

WATER DOWN THE DRAIN? HUNGARY'S WASTEWATER TREATMENT POLICY

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Introduction

In 1999 a \$29.5 million loan agreement was reached between the World Bank and the Municipality of Budapest to finance the improvement of wastewater collection and treatment within the capital. ("World Bank Approves...", p. 1) Specifically the funding was designated to increase the capacities of the North Budapest and South Pest wastewater treatment plants, as well as to construct sewer lines to transport wastewater from North Buda. ("Project Appraisal Document...", p. 4) The combined effect of these infrastructure improvements according to the Project Appraisal Document was "a significant reduction in discharges of untreated sewage to the mainstream Danube." (p. 9) Many areas in Hungary still have treatment facilities with insufficient capacity; and rivers, streams, and lakes act as repositories for untreated or partially treated wastewater. If residents do not

have sewerage pipes connected to a septic tank or municipal treatment plant, the sewage trickles out of pipes, forming wastewater run-off. (Somlyody and Shanahan, p. 13)

The lack of wastewater treatment or sewer access in Hungary had been labeled a high priority environmental issue by the European Union in the late 1990s. ("Commission Opinion...", p. 91) Furthermore, throughout Hungary's negotiations to join the European Union which ended in 2002, there was a planned initiative to increase the number of wastewater infrastructure and treatment plants in Hungary.

In this article I seek to show that the improvement in wastewater collection and treatment in Hungary can be attributed to the pressure to attain European Union accession standards. In addition, the financial support from the Hungarian Parliament, private sources such as the World Bank, and the European Union accession funds has allowed

the construction of new wastewater treatment infrastructure. Furthermore, one effect of better wastewater treatment has been the relatively low incidence of water-borne diseases in Hungary. In short, the significant progress made by the Ministry of Environment and Water in expanding sewer access and water treatment across Hungary since independence makes its plan of establishing treatment in the majority of communities by 2015 an attainable goal.

Background

Generally speaking, the high cost of wastewater collection and treatment is due to the complexity of the process. The first challenge is connecting sewer pipelines to each residence and building to collect wastewater. Each sewer line then feeds into a larger pipe, which may merge several times with other branches to form a main sewer or interceptor. Through this maze of sewer pipes, wastewater is transported to a treatment plant, where a series of processes is employed to remove impurities in the water. A series of three levels of treatment can be applied to the wastewater, with different impurities removed at each stage. Primary treatment removes large solids while separating grit from organic materials, while in secondary treatment bacteria filter the water by consuming the organic matter. (Pescod) Before the effluent water is released into a natural stream or lake, a tertiary treatment is utilized to remove nitrogenous compounds found in fertilizers or heavy metals. (Pescod) Finally, the water is disinfected in a disinfection process, such as chlorination, which serves to remove bacteria from the treated water. (Pescod) Thus, the high cost to construct and maintain the sewer pipelines as well as the treatment plants requires significant capital investment.

In the case of Hungary, many larger cities contain networks of sewers and wastewater treatment plants; however, the usage costs of sewer access in these areas deter approximately one-third of residents from subscribing to the service. (Smith and Princz, p. 2) Fewer than one-third (or approximately 124 plants) are not equipped to handle the volume of wastewater received, which may compromise the quality of

the treatment. (Smith and Princz, p. 2) In other words, some plants are forced to treat some of the sewerage while discharging some untreated sewage directly into a natural stream or body of water. Therefore, sizeable amounts of funding are needed to alleviate the high cost and overextended condition of regional treatment facilities. Also, the monitoring of water on a national level is required to maintain water quality standards in lakes and rivers.

Pre-Accession Legislative Changes

The treatment of wastewater has been a high priority of Hungarian environmental policy in recent years. (*Implementation of Agenda 21...*, Chapter 18) However, the effectiveness of Parliament's environmental policy has been closely linked to the amount of money allocated to environmental development. In the last twenty years, progress has been made in connecting thousands of buildings to sewer and wastewater treatment systems. The most dramatic increase occurred while Hungary was in the process of accession to the European Union in the mid-1990s. During this time, the European Union provided funding for the Phare and the Instrument for Structural Policies for Pre-Accession (ISPA) programs. The Phare program is a European Union fund that provides monetary assistance to accessing states to supplement national budgets in enacting changes and improvements in infrastructure. ("The Phare Program," p. 1) The ISPA program was founded in 1999 to replace the Phare program's funding of environmental and infrastructure projects in countries which recently joined the Union. ("Pre-Accession Assistance," p. 1)

