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The polluter-pays! But, for what?

Abstract

The guidelines on the economics of the EU Water Framework directive focus mainly on environmental and resource costs. This is in other words the effect side of good water management. They provide little direction on the financial costs of water supply and water use, the efficiency side of the equation. These costs divide into direct operational cost for labour and energy, taxes and capital costs.
This article presents for the case of Croatia, the different costs for which eventually the user has to pay and shows the differences in efficiency between the four Croatian riverbasins and compares them with what is found in other countries of the European Union.
It concludes that a uniform way of presenting these costs at riverbasin, national and EU level would provide insight in what the user pays for and enhance the role of a river basin authorities by providing a transparent tool to stimulate good governance in water use.

Introduction

This article considers two principles of the EU Water Framework directive important:

- "The principle of recovery of the costs of water services, including environmental and resource costs associated with damage or negative impact on the aquatic environment should be taken into account in accordance with, in particular, the polluter-pays principle."[2]
- The diversity in the planning and execution of measures to ensure protection and sustainable use of water should be taken into account in the framework of the river basin.

The polluter-pays principle is an important economic guideline however, it leaves the question unanswered what the polluter should pay for. The directive does not specify the kind of costs that have to be recovered neither that such recovery of the costs of water services should explicitly result in an efficient use of water, energy and labour. EC Policy director, Mr. S Scheuer [10] observes that such absence of clearly defined economic guidelines might lead to low transparency and little justification in most of the cost recovery analyses as.

This article takes "the user-pays" and not the "polluter-pays" as its main principle.
The morale principle of the polluter-pays is that polluter pays according to his contribution to the problem which is, "the pollution of the water" and is as such the general principle of environmental policy. The principle is to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources as water. In the case of large industrial and agricultural water users this polluter-pays principle is relatively straight forward and can easily be applied: the quality of discharged water should meet the pollutions norms and if not, the user should clean it and/or be fined accordingly. In the case of domestic water use the polluter-pays principle is less obvious and more difficult to

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[2] Stated in directive 38

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apply. The morale principle of the "user-pays" is that he should bear the cost according the value of the resources used and the services received. In the case of water supply to domestic and non–domestic users, it is difficult to link the specific user to his volume of polluted water and the customer is charged based on the principle of the "user-pays". The question "The user pays for what?" can be answered in two ways: At the benefits side, he pays for the consumption of clean water and after use for treatment and disposal. But the question can also focus on the cost side of the (B=C) equation, where the answer will be: He pays for all the services, the transport of a guaranteed sufficient and constant volume of water of reliable quality, and the transport, the treatment, processing and discharge of his used-water back into the river-system.
Many of the studies and guidelines [10, 11, 12, 13, 14] on economic use of water focus on the costs that occur with or are caused by the use of water like: Resource cost[3] if for instance, water uses in agriculture (with low water charges) causes shortages in water supply for human consumption in cities and environmental costs[4] which is the damage the use of water caused on the environment. In both cases it is complicated to determine.
To a lesser extend the guidelines refer to the financial costs, that are the costs of providing and administering these services, e.g. all operation and maintenance costs and capital costs (principal and interest payment), and return on equity where appropriate).

This article looks into these costs and assesses what the user pays based on technical and financial data from 56 water enterprises (WE) in Croatia. These data are presented at the level of the four river basins (RB) in Croatia which are, Drava-Dunav, Dalmatia, Sava and Istrian. It analyses what the user in each of them pays for his water, as well as, for the different costs needed to deliver this water, by comparing the four basins between each other as well as with other EU countries. It distinguishes the cost-categories: to allow for the water to be delivered and transported; to keep a system in operation like the costs for maintenance and management; and costs needed to have a system financed and the past and in future.
It shows the differences in efficiency in the use of resources between different basins and compares them with the situation found in other countries of the EU[5].

