Austria:
Municipal Water and Wastewater Management

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Executive Summary

This report provides an overview of the two most important elements of municipal water management: providing safe drinking water, and treating municipal wastewater, highlighting opportunities for U.S. companies. The first section covers drinking water, and the second section is dedicated to municipal wastewater treatment. Each section includes information about the infrastructure, the legal framework, technologies currently in use, the value chain, trends, best prospects, and notable trade events. The final page is dedicated to a list of important contacts in Austria.

Water Facts

Austria is rich in water resources, due to the fortunate combination of sufficient precipitation, significant feeding rivers, a moderate climate and a history of effective water management that reaches back into the previous century. Average annual precipitation in Austria is 1,100 mm, and 320 mm flow downriver into Austria from contiguous countries. After subtracting the 500 mm lost to evaporation, Austria has an average yearly water supply of 84 billion m^3, of which only around 2.6 billion m^3 is actually used[1]. Managed water use in Austria diverges considerably from worldwide averages: whereas the worldwide average predicts that 70% of water be used for agriculture, 22% for industry, and only 8% in households, in Austria only 5% is used for agriculture, 56% for industry, and 39% in households.[2]

Section I. Drinking Water

In Austria, all tap water is potable. The water transported to households and used for everything from washing clothes to flushing toilets is of drinking water quality. Most of the water is used for baths and showers (34%). Another 22% is used for flushing toilets, and 17% is used for washing clothes. Only 3% of the household drinking water is used for drinking and cooking.[3] The average per capita water use is approximately 135 liters per day, and a 4-person household uses an average of around 200 m^3 of drinking water per year. The cost of drinking water is 1.07 Euros per cubic meter.[4]

The source of Austrian drinking water is split evenly between ground water and spring water, both of which are of excellent quality. In fact, maintaining the high quality of water *sources* has historically been and is still the driving principle behind Austria's water policies. The idea of protecting sources also forms the basis for E.U. water management directives.

Infrastructure

The Austrian drinking water infrastructure is in many ways unique within Europe, and indeed, the world. First, it is characterized by an enormous number of providers: around 6,000. The largest 14 together serve 3.6 million people, or 44% of Austria's population. Vienna's waterworks is by far the largest

[1] Federal Ministry of Agriculture, Forestry, Environment and Water Management
http://wasser.lebensministerium.at/article/articleview/60327/1/14151
[2] Wasser in Österreich: Zahlen und Fakten, 2007. Available for download (German) at
http://gpool.lfrz.at/gpoolexport/media/file/Wasser_in_Oesterreich_-_Zahlen_und_Fakten_-_Folder_2007_Deutsch_020307.pdf
[3] same as above
[4] www.ovgw.at/wasser/themen/index_html?uid:int=294

provider, serving the just over 1.8 million inhabitants of Austria's capital city. The smallest 5,200 water providers serve an average of only 350 people per facility.[5]

A second unusual feature of Austria's drinking water is the lack of treatment. Because Austria's groundwater is of such excellent quality, most drinking water is distributed without treatment or disinfection. While it is true that all of the larger water providers have a disinfection system installed, they are generally not in use. The exception to this rule is the chlorine gas system in Vienna, which is necessary due to the size of the water distribution network in this city of nearly 2 million. Even in Vienna, however, the level of disinfection is minimal.

According to figures from 2003, 88.9% of all Austrians purchase water from a provider.[6] Considering the topography of Western Austria, with its difficult to reach alpine valley settlements and isolated high altitude farms, this is considered to be very close to full water network expansion. The water delivery network is 59,000 km long, and includes 2,900 tanks with 4.2 million cubic meters of capacity. There are over 1.1 million building connections, and 2,630 spring taps.[7]

Legal Framework

The legal basis for the management of drinking water in Austria is the so-called "Trinkwasserverordnung",[8] which sets the EU Drinking Water Directive[9] into national law. The Federal Ministry for Health, Family and Youth is responsible for this area of water management.

This regulation sets both the parameters for biological and chemical elements in drinking water, as well as the water quality monitoring requirements.

Chemical Parameters for Drinking Water

Substance	**Value**	**Unit of Measurement**
Acrilamide	