Public water supply systems and sewerages in the Czech Republic:

A Comparative Analysis

IREAS, Institute for Structural Policy

Ing. Silvia Aguilar Bobadilla
Ing. Lenka Camrova

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Introduction

The scope of this report is to help understand the position of Czech water (W) and wastewater (WW) utilities in the European context, i.e. in comparison with similar organizations abroad. The report briefly presents available relevant information on public water supply systems and sewerage in selected European countries.

The analysis has been divided into 5 parts, conclusions and a bibliography. Each part describes the data from different sources of information. Generally each source of information found, includes a different set of countries and an array of indicators for a specific period of time, so an overall comparison of particular countries regardless of the data source was not possible.

The Czech Republic is often compared with other former EU accession countries. This report aims to understand the position of the Czech public water supply and sewage sector not only at the CEE (Central-Eastern European) level (because of the relatively good quality of service) but also an overall European level.

The report concentrates on data available for the technical and economic issues of water supply and the sewage sector. In order to avoid redundancy, we tried to only include the data for the indicators observed (the latest information available) once. Few comments about institutional issues can be found in particular information sources but they are not the main subject of the study, principally due to the complexity and diversity of institutional performance and the history of the countries studied.

1 World Bank – Program "IB-NET"

The International Benchmarking Network for Water and Sanitation Utilities **(IB-NET)** is an initiative of the World Bank and its objective is to support access to comparative information that will help to promote best practice among water supply and sanitation providers worldwide and eventually will provide consumers with access to high quality, and affordable water supply and sanitation services.[1]

Unfortunately, this website still lacks available information for all the countries. The majority of the data corresponds to information about Latin America, Asia, Africa and Eastern Europe.

For the purpose of this work we focused at the European level and we compared data from the Czech Republic; Croatia; England & Wales; Hungary; Norway and Romania. The IB-NET works mainly with data regarding issues about the W and WW infrastructure in different countries. A description for each country about the general institutional framework is also available. The majority of the indicators used by the World Bank, reflects a period of time between 2000 - 2004. Monetary terms are described in US dollars. It is important to note that the information in the IB-NET database comes from records of about 15-20 of the largest national W and WW utilities, it does not represent the data of all the water utilities operating in the countries.

1.1 Water and Sewage Coverage

The proportion of water coverage as a percentage of the population that can benefit from water supply facilities does not differ extremely among countries. All the countries observed have above 90% coverage. Hungary has the best position with 99% coverage. In 2004, in Romania and Hungary, there were still a part of the population which was not connected directly to the public water supply network, but who used a public water point to get drinking water (8 % and 1% respectively). The portion of this type of water supply slowly decreased over the recorded five year period of 2000 – 2004.

Data about sewerage does not seem no to be as homogenous as the previous one (see Table 1). By the year 2003 all the observed countries had achieved at least 60% of sewage coverage. The Czech Republic had best position with three quarters of the population connected to public sewerage. The data on the quality of the wastewater treatmentis available in Tables 13 and 14.

Table No.1. Sewerage Coverage (%)

Year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	75%	67%	n.a.	54%	69%	71%
2001	76%	67%	n.a.	55%	73%	71%
2002	75%	68%	n.a.	57%	75%	72%
2003	76%	68%	n.a.	60%	76%	73%
2004	75%	68%	n.a.	60%	69%	73%

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

[1] The International Benchmarking Network for Water and Sanitation Utilities (IBNET). [online] http://ib-net.org

1.2 Water Consumption and Production

From Table 2 and 3 it can be seen that there is a decrease in the production and consumption of water in 2000 – 2004. The most evident reduction occurred in Romania (water production dropped by 40.7% and water consumption by 37.6%). Croatia and Hungary showed a fall in water production close to 7% and the Czech Republic by 9.5%. The reduction in water consumption in the Czech Republic was 4.8% over the five year period.