Water sold

During 2002-2005, the water sold in Croatia annually was on average 241M mc water, most of which (61%) to domestic users. Half (50%) of this volume in the RB-Sava, 22% in RB-Dalmatia, and respectively, 15% and 13% in RB-Istria and RB-Drava.

[3] Defined as the costs of foregone opportunities which other uses suffer due to the depletion of the resource beyond its natural rate of recharge or recovery (e.g. linked to the over-abstraction of groundwater)
[4] the costs of damage that water uses impose on the environment and ecosystems and those who use the environment (e.g. a reduction in the ecological quality of aquatic ecosystems or the salinisation and degradation of productive soils).
[5] In Croatia the WE costs include sewerage costs, in the Netherlands WE sell and charge for water, another organisation (waterschap) treats sewerage and collects fees based on land.

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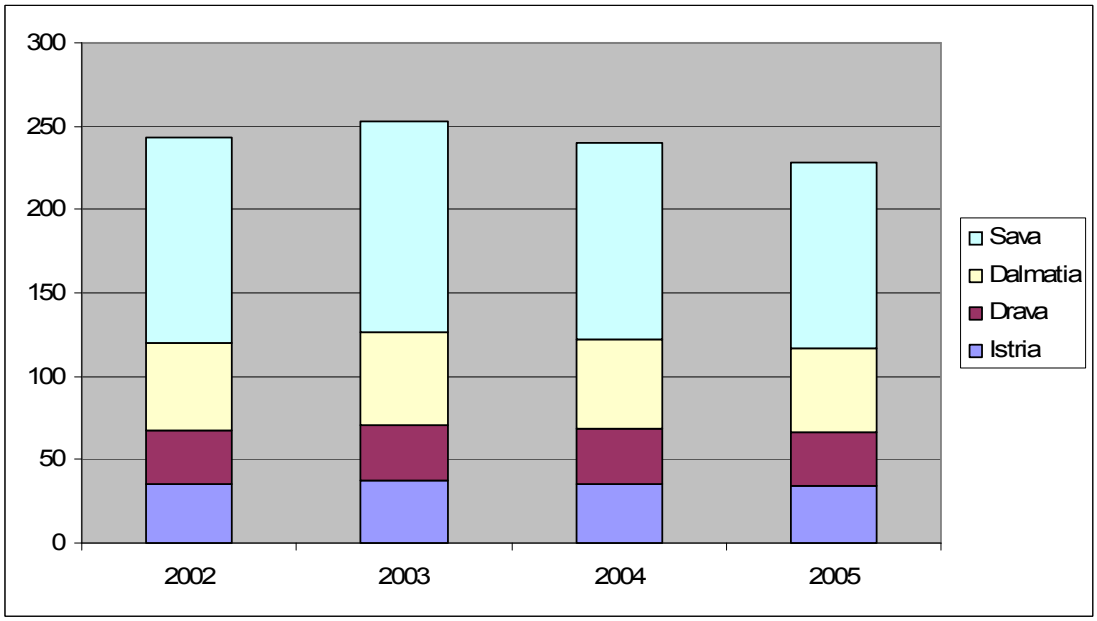
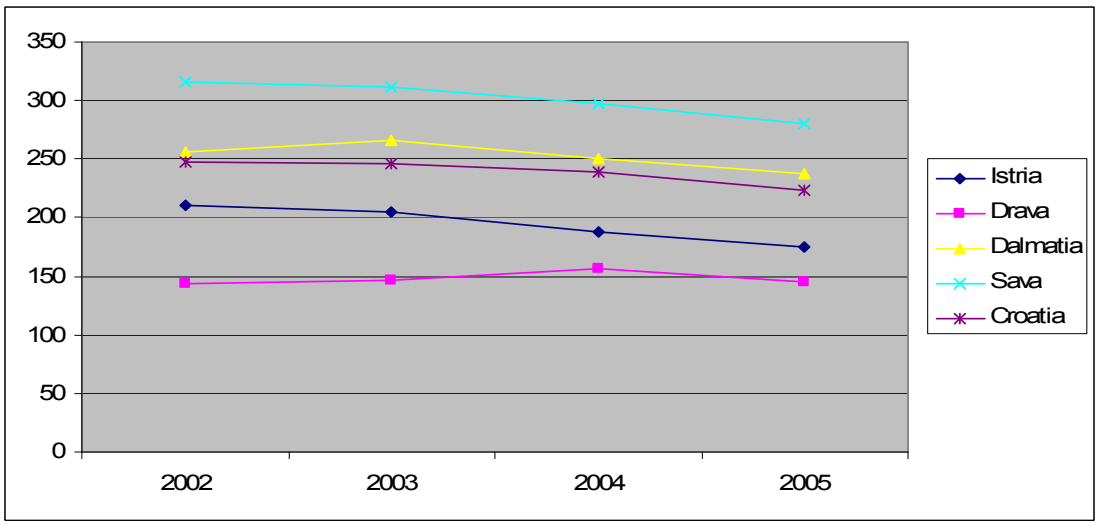
Figure 1. Water sold per river basin, (million mc)



