432	408	8.	840	9.
Primorsko-goranska	1.073	377	9.	1.450	5.
Ličko-senjska	509	288	10.	796	10.
Osječko-baranjska	390	264	11.	654	11.
Krapinsko-zagorska	331	261	12.	592	13.
Brodsko-posavska	213	252	13.	465	17.
Vukovarsko-srijemska	271	210	14.	481	16.
Varaždinska	462	185	15.	647	12.
Virovitičko-podravska	212	138	16.	350	19.
Sisačko-moslavačka	439	131	17.	570	14.
Požesko-slavonska	371	117	18.	488	15.
Bjelovarsko-bilogorska	223	85	19.	308	20.
Zagrebačka	122	25	20.	148	21.
Koprivničko-križevačka	354	23	21.	377	18.

Source: authors' calculation on the basis of data supplied by Croatian Waters PC, 2008

being introduced, which should ensure that the costs of supplying drinking water are covered. Alongside the introduction of an economic price for water, low income group households should be given subsidies and grants. The main results of this paper are as follows.

- The water supply system in Croatia is not efficient, for when there is an increase of one cubic metre of water delivered losses of 0.89 m^3 are incurred.
- Losses in the water supply network are not statistically significant for the amount of total charges to industry and households. The price is set arbitrarily without an insight into the real costs of water distribution.

Recommendations for the utility firms and the Croatian Waters Public Corporation include the following.

- Investigate the reasons for losses arising in the water distribution system.
- Investigate the degree to which households are connected to the network, and what percentage of illegal connections there is.
- Determine differences in the structure of prices in municipalities and cities and costs of water supply according to the different utility companies.
- Analyse the magnitude and structure of the subsidised costs of water and determine who it is that is subsidised, households or industry.
- Analyse the reasons why collection is better from households than from industry. Determine the reasons for the big differences in the collection of water charges and analyse whether the burden of payment is being transferred via the price rise from industry to the household sector.

Annexe

Table I. Percentage of households connected to the water supply network per country

Country	1997	1998	1999	2000	2001	2002	2003	2004	2005
Belgium	92	94	95	95	97	96	97	97	98
Bulgaria	98	98	98	98	99	99	99	99	99
Czech R.	86	86	87	87	87	90	90	92	92
Denmark	:	:	:	:	95	97	:	:	:
Germany	:	99	:	:	99	:	:	:	:
Estonia	:	:	:	70	71	72	72	72	:
Ireland	:	:	:	:	:	90	:	:	83
France	:	99	:	:	99	:	:	:	:
Italy	:	:	100	:	:	:	:	:	:
Cyprus	100	100	100	100	100	100	100	100	100
Latvia	:	:	:	:	:	76	76	76	76
Luxembourg	:	:	:	:	:	:	:	100	:
Hungary	98	98	98	98	93	93	:	:	:
Malta	100	100	100	100	100	100	100	100	100
Netherlands	100	100	100	100	100	100	100	100	100
Austria	87	88	89	89	89	90	:	:	:
Poland	79	80	80	83	85	85	85	86	86
Portugal	:	85	:	:	:	:	:	:	92
Romania	:	:	:	:	:	54	:	:	:
Slovenia	:	:	:	:	:	91	:	:	:
Slovakia	:	:	:	:	:	:	84	:	:
Sweden	86	:	:	:	:	:	:	:	:
Turkey	71	71	73	74	75	76	77	79	:
Iceland	:	:	:	95	95	95	95	95	95
Norway	:	89	89	89	89	89	89	89	89
Slovenia	:				91				
Croatia	:								75

Source: OECD, EUROSTAT, Croatian Water

Table II. Measures to make drinking water more affordable for domestic users

Country	Large subsidies[a]	Reduced VAT[b]	Reduced WWT[c]	Progressive tariff[d]	Social tariff[e]	Targeted assistance[f]	No disconnection[g]	Free block[h]	Unmetered[i]	No fixed fee[j]	Income support[k]
Australia				Yes	Yes				Yes		Yes
Austria					Yes		Yes			Yes	Yes
Belgium		Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes
Canada	Yes								Yes		Yes
Czech R.	Yes	Yes								Yes	Yes
Denmark							Yes		Yes		Yes
Finland						Yes					Yes
France		Yes		Yes/No/l		Yes	Yes				Yes
Germany		Yes					Yes				Yes
Greece	Yes			Yes	Yes						Yes
Hungary	Yes				Yes	Yes				Yes	Yes
Iceland							Yes		Yes		Yes
Ireland	Yes						Yes	Yes	Yes	Yes	Yes
Italy	Yes	Yes		Yes	Yes						Yes
Japan		Yes	Yes	Yes							Yes
Korea				Yes			Yes			Yes/No	Yes
Luxembourg				Yes	Yes	Yes	Yes				Yes
Mexico	Yes			Yes	Yes	Yes	Yes		Yes		Yes
Netherlands		Yes	Yes								Yes
New Zealand									Yes		Yes
Norway							Yes		Yes		Yes
Poland	Yes									Yes	Yes
Portugal	Yes	Yes		Yes	Yes						Yes
Slovakia	Yes										Yes
Spain	Yes	Yes		Yes	Yes						Yes
Sweden							Yes				Yes
Switzerland	Yes	Yes					Yes				Yes
Turkey	Yes			Yes							Yes
UK/m		Yes			Yes	Yes	Yes		Yes		Yes
USA				Yes/No	Yes	Yes					Yes

[a]*Subsides for water supply and/or sanitation over 30% of service cost (including investment).*

[b]*VAT on water bellow normal rate*

[c]*Reduced waste water tax on other water charges for the poor (in many cases the WWT for households is flat rate and indirectly linked to property size or value).*

[d]*Progressive water tariff in general use.*

[e]*Social water tariff (reduced price for certain groups of users).*

[f]*Targeted assistance, i.e. grants or forgiveness of arrears for water provided to poor people.*

[g]*No disconnection of water supply of poor people with arrears for water or for municipal tax.*

[h]*Provision of a first block at zero price for poor people or all people.*

[i]*Provision of water to individual dwellings is unmetered in most cases (flat rate tariff for households).*

[j]*Only proportional fee.*

[k]*Income support for poor people.*

[l]*Yes/No: used but not in most cases.*

[m]*England and Wales only. For Northern Ireland, same as Ireland.*

Source: OECD

Institut za javne financije
Katančićeva 5
Zagreb, Hrvatska
p.p. 320

INSTITUT ZA JAVNE FINANCIJE

Institute of Public Finance
Katančićeva 5
Zagreb, Croatia
PO Box 320

**Poštarina plaćena
u poštanskom uredu
10000 ZAGREB**

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