During the decades of the communist era in Hungary, there was insufficient investment in new sewer lines and treatment plants. Each area of the environment, such as air quality and wildlife protection, was monitored by separate departments, with the charge of wastewater treatment falling under the jurisdiction of the National Water Authority. (Enyedi and Szirmai, p. 147) However, bureaucratic non-cooperation and lack of funding created little room for improvement. Supervision of the multiple environmental sectors remained separated among several departments even after the creation of

the Ministry for Environmental Protection and Water Management. (Enyedi and Szirmai, p. 148) By the end of the communist regime in 1989, less funding had been allocated to the environment than in previous years because of an economic downturn. Without adequate budgetary financing, environmental improvement remained a low governmental priority. (Enyedi and Szirmai, p. 148)

The problem of insufficient funding continued through the first six years of Hungarian democracy. For example, a 1991 study by Somlyódy and Shanahan found that:

Public sewerage extends to an area inhabited by 51 percent of the population, but only 42 percent of the dwellings in these areas are connected to the system. The technology level of wastewater treatment shows a striking pattern: 12 percent of municipal sewerage receives only mechanical (primary) treatment; 33 percent receives biological (secondary) treatment; but 55 percent receives no treatment at all. (p. 13)

Some progress was made through 1994, during which period Hungary entered into discussions with the European Union to determine the changes needed to align Hungarian governmental policies with European protocol. In fact, the percentage of houses connected to sewer systems increased by only one percent from 1991 to 1994. (*Implementation of Agenda 21...*, Chapter 18) However, the amount of wastewater receiving at least primary treatment increased from 45 to 54 percent. (*Implementation of Agenda 21...*, Chapter 18) Due to the percent of water still remaining untreated, Hungarian wastewater policy and Parliamentary funding were inadequate to bring about an increase in treatment throughout the country.

A milestone event was the passage of the Environmental Protection Act LIII in December 1995. Not only did Act LIII address the need for increased environmental regulation but, with respect to wastewater management, section 21 of the Act stated, "After proper treatment, the discharge of used and wastewater into water bodies can occur only in a manner that will not endanger either the conditions of natural processes or the quantitative and qualitative

renewal of waters." (Act LIII, pp. 2 and 13) The Act also stated that cooperation between the Ministry of Water and Environment on the national level and municipal environmental councils was needed to ensure environmental protection. (Act LIII, p. 9) However, the Act was designed only to clarify the government's position on the environment, and the question of the funding of regional wastewater processing facilities was not specifically addressed.

By July 1997 the treatment of wastewater was still identified by the EU as a weakness in Hungary's environmental policy. In its Opinion on Hungary's Application for Membership to the European Union, the European Union Commission concluded:

The country still faces a major challenge to bring its standards up to those of the European Union in the areas of water. Water quality, closely linked to agricultural activities and exacerbated by the lack of wastewater treatment plants in many settlements is the main problem and requires major investment. ("Commission Opinion on Hungary's Application...", p. 91)

Once again, proactive legislation with accompanying capital expenditure was required to implement a significant change in wastewater collection and processing throughout the country.

Legislative Changes to Meet European Union Standards

Later in 1997 the Ministry of Environment and Water unveiled a plan which, over the next few years, provided the legislative basis for wastewater treatment expansion. The first National Environmental Protection Program (NEPP I), which was in force between 1997 and 2002, cited wastewater treatment as an environmental issue in need of improvement. (*National Environmental Programme 2003–2008*, p. 17) NEPP I also identified 2015 as the target date for access to wastewater treatment to be set up throughout the country and also, by that time, for sewer and treatment facilities to be established in hundreds of localities. (Gergely) Furthermore, less populated areas unable to support the construction of sewer

infrastructure would construct local plants, whose size was to be large enough to treat each municipality's wastewater intake. (Gergely) A follow-up program, NEPP II, effective from 2003 up to the year 2008, replaced NEPP I, which expired in 2002. NEPP II also redefined environmental priorities, identifying the need for purer water through increased treatment, removal of nitrates and arsenic from water supplies, and the establishment of a system for the disposal of solid waste in the following five years. ("Environment and Health," pp. 1-4)

However, capital investment was still needed to implement the environmental development plan delineated first in NEPP I and later in NEPP II. The decisive factor in increasing the level of wastewater treatment in Hungary was the influx of European Union financial support under the Phare program. For the year 1998, Hungary received a total of 67 million euros, of which 14.2 million euros was set aside for meeting European Union environmental standards. (*The Phare Program Annual...*, p. 41) Later in June 1999, the Instrument for Structural Policies for Pre-Accession program (ISPA) took over funding environmental development from Phare. The ISPA continued to finance the building of infrastructure and technological improvements in all areas of the environment, including water treatment. ("Pre-Accession Assistance," p. 1) After Hungary's accession to the EU, projects initially funded by ISPA continued to receive financing through the Cohesion Fund. ("Pre-Accession Assistance," p. 1)

Despite the water treatment policies of NEPP I, the October 1999 Progress Report issued by the European Union Commission on Hungary's progress towards accession was still not favorable. The report noted that, while the capacities of treatment plants had been expanded and new technology had been integrated into existing wastewater treatment systems, more improvements were still needed. Furthermore, Hungary's environmental regulations were still not harmonized with accepted EU statutes. (Regular Report: From..., p. 47) Yet the funding provided through the Phare and ISPA programs as well as the Parliamentary allocations seem to have provided the capital necessary for

the facility and technological improvements that had been implemented.