The domestic use of water which was on average 239 mc/connection decreased, except for those water enterprises located in the river basin "Drava". But here the reported water use of 150mc/connection is already lower than in the other three river basins.

Figure 2. Domestic water use (mc/connection)



Assuming an average of 5 persons per connection, the consumption of 238.6 mc/connection equals 131 l/capita-day. This water consumption is relatively low and comparable with Germany and Denmark[6], which as we see in the next table, record compared to other countries a low consumption.

Table 1 . Domestic water consumption per country (l/capita-day)

Country	l/capita-day	Country	l/capita-day

[6] In these two countries, the water use per capita has been gradually reached this level because of improved water saving techniques introduced in the equipment used by the households.

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Belgium	122	Luxemburg	170
Germany	129	Sweden	188
Denmark	136	Italy	213
Spain	145	Switzerland	237
England	147	Canada	255
France	151	Austria	256
Finland	155	Norway	260
Poland	158	Japan	278
Austria	160	USA	295
the Netherlands	168		

Source: BGW wasser statistik, 2000

The water sold in Croatia during this period shows an annual decrease of 3.4%. This is a similar development observed elsewhere in Europe[7], where Germany, Denmark and the Netherlands record similar decreases in water consumption [2, 3, 9]. Only in the UK the domestic demand shows an increase to 150.65 l/p/d. The cause might be that in the UK only a minority of connections are metered. Here we see that the 46 million unmeasured customers consumed 152.24 l/p/d, while the 12.5 million measured customers consumed 5% less, 144.14 l/p/d. [6]. The non domestic water consumption in the UK however is also decreasing.

Energy costs

Energy is an important resource used in the supply and disposal of water and mainly used for the electric pumps[8]. We assessed the efficiency in energy use using, the energy per cubic meter of water taken in (KWH/mc). For the whole of Croatia this energy efficiency is 0.46 KWH/mc in 2005 and did not change much during the reported period. If compared with the UK and Denmark this efficiency is good: In the UK the use is 43% higher, energy use recorded here is 0.66 KWH/mc, Denmark records 0.47 KWH/mc.

Between the four basins, energy use in RB-Istria is relatively highest (0.58 KWH/mc)
Because of the topography in Istria, here probably high energy use might be caused by higher pumping heights.

[7] Studies suggest that the cause for this decrease is more efficient water use of dishwashers, washing machines, toilet flusher and showers together with raising awareness and higher prices for water. Similar causes could be the reason for this decrease in Croatia.

[8] It is argued that water at the source as such is free. All entreprises pay a waterfee and/or tax but we regard this as tax.

