Water management in the Czech Republic: Transformation, restructuralization, and comparison of the current state of the branch with the state in 1993

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Abstract

The privatization process in the water industry is often a much discussed topic worldwide within the contexts of economic efficiency and social responsibility. As are the topics of organizing the market, transparency, private providers, and the nature of ownership of water infrastructure. The article describes the specific approach to transforming the water industry in the Czech Republic, its mechanisms, the role of the state, cities, and municipalities, and the private sector. A comparative analysis of the data describes the current state of key indicators of the industry and the state in 1993, such as number of owners and operators, connectivity to water infrastructure, consumer consumption, water losses, number of waste water plants etc. Article also describes the current condition of the market and affirms the significant development of Czech water industry since the beginning of the 1990s.

Keywords: water management, transformation, privatization

Introduction

The water industry, as a typical representative of network branches, is one of the key segments of the economy. Water was, is, and always will be an essential human need. The distribution of drinking water and the piping away of waste water via public pipes is nowadays considered as an automatic service by the society, without which we could not imagine everyday life. Since water is an essential human need, its reliable distribution is considered a duty of the public sector, since the market system could fail, and repairing potential damages could cost large sums of government funds and efforts. Over time, things change and move towards a revolutionary understanding of utilities and public goods (Mejstřík, 2004). Experiences with other network branches, such as the railway transportation or energy, also show that participating in the private sector has a number of benefits, such as higher effectivity and the level of provided services (Amos, 2004). The situation was similar after the entry of the private sector to the water industry in the Czech Republic during the 1990s, which provided the sector with dynamics and pressure to economic effectiveness (Hlaváč, 2006).

The transformation and privatization of the water industry is also the focus of a number of foreign studies whose conclusions vary significantly. In several cases, the participation of the private sector in the water industry is seen as only "picking out" the rentable elements of the market which in the end leads only to a price increase which does not correspond with the appropriate level of effectiveness and productivity (Memon and Butler, 2003). Partial privatization and participation of the private sector in developing countries can on the other hand lead to the branch receiving large capital investments that later raise the overall level of services and enable significant revitalization of infrastructure and improve the purity of water itself (Pangare et al., 2004). In most cases, the participation of the private sector is only partial – the ownership of the infrastructure remains in the hands of the public sector and the management of it is provided by the private partner via temporary lease. One of the few exceptions is the privatization of the water industry in the United Kingdom where the water infrastructure was sold to private operators. The entire branch is thereby solely private, of course under strict observation by the regulator. In this case the opinions differ about the development of effectiveness and productivity that the privatization brought. One side of the opinion spectrum states that the privatization significantly strengthened the technological facilities of the water industry but did not deliver the promised growth of productivity, thereby causing significant losses of overall effectiveness (Saal, Parker and Weyman-Jones, 2007). Another study however shows that the UK water industry experiences (thanks to the privatization) very quick technological development which leads to the constant decrease in operational costs (Bottasso and Conti, 2003).

The following part of the article will describe the process of transformation and the later privatization of Czech water market, its mechanisms, and the role of individual players. For an objective evaluation of the development of the market, there will be a comparative analysis of data that will compare the current state of key indicators of the water industry with the state in 1993. The data for the analysis was gathered from the publicly accessible database of the Czech Statistical Office, statistical yearbooks, and annual reports from the fields of water management and waste management published by the Ministry of Agriculture of the Czech Republic.

Transformation of the Czech Water Industry

The transformation of Czech water industry started in 1992. The entire preparation process for this extensive transformation was initiated primarily by the Resolution of the Government of the Czech Republic No. 222 adopted on 3 July 1991, on the principles of the reforms and transformation processes of the systems of providing drinking water, sewage systems, and waste-water treatment. In the same year, the Act No 92/1991 Coll. was established, on the transfer of property of the state to different persons which defined the course and form of privatization projects, thereby preparing all necessary institutional documents for the extensive transformation and restructuralization not only of the water industry. Besides the mentioned acts, the Ministry of Agriculture also worked

on a study called "Zásady pro privatizaci státních podniků oboru veřejných vodovodů a kanalizací" (Rules for Privatizing State-Owned Enterprises in the Area of Public Waterworks and Sewage Plants). The objective of the study was i.a. to introduce foreign experiences to the issue and their recommendations for a healthy development of the branch, as well as appropriate setting of regular mantinels for the functioning of the market environment. The study also stressed the advantages of bigger organizational structures that function more effectively and provide the users with high-quality services with appropriate tempo of price growth (Transparency International, 2009).

