



Evaluating Economic Policy Instruments for
Sustainable Water Management in Europe

WP3 EX-POST Case studies
Water load fee, Hungary

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Executive Summary

Definition of the analysed EPI and purpose

The Water Load Fee (WLF) is an effluent tax, it is intended to reduce the amount of pollutants discharged directly into the running water and has been in effect since 2004. The WLF is based on point sources and is assessed based on the total amount of pollutants measured and on the expected damages.

The WLF regulation is intended to reduce the total amount of pollutants discharged directly into running waters. The fee is based on the multiplication of four factors. The rate of the water load fee is defined by the product of: 1) the total amount of the annual discharge of the contaminant measured in kilograms, 2) multiplied by a specific rate per pollutant, 3) a measure of area sensitivity and 4) sludge disposal factors.

Nine contaminants are regulated: COD, phosphorus, inorganic nitrogen, mercury, cadmium, chrome, nickel, lead and copper.

The fees determined by the Act were phased-in gradually. In the first few years, 2004-2007, only a share of the calculated fees had to be paid. The total fee was assessed only from 2008 onwards.

No explicit, quantitative WLF target was set when it was introduced. Only general principles were formulated: pollution reduction and the implementation of the polluter pays principle. However, its introduction was primarily the result of fiscal goals.

No official re-thinking, review, formal assessment, or evaluation has been prepared since its introduction seven years ago. What is more, the system fell completely out of the scope and responsibility of environmental governance regulatory institutions.

Introduction

The dominant water protection regulation that decisively changed the behaviour of those affected is the Command and Control (CC) regulation introduced in 2001. When the WLF was introduced, it was not compared to the water protection regulation (CC). It operates rather as an alternative to it and is essentially regarded as an amendment to the CC regulation. The impact of the WLF cannot be appropriately evaluated. No data collection has been carried out and no other information is available on its effectiveness. Not even stakeholders have relevant information. Thus no clear contribution increased economic efficiency can be identified.



Legislative setting and economic background

The legal basis for applying environmental load fees was established by the Environmental Protection Act (Act No. 53, 1995). The introduction of the WLF failed several times between 1996 and 2002 due to stakeholder resistance. The bill was finally passed in 2003 as a result of the Ministry of Finance's promotion of the bill and as part of an attempt to improve the income of the state budget. Three kinds of fees were introduced in the 2003 Act No. 89 on environmental load fees (ELF): an air load fee (ALF), a water load fee (WLF) and a soil load fee (SLF).

All polluters, including public utilities, who discharge contaminants into running water are required to pay the WLF. Service provider companies charge users the WLF through their prices. Thus the WLF is ultimately paid by the households, the industrial and commercial sector and those utilizing the sewage system.

The main stakeholders and social groups affected by the WFL are the general population (households), wastewater service providers and businesses. Among the latter, those who discharge directly into running water and those who discharge into the public sewer are affected differently. The service provider is responsible for most of the liability. Altogether, in 2005 municipal sewage and wastewater treatment amounted to a share of 90% in the total WLF payment.

Brief description of results and impacts of the proposed EPI

The WLF has an impact on production. It increased the costs of production and thus influenced the amount of profit at a rate that depends on the market situation. The WLF paid in 2005 (when the payment obligation was only 30% of the total fee) was 0.005% of the net revenue of industry and 0.07% of the profit. The fee liability amounted to 1.5% of revenue and 26% of after-tax profits in the public water utility sector. Sectors were affected differently by the regulation. According to the preliminary socio-economic assessment (ÖKO CO. Ltd, 2003), compared to the GDP of the sectors, the following are more heavily affected than the average: fisheries, the wood-working industry, the food industry, metallurgy, metal-working and the chemical industry.

The WLF raises the prices paid by users in areas with public utility sewage disposal and the service provider pays the collected fees into the central budget. Settlements and service providers are most affected by the water load fee where there is a sewage system without wastewater treatment. Between 2004 and 2010, when the Budapest Central Wastewater Treatment Plant (BCWTP) was built, Budapest was among the most highly affected settlements. The WLF's share of the total wastewater price was approximately 16.5% in 2008, when the total WLF had to be paid. In 2011, when the BCWTP had already been in operation for an entire year, the total amount of the WLF had declined to less than half of its previous amount and its share had decreased to one-third because less pollution was discharged.



In Hungary in 2010, the WLF differs between settlements, the WLF was between 0.5-11% of the average wastewater price.

As a result of the increase in wastewater (and water) prices, water usage declined and the degree of affordability changed. In the case of the most affected sector, urban wastewater services, the wastewater programme is mainly financed from state and EU sources and only to a smaller extent by the municipalities. But it is not financed from water fee revenues. Thus neither the municipalities, nor the wastewater service providers have been able to achieve significant improvements solely because of the WLF. Thus its impact is more limited. However, some service providers were able to achieve the modernization and environmental-friendly operation of wastewater treatment technologies. The new CC regulation is also crucial in the case of those directly discharging into running water. In this case, the necessary technological improvements became more affordable as a result of the contribution provided by the WLF.

The decline in water use resulting from the fee increase is clearly an advantage. On the other hand, high prices led to an increase in environmental and health risks increased, primarily in poor rural regions. The number of those supplying themselves with water from groundwater resources, instead of relying on the public water supply, and the number of those illegally disposing of their wastewater, has increased.

From a strictly fiscal viewpoint, the WLF is a failure. Revenues have been far less than expected. The primary reason for this is that fee payers significantly (and excessively) exploited the system of allowances intended to finance investments and the purchase of metering devices. The system of allowances likewise had a market distorting effect because of the often-unnecessary acquisition of new of laboratories. Thus, on the whole, the WLF more like a financing instrument than creating incentives to change behaviour.

The failure to harmonize the operation of the administrative structure with parallel legislation (the CC) is an important factor. While the operation of the CC regulation remains under the governance of the Ministry responsible for environmental protection and its regional bodies, the collection and control of the WLF falls under the responsibility of the National Tax and Customs Administration (NTCA). This complicated institutional and political situation resulted in the fact that the WLF has been operated entirely from a fiscal perspective. Moreover, the competent authorities do not have the means to ascertain the principal component features of the WLF: the total amount of pollutants emitted and operational and transaction costs.

Conclusions and lessons learned

Both from an environmental as well as from economic point of view, parallel regulations and double taxation (CC regulatory fines and the WLF fee) should be avoided or introduced and operated in a harmonized fashion. Environmental improvements should have the smallest social impact and the lowest possible cost.



It is not a good idea to treat an environmental, emission-based regulation solely from the standpoint of tax collection.

The WLF system's undeniable advantage is the fact that water pollution generates extra costs and damages. For the first time, in part as a result of the WLF, it became clear that polluters should pay these costs. Industry, service providers and the general population have now accepted this, and the level of environmental awareness has increased over the past seven years.

The WLF regulation clearly needs to be revised, not only because the list of regulated pollutants is out-of-date (e.g.: BOD should be regulated instead of COD), but also because it is necessary to fulfil the requirements of the Water Framework Directive (WFD). The water protection regulation (CC) also needs to be brought into compliance with the new situation. So-called basic measures were to be realized by 2010, except for the development of wastewater treatment in settlements with a population between 2,000 and 10,000, where the deadline is 2015. The new principal aim is the implementation of the programme of measures and especially the implementation of the supplementary measures, as defined in the river basin management plans in accordance with the WFD. This requires revision both of the CC regulation and the WLF.