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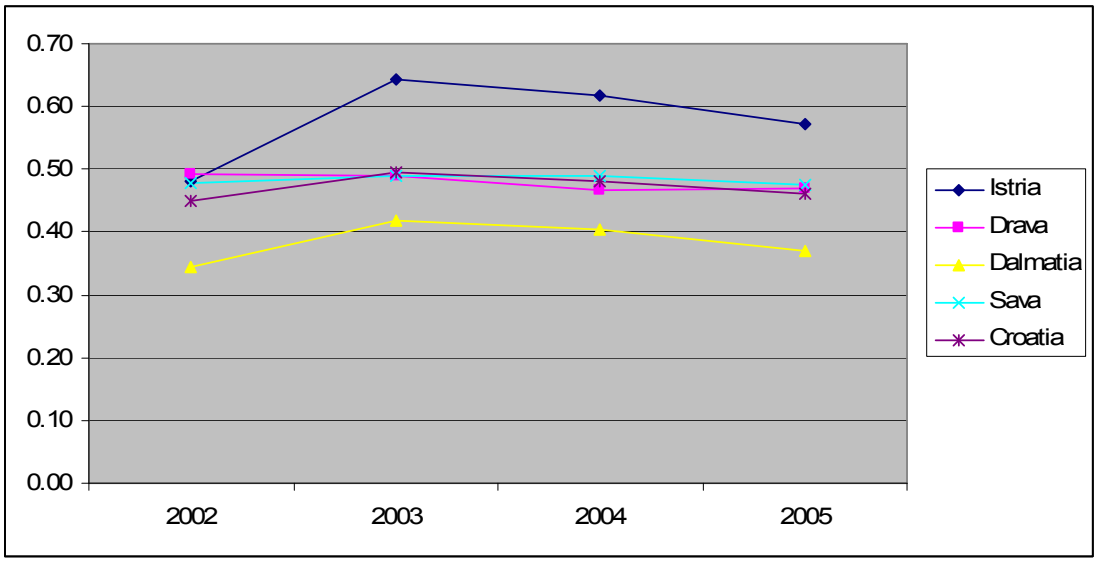
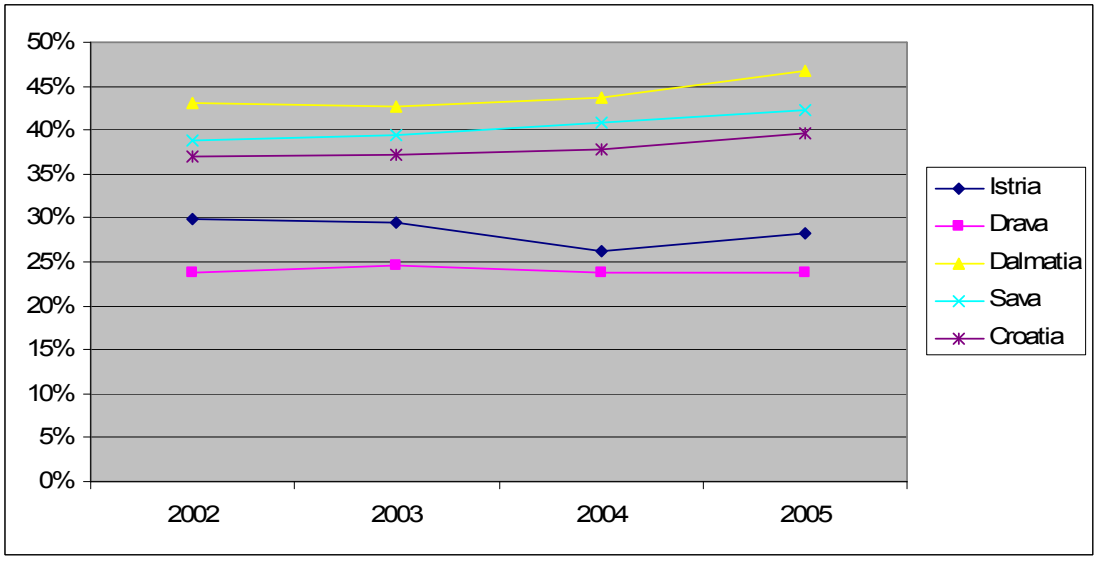
Figure 3. Efficiency in energy use in four riverbasins (KWH/mc water taken in).