The specific process of transformation of the branch started in 1993, initiated by a gratuitous transfer of state-owned property of the water industry's infrastructure and operational property (via the Fund of National Property) to the self-government of cities and municipalities. In principle, every city or municipality became a sole owner of its water industry infrastructure and its operational property. All responsibility from these remained with the management of the municipalities. Until 1993, there existed overall 11 state-owned water industry enterprises (9 regional and 2 in Prague that provided the management, renewal, and development of water industry infrastructure). The implementation of privatization projects and the transformation lead to the fragmentation of these large wholes, in 1994 there were around 40 regional water industry enterprises and more than 1,200 additional small-scale operators. The privatization projects were at the same time constructed so that they secured the decisive influence of the cities and municipalities over the newly established water industry enterprise via having the majority of the shares in them. The beneficial interest of these enterprises (that the municipalities also received for free) was established by the value of their infrastructural property. Naturally, larger cities with a dense infrastructural network had a larger property share in the regional water industry enterprises than smaller municipalities with only several connections. Already at this stage, between 1992-1993, the state calculated the option of creating two different models of management:

- *Mixed model* – water industry enterprise owns and at the same manages the water infrastructure based on agreed upon norms and proper administration of the enterprise;
- *Separated model* – water industry enterprise only owns the water infrastructure and the management and connected services are provided by other natural or legal persons based on a contract (separation of ownership and management). Municipalities do not lose the oversight over the water and sewage prices.

To call the process until this point as a privatization process is completely false. It only came to the so-called deetatization – a transfer of the previously state-owned property (water industry and sewage infrastructure and connected operational property) to cities and municipalities. The original 11 water industry enterprises were by privatization projects fragmented into about 40 regional water industry enterprises whose new majority shareholders were the self-governments of cities and municipalities. Approximately 90% of all the shares of these newly established water industry

enterprises were owned by cities and municipalities. The state also within this process created certain safeguards that were supposed to even prevent a complete privatization of this industry as a monopole. Such a safeguard was e.g. an option of using the state administration's influence in water industry enterprises in the form of a "golden share". In such a case, the state could block any fundamental planned changes in the water industry enterprises for which a certain number of shares would be needed at the general meeting. The state also as a part of the privatization projects worked in limiting rules regarding the transfer and selling of shares. The intent of this was to keep the planned owner structure and prevent the selling of shares to the hands of private enterprises. Privatization (selling of share into private hands) would be a serious breach of not only the rules of the water industry enterprises but also of the rules of the Commercial Code. The remaining 10% of the market was provided by small operators created by cities and municipalities that decided to not invest their gained infrastructure and operational property into the ownership of regional water industry enterprises in which the municipality could have their representative, or participated in the ownership of such an enterprise via the purchase of a minority part of the shares (Transparency International, 2009).

At the end of the 1990s, the tendencies towards gradual actual privatization of the water industry enterprises commenced via a direct purchase of shares. In many divisions of owners of water industry infrastructure, it came to the transfer of ownership of separable (operational) property. E.g. in the South Bohemian Region in its water industry, already in 1998, the relation to the property changed this way in more than 90 cities and municipalities. The consequent privatization was joined by more than 45 regional water industry enterprises (MZe, 1999).

Tab. 1: Approach to privatization of water lines and sewerage systems until December 31, 1998

Privatized enterprises	45
Presented projects	162
Accepted projects	84
Privatized property	48,720,000,000 CZK
Implementation approach (of property privatization)	99,98%

Source: Ministerstvo zemědělství, 1999: Report on the state of the water industry of the Czech Republic, 1999

The biggest interest of investors (mostly abroad) was in the shares of large cities that provided water to densely populated areas or in enterprises that provided the management of large areas. For example the enterprise Pražské vodovody a kanalizace

a.s. was privatized this way – by selling shares (it was established in 1998 via the decision of the Fund of National Property and thereby separating property from management), which provided the provision, draining, and cleaning of water for the entirety of Prague and parts of the Central Bohemian Region. Ownership of the Prague water industry infrastructure remained (and remains until today) in the hands of the enterprise Pražská vodohospodářská společnost that is 100% owned by the Prague City. In the first stage, 66% of shares of the enterprise Pražské vodovody a kanalizace a.s. was sold off in a public tender, the remaining 34% were transferred with no additional costs within a privatization project to the ownership of the Prague City. The second stage happened within a few months and the remaining 34% of shares were sold to private hands, namely to a supranational water concern Veolia Voda (at that time Vivendi Water).

Similarly, privatization took place in other water industry enterprises that decided to separate their operational part from their ownership structure. They signed a contract between the operational enterprise and the city (or the alliance of cities and municipalities) lasting longer than 20 years. The sale of the operational parts of the enterprises meant that cities received sufficient amount of finances and the transfer of responsibility of the operations of infrastructure. Privatization of water industry enterprises also often happened via selling of shareholder rights (basically granting full powers to voting rights on shares), which allowed a relatively simple loophole of the rules of the water enterprises about the inability to directly transfer shares. The administration of cities and municipalities did not have experience with running infrastructure and often had problems. The arrival of private partners was therefore a natural reaction to missing market know-how and insufficient capital facilities.