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1 EPI Background

The principal problems with the main waterways originated with organic and nutrient loads in the beginning of the 21st century (the principal loads in various sectors are indicated in Table 2.2.). In order to achieve the pollution reduction aim and to comply with EU requirements, the CC water protection regulation had to be completely restructured in 2001.

Wastewater discharges have been strictly regulated since 2001. This has been achieved by means of: licensing, setting limit values, area categories, monitoring, self-monitoring, data submissions, grace periods, strict fines, etc. In accordance with the CC water protection regulation, the proscribed limit values are to be fulfilled by the existing plants and wastewater treatment plants by the 31st of December 2010. The grace period is shorter for IPPC-licensed activities: 31 December 2007. In the case of urban wastewater treatment plants, the deadlines set in the directive concerning urban wastewater treatment (91/271/EEC) are to be met as follows: by 2008 for agglomerations with discharges higher than 10,000 PE on designated sensitive areas, by 2010 for agglomerations with discharges higher than 15,000 PE, and by 2015 for agglomerations with discharges between 2,000 and 15,000 PE.

It was generally expected that the major wastewater treatment investments should be carried out without the introduction of the WLF. This was also true because the development of urban wastewater treatment infrastructure was addressed in the framework of the Wastewater Programme with the help of EU subsidies. The situation was similar in the case of industrial wastewater dischargers who emit pollution above limit values. As a result of the stringent water protection regulation (deterrent fines and other sanctions), they are obliged to reduce their emissions.

According to the relevant impact assessment (ÖKO Co. Ltd, 2001), the introduction of CC (baseline scenario) results in a significant improvement of the environment. Altogether an approximately 30-40% decline in the level of damage caused by different pollutants measured in *dangerousness units*¹ has been estimated within the industry after the expiry of the grace period. In the case of urban wastewater treatment, the expected decline is bigger than for industry, about 60-70%. In the case of Budapest, a decrease of approximately 70-80% in the dangerousness unit is expected.

In accordance with the Act on environmental protection introduced in 1995, the WLF strategy had to be formulated and passed by the end of 1996. The aim of the introduction of the ELF – originally defined in the EPA and previous concepts - is complex: to encourage those concerned to reduce pollution, loading (incentive function); **to enforce the polluter-user pays principle** (each unit of emission, usage must be paid for); a significant share of fee revenues must be used for the reduction

¹ Quantities of pollutants were converted into dangerousness units based on certain rates.



of load (earmarking); The associations of those paying the fees must be consulted on fee rates and their implementation, Compliance with load registration and declaration must be improved (the polluter paying the ELF is obliged to register the load, to provide relevant data and to submit a declaration)

The Ministry responsible for environmental protection (MoEW) prepared the bill in several versions and completed it, along with the socio-economic impact assessments, between 1996 and 2003.

Three kinds of fees were introduced with the 2003 Act No. 89 on environmental load fees (ELF): air load fees (ALF), water load fees (WLF) and soil load fees (SLF). This case study focuses on the WLF. A short evaluation of the SLF can be found in Annex 1. With regard to surface waters and point source pollution, two kinds of regulatory instruments and two economic instruments (a fine, CC, and a water load fee, WLF) were introduced in parallel as a consequence of the introduction of the regulation on environmental load fees (ELF) in 2004.

The WLF regulation is intended to reduce the total amount of pollutants discharged directly into running water. The fee is based on the multiplication of four factors. The rate of the water load fee is defined by the product of: 1) the total amount of the annual discharge of the contaminant measured in kilograms, 2) multiplied by a specific rate per pollutant, 3) a measure of area sensitivity and 4) sludge disposal factors.

Nine contaminants are regulated: COD, phosphorus, inorganic nitrogen, mercury, cadmium, chrome, nickel, lead and copper.

There are three area sensitivity categories: the Lake Balaton catchment area (A) where the factor is 1.4, other protected catchment areas (B), where the factor is 1.0, and other areas (C) with a factor of 0.7. The function of the sludge disposal factor is to encourage environmental-friendly sludge disposal. The categories are as follows: an agricultural utilization, re-cultivation and composting factor: 0.8; an incineration factor: 1.0. Other disposal factors are dependent on area sensitivity as well as (area categories are in brackets) temporary storage 1.3 (A), 1.2 (B), 1.1 (C); landfill 1.2 (A), 1.1 (B), 1.0 (C); and regional landfill 1.1 (A), 1.0 (B), 1.0 (C)

All polluters, including public utilities, who discharge into running water pay the WLF. Service companies pass the WLF on to users by adding the WLF to their regular service fees. Thus households, industry and others who use the sewage system ultimately pay the WLF.

The basic effect of the WLF regulation is to increase wastewater prices. In order to avoid the fast, drastic increase of sewage wastewater prices, cost increases were phased-in. The aim was to establish a stable, predictable regulation. There are no adjustments for inflation. The rate has so far not been raised. The fees determined by the Act were only introduced gradually. In the first few years, only a share of the total calculated fees was charged. The full fee was charged only from 2008 onwards.



The WLF is point source-based and is measured at each discharge point. Pollution loads are measured and the WLF is charged based on the total pollution content. The WLF is like a tax and is the non-earmarked revenue of the central budget.

2 Characterisation of the case study area (or relevant river basin district)

1.1 Environmental characterisation

The case study area is Hungary. The transformation of the Hungarian economy in the beginning of the 90's wiped out the most out-dated resource consuming heavy industries and introduced incentives for rational use. The decline of water consumption and the lower pollutant emission levels were the positive side of the economic downturn. The new build-up of the industrial base introduced more advanced technologies, lowering the per capita environmental impact of economic growth. But pressures are increasing again with rising output in all sectors of the economy. New measures will be necessary in order to cope with strengthening pressures.

Another result of this process is that the bulk of the pressures now originate from households, not industry.

In 2007, most of the discharges from point sources into running waters, 97.7% of the BOD load, 79.6% of the COD load, 92.8% of the nitrogen load and almost 92.3% of the phosphorous load could be attributed to **municipal wastewater load (industrial wastewater discharged into public sewers is included)**. This also confirms that the development of municipal wastewater treatment is of the outmost importance. Those discharging directly into running water are responsible for most of the load, 70.4% of the load with respect to metals.

Table 2.1 - Main pressures from point sources in 2004 and baseline scenario for 2015

	wastewater 1000 m3/y	BOI t/y	KOI t/y	Floating material t/y	Total nitrogen t/y	Total phosphorus t/y	Heavy metals* t/y
2004 Municipal	757 111	57 926	102 232	381 289	23 718	3 933	95
2004 Industry + construction**		4 816	16 614	9 214	2 041	95	9
Of which:	158 819	4 518	15 946	8 907	2 008	94	9
Manufacturing							
Other		567	1 860	1 118		10	0
2015 Municipal	749 188	31 951	95 829		26 403	3 979	
2015 Manufacturing**		3470	17523	7550	1027	155	12

*Heavy metals: Cu+Pb+Cr+Cd+Ni+Zn **emission into running water

Source: NRBMP, 2010; 7.3. Background material Table 2.2, 2.10, 3.23. (NRBMP, 2010a)



Table 2.2 - Point source emissions by sector in 2007.