A commonly used indicator in assessing efficiency in water supply is the water losses or preferable "unaccounted for"[9].
The next figure shows the development of this "un-accounted for" in Croatia and its RBs.

Figure 4. Unaccounted for in four river basins (%)



There shows an upward trend in "un-accounted for", especially in RB-Dalmatia and RB-Sava. Overall in Croatia "un-accounted for" increased from 37% in 2002 to 39% in 2005. Compared with other countries in Europe this Croatian figure is relatively high: Germany and Denmark record an the un-accounted of 9%, France 25%, Italy 27%. Even the UK reports 29% but, because here most of the connections (70%) are not metered, this figure might be higher.

[9] The "Unaccounted for" is the difference of the volume of water "taken in" and volume "sold" divided by the volume "taken in". Because difference this does not necessarily means "losses", the term "Unaccounted for" is used.

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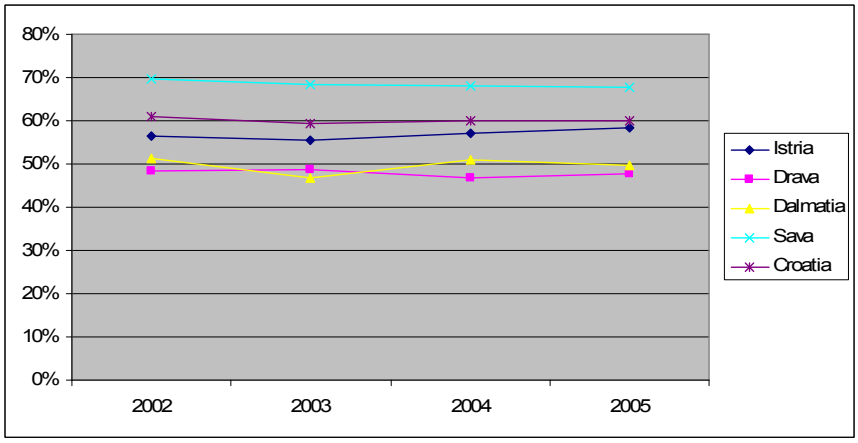
Labour costs

The largest cost component in the provision of water is labour[10], it amounts to approximately 60% of the total operational costs. Compared with for instance Germany where it is 20.4%[11], one might conclude that the user pays relatively much for labour.

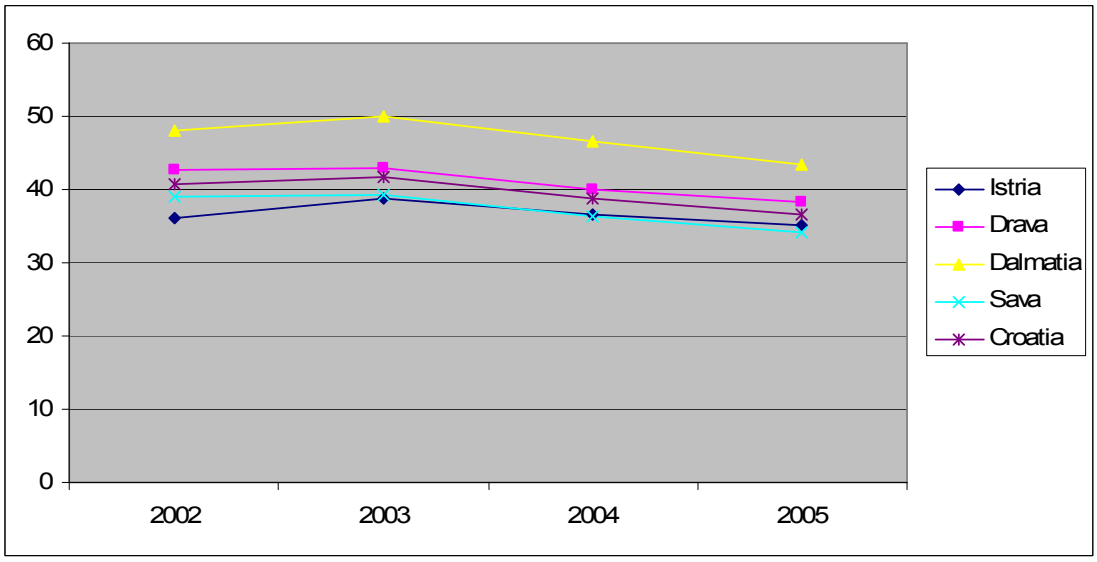
Figure 5. Labour as part of operating cost in four riverbasins (%)