Hungary's progress in providing access to sewerage systems and wastewater treatment can be illustrated by comparing the data from 1994, when only 43 percent of homes were connected to sewer access, to those released by the Ministry of Health in 2002:

While there is almost comprehensive mains water supply, the proportion of homes connected to the sewage network was 56.0 percent in 2002, and 36.9 percent in [unconnected] villages. Although there has been significant development in communal sewerage treatment, there are still a lot of tasks in building sewage pipes. The situation is most favorable in Budapest, where more than 90% of the homes have been connected to the sewerage system since 1995. ("Environment and Health," p. 4)

Overall, the number of dwellings with sewage access increased thirteen percentage points in eight years. Furthermore, as the largest city, Budapest is a major producer of wastewater. With nearly all of its residences connected to a centralized wastewater system, within eight years hundreds of thousands of Hungarians received new access to sewer service, and the problem of disposal of sewage into surface waters was largely eliminated.

In the same year, the 2002 European Union Regular Report, a yearly document which reevaluated the improvements and problem areas needing to be addressed before Hungary's accession could be completed, concluded that increasing wastewater treatment and sewer lines nationally would not be complete by 2004, the planned year of accession to the EU. In commenting on progress made since the 1999 Regular Report, the Commission on Hungary's accession found:

...that effective compliance with a number of pieces of legislation requiring a sustained high level of investment and considerable administrative effort (e.g. urban wastewater treatment...) could be achieved only in the long to the very long term... It depended also on an increase in public and private investment. (Regular Report on Hungary's Progress..., p. 108)

Therefore, an agreement between Hungary and the European Union was negotiated to extend the target date for Hungary's meeting European Union standards on wastewater treatment. This would allow new development projects to be completed, which would connect most of the Hungarian population to sewerage systems by December 31, 2015. (Regular Report on Hungary's Progress..., p. 108)

The slow progress of Hungary toward nationwide wastewater treatment in the last two decades can be seen in Figure 1. The figure depicts the percent of homes with public sewer system access between 1980 and 2002. The modestly increasing trend reflects the effect of Parliamentary legislation and the ongoing investment in sewer and wastewater infrastructure.

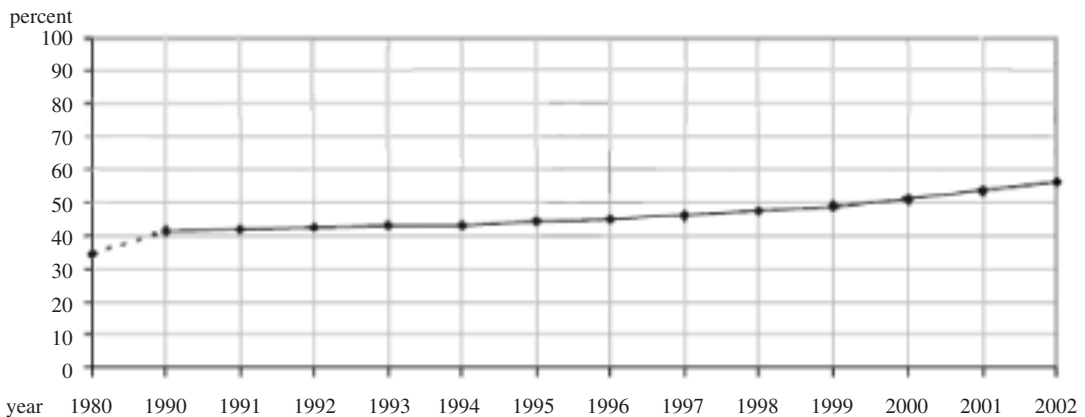
Environmental Investment

When the Ministry of Environment and Water reevaluates the availability of wastewater treatment and sewerage access in 2015, what will be the total cost for the development of wastewater infrastructure? In 2002 the Minister of Environment and Water Maria Korodi projected that the Hungarian government will con-

tribute 2.5 trillion forints (about \$10 billion) through 2012 to improving wastewater treatment throughout the country. ("Hungary's Environment...", p. 1) While this sum has not been specifically allocated for wastewater treatment expenses, fifty percent of the funds designated for environmental improvement between 1998 and 2015 will be used for water management, which includes wastewater treatment. (Gergely)