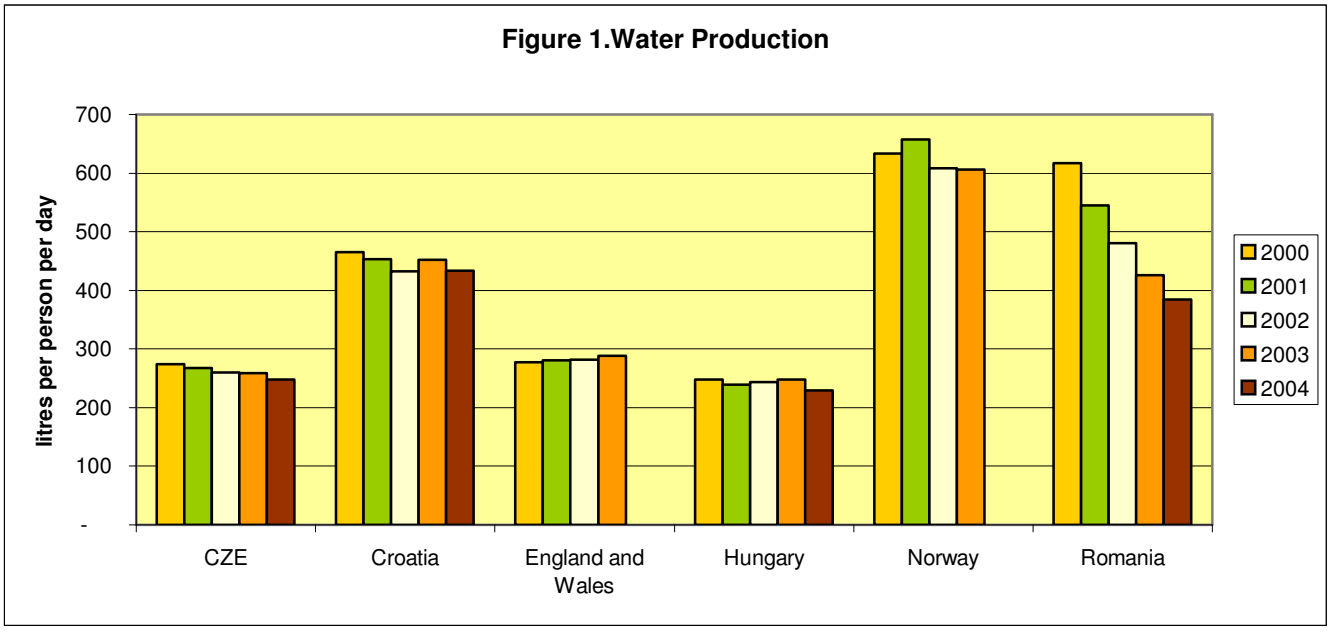
In some countries (the Czech Republic, Romania), the decrease in water production was more rapid than the decrease in water consumption. This was caused by further reduction in water loss (see Table 5).

Table No.2. Water Production (In Liters per person per day)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	274	466	278	248	633	617
2001	267	453	281	239	658	545
2002	260	433	282	244	608	481
2003	259	452	288	247	606	426
2004	248	433	n.a.	230	633	385

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

Figure 1.Water Production



Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

In CEE countries (CR, Hungary, Croatia and Romania), the general decrease in consumption is caused by the introduction of different types of economic measures and control tools – e. g. the installation of water meters (see chapter 1.3), investments into sewage networks and wastewater treatment and the subsequent increase in tariffs. In the CR and Hungary, some large consumers – industrial facilities – also decided to switch to their own water resources. It is assumed by Czech water experts that water consumption per person per day has already reached the hygienic limit, so a further decrease in consumption is not a probable scenario even if water and sewage tariffs will rise.

Table No.3. Water Consumption (In Liters per person per day)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	208	382	233	200	n.a.	388
2001	204	370	235	191	n.a.	327
2002	201	358	235	191	400	281
2003	201	364	241	191	428	249
2004	198	351	n.a.	180	421	230

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

1.3 Proportion of Water Sold that is Metered:

The volume of water sold that is metered reaches at least 82% in all countries except in England & Wales, that showed a proportion of 42% for 2003. The highest proportion of measured water is in the Czech Republic (100%). The most rapid increase in water sold that is measured appeared in Romania. This factor can explain the large decrease in water consumption in this country between 2000 – 2004.

Table No.4. Water Sold that is Metered (%)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	99%	82%	39%	93%	n.a.	76%
2001	99%	82%	40%	95%	n.a.	81%
2002	99%	82%	41%	96%	n.a.	84%
2003	100%	82%	42%	95%	n.a.	87%
2004	100%	82%	n.a.	96%	n.a.	88%