The figure indicates that firstly, in the RB-Sava, the percentage labour cost is highest and secondly, little or no improvements have been recorded during the past five years.

Looking into more detail, shows that labour efficiency is decreasing. Taking for instance, "water sold per person employed" one observes a decreasing trend. Probably as we saw a decrease in volume of water sold, the same number of persons are being employed selling less water.

Figure 6. Water sold by persons employed in four river basins (1000mc/person)



[10] The cost of labour includes all personal costs from director, administrators, technicians to guardsman.
[11] Source see list of publications consulted.

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Comparing this labour efficiency in Croatia of 36.500mc/employee with other countries in the EU like, the Netherlands (220,390mc/p), Denmark (197,400mc/p), the UK (94,000mc/p), Belgium (81,000mc/p), or France 76,000mc/p), one might conclude that in Croatia this efficiency leaves room for improvement.

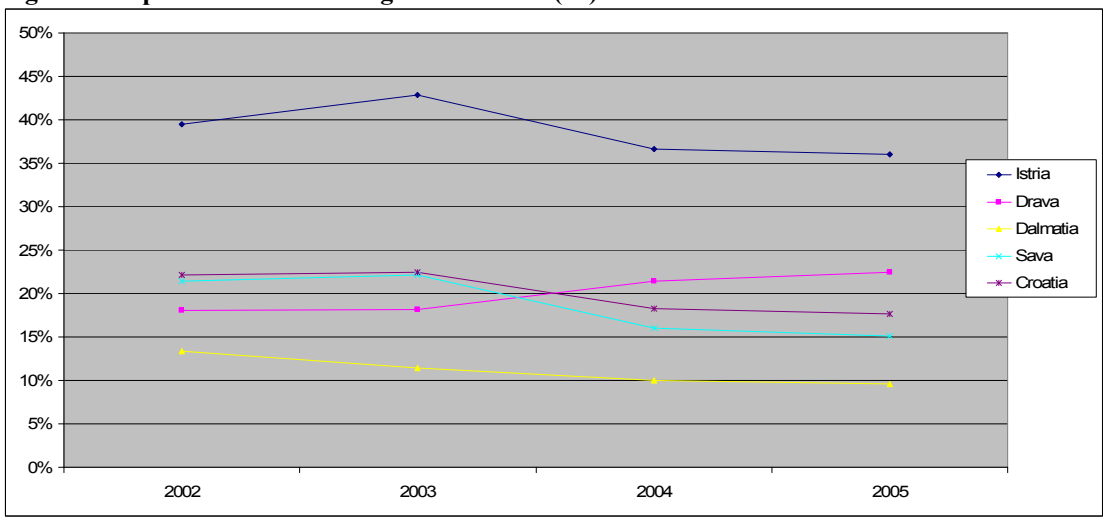
Capital costs

The capital costs taken into consideration are:

- Depreciation which is an annual reservation for the required and foreseen replacement of or, re-investments in the fixed assets. They amount, in 2005, to EUR40.8 million in total.
- Interest paid on loans, which are is the costs of taking a loan and which reported to be in total EUR4.7 million in 2005, on average 18% of the gross revenues.
- Transfers of profit to share holders.

The enterprises reported on average that capital costs were approximately one fifth of their gross revenues.