	Wastewater million m ³ /year	COD t/y	BOD5 t/y	Nitrogen t/y	Phosphorous t/y	Metals t/y	Salt t/y
	33	769	175	3	0	0	11 644
Thermal water, bathing water							
Service industry	5	262	31	79	6	0	622
Agriculture	1	0	0	0	0	0	0
Oil processing	0	0	0	0	0	0	0
Metallurgy, metal processing	86	2 987	78	266	40	98	147
Waste treatment	0	9	2	0	0	0	0
Fishery	41	2 160	20	86	75	0	0
Energy industry	676	9 443	5	3	1	0	10 759
Food industry	14	650	209	35	32	0	191
Other processing industry	44	7 312	622	411	23	2	317
Mining	38	5	3	1	0	0	3 913
Communal services	529	91 974	48 877	11457	2110	42	33 683
Total	1 467	115 570	50 022	12 342	2 287	142	61 276

Source: NRBMP, 2010 Appendix 2.5 (NRBMP, 2010b);

1.2 Economic characterisation

The beginning of the period of economic transformation resulted in a severe decline in GDP and the deterioration of living conditions and subsistence perspectives. This hindered the necessary decline in the level of redistribution and placed an overwhelming burden on markets, resulting in sluggish growth (compared to the growth potential). No resources were available for restructuring public services and there was a significant need for foreign capital inflows.

As a consequence, due to the market transition and the EU accession process, the practical reduction of environmental threats advanced in line with the strengthening of environmental and community regulations. The result is a regulatory structure with insufficient resources and a mandate to exercise increased regulatory authority.

Table 2.3 - GDP time series

	GDP/person (pps)	GDP/person € (2010)	GDP million € (2010)
1995	7 568	7050	72 868
2000	10 555	8 222	83 979
2004	13 745	10 074	101 833
2005	14 187	10 284	103 741
2008	16 266	10 573	106 146

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Table 2.4 - Share of GDP by Economic Sector

Million HUF	2001	2004	2009
Agriculture	0.10	0.08	0.07
Mining	0.00	0.00	0.00
Manufacturing	0.74	0.66	0.72
of which			
Food, beverage, tobacco	0.12	0.09	0.08
Forest products	0.01	0.01	0.01
Paper and printing	0.03	0.02	0.02
Oil, nuclear, coal products	0.04	0.03	0.06
Chemical industry	0.05	0.05	0.05
Metallurgy and mineral products	0.08	0.07	0.08
Machinery	0.03	0.03	0.04
Electric machinery, instruments	0.20	0.20	0.19
Vehicle and parts production	0.11	0.10	0.13
Electricity, gas, steam, water provision	0.07	0.07	0.07
Industry total	0.82	0.74	0.79
Other	0.09	0.18	0.13

Source: KSH/a; KSH/b

3 Assessment Criteria

3.1 Environmental outcomes

Though influenced by several other factors as well, the decline in the emission of regulated substances has had a beneficial impact on surface water ecological and chemical status. The WLF regulation is only applied to point source pollution and does not cover all pollutants. However, in accordance with the WFD approach (regarding organic substance, nutrient loading, and other dangerous substances), the WLF covers a number of important substances. The status of the waters is influenced as well by contaminants other than pollution from point sources (e.g. from diffuse sources) and also other loads (hydro-morphological intervention, abstraction, and other loads like recreation, transport, excess water diversion, etc.).

It is almost impossible to quantitatively evaluate the WLF's partial environmental impacts, since the impact of the various WLF component factors on measurement results cannot be determined.

The introduction of the WLF alone would not have been enough to bring about significant change. But in conjunction with the CC regulation, it accelerated the process and also made it more affordable.



A survey of the experience of the first two years of the introduction of the water load fee was carried out in 2006 among public utility companies (21 service providers took part) (Berczné Eszterhai, Csúport, László, Istvánné Szabó, 2006). In accordance with this, 24% of those asked (5 service providers) modified their **development plans and the technology of existing wastewater treatment** as a consequence of the introduction of the water load fee. Investments for reducing ammonia, OSE, phosphorous, and dichromate oxygen were planned, entitling these companies to a fee reduction. 38 % of the service providers (8 service providers) **optimized their operations** regarding the **return** of the water load fee resulting from the reduction in the usage of chemicals (ferrous-sulphate, poly-aluminium chloride), increasing operational costs and reductions in substances loading waters (phosphorus).

The introduction of the WLF encouraged - to varying degrees – the industrial and public utility dischargers to implement pollution-reducing measures in their operations, or respectively encourage all dischargers to carry out less expensive but continuous improvements in their plant operations.

Emissions, as discussed in the background section, decreased significantly, primarily as a result of the CC regulation. According to available data (NRBMP, 2010a, Ministry of Environment and Water, Government of Hungary, 2005) pollutant emissions in 2007 were already significant lower than their 2002 level, in the case of BOD 83%, in the case of nitrogen 50% and in the case of phosphorous 57%.

No economic evaluation of the benefits for water-related ecosystems was conducted.

3.2 Economic Assessment Criteria

- a.) The ELF was not compared with other alternatives. A comprehensive socio-economic assessment was carried out (ÖKO Co. Ltd., 2003).
- b.) A command-and control mechanism was in place.

When the WLF was introduced, it was not assessed in conjunction with the water protection regulation (CC). Rather, it was regarded as an amendment to the CC. These two regulatory concepts essentially existed in parallel. It was never clearly determined how much the WLF contributed to the additional enhancement of economic effectiveness/efficiency. The dominant regulation which decisively changed the behaviour of those affected was the CC regulation. It is virtually impossible to independently evaluate the impact of the WLF. No data collection was carried out, nor is any other relevant information available. Not even stakeholders possess relevant information. Thus, there was no clear contribution to an increase in economic efficiency.

- c.) No cost-effectiveness analysis was carried out in order to choose and design the EPI. However, socio-economic impact assessments (ÖKO Co.Ltd., 2003) were carried out for various alternatives in the framework of the ELF concept. The alternatives



differed with respect to the total amount of the fee, the area factors, the circle of the fee payers and the regulated sectors as well.

d.) The WLF regulation did not result in cost savings for users. The costs of introduction were covered partly by the public administration, partly by the wastewater emitters (service providers and industrial plants). However, the real cost bearers were those using the public wastewater utility (the general population and industry).

The emission reducing investments, interventions realized by the affected economic units (industry) and public utilities, are basically the result of the stringent and more effectively enforceable CC water protection regulation (Command and control type, strict fine system) introduced in 2001. This was supplemented in the field of public utility sewage and wastewater treatment by the wastewater programme realized in accordance with Directive 2000/91/EC. The municipalities themselves are responsible for carrying out the wastewater treatment infrastructure investments (sewer system development in areas not yet covered and the construction of wastewater plants in compliance with the new limit values). These could have been realized using the EIOP (2004-2006), EEOP (2007-2013) and EU subsidy systems. Independent of the WLF system, the EU subsidies covered up to 75-85 % of the investment costs.

e.) The main reason for the introduction of the ELF in 2004 was to increase budgetary revenues. Budgetary income of circa 14 billion HUF was expected from the three load fees (air, water and soil load fees) by 2004. The greatest pressures (as well as expected revenues) arose against the air load fee from the side of the Ministry of Finance. Nevertheless, actual revenues were well below the expected amounts (forecast in socio-economic impact assessments). Budget revenue was only around 8 billion HUF.

The ELF Act allows for significant allowances in certain cases, in order to reduce the burden of organizations carrying out infrastructure investments serving environmental protection goals and to encourage them to undertake these investments.

The Act defines circumstances according to which allowances can be deducted from payments to the central budget as follows:

- Firms who realize investments that reduce water discharge loading directly into surface waters are eligible for a 50% water load fee allowance during the years of its implementation, up to a maximum of five years.

- 80% of the purchase price of water quality and quantity measurement instruments can be deducted from the WLF advance fee paid by the polluter in the year of the purchase. There has been only one substantial modification in the ELF regulation of since 2004; from January 2011 on, this allowance no longer exists.