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

1.4 Water Loss

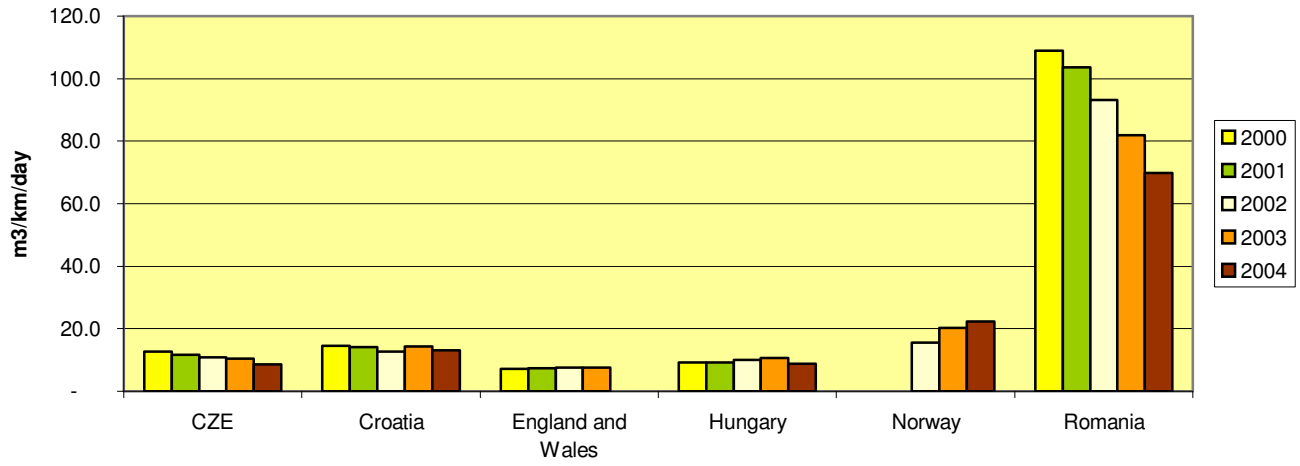
The "Unaccounted for Water" indicator shows the volume of water "lost" in the infrastructure per km of pipelines per day. Therefore, it represents water that has been produced and lost before it reaches the customer. The greatest quantity of water lost per km daily, is again Romania (69.9 m^3 in 2004). In other countries this number is lower. In the Czech Republic, a continual decrease in water lost can be observed. Generally, this evolution may be a sign of repairs to pipelines (the Czech Republic), better control against theft and the more widespread use of water meters (Romania).

Table No.5. Non Revenue Water(m^3/km/ day)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	12.6	14.5	7.1	9.2	n.a.	108.9
2001	11.8	14.2	7.4	9.3	n.a.	103.6
2002	10.8	12.6	7.5	10.0	15.5	93.2
2003	10.5	14.4	7.5	10.7	20.2	82.0
2004	8.6	13.1	n.a.	8.9	22.3	69.9

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

Figure 2.Non Revenue Water



Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

1.5 Unit operational costs (total, staff and energy)

The unit operational costs presented below, are related to providing both – water supply and sewage services to consumers. Notable differences can be seen among the low costs in Romania and Croatia in 2004 (0.36$ and 0.57$ respectively) and the rather high costs in the Czech Republic (1.03$) and Hungary (0.83$). Between 2000 – 2004, the unit operational cost for water and wastewater per cubic meter sold increased by at least 42% in the all of the CEE countries studied. The highest operational costs are shown by Norway at 1.30$ per cubic meter of water and waste water in 2004.

Table No.6. Unit Operational Cost W&WW (US$/m3 water and wastewater sold)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	$ 0.65	$ 0.40	n.a.	$ 0.40	n.a.	$ 0.16
2001	$ 0.67	$ 0.41	n.a.	$ 0.44	n.a.	$ 0.18
2002	$ 0.76	$ 0.45	$ 0.40	$ 0.55	$ 1.07	$ 0.22
2003	$ 0.90	$ 0.50	$ 0.45	$ 0.67	$ 1.19	$ 0.27
2004	$ 1.03	$ 0.57	n.a.	$ 0.83	$ 1.30	$ 0.36

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

The following table shows the unit operational costs for water supply only. They usually represent more than a half of total unit operational costs for W and WW (from 54% in the Czech Republic to 67% in Romania in 2004). Between 2000-2004 the portion of water supply unit operational costs decreased in all CEE countries, which means that wastewater treatment was getting relatively more costly. This corresponds with the increasing pressure on sewage constructions and reconstructions and the implementation of better wastewater treatment technologies in EU countries, but even outside of the EU. The portion of wastewater treatment unit to operational cost increased over the given five years by about 4% in Czech Republic and Hungary, and by about 7-8% in Croatia and Romania.

Table No.7. Unit Operational Cost –Water only (US$/m3 water sold)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	$ 0.38	$ 0.29	$ 0.33	$ 0.27	n.a.	$ 0.12
2001	$ 0.39	$ 0.27	$ 0.31	$ 0.30	n.a.	$ 0.12
2002	$ 0.43	$ 0.29	$ 0.32	$ 0.37	$ 0.78	$ 0.15
2003	$ 0.51	$ 0.34	$ 0.34	$ 0.45	$ 0.74	$ 0.19
2004	$ 0.56	$ 0.37	n.a.	$ 0.53	$ 0.80	$ 0.24

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

Staff costs are usually the largest component of operating costs. In 2004, in almost all the countries, labor costs varied between 35% and 39% of total operational costs. The exception was the Czech Republic with a share of only 12%.