Figure 7. Capital cost as share of gross revenues (%)



In Croatia the third capital cost does not occur, the municipalities are the owners of the enterprise and the subject of shareholders is under discussion for the enterprises in the larger cities. The figure shows a large difference between RB-Istria and the other RB.
The information should be considered with care because, in many cases depreciation is calculated using historical prices and in the case of Dalmatia large investments are paid with loans from the World bank and EBRD, here the enterprises did not report the interest on these loans.

A study of the watersupply [11] compares main costs paid per cubic meter in the Netherlands and the UK and finds that in the UK depreciation and profit transfers are higher than in the Netherlands:

EUR/m3	NL	UK	NL	UK
Tax	0.14	0.04	10.7%	3.1%
Profit to shareholders	0.27	0.32	20.6%	25.2%
Depreciation	0.27	0.38	20.6%	29.9%
Operational	0.63	0.53	48.1%	41.7%

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Total	1.31	1.27	100.0%	100.0%

The study suggests that in the UK share holders demand a higher share but also that the depreciation costs are based on different calculations. In the UK recently large investments took place in the pipe network and here depreciation is based on replacement cost, in the Netherlands on historical costs. The assumed lifetime used for depreciation differs between the two countries. This might be the reason that in the UK as part of what the user pays, part depreciation is 44% more than it is in the Netherlands.

An article in a Dutch newspaper[12] with the heading: "Customer pays 25 euros too much" explains that the water enterprises increased their profit with 30% in 2006 and paid their shareholders also 30% more profit. The article questions whether the benefits in efficiency (more profit) should be paid to the shareholders instead of lower prices for the public. For what the user pays is open for debate to arrive at a more uniform and transparent method for calculating.

Taxes

Tax is "the money levied by a government for its support or for specific services".
In Croatia the water bill specifies items like, Concession fee, VAT, Water user fee, Water protection fee, and in many cases also other kinds of local fees like, water supply maintenance & construction fee, WWT maintenance & construction or Credit payment, etc. The collected amounts will be transferred to, either the treasury of the Central government, (Concession fee and VAT) or, to "Croatian Waters", a specialised department of the Ministry of Agriculture, Forestry and Water Management (Water user fee and Water protection fee), or to municipals, in the case of the other local items. All of the receiving authorities being government bodies and for that reason all these fees are considered as taxes.

Based on data provided, the annual payments of 1) Used water fee, 2) Water protection fee, 3) Concession fee, 4)VAT and other kinds of taxes, in 2005 totalled EUR63.7 million or, 25% of the gross revenues[13]. This is less than the amount of tax we calculated as it should be, using reported gross revenues and volumes of water sold and assuming all enterprises pay the fees[14], in that case in Croatia, tax is 40% of the gross revenues. This difference between reported and calculated tax indicates that often, in the payment of the fees other than VAT, there is room for negotiation between an enterprise and the receiving authority.
Between the four RB the percentages showing the recorded taxes as part of the reported revenues differ much between the four basins and are lowest in the RB-Sava and RB-Dalmatia, where most (75%) of the water is consumed.

[12] Xander van Uffelen, de Volkskrant, Frontpage, 12 September 2007 (page 01)
[13] As some WE reported not to have paid part of the fees and taxes the calculated taxes assuming that all fees and taxes on water sold and gross revenues are paid amount to 40% of the gross revenues,
[14] Some enterprises informed the consultant that they did not have to pay all these fees because of their financial position and the low paying capacity of their customers.