As previously mentioned, a portion of the funding has been and will continue to be provided through the Phare and ISPA programs of the EU; however, the Hungarian government and private sources also have generated capital for investment in environmental infrastructure. The capital invested by the government and private industry into wastewater treatment will cause spending on the environmental sector to have grown from 1.2 percent to 2.2 percent of the gross domestic product between 2003 to 2008. (Gergely) The increase in spending on environmental investment, as seen in the rise of the gross domestic product, reflects the magnitude of environmental investment, which is estimated to be around 10 billion euros between 1998 and 2015. In order to maintain the rising gross domestic spending on the envi-

Figure 1
The Proportion of Homes in Hungary
Connected to the Public Sewage System from 1980–2002



Source: Ministry of Environment and Water.

ronment, increased national and municipal government taxation and private industrial sources will need to continue to act in concert. (Gergely)

The percentage of total funding allocated for environmental investment by the national government will be determined by the magnitude of the tax revenue collected from all Hungarians. The financial contribution of the Hungarian public was noted in 2001 when Judit Zalatnay (p. 1) wrote, "The high Hungarian labor tax does not leave much room for additional financial burdens on taxpayers. As a result, Hungary does not have many environmental economic instruments in place today." Through the contributions of taxpayers, enough tax revenue was generated in 2004 to enable the Hungarian Parliament to allocate 17.5 billion forints toward increasing sewer access and wastewater treatment. ("2004 Budget Allocates...", p. 1) This figure was roughly nineteen percent of the total allocation for environmental investment for the year. Thus, the increase in wastewater treatment and sewerage has become a national priority and an infrastructure project subsidized by domestic and international funds.

Health Benefits of Wastewater Treatment

In addition to removing wastewater, sewers and treatment facilities help to reduce waterborne diseases. Bacteria, protozoa, and viruses in wastewater, if not removed before being deposited into a body of water, can be a source of diarrhea and other diseases. This is especially the case, for example, if the receiving body of water is a river. Towns downstream may inadvertently draw wastewater from the river, which had been deposited by upstream communities. If these areas possess inadequate drinking water purification, protozoa, viruses, and bacteria such as *E. coli* could enter the drinking water supply. Likewise, in areas lacking sewers the main receptacles for wastewater are septic tanks. However, if septic systems malfunction or are not kept a safe distance from wells, potable water drawn from the wells can become contaminated and thus another source of disease. Likewise, if septic tanks leak to the

surface and become part of the surface water system, thereby contaminating streams, water drawn from these sources may not be adequately filtered by the soil and unsuitable for drinking.

Realizing that access to sewers and purified water is also a health-related issue, the Hungarian government was one of sixteen nations that ratified the Protocol on Water and Health at the 1992 Convention on the Protection and Use of Transboundary Water Courses and International Lakes. ("Protocol on Water...", p. 3) Focusing on decreasing the number of Europeans without access to water treatment and waste removal, the Protocol set 2015 as the date for lowering the incidence of water-borne diseases to near zero across Europe. ("Protocol on Water...", p. 5) To meet this goal, each of the signing countries set individual goals to increase the water treatment and sanitation available to their citizens. ("Protocol on Water...", p. 6)

The 2015 target date of the Protocol coincides with the year which has been set for Hungary to meet the water treatment standards of the European Union. Therefore, both international agreements strengthen the commitment of Hungary to increase the number of sewer lines and improve water purification, as well as to decrease the incidence of water-borne diseases among its people.

Conclusion

The process of increasing sewer access and improving wastewater treatment in Hungary has been a continuous one. Through its transition to a European Union member state, Hungary has been able to strengthen its programs on water quality and sanitation. European Union subsidies and the implementation of new infrastructure have been indispensable to Hungary's ability to improve the condition of wastewater treatment. However, additional changes require still further investment and the cooperation of the private and public sectors, including all levels of governments. (*National Environmental Programme 2003–2008*, p. 10)

The European Union subsidy will continue through the ISPA's post-accession program,

the Cohesion Fund. With continued financial assistance, in addition to private and Parliamentary funding, the improved water treatment and the construction of new sewer lines will continue into the next decade. In addition, the target date of 2015 for most communities to have access to local sewers and water treatment is rea-

sonable when the considerable improvements which have been made in the last fifteen years alone are taken into account. Thus, Hungary has a great potential to improve its wastewater treatment and sanitation, but it is up to the Parliament to continue the impressive changes made since independence.

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