Table No.8. Labor Costs vs. Operational Costs (%)

Year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	14%	28%	19%	42%	n.a.	27%
2001	14%	30%	19%	41%	n.a.	30%
2002	14%	35%	19%	42%	40%	31%
2003	13%	36%	19%	36%	39%	35%
2004	12%	38%	n.a.	35%	39%	35%

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

In the IB-NET database, there are two more indicators related to staff efficiency in W and WW services showing the relative quantities of workers per 1000 connections and 1000 inhabitants. Table 9 shows the number of workers employed per 1000 water connections. From this table we can again observe the relative disadvantage of Romania, which employs approximately 13 men per connection, while in Hungary it is only 5.4 men. In 2004, the Czech Republic needed 8.3 men for each connection. In all countries the No. of employees per connection is decreasing.

A connection is classified as the outflow from the main pipelines to the customer's private property (or the inflow from the property in the case of wastewater). One water connection and one sewage connection is usually related to one building. The number of households connected to networks does not necessarily correspond with the number. of connections, since a block of flats is covered by one connection.

Table No.9. Staff per Connections (For each 1000 W&WW conn.)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	10.1	7.0	n.a.	6.7	n.a.	20.7
2001	9.6	6.9	n.a.	6.3	n.a.	18.4
2002	9.2	6.8	n.a.	5.8	n.a.	16.0
2003	8.8	6.7	n.a.	5.6	n.a.	14.6
2004	8.3	6.6	n.a.	5.4	n.a.	13.3

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

Table 10 presents the number of employees related to the population served. The results are more homogeneous than the previous indicator. The possible differences in understanding the term "connection" between states are eliminated in the case of this indicator.

Table No.10. Staff per Inhabitants (For each 1000 W&WW pop. served)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	1.2	1.6	n.a.	1.6	n.a.	1.8
2001	1.1	1.5	n.a.	1.6	n.a.	1.8
2002	1.1	1.5	n.a.	1.5	n.a.	1.7
2003	1.1	1.5	n.a.	1.5	n.a.	1.7
2004	1.1	1.6	n.a.	1.4	n.a.	1.6

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

Table 11 deals with the proportion of energy costs to total operational costs. The ratio is the lowest in the Czech Republic (energy costs were only 6% in 2004). The proportion of energy costs is slowly decreasing even though the prices of electricity are slightly increasing. The highest relative costs on energy are in Romania (17%).

Table No.11. Electrical Energy Costs vs. Operational Costs (%)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	7%	7%	13%	12%	n.a.	25%
2001	7%	7%	13%	11%	n.a.	21%
2002	6%	7%	13%	11%	n.a.	22%
2003	6%	7%	13%	12%	n.a.	20%
2004	6%	7%	n.a.	9%	n.a.	17%

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

The last indicator related to costs shows the degree to which external (private) contractors are used to provide services for W and WW utilities. The highest ratio (19%) was achieved in Croatia in all the years observed. By comparing the portion of contracted-out service costs with the relative number of staff (Table 10), no concrete conclusion can be made – i.e. we cannot support the hypotheses that a decrease in the number of staff causes an increase in contracted-out services).

Table No.12. Contracted-out service costs vs. Operational costs

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	10%	19%	15%	7%	n.a.	7%
2001	11%	20%	15%	8%	n.a.	7%
2002	10%	20%	15%	7%	n.a.	8%
2003	10%	21%	15%	8%	n.a.	9%
2004	9%	19%	n.a.	8%	n.a.	11%

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

1.6 Quality of Service

The ratios in Table 13 and 14 provide a comparison of the quality of (treated) wastewater that is discharged to surface water.

Regarding wastewater treated at least to a primary level, the highest proportion to total wastewater collected is in Romania. Primary treatment mostly means mechanical treatment (the elimination of suspended materials).

Table No.13. Wastewater - at Least Primary Treatment (% of WW)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	93%	13%	95%	60%	n.a.	98%
2001	93%	12%	97%	87%	n.a.	98%
2002	95%	11%	98%	83%	n.a.	98%
2003	96%	13%	98%	77%	n.a.	98%
2004	97%	54%	n.a.	80%	n.a.	98%

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

If comparing data of at least secondary (biological) wastewater treatment, the situation is slightly different. The best results are achieved in the Czech Republic, where about 95% of total wastewater collected was treated at least to secondary level in 2004. This high portion was achieved, because the IB-NET data comes mostly from the largest W and WW utilities in the CR, which has already been equipped with better wastewater treatment facilities. In Hungary, the large construction of a wastewater treatment plant for the capital Budapest is currently ongoing. When finished, the ratio (secondary treated WW/total WW) will also be close to 90%. The worst situation is in Croatia (only 1% of wastewater is biologically treated).