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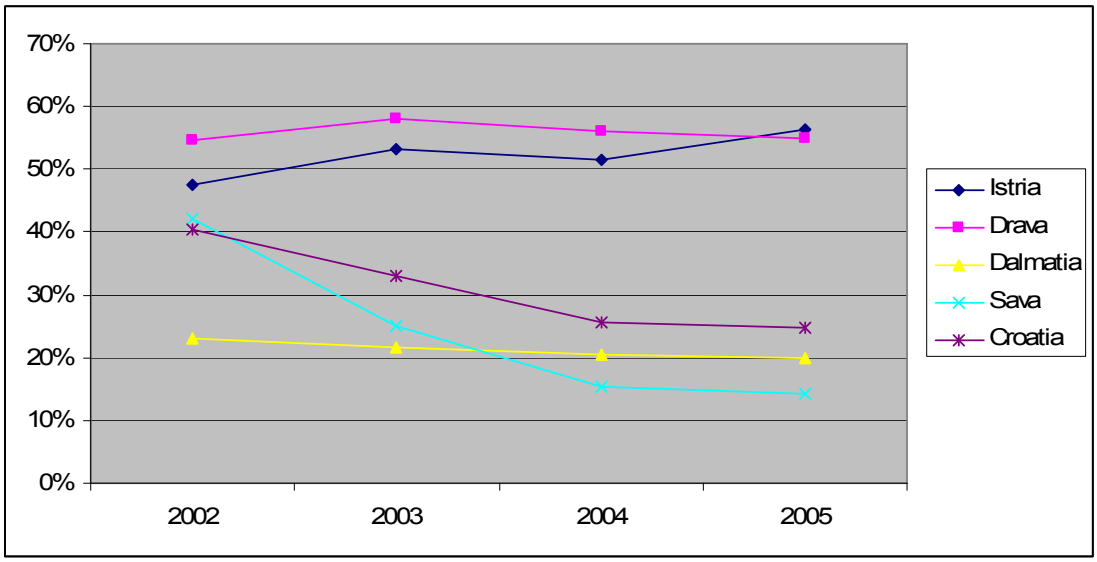
Figure 8. Recorded part of gross revenues paid as taxes in four river basins (%)



This calculated tax on water revenues of 40% is comparatively high: In France for instance the tax paid on water is 17% [5]; in the Netherlands 23% [9] and even in Denmark, it is still 35% [3].

One can conclude that in the case of Croatia the consumer a large part of what he pays is for taxes.

Conclusions

The EU water directives states that in economic terms, the polluter pays. The economic guidelines on this economic principles mainly focus on effect side, the resource and environmental costs of water use. They pay little attention to the efficiency side.
This article shows that what the domestic water user pays for differs between the Croatian river basins and also between EU countries.
In Croatia the water supply in river basin "Itria" uses more KWH per meter cubic than in other three river basins. In 2005 Croatia used 0.46 KWH/mc, comparable with Denmark (0.47 KWH/mc) but more efficient compared with the UK which reports a energy use 43% higher. Labour efficiency in Croatia is low: For one person employed a volume of 36.500 mc water is provided. In the Netherlands this is 6 times more per employee, in Denmark 5.5 times, the UK 2.5 and in France 2 times. Compared with other countries the Croatian user pays a high tax for his water, more than is the case in other countries.

Many of these differences are justified because the different circumstances under which water is supplied: The size of the network, the distance between the source and the consumer, the number of persons per area, a topography of the area, all will effect the energy costs for pumping. Moreover a large enterprise will have relatively lower labour costs than a small enterprise. Different political and social policy explain differences in labour efficiencies and taxes to be paid on water. Different policy on accountancy rules explain differences in what the user is charged for depreciation and profit transfers. But many difference might be cause by inefficient management.

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The EU directives point out that the polluter/user should pay and should use water efficiently. But provide little direction on the efficiency of supply of water and the treatment of water.

We conclude that a uniform way of presenting efficiency in water supply using both financial and physical indicators for the main cost categories at the level of, the enterprise, the riverbasin, the nation and the EU, would enhance the transparency in showing how the goal of the water directive in the European Union is being achieved. It would provide a clear insight into what the user/polluter does and might pay and advance good governance in water management.
Furthermore such an ability to compare efficiency between enterprises, river basins and countries would make it possible for a riverbasin authority and the government to play an active role in introducing and improving good governance in the water sector.

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