Since administration costs are less than the total income of the budget, the situation of the central budget has clearly improved as a consequence of the introduction of the ELF. The tax structure was moderately changed.

Table 3.1 - Annual liabilities of WLF, HUF thousand in 2010 prices



Year	Annual liabilities	Allowances of fees received for investments and purchase of measuring instruments %	Central Budget Revenue
2005	4,654,415	48.0%	52.0%
2006	8,019,949	44.7%	55.3%
2007	9,553,650	43.9%	56.1%
2008	n.a	n.a	n.a
2009	8,390,603	22.4%	77.6%
2010	4,420,025	37.8%	62.2%

Source: Hungarian Tax and Financial Control Administration

Total fee allowances amounted to more than 40% of the liabilities in the early years. Thus the income of the central budget was approximately 60% of the total levied water load fee. 2009 was the first year when the total amount of the fee was paid by the polluters. The rate of allowances was only 22% that year. 2010 was the year in which the Budapest Central Wastewater Treatment Plant was completed by the biggest fee payer. This is why the total amount of the WLF decreased at such a high rate at the national level in the same year as well. The Budapest case (WLF and wastewater prices) is presented in detail in Annex 2.

Local community (residents)

The principal source of funding for the realization of the WLF came from consumers for using the public wastewater utility by means of paying the sewer-wastewater price increased by the WLF. Consumers basically considered the introduction of the WLF as a type of fee increase. (See Section 3.3.)

Water companies (service providers)

It can be concluded (based on interviews with several service providers and MAVÍZ) that the service providers are not significantly motivated to undertake pollution reductions as a result of the WLF. Most of the pollution reduction was the result of the systems' infrastructure development (Wastewater Programme) financed by the municipalities, the EU, and the state. The low level of motivation is also a consequence of the fact that the total amount of the WLF could be invoiced to users, i.e. the real burden was borne in part by those using the service (the general population, institutions, industry). At the same time, out of political interest the municipalities determining the fees would often attempt to minimise fee increases,



even at the cost of service safety. The huge increase in the fees placed pressure on the users' ability to pay (and the proportion of bad debts increased). A number of service providers – in the framework of their limited financing possibilities – tried to reduce the amount of the WLF paid by consumers.

Theoretically, service providers are only intermediaries, since they collect the WLF from users and pay it into the central budget. But as a result of the system of allowances that was introduced, they benefited from the introduction of the regulation. Allowances essentially attempt to retrieve a share of, or prevent deficits arising from, the default plan of the revenue's earmarked use.

A significant share of the service providers – though to different extents and with different amounts of courage - took advantage of the possibility offered by the ELF Act to purchase measuring devices. According to the service providers – though it is difficult to verify - the purchase of measurement instruments was practical and beneficial. (There are contradictory opinions as well, according to which too many of these instruments were purchased by the service providers and some were handed over to others through leasing contracts). The technical level of existing laboratories was significantly improved and this contributed to compliance with self-reporting requirements.

On the whole, the purchase allowance for measurement instruments adversely affected private laboratories. It clearly had a market distorting, anti-competitive effect. Thus, on the whole, this policy resulted in a needlessly expensive, wasteful and ineffective allocation of resources.

Service providers took advantage of the WLF for investment purposes. But here the difficulty was that only 50% of the WLF could be deducted in the form of allowances, thus limiting their access to adequate resources.

On the whole, from the viewpoint of the service providers, the impact was positive in that the ELF act made significant updating of laboratory equipment possible. Most service providers took advantage of this option. The environmental policy objective having already been formulated by the Environmental Protection Act 1995 too – that is, compliance with load registration and declaration must be improved - was promoted by the improvement of laboratory equipment.

Industries discharging into the public sewer

The pricing authority is the municipality itself in Hungary. The introduction of the WLF did not make any municipalities switch to a pollution proportional charge system (Previously this was considered by Budapest and a study was prepared, but the concept was rejected).

A heavily polluting plant in a settlement pays the same amount as an average or below average polluter. Thus the more heavily polluting plants benefited from the



regulation compared to less polluting plants, but often even compared to a plant with similar technology, discharging directly into the running water. There are settlements that pay high WLF charges because their wastewater treatment plant is not appropriate (e.g. Budapest). The plants here pay a much higher WLF than a plant with similar technology but operating in another settlement.

Industries discharging directly into running water

Command and control regulation had the principal effect on pollution reduction in the case of those discharging directly into running water. These plants are directly subject to the WLF regulation. They are interested in the reduction of pollution (but only if it is economical).

Depending on the market situation it was not always possible to pass WLF costs on to prices. In a few cases, in order to sustain profitability, companies realized more than the pollution reduction required by the obligatory CC regulation, or prior to the deadline. This also contributed to pollution reduction. The total amount of the WLF itself usually did not reach levels that would make pollution-reducing investments economical, especially in the case of really big polluters.

f.) If only the CC regulation had been introduced, the risk would have been a bit higher. WLF only slightly contributes to reducing environmental risks.

g.) The WLF contributed to the implementation of total cost recovery, since its introduction meant the internalization of (a part of the) external environmental costs. **The WLF as an EPI totally in line with the concepts of cost recovery and the polluter-pays-principle in relation to WFD art. 9.**

h.) The introduction of the WLF could have provided effective incentives in the middle of the 90-ies, in the period during which it was in originally planned. Considering the EU-conform CC regulation that has since been introduced, to which an effective EPI (fine system) was associated, the role of the WLF could only provide a complementary, accelerating impact.

According to the WLF the **general population** had to pay higher prices, but could not really adjust their behaviour according to their pollutant emissions.

Since infrastructure investments were financed using external resources (municipalities and the state, EU subsidies), **service providers** have no effect on the implementation of waste water treatment investment. Mainly technologies related to the operation of existing facilities were modified by service providers. (see Section 3.1.). Cheap organizational and chemical modifications were introduced in some cases, as a result of which loads were reduced.

Since the wastewater prices paid by **industries discharging into the public sewer** are not proportional to the pollution but are rather proportional to the total discharges, measured in cubic meters (the WLF paid by service providers is



transferred to the price in proportion to m³). Thus there is no incentive impact, there is no impact felt by those discharging into the public sewer at all.

In the case of plants discharging directly into running waters CC regulation had a decisive role too. However, interest in cost-effective solutions can be detected here more than in the case of public utility services. The WLF distracted the own sources marked out for pollution reduction into the central budget and either did not reallocate them for pollution reduction, or only partially did so (50%). Thus, the financing of interventions became more difficult. The system of allowances had a market distorting effect because of the often unnecessary acquisition of laboratory equipments. Thus, on the whole it cannot be regarded as a proper, encouraging regulatory instrument, but rather as a tax-like EPI.

3.3 Distributional Effects and Social Equity

As discussed in Section 3.1, the groups affected by the WFL are the general population (households), wastewater service providers and industry. Among the later, those who discharge directly into running water and those who discharge into the public sewer are affected differently. The service provider is responsible for most of the liability. In total, in 2005 the rate of sewage and wastewater treatment amounted to 90% within the WLF obligation. Almost 60% of the total fee liability was that of the BSW Ltd's.

The total share of industry directly affected by the WLF – not including the public utility sector – amounted to almost 8% in 2005.

The WLF has an impact on production. It increased the costs of production and thus influenced the total amount of profit at a rate that depends on the market situation. In 2005, when the payment obligation was only 30% of the total fee, the WLF amounted to 0.005% of net industry revenue and 0.07% of profit. The fee liability amounted to 1.5% of the revenue and 26% of after-tax profit in the public water utility sector (NRBMP, 2010d).