EU policy also requires the introduction of the tertiary level of wastewater treatment (i.e. the elimination of nitrates and phosphorus) in specified sensitive and vulnerable zones. The entire territory of the Czech Republic was claimed as a sensitive zone according to directive No. 91/271/EEC. Unfortunately, data on tertiary treatment are not available in IB-NET structures (see Chapter 2 for more information).

Table No.14. Wastewater - Secondary Treatment or Better (% of WW)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	91%	1%	92%	58%	n.a.	79%
2001	91%	1%	96%	49%	n.a.	72%
2002	93%	1%	98%	52%	n.a.	70%
2003	94%	1%	98%	61%	n.a.	88%
2004	95%	1%	n.a.	59%	n.a.	88%

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

1.7 Billing and Collections

The last set of data from IB NET offers a comparison of tariffs (W and WW tariff) per cubic meter sold. This amount is presented in monthly equivalents and reflects the total billed service which has been paid by consumers. The highest tariff is paid by consumers in Romania (12$ in 2004). In Norway and England & Wales the tariffs are more than 2$. It is difficult to explain such huge differences in tariffs since the composition of water and wastewater tariffs can significantly differ from country to country. The expensive water in Romania can be explained by the large amount of water lost (see Table 5) which increases the costs of service. A further analysis of the water pricing system can be found in Chapter 4 of this report.

Table No.15. Average Revenue W&WW (US$/m^3 water and wastewater sold)

year	CZE	Croatia	England & Wales	Hungary	Norway	Romania
2000	$ 0.71	$ 0.50	n.a.	$ 0.38	n.a.	$ 9.27
2001	$ 0.78	$ 0.50	n.a.	$ 0.44	n.a.	$ 8.30
2002	$ 0.97	$ 0.59	$ 1.91	$ 0.53	$ 2.36	$ 8.82
2003	$ 1.18	$ 0.69	$ 2.14	$ 0.64	$ 2.47	$ 9.64
2004	$ 1.37	$ 0.87	n.a.	$ 0.75	$ 2.56	$12.00

Source: The International Benchmarking Network for Water and Sanitation Utilities (IBNET).

Figure 3 shows the comparison of average tariffs per m^3 for the year 2003 with the unit operational costs in US dollars (Table 6). The overall logic is that revenues should exceed operational costs, which is not the case of Hungary. In the Czech Republic, the relatively small difference is caused by an increase in profit. The large difference between revenues over operational costs can also be caused by investment costs, which can, but does not have to, be included in operational costs (the pricing policy depends on the regulation of the public water supply and sewage sector). In the Czech Republic a minor portion of investment costs is included in operational costs through amortization. Most investments are subsidized from public resources.

Chyba! Objekty nemohou být vytvořeny úpravami kódů polí.

2 European Water Association (EWA)

The European Water Association (EWA) is a NGO dealing with the management and improvement of water resources. The EWA consists of about 22 European national associations[2] representing technical experts from W and WW utilities as well as policy consultants, and 14 firms and enterprises as corporate members.

The yearbook[3] presents a summary of the activities related to the years 2004/2005. It also includes a list of water and wastewater indicators of most European countries. The information reveals few statistical data about population and population density and indicators about the W and WW sector. A summary of the indicators is included in Table 16 and 17.

There is only a little homogeneity in data sets for particular countries. The majority of the countries are presented with information from 2002 – 2003, but there are cases for which the years used can vary from 1995 to 2004. However, even with this complication, there is still a limited possibility to compare data with similar periods of time for the water sector (Czech Republic, Estonia, France, Germany and Hungary) and for the wastewater sector in 2003 (Czech Republic, Estonia, Germany and Hungary). Further, some other European countries above the IB-NET available data are included in EWA statistics.

2.1 Drinking Water Sector

In 2003, the highest proportion of the population served with drinking water was in France (99%). The Czech Republic reported 92% and the lowest share was observed in Estonia (77%). The daily consumption of drinking water in liters per person and day was the highest in the Czech Republic (201 liters). Estonia had very low water consumption – only 100 liters per person and day.

Table 16 also includes information on the origin of drinking water.

Table No.16. Drinking Water Sector

Country	Year	Origin of Drinking Water			Population served	Household consumption
		Groundwater %	Surface Water %	Spring water %	%	in liters per person and day
Austria	2004	50		50	87	125
Czech Republic	1998	30	65	3	92(2003)[1]	201(2003)[1]
Croatia	2000	86			92[1]	382[1]
Estonia	2003	65	35		77	100
France	2003	40	60		99	164 (1994)
Germany	2003	65	21	14		
Hungary	2003	43	6	11 (karstic -40 bank filtered)	98	151
Netherlands	2002	58	38	4	96	127
Norway	2002	10	90		78[1]	400[1]
Slovenia	2004	57	3	40	97	146
Spain	1998	17	76	3-4(desalted)	97	265
UK	2000	33	67		n.a.	343

Source:EWA European Water Association. Yearbook 2005

(1) Source:IB-NET

[2] Members of the EWA are Austria, Belgium, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Serbia and Montenegro, Slovenia, Spain, Switzerland, the Ukraine and the United Kingdom.