Comparative analysis of data and comparison of the current state with the state in 1993

Since 1993, the Czech water industry came a long way. It went through a complicated change of property structure, as well as an extensive industry-wide transformation. Despite fundamental changes in the running of the entire industry, there has been significant development and the market environment has at least partially stabilized although the entire society still passionately debates the efficiency of private and public operators.

Thanks to the government's approach and the transformation and privatization plans, the current Czech water industry consists of 6,795 owners of infrastructure (almost the same number as the number of cities and municipalities in the Czech Republic) and 2,878 operators (Table 2). The Czech Republic is unique within Europe, especially due to the number of owners.

Tab. 2: Number of owners and operators

	1993	2017	Change
Owners	11	6,795	+6,784
Operators	11	2,878	+2,867

Source: Ministerstvo zemědělství, 1999, ČSÚ

Water line infrastructure

Drinking water has become more accessible for Czech users. In 1993, there were 8.75 mil. people connected to water lines (see Table 3), which was 84.7% of the population. Until 2017, this number grew to 10.03 mil. inhabitants (94.7% of population). As of right now, almost all households in the Czech Republic have access to a drinking water line. The availability of basic human needs, to which access to drinking water definitely counts, is in close connection to the increasing living standard of the society.

Tab. 3: Number of inhabitants connected to the water line network

	1993	2017	Change
Number of inhabitants	8,75 mil.	10,03 mil.	+ 1,28 mil.
Share	84.7%	94.7%	+ 10%

Source: Ministerstvo zemědělství, 1999, ČSÚ

To serve such a number of inhabitants, it was necessary to significantly broaden the water line infrastructure, as well as to revitalize the already existing water line network. The overall length of the water line infrastructure increased between 1993 and 2017 by approximately 33,000 km (Table 4). Each year, it has on average expanded by around 1,375 km (around 6.5 times the distance between Brno and Prague).

It is also important to mention that the development of infrastructure is capitally very difficult. According to the Ministry of Agriculture, the value of the water line infrastructure is more than 365 bil. KCZ which is ca. 4.6 mil. CZK per 1 km of water line.

Tab. 4: Length of water line infrastructure

	1993	2017	Change
Length (km)	45,579	78,584	+ 33,005

Source: Ministerstvo zemědělství, 1999, ČSÚ

Gradual revitalization, significant increase of the state of water line infrastructure, and faster resolving of accidents reflects the significant decrease in water waste within the pipe network when distributing water. In 1993, the overall water loss in pipes was 310 mil. m^3 per year. Until 2017, the annual loss decreased by 212 mil. m^3 (Table 5). The overall share of lost water in the pipes was about a third of water in 1993. The resulting losses in 2017 constitute around a fifth of the overall distributed water amount.

Tab. 5: Water loss in pipe networks

	1993	2017	Change
Losses (mil. m^3/year)	310	98	-212
% from distributed water	28.9%	16.4%	-12.5%

Source: Ministerstvo zemědělství, 1999, ČSÚ

Although the number of inhabitants connected to the water network has significantly increased since 1993, the overall yearly volume of invoiced water decreased by about 261 mil. m^3 of water (decrease of 35 %, Table 6).

Tab. 6: Volume of invoiced water

	1993	2017	Change
Volume of invoiced water (mil. m^3/year)	743	482	-261

Source: Ministerstvo zemědělství, 1999, ČSÚ

The explanation of the above stated decreasing trend in volume of invoiced water can be found primarily in the steadily decreasing consumption of water on average. In 1993, the average water consumption was 223 l per day and inhabitant, until 2017 this value decreased to around 132 l daily (Table 7). The average consumption of drinking water in households was 88.7 l per day and person in Czech households in 2017. This number decrease by half since the 1990s. The Czech Republic is in this instance one of the most economical in Europe. A lower average water consumption is only in Estonia and Slovakia. The trend is also influenced by the development of technologies that introduced much more economical appliances to Czech households.

Tab. 7: Average water consumption in the Czech Republic

	1993	2017	Change
Average overall water consumption (l/day)	223	132	-91

Source: Ministerstvo zemědělství, 1999, ČSÚ

The following Table 8 shows an interesting comparison. It illustrates how the buyer power of an average wage developed over time. Meaning how many stated goods we could purchase with an average wage. In 2017, we could purchase with an average wage 775 kWh of electricity and 634 liters of gas more than in 1993, but water got relatively expensive, and we could only purchase on average 212 m^3 less. Also due to the increased prices of water and sewage, Czech households behave more economically and the average consumption decreases.