The sectors were affected differently by the regulation. According to the preliminary social and economic assessment (ÖKO Co. Ltd., 2003), compared to the GDP of the sectors the following sectors were affected to a higher degree than the average: fisheries, the wood-working industry, the food industry, metallurgy, metal-working and the chemical industry.

In practice, the WLF increases the prices paid by users in areas with public utility sewage disposal and the service provider pays the collected fees into the central budget.

As a result of the increase in sewer wastewater prices, water usage declined and its affordability changed.

Price

Table 3.2 - Average water and wastewater prices in Hungary in 2003 and 2009 HUF/m³

Category	2003	2009	2009/2003 change
Household water prices	164,0	337,0	2,05
Non-household water prices	176,0	508,7	2,89
Household sewer prices	148.6	291.1	1.97
Non-household sewer prices	173.9	418.6	2.41

Source: National River Basin Management Plan, main text (NRBMP, 2010c)

Prices have increased 2-2.5-fold in the last seven years and the rate of change has far exceeded the rate of inflation. The increase in prices was the result of the excess costs of the new plants being constructed and because of the Wastewater Programme and the introduction of the water load fee.

Average non-household sewer prices are 43% higher than household prices. The amount of the prices varies tremendously across settlements and by service provider. There was a 20-fold difference between the lowest and the highest water prices and a 23-fold difference between the different sewer prices in 2009. This variation is not primarily the consequence of introducing the WLF, though it was a contributing factor. **At present, the WLF differs between settlements and is around 0.5-11% of the average price paid.**

As a consequence of the fee increases, water usage, and thus the specific amount of invoiced water and wastewater, declined. Average annual per capita water use declined from 39 m³/day (in 2003) to 35.9 m³/day in 2009.

Affordability

The increase in the fee affected the „material living standard“ and the amount and structure of household expenditure changed. The water affordability index and sewage is high, even in international comparison. The national river basin management plan contains an analysis on this point (NRBMP, 2010c). Water and sewage costs amounted to 3.4% (water price: 1.8 %, wastewater price: 1.6 %) of the net Hungarian household income in 2009. Naturally, this varies significantly from region to region and across income categories. Despite consuming only 70% of average water use, the average burden of the population in the lowest income decile is 6 % (water price: 3.2 %, wastewater price: 2.8 %).

This has increased environmental and health risks, mainly in poorer rural regions. Both the number of those who supply themselves with water from polluted groundwater instead of relying on the public utility water supply (healthy drinking water) and the number of those who dispose of their wastewater illegally have increased. (This endangers water aquifers and soil as well, endangering public health too.)



Measurement of the quality of emitted waste waters improved as a result of the introduction of the WLF, which necessitated the improvement of the level of experience related to the monitoring activities.

Introduction and implementation of the WLF raised awareness in relation to the water pollution issue and the Polluter Pays Principle (PPP). This very important principle was accepted by the industry, the service providers and the public, and the level of environmental awareness has increased in the past seven years.

Leisure activities might be affected, since as a consequence of the pollution reduction the quality of surface waters, thus the quality of waters suitable for bathing and angling has improved as well.

The number of employees was increased at the responsible public administration organization (NTCA), for details see Section 3.6.

The bargaining capacity of the stakeholders did not change.

3.4 Institutions

Green organizations being opposed to the Bős-Nagymaros Barrage System, heavily criticising the water management, its lobby and its organizations both from professional and from political viewpoints, were factors directly determining the social system change in Hungary in 1989. Subsequent to the social system change, a sharp opposition was formed between water management organizations having century-long experience and great tradition and the relatively young, inexperienced but politically more supported environmental and conservational organizations within the public administration. The organizations worked parallel at ministerial (the two groups were under two different ministries) and at different territorial levels (12 territorial water directorates, the 12 environmental inspectorates and the National Parks). These two have belonged to the same Ministry since 2002 and authority tasks have been carried out by a uniform, so-called “green authority” since 2005. The administration and other public functions, the operation of state owned facilities and institutions have been separated since 2005. Such tasks belonging to water management and environmental protection (e.g. flood protection, excess water protection, water damage prevention) are carried out by the 12 Environmental and Water Directorates, and by the 10 National Parks in the field of conservation. Several smaller or larger changes have taken place in the organizational system since 2005. Although the conflict between environmental protection, conservation and water management has decreased, but it is still present in decisions as well as in everyday practice. Though the organizational system of environmental protection has improved since the social system change, but its lobbying power is still much weaker than that of the economic, financial lobby.



The system of the central environmental, water administration and the regional organizations - directorates, inspectorates (authorities) - has been changing continuously since the social system change in 1989. After each change of government, and often even between changes of government, radical organizational restructurings (demergers and mergers) have taken place. These changes cause uncertainty in the regional organizations, strengthen dependence on the headquarters and weaken enforcement of the regulation.

In accordance with the Hungarian self-government Act, it is the duty of the local municipalities to provide the settlements with healthy drinking water and to manage the sewage and wastewater treatment needs of the settlements. While there were only 33 service providers in Hungary in 1992, at present there are almost 380. As a consequence, differences between the operational standards of the water utility services have increased. In addition to problems of ownership and fragmented operational structure, the construction of unused capacity is also typical.

The Central Environmental Fund had a significant, positive role in the tender-based financing of environmental developments after the social system change. Incomes of environmental protection went into this Fund (e.g. environmental fines, product taxes). This fund (along with the Water Management Fund of similar structure) was abolished in 2004, mainly for fiscal reasons. This had a basic impact on the WLF's construction as well (it was turned into an income of the central budget).

The actual scheme of the present financing system for infrastructure and development is as follows: the municipality invests in infrastructure and development (with the help of the state or EU subsidies) and the service provider is responsible for operation and maintenance. In reality, fees do not cover most of the cost recovery needs. In practice, the financing of pollution reducing infrastructure development depends on state (and/or EU) resources. Where these resources are not available, neither the municipalities nor the service providers are in a decision-making position. The incentive impact of the WLF is fundamentally limited by this financing scheme.

3.5 Policy Implementability

The legal basis for applying environmental load fees was established by the Environmental Protection Act (Act No. 53 of 1995) (hereinafter EPA). In order to introduce the fees, several concepts and versions of fee rates were elaborated between 1996 and 2000.

Prior to the actual introduction of the WLF, a fundamental change occurred in the regulation of water protection in 2001. The water protection regulation (CC regulation) currently in effect was introduced by the Ministry of Environment and Water (MoEW, which was renamed the Ministry of Rural Development in 2010. MoEW is also responsible for its enforcement. The locally competent Inspectorates



for Environment, Nature and Water (there are ten inspectorates - hereafter authorities - in Hungary) regularly control wastewater emissions according to the given rules² by means of sampling and on-site control.

Those emitting wastewater above 15 m³/operation day, or emitting hazardous substances or leather-works wastewater, substances of metallurgical origin or chemical plants are obliged to perform self-monitoring and to prepare a self-monitoring plan.

The CC regulation defines the rules for sampling and measurement, self-monitoring and on-site monitoring rules, as well as the requirements governing the submission of data. The data must be submitted to the state authority responsible for the enforcement of the regulation.

Getting back to the process of the introduction of the WLF, consultations with stakeholders were conducted. The consultation process was multi-phased, with the involvement of the main stakeholders: the Hungarian Water Utility Association (MAVÍZ), municipalities, the associations of the most affected sectors and the Chambers. In the end, the 2003 Act No. 89 on environmental load fees came into existence.