[3] European Water Association. Annual Report 2005. [online] http://www.ewaonline.de/pages/yearbook.htm

2.2 Wastewater Sector

The lowest proportion of the population connected to sewerage was observed in Hungary (59%) in 2003. Germany and The Netherlands reported more than 95% of the population connected, while Estonia and The Czech Republic presented results of 72% and 76% respectively.

The quality of wastewater treatment divided up into all three types of treatment is introduced in the last 3 rows of Table 17. The highest level of treatment is in Austria, Germany and the Netherlands, where most of the wastewater is treated at the tertiary level.

Table No.17. Wastewater sector

Country	Year	Annual wastewater quantity in million m³	total population connected to public sewer systems %	total population connected to public treatment plants %	% of annual wastewater quantity treated with primary treatment only	% of annual wastewater quantity treated with primary and secondary treatment only	% of annual wastewater quantity treated with primary, secondary and tertiary treatment
Austria	2001	1068.00	86.6.	86.60	<1.0	6.7	93.3
Croatia	2000	n.a.	67%		13.00 [1]	1.00[1](secondary treatment or better)	
Czech Republic	1998	576.00	76(2003)[2)]	72.00	2.00	31.00	67.00
Estonia	2003	11.009	72.0	71.00	1.0	25.0	7.01
France	1994	16.30.00	93.0	87.50	15.0	70.0	15.0
Germany	2003	10473.00	95.0	93.00	0.2	5.1	94.7
Hungary	2003	514.00	59.0	51.00	3.0	68.0	29.0
Netherlands	2002	1346.60	98.0	98.00	0.0	20.0	80.2
Norway	2000	n.a.	80	77.00	28	63	91
Slovenia	2004	776.00	53.0	36.00	18-42 only pre/treatment	32.0	9.0
Spain	1998	n.a.	86.0	83.00	24.8	7.00	4.0
UK	2000	n.a.	94.0	94.00	1.6	68.0	30.0

Source:EWA European Water Association. Yearbook 2005

(1) Source:IB-NET

3 Austrian Study

The study[4] made by the Austrian "Staedtebund" in 2002, covers data from Austria, England & Wales, France, Germany and the Netherlands. It was developed as a set of case studies for each country. The following indicators are covered by the analysis: Quantity, quality and use of water resources, legislation, administrative structure, financing and the cost structure of water management, drinking water and wastewater management, water markets, the internal structure of water organizations, the pricing system and environmental protection.

For the purposes of this report, we have chosen data, which corresponds with the IB-NET database. A further comparison of the Czech Republic with Austria, the Netherlands and France can be made. We therefore added some information for the Czech Republic from IB-NET into the following tables for comparative purposes.

Table 18 shows the non revenue water in relative numbers for different years. We can observe a higher efficiency of water supply (as the difference in water consumption vs. production) in the Netherlands for the year 2000. The Czech Republic and England & Wales reported results above 20% of unaccounted water in the same year.

Table No.18. Non Revenue Water (%)

Country	Year	Unaccounted for Water %
Austria	1997	9.5
England & Wales	1999/2000	22.0
France	1998	30.0
The Netherlands	1999/2000	6.0
Czech Republic(1)	2000	24.0

Source: Oesterreichischer Staedtebund. Internationaler Vergleich der Siedlungswasserwirtschaft. 2002.

(1) Source: IB-NET

Table 19 shows sewerage coverage for 1997 and 2000. The Netherlands showed the highest proportion of the population connected to sewerage systems (97.4%). In 2000 the situation in the Czech Republic regarding this indicator was similar to the situation in France.

4 *Oesterreichischer Staedtebund*. Internationaler Vergleich der Siedlungswasserwirtschaft. 2002.[online] http://www.staedtebund.at/de/publikationen/Studien/vergleich_siedlungswasserwirtschaft.pdf#search=%22Internationaler%20Vergleich%20der%20Siedlungswasserwirtschaft.%202002.%22

Table No.19. Sewerage Coverage %

Country	Year	Sewerage Coverage %
Austria	2000	86.5
England & Wales	2000	85.0
France	2000	77.0
Germany	1997	88.6
The Netherlands	1997	97.4
Czech Republic(1)	2000	75.0

Source: Oesterreichischer Staedtebund. Internationaler Vergleich der Siedlungswasserwirtschaft. 2002.