Tab. 8: Buyer power of the average wage

	1993	2017	Change
Water (m^3)	553.85	341.03	-212.82
Gas (l)	338.53	972.5	+633.97
Electricity (kWh)	6,946	7,721	+775

Source: ČSÚ

Waste infrastructure

The number of people connected to the sewage system also increased. In 1993, approximately 6,7 mil. inhabitants were connected to the network; this number grew to more than 9 mil. inhabitants in 2017 (Table 9). In 2017, more than 85% of the Czech population were connected to the sewage system. Sewage sinks in gardens have become only an unpleasantly smelling memory for a lot of Czech households.

Tab. 9: Number of inhabitants connected to the sewage system

	1993	2017	Change
Number	6.7	9.05	+2.35
Share	64.9%	85.5%	+20.6%

Source: Ministerstvo zemědělství, 1999, ČSÚ

With the growing number of inhabitants connected to the sewage system, its length also increases. Since 1993, the length of the system grew by almost 31,000 km (Table 10). Each year, it grew on average by around 1,291 km. Same as the water system, the sewage system pipes are very costly. The overall value of the sewage system is more than 400 bil. CZK. Each kilometer of sewage infrastructure is worth almost 8.5 mil. CZK.

Tab. 10: Length of the sewage system (km)

	1993	2017	Change
Length of the sewage system (km)	17,493	48,491	+30,998

Source: Ministerstvo zemědělství, 1999, ČSÚ

With a constantly decreasing amount of used water, the overall volume of invoiced water also decreases. Logically, the volume of water released into sewage also decreases. In 1993, the volume of released water was more than 690 mil. m^3 per year; this number decreased by 237 mil. m^3 by 2017 (Table 11).

Tab. 11: Volume of water released into the sewage system (mil. m^3/year)

	1993	2017	Change
Volume of water released into the sewage system (mil. m^3/year**)**	690.3	453.3	-237

Source: Ministerstvo zemědělství, 1999, ČSÚ

In comparison with 1993, the Czech Republic now has more than four times more sewage treatment plants. In 1993, there were 677 plants, the network grew to 2,612 plants in 2017 (Table 12). These plants do not only clean waste water from households but also rain water which lands in the sewage system. Primarily rain water is nowadays being cleaned in larger volumes than in the 1990s and the plants are always busy even though the volume of waste water from households has decreased.

Tab. 12: Number of waste water plants

	1993	2017	Change
Number of waste water plants	677	2,612	+1,935

Source: Ministerstvo zemědělství, 1999, ČSÚ

Thanks to the extensive network, a much larger share of waste water can be cleaned. In 1993, around 79% of waste water was cleaned; in 2017, the volume of cleaned waste water was 97.5% (Table 13). Almost all waste water is therefore cleaned effectively and can be reused.

Tab. 13: Share of cleaned waste water within the overall volume of waste water

	1993	2017	Change
Share of cleaned waste water	78.9%	97.5%	+18.6%

Source: Ministerstvo zemědělství, 1999, ČSÚ

Conclusion

The Czech water industry has come a long way since the 1990s. The deciding factor for the future of this branch was the transformation process, during which the infrastructural property was transferred to cities and municipalities that were supposed to then decide how to manage the newly gained property. The implementation of privatization projects lead to the fragmentation of the original 11 water industry enteprises into more than 40 regional water industry enteprises to which the municipalities were able to voluntarily invest their infrastructural property and still decide on the questions of manangement together with other representatives of cities that decided on the same approach. As a part of the privatization projects, newly established regional water works were constructed so that they could secure the deciding influence of cities and municipalities via major share ownership. The beneficial interest of municipalities of these newly established water enterprises (that municipalities received free of charge) was determined by their infrastructural property that they invested in the enterprise. Although the statutes of these regional waterworks allowed direct sale of shares only between the current owners (primarily cities) – which was supposed to prevent privatization of enterprise – the extensive process of privatization started in 1998 when the market was opened to domestic and foreign investors.

The comparative analysis of the overall development of the market since 1993 seems very optimistic. In 1993, there were 84.7% of Czech inhabitants connected to the water network. This number grew to 94.7% in 2017. The sewage network grew by almost 31,000 km and by 2017, there were 20% more people connected to the system than in 1993. The density of the infrastructure almost doubled since the 1990s. The growing efficiency of the branch is evidenced by the number on water loss in pipes during distribution – this value decreased by 68% between 1993 and 2017. The number of sewage treatment plants also significantly increased – the Czech water industry manages to clean 97.5% of sewage water. Despite a larger share of connected inhabitants, the overall volume of invoiced water constantly decreases and Czech households on average

are one of the most economical users of water in Europe. For enterprises to upkeep their profits, to develop and maintain the infrastructure, increase the quality of services, and to secure the corresponding quality of water, it is necessary for the price of water to also increase. In comparison with the prices of goods such as electricity or gas, the growth of the water price is much higher.

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