The introduction of environmental load fees was initiated three times by the MoEW between 1996-2000. But all of these attempts were rejected by the Ministry of Economy. The initiative typically failed at the stage of inter-ministerial negotiations. The Ministry of Economy agreed with the position of one of the main stakeholder's, the Confederation of Hungarian Employers and Industrialists' (BusinessHungary), that the ELF would damage competitiveness and economic profitability and was thus opposed to its introduction. MAVÍZ also raised objections, mainly because of the expected wastewater price rise and because it significantly worsened the revenue collection rate, causing serious liquidity problems for the service providers.

Resistance diminished in 2003, when the introduction of the regulation was initiated by the Ministry of Finance and not by the MoEW, with the express purpose of increasing the income of the budget. The most important stakeholders (Business Hungary, MAVÍZ) participated in the negotiations in 2003, but no negotiations with full-scale public participation took place. In spite of the interests and opinion of the stakeholders, the WLF introduced was more unfavourable for them. The reason for this is that the Government's interest was as centralized as possible and non-earmarked income. This interest was effectively represented by the Ministry of Finance having the biggest lobbying power. The EPI was not adopted in 2003 because it had become more advantageous for those concerned, but because the adoption was initiated and promoted by a much more powerful ministry than the MoEW. The same reasons caused the fact that the management and financial system

² MoEW Decree No. 27/2005 (6.12.) on the detailed rules of the control of used and wastewater discharges



of environmental protection had been changed by 2004 and the Water and Environmental Fund abolished.

As for the actual amount of the WLF the result was as follows: The total amount of the WLF unit fees was modified (almost doubled) compared to the concept from 2000. The amount that could be spent on direct pollution-reducing infrastructure development also decreased. Only 50% of the fees could be spent on this, compared to 92% in the original concept.

According to the original concept, the WLFs would have gone into the Environmental Fund and could have been used for pollution reducing investments. The Ministry of Finance initiated these changes for fiscal reasons. Thus, contrary to the original concept, ELF payments did not go into the Environmental Fund but instead went directly to the central budget. Their usage for pollution reduction was not ensured.

Pollution reduction is still an aim in the ELF. This was to be addressed through fee rates as well as the system of allowances (for investment and monitoring equipment).

At present, the WLF is not a flexible instrument. Both the amount of the fee and the form of supervision and control are centrally determined. Defining the fees at a uniform, national level does not reflect, cannot reflect the differences resulting from the different pollution reduction requirements necessary for achieving the good ecological and chemical status of the certain water courses and water bodies. It cannot be adapted to local particularities.

The ELF is in broad compliance with the WFD goals of total cost recovery.

The introduction of the WLF was not properly prepared and the regulation introduced in 2004 left several questions without clarification. This mainly applies to the calculation methods: the person/organization causing the pollution and the extent of the pollution caused could not be clearly determined.

The WLF regulation does not fall within the jurisdiction of the MoEW and its responsibility for environmental and water issues, but instead within the National Tax and Customs Administration's (NTCA) scope of authority. This is the consequence of the power of the financial public administration (see the previous paragraphs). Even at the ministerial level, until 2010 the WLF was under the direction of the Ministry of Finance (MF) and not the MoEW. At present, administrative aspects remain under the Ministry of Rural Development's (MRD) scope of authority (the MRD is currently responsible for environmental protection). Taxation duties related to the WLF are carried out by the NTCA. The regulations of the Act on taxation need to be applied to the payment and declaration of the WLF, its related legal consequences, forfeiture of the right of imposition and collection, to financial monitoring as well as to its implementation. This also confirms that in reality the WLF (along with the ALF and the firm-related part of the SLF) function(s) as a tax.



The Act on the ELF provided a certain role for the authority. The Inspectorates for Environment, Nature and Water audit the emission data. In the course of monitoring, if disparities are found in the submitted data, the National Tax and Customs Administration (NTCA) is informed.

However, practice shows that the environmental authority's management of the administrative part of the WLF was not required by the NTCA. In practice, the inspectorates are not aware that the emission data serves as the basis for the WLF. The NTCA's monitoring power only covers payments, the schedule, and, in particular, the verification of allowances and exemptions.

Proposals were elaborated (e.g. NRBMP, 2010d) regarding the necessity of the WLF system's review (e.g. list of pollutants, list of exemptions) but no thorough review was carried out. The environmental administration has practically no knowledge of the adaptation of this regulator. The actual impacts were not assessed and no study was prepared. The financial administration proposed the changes (e.g. simplifications of the accounting) and the only large amendment since 2004 (from 2011 on the 80% allowance for measurement instruments was abolished).

Of the present EU sectoral policies, WLF is most related to the WFD. However, when the WLF was adopted in 2003, the river basin management plans were not yet elaborated. It is already obvious that in view of this the WLF needs to be modified too (see the suggestions formulated in Section 4.1). Nevertheless, the WLF is absolutely in harmony with the objectives formulated in the WFD that is, with the development in water status and with the application of the principle of recovery of the costs of water services including environmental costs.

3.6 Transaction Costs

Cost of introduction

The introduction of the WLF was attempted three times up to 2003 and was finally adopted in 2003. For each of these attempts, socio-economic impact assessments were also prepared on behalf of the Ministry responsible for environmental protection (ÖKO Co. Ltd., 2001, 2003, NRBMP, 2010a).

Cost of implementation

In order to determine the extra cost of the system's introduction, the central question is how many extra measurement and control functions are defined by the WLF regulation as compared to the CC regulation. With respect to measurement, the scope of the pollutants is much wider in the CC regulation and covers not only the nine substances affected by the WLF regulation, but also an additional 61 some substances. At the same time, the CC regulation proscribes an inspection method and a minimum measurement limit for all pollutants. In accordance with the WLF regulation, all pollutant measures above "0" must be paid for. Thus more accurate instrumentation is required. In accordance with the CC regulation, the measurements



must be carried out on the basis of the self-monitoring plan and data submissions must be carried out annually. In accordance with the WLF regulation, the emitters must declare their payment obligation. The emitter must determine and transfer the net advance fee on a quarterly basis. The emitter is obliged to keep a record for each point source clarifying the basis for the fee payment and its amount. This quarterly obligation necessitates extra work, mostly in the form of an extra measurement burden.

The obligations of self-assessment, data submission and self-monitoring are required by the regulation. The polluters, including service providers, are required to claim their actual emissions and to fulfil their payment obligation. As a consequence of the obligation of self-monitoring, the cost of the establishment and operation of a laboratory, or the cost of hiring an external contractor, needs to be covered by the polluter.

The purchase of measuring devices did not cost extra money for the service providers. This was financed from the user-financed WLF. According to some calculations, this sum amounts to almost 6 billion HUF.

Since the measurement of numerous parameters was required - the measurement of which was not possible by means of instruments already in use - the WLF required passage by Government Decree (in particular for the detection of extremely low values). The purchase of appropriate instruments required time. It also took time to clarify the method used for detecting the pollutants (measurement or estimation). The determination of the total amount of rainwater was similarly problematic. Deciding whether the WLF should be indicated separately from other fees and whether the value added tax (VAT) should be calculated for the WLF or not caused additional difficulties. Further, deciding how to handle differences between the estimated and calculated WLF was also problematic. Coordination and problem management required different amounts of time depending on the service provider. Difficulties in understanding and interpreting the terms of the regulation also took time. Thus entering into an appropriate form of cooperation between different departments of water companies (financial, monitoring departments) could take anywhere from a few months to a year.

Cost of operation

The National Tax and Customs Administration (NTCA) gained additional responsibilities: the development and introduction of a WLF declaration form, data processing, monitoring, etc.