(1) Source: IB-NET

4 Socioeconomic and Economic Indicators for Selected Countries

After the introduction of water and wastewater data, we finally add some basic socioeconomic and economic indicators mainly available from EUROSTAT and other related information sources.[5]

4.1 Socioeconomic Indicators

The following table includes some indicators that are useful to complete the picture about public water supply systems and sewerage in particular countries. Data on population density draws a picture of the infrastructure specifics; GDP per capita, the comparative price levels and the inflation rate introduce the purchasing power of inhabitants in the EU-15. Lower GDP per capita, in relative terms, is still shown by the CEE countries.

Table No.20. Socioeconomic Indicators.

Country	Year	Total Population/ M inhabitants	Population density / inhabitants per km2	GDP per capita (1)	Comparative Price Levels (2)	Inflation Rate
Austria	2003	8.10	98.50	120.30	105.70	1.3
Denmark	2003	5.40	125.10	120.80	138.80	2.0
Croatia	2002	4.44	79.20	46.70	55.30	n.a.
Czech Republic	2003	10.20	132.10	67.70	55.50	-0.1
Estonia	2003	1.36	32.00	48.20	63.20	1.4
France	2003	61.00	110.00	111.60	105.80	2.2
Germany	2003	82.60	231.20	108.20	108.70	1.0
Hungary	2003	10.15	190.00	59.20	59.00	4.7
Italy	2003	57.30	195.20	107.70	102.30	2.8
Netherlands	2003	16.20	480.00	124.60	106.60	2.2
Norway	2003	4.52	13.94	164.50	145.20	2.0
Romania	2003	21.83	94.00	34.70	41.50	15.3
Slovenia	2003	1.90	99.00	75.90	77.90	5.7
Spain	2003	41.60	83.00	97.20	86.50	3.1
UK	2003	59.40	244.00	116.00	103.80	1.4

(1) GDP per capita in Purchasing Power Standards (PPS), (EU-25 = 100)

(2) Comparative price levels of final consumption by private households including indirect taxes (EU-25 = 100)

Source: EUROSTAT

4.2 Economic Instruments for Water Management

The economic instruments of environmental policy in water management are mostly pollution charges for wastewater effluent, and fees for surface water and groundwater withdrawals. Water and wastewater tariffs serve as economic government policy tools, while they are regulated for social or other purposes.

The complexity of the pricing system in each country makes it difficult to make a proper comparison. The inhabitants' purchasing power has to be taken into account (see Table 20). E.g. in the Czech Republic and Denmark

[5] Other sources of information for this section inlcude: *European Commission –DG Environment*. Water pricing in selected Accession Countries to the European Union, current policies and trends. Final Report 2000;*European Environment Agency*. Selected indicators; *Improving Water Management*. Experiences from OECD Countries . OECD IWA Paris, 2003 ; and *Kraemer, Piotrowski*. Comparison of Water Prices in Europe. Centre for International and European Environmental Research. Berlin 1998.

water and wastewater tariffs are almost the same in absolute terms, although the economic level of both countries (considering the GDP per capita) varies greatly.

The different reasons for fees and charges influence their levels. In Denmark and the Netherlands, fees for water abstraction are applied as an instrument for achieving environmental goals. In France and in Germany, abstraction fees are intended to cover the administrative costs of state water administrators.

Table No.21. Selected Economic Instruments for Water Management in Europe.

Country	Year	Wastewater/ Pollution charges	Drinking Water Prices/ m3	Water Charges/Taxes / m3					
			EUR	Standard Rate EUR/m3	Agriculture, Industry / EUR/m3	(Infiltrated) Groundwater / EUR/m3	Use of Revenues	Exemptions, Discounts	Results
Czech Republic	**2006**	0.23 EUR/kg treated wastewater, 2.03 EUR/kg phoshorus,1.16 EUR kg Nitrates	1.54 (2006)	0.04-0.07		0.12	protection of groundwater reserves		
Denmark	**2003**	2.7 EUR/kg treated wastewater, 14.7 EUR/kg phosphate, 1.5 EUR/kg organic mat	1.538812			0.7. 0.84 VAT incl	General Revenue	Industry and Agriculture exempt	Household water consumption and leakage rates decreased
Estonia	**2000**		0.43	0.013-0.016		0.016-0.048 depending on use			
France	**2003**		1.23	0.00071 to 0.04 (1994)			Earmarked for water agency investment programs	Small municipalities exempt , industrial sector partly exempt	Effective in raising revenues but no incentives. Charge promotes metering for irrigation water
Germany	**2003**	36 EUR per damage unit;50 kg COD, 25 kg nitrates,20 kg mercury...(1998)	1.77	0.05-0.06			Research and Pollution Abatement	Depending on water quality, some sectors eligible for reductions	Rate too low to have any significant incentive effect