There is no information available on the actual operational cost. According to the preliminary socio-economic impact assessment (ÖKO Co. Ltd., 2003.), approximately 24 people are required at the national level. Specific wage costs can amount to **100-125 million HUF for 24 persons** annually as a consequence of the characteristics of the required profession. On top of this, job creation costs amount to approximately 48 million HUF.



The introduction of the WLF-related regulation also led to a minor, operational change for service providers. It necessitated the modification of the registry and accounting system and changes in the internal rules. The nature of the task required the co-operation of the technical (investment), examination laboratory and the financial fields. In general, the data collection and management tasks did not necessitate an extra number of employees and the additional cost is not significant.

Since the inspectorates did not have a substantial enforcement role, no transaction costs arose.

3.7 Uncertainty

The expressed aim of the WLF was pollution reduction and the implementation of the polluter pays principle. However, its real aim was to raise income for the central budget. The expressed aim of the Hungarian water protection CC regulation was to achieve the limit values conforming to the EU requirements. When the WLF was introduced, no specific targets for the total amount of pollution reduction were set.

The Hungarian water protection regulation and information system, as well as the operational features of the WLF, do not facilitate the evaluation of the environmental results or the determination of the real costs. The main reason for this is that the NTCA, who is responsible for the collection of the WLF, only cares about the financial resources and whether or not exemptions and allowances are justified. No attempt is made to link these to actual pollutant emission amounts. Total amounts of WLF eligible pollutant emissions are not registered. On the other hand, the environmental inspectorates are required to keep a record of the pollutants emitted by all point sources. However, it is impossible to distinguish between the impact of the CC regulation and that of the WLF. Thus it is not possible to empirically determine the difference between the *without*-WLF baseline scenario and the current situation resulting from WLF introduction.

4 Conclusions

4.1 Lessons learned

There was no explicit quantitative aim of the WLF when it was introduced. Only general principles were formulated (pollution reduction, polluter pays principle). However, its introduction was primarily driven by fiscal goals. Thus it is not easy to clearly determine success or failure. The introduction of the WLF could have been an effective measure in the middle of the 90's, when it was originally planned.

From the viewpoint of the environment: the independent effect of the WLF cannot be determined or quantified. The impact of the WLF occurred in parallel with a new, more stringent CC regulation developed to meet EU requirements. This implies not



only that the separate evaluation of the WLF's environmental impact is not possible, but also that the planning of the WLF should have been harmonized with the CC regulation. The introduction of WLF alone would not have encouraged positive developments. But in conjunction with the CC regulation, it accelerated the realization of its goal and made it more economical as well.

From the viewpoint of the economy: in the case of the most affected sector, urban wastewater services, the wastewater programme was mainly financed out of state and EU sources and only to a limited extent by the municipalities. However, since WLF fees were not used to finance the wastewater programme, neither the municipalities, nor the wastewater service providers were able to achieve significant improvements as a result of the WLF alone. Thus the impact was more limited. Some service providers were able to realize the modernization and environmental-friendly operation of existing wastewater treatment technologies. The new CC regulation is also crucial with respect to direct discharges into running water. But in this case, developments that were required anyway became more economical as a result of the WLF.

From a strictly fiscal viewpoint, the WLF represents a failure since the incomes achieved was far less than expected.

The primary reason for this is that the fee payers significantly (even excessively) exploited the system of allowances set aside for instrument purchases. The system of allowances had a market distorting effect in particular because of the frequently unnecessary construction of laboratories.

Thus on the whole, the WLF cannot be regarded as an appropriate, encouraging regulatory instrument, but rather as a tax-like EPI.

Both from an environmental, as well as from an economic, point of view, one fundamental lesson to be drawn is that parallel regulations and double taxation (in this case fines and the WLF) should either be completely avoided, or should be introduced and operated in a harmonized fashion. Environmental improvements should be achieved at the lowest cost and should cause the fewest social problems possible.

From the viewpoint of distributional effects and social equity: the WLF contributed (especially in Budapest) to an increase in wastewater prices. These increases were already large as a result of the wastewater programme and thus contributed to the worsening of affordability indices. The decline in water use resulting from the fee increase clearly represents an advantage. In the case of settlements there was no real increase in the standard of services (e.g.: wastewater treatment) accompanying the increase in service prices. The WLF paid by users became the income of the state budget. Only some users (direct dischargers) had an opportunity to reduce pollution, others (e.g. households) did not. So in practice they paid a new tax. The winners of the regulation were the wastewater service providers, in particular due to the opportunity to freely purchase new measurement instruments.



From the viewpoint of institutional and political implementability and transaction costs: the failure to harmonize the operation of the jurisdictional structure is an important factor. While the management of the CC regulation is under the governance of the Ministry responsible for environmental protection and its regional bodies, the collection and monitoring of the WLF falls under the responsibility of the NTCA. This institutional, political situation resulted in the fact that the system is operated entirely from a fiscal perspective. Important information about the basis for the WLF fees, the amount of pollutants and operational and transaction costs, is not readily available to the competent authorities. This example clearly illustrates the difficulties that arise in handling an environmental, emission-based regulation solely from the perspective of tax collection.

The introduction of the WLF failed several times between 1996 and 2002 due to stakeholder resistance. Only the Ministry of Finance's promotion of the bill in order to enhance the income of the state budget ensured its eventual passage in 2003.

Suggestion:

The WLF regulation clearly requires revision, not only because the list of the regulated pollutants is out-of-date (e.g.: BOD should be included instead of COD), but also in order to achieve compliance with the requirements of the WFD. The so-called basic measures were to be realized by 2010. Accordingly, the grace periods provided in the CC regulation have either already expired in 2010, or will slowly expire by 2015 (for settlements with a population between 2000 and 10000). The new main aim of the water protection regulation is the implementation of the programme of measures of the river basin management plans in accordance with the WFD, especially the implementation of the supplementary measures. This necessitates a fundamental revision, both with respect to the CC regulation and the WLF system. Where supplementary measures are required based on the programme of measures of the river basin management plans, then specific new limit values will have to be determined, their fulfilment made obligatory, the relevant fines elaborated, and the respective elements of the CC regulation will also have to be modified. The WLF regulation should be revised and harmonized with the CC regulation. If the suggested establishment of a specific, individual limit value system does not occur, then the substantial modification of the regulation of the water load fees clearly must be considered (the incompatibility of the two regulatory features—fines and the WLF—is not expedient).

The following three steps should be accomplished in the course of the reformulation of the WLF:

- Revision of fee rates: Territorial differentiation should be introduced. Higher fees should be determined for *at risk* water bodies, in particular with respect to specific, individual pollutants.
- The administration and use of revenues should occur on a regional level (as earmarked revenues).
- The potential and specific conditions for WLF refunds and allowances should be reconsidered.



4.2 Enabling / Disabling Factors

The main enabling factors are as follows:

- The EPI is defined by point sources on the basis of the amount of pollutants measured. The level of dangerousness is defined by means of different fee items determined on the basis of the expected damages.
- The recognition that water pollution generates extra costs and damages that must be paid by polluters is an undeniable advantage of the WLF system. With the introduction of the WLF, this was made clear and financially tangible for the first time. Further, this system was accepted by industry, service providers and the general population, and the level of environmental awareness has increased in the past seven years.

The main disabling factors are as follows:

- The lack of harmonized planning and operation of the different regulatory instruments (CC, WLF, subsidy systems).
- The financing of infrastructure development is independent of the WLF in the municipal sphere. No official re-thinking, review, impact assessment, or evaluation has been prepared since its introduction seven years ago. What is more, the system fell completely out of the scope and responsibility of environmental governance.
- The lack of coordination of the institutional structure and the dominance of the NTCA
- Reform and the behavioural adjustment of the main stakeholders are not really facilitated by the WLF.

5 References

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6 Data Sources

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Annex I: The soil load fee (SLF) in Hungary

The 2003 Act No. 89 on environmental load fees (ELF) introduced three kinds of fees: an air load fee (ALF), a water load fee (WLF) and a soil load fee (SLF).

In order to protect groundwater and soil quality, a soil load fee (SLF) has been applied. According to the first versions of this EPI (between 1996-2002) all soil loaders (households and companies), who did not connect to the sewage system and did not have a proper substitute for sewer services were supposed to pay a fee. But finally, in accordance with the enacted Act, only those households that fail to connect to the sewage system where one is available must pay the SLF. The related impact assessment (ÖKO Co. Ltd., 2000) pointed out that the planned fee rates were not sufficient (without subsidies) to encourage households to install a modern or adequate substitute for sewer services. On the other hand, there would be a significant burden for those living in areas without sewage systems. According to the calculations, on average the SLF payment obligation would amount to 0.6-1.2% of household expenses (actual rates depended on the different draft versions and the area sensitivity categories).

In accordance with the spirit of the ELF regulation, emitters who are not connected an available public sewer system are obliged to pay soil load fee. Thus the act encourages both households and companies to connect to the sewer system in areas where one is available.

The soil load fee is the product of; 1) a base charge (calculated on the basis of total water use (in m³)), 2) a unit fee (120 HUF per m³), and 3) an area sensitivity factor. The area sensitivity factor differs from the one used for the WLF. Here, the areas are defined from the viewpoint of groundwater status (less sensitive, sensitive and highly sensitive). The large differences in the factors support the goal of strongly encouraging connections to the sewer system in sensitive and highly sensitive areas. The unit fees pertaining to bigger users are higher in all areas, underlining the intention of the legislators to target those companies who discharge their wastewater into the ground and to encourage or force them to connect to the sewer system. In addition, municipalities stood to gain more revenue from the SLF at the expense of the central budget.

The actual multipliers are as follows:

- In the case of soil loading occurring within the local (municipalities) water management jurisdiction (in practice households, institutions, small enterprises) the factors are: 1 (less sensitive) 1.5 (sensitive), 3 (highly sensitive). Municipal revenue.
- In the case of soil loading falling affecting water right permitting (that is activities with a water extraction above 500 m³/day, for the most part companies) the multipliers are: 1.1 (less sensitive) 2 (sensitive), 5 (highly sensitive). Central budget revenue.



The soil load fee itself was not sufficient to significantly increase willingness to connect to the sewage system, since the total amount was typically lower than the cost of the connection to the sewer system and the sewer prices to be paid afterwards. Thus the principal effect was to increase municipal revenue. The municipalities could use this revenue for any environmental purposes. However, these revenues were often used to cover the self-contribution to sewage and wastewater treatment projects supported by the EU. In such cases, these revenues indirectly contributed to the improvement of groundwater and soil conditions. Since the soil load fees aimed at increasing the rate of connection to the sewage system in areas with sewage, in the long run they had no effect on the promotion of modern wastewater treatment methods in areas without sewage system (eg. agglomerations below 2000 inhabitants and settlements, or partial settlements that could not be economically provided with sewage systems). Thus they did not contribute to the improvement of the environmental status in these areas.

No information has been collected on the amount of the payments in the actual settlements, since these are municipal revenues.
The total fee was to be paid only from 2009 on.

Table 1 - Soil load fee between 2004-2009

Type of environmental load fee	2004	2005	2006	2007	2008	From 2009 on
Soil load fee	20 %	20 %	50 %	75 %	90 %	100 %



Annex II: Water load fee (WLF) and wastewater prices in Budapest

Almost half of the municipal wastewater in Hungary is emitted in Budapest, where a significant part of the wastewater was previously discharged into the Danube without treatment (until 2010).

Service providers and settlements are most affected by the water load fee where there is a sewage system rather than where there is no wastewater treatment or it is not sufficient. Thus between 2004 and 2010, when the Budapest Central Wastewater Treatment Plant was being built, Budapest was among the most affected settlements. A Budapest inhabitant pays a WLF that is more than three times higher than the average fee. The national average fee increase is also expected to be high, over 30%. The biggest WLF payer was the capital, both with respect to the order of magnitude and also with regard to the share of the WLF. This has been substantially changed by means of the installation of the new Budapest Central Wastewater Treatment Plant (BCWTP), as illustrated in Table 1 below.

Table 1 - Wastewater prices and water load fees in Budapest HUF/m³

Year	Wastewater price (without WLF)	WLF	Wastewater price	VAT	Wastewater price to be paid	Proportion of WLF compared to the price %	Comment
2005	159.81	8.29	168.10	15	193.32	4.93%	Payment of 30% WLF
2006	189.40	7.60	197.00	20	236.40	3.86%	Payment of 50% WLF
2007	190.61	24.89	215.50	20	258.60	11.55%	Payment of 80% WLF
2008	198.04	38.96	237.00	20	284.40	16.44%	Payment of 100% WLF, BCWTP was not yet built
2009	228.18	32.23	260.50	25	325.63	12.37%	Trial operation of BCWTP from August
2010	248.47	23.73	272.20	25	340.25	8.72%	Normal operation of BCWTP from August
2011	308.00	18.57	325.30	25	406.63	5.71%	The first

Data Source: BSW <http://www.fcsm.hu/content/index.php/31>

The price of wastewater service increased between 2005 and 2011 at a very high rate, more than doubling during this period. Water prices also increased over the same period, but by at a much lower rate: by 2011, the 2005 price (131.6 HUF/m³) had increased by approximately 40% (to 185.5 HUF/m³).

Previously water prices in Budapest were among the lowest in Hungary. However, over the few past years they have risen above the national average.

The high rate of price increases encouraged water users to reduce their consumption. Water use/wastewater discharge decreased by 15.2%, from 172.3 l/person/day in 2004 to 151.2 l/person/day in 2009.

The WLF was almost 40 HUF/m³. As a share of the total price, it was approximately 16.5% in 2008 when the full WLF had to be paid. However, by 2011, after the BCWTP had been in operation for an entire year, the total amount of the WLF had declined by more than half and its share in wastewater charges had declined to one-third. Total WLF revenue is expected to decline further in 2012 (as a result of the first entire year of BCWTP operation) and it is expected to amount to ca. 9-10 HUF/m³ between 2012-2015 (in 2012 prices). The realization of the Complex Integrated Sewerage of Budapest Project will result in an additional ca. 2 HUF/m³ decline in the WLF through the elimination of totally untreated wastewater point sources. Thus, in the long run, with the appropriate treatment of all wastewater, the WLF will decline to about 7-7.5 HUF/m³. Thus from 2016 on, the WLF will total only up to about 2% of the total wastewater price.



Annex III: Pedigree matrices for the environmental outcomes, economic costs and distributional effects

	Environmental outcomes	Economic costs	Distributional effects
EPI to be assessed	Decreasing amount of WLF affected pollutants. No empirical data.	Financial cost is assessed in HUF (see Table 3.1) Environmental benefit is not assessed in monetary term, but evaluated in qualitative method	Household (higher price, affordability) Firms (Amount of WLF paid related to the outcomes and profit)
Proxy	2	Financial: 4 Environmental: 2	Household 3 Firms. 2
Empirical	1	Financial: 4 Environmental: 1	Household 4 Firms. 2
Method	0	Financial: 4 Environmental: 1	Household 3 Firms. 2