Country	Year	Wastewater/ Pollution charges	Drinking Water Prices/ m3	Water Charges/Taxes / m3					
			EUR	Standard Rate EUR/m3	Agriculture, Industry / EUR/m3	(Infiltrated) Groundwater / EUR/m3	Use of Revenues	Exemptions, Discounts	Results
Hungary	**2003**		0.47	0.07-0.02 depending on use					
Italy	**2006**		0.71						
Netherlands	**2002**	20% of pollution permitted (1995)	1.23	0.15 (1995)	0.08 (1995)	0.025 (1995)	General Revenue	Agriculture almost completely exempt	Industrial water consumption declined between 2 and 12%
Slovenia	**2004**		0.31	0.03					
Spain	**1998**		0.54						
UK	**2006**		1.32	0.006-0.03 on licensed volume			Administration Costs	No exemptions	Rate too low to have any significant incentive effect

Source: : *European Commission –DG Environment*. Water pricing in selected Accession Countries to the European Union, current policies and trends. Final Report 2000;*European Environment Agency*. Selected indicators; *Improving Water Management*. Experiences from OECD Countries . OECD IWA Paris, 2003 ; and *Kraemer, Piotrowski*. Comparison of Water Prices in Europe. Centre for International and European Environmental Research. Berlin 1998.

5 Other Information Sources in Brief

5.1 European Commission

In 2000, a detailed report *Water pricing in selected Accession Countries to the European Union (current policies and trends)* about the water pricing system in 10 CEE countries, including the Czech Republic, was published by the DG Environment of the European Commission.

The study is divided into three parts: household water, industrial water and agricultural water. It also covers other indicators on general water management issues. The content of the report is relevant for our comparative analysis, however, the data has not been up-dated.

5.2 OECD

In 2003 the International Water Association published a report with recent experiences from OECD Countries called *Improving Water Management*[6]. The report addresses global issues such as water scarcity, water quality and water markets. The data for all OECD countries is not often complete and is also presented in the form of charts.

Information about the Czech Republic is mentioned in order to give a picture of water supply penetration, the relative large variation in water tariffs between 1997 – 2000, reductions in water consumption and subsidies and the institutional arrangement of water management.

5.3 EUROSTAT

EUROSTAT[7] is the largest database of various indicators from all European countries. Water issues can be found under the topic "Environment and Energy", e. g. indicators on water abstraction, water use, consumption and wastewater treatment. Some data has been presented in Table 20.

[6] *Improving Water Management. OECD. 2003. [online]* http://www1.oecd.org/publications/e-book/9703021E.PDF#search='water%20management%20austria%20report'

[7] *Eurostat [online] http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090.30070682.1090_33076576&_dad=portal&_schema=PORTAL*

Conclusions

The purpose of this brief analysis was to compare the situation in the Czech water and wastewater sector with other European countries. The evolution of the sector in the Czech Republic is often considered at the CEE scale, although it would be better to compare it to developed countries' systems. The Czech republic reports evident efforts for the improvement and stabilization of the water and wastewater sector, it shows high levels of water supply and increasing quality of wastewater treatment with relatively low costs.

From the indicators introduced (regarding the largest IB-NET data), it is obvious that the changes in Hungary and the Czech Republic follow a similar direction, so there is a large potential for information trade-offs between these two countries. On the other hand, inverse trends in indicators were often reported by Norway and England & Wales – e. g. water consumption is stable or increasing, water loss is increasing etc. Finally, Romania shows the specific example of a post-socialist country in which a lot of work to stabilize water and wastewater sector still has to be done.

While searching for available data for this type of comparison, investigators face many difficulties. Not all European countries are included in particular data sources, data is not complete and often comes from different time periods. Data presented must be interpreted carefully, because in some cases indicators do not work with the same basis.

Comparisons made in this report as well as the overview of other studies mentioned could serve as the starting point for the further and deeper analysis of the water and wastewater sector at the European level.

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About IREAS

Institute for Structural Policies, IREAS, is non profit organization, formed as project based platform of academic and policy experts from Central and Eastern Europe. IREAS was established in 2001 with the aim to initiate and coordinate cooperation of experts and institutions in fundamental research and its practical application into EU policies, particularly environmental and structural.

Main activities of IREAS consist of pursuing research and consultancy, organizing trainings and education for public sector and non-profit non-governmental agencies, issuing publications etc. Main research topics covered by IREAS are currently as follows:

- EU regional policy,
- Rural development,
- Climate change and energy,
- Waste and water management,
- Human resources development.

Contacts and further information are available on: www.ireas.cz. Contact person regarding the report is Lenka Camrova, camrova@ireas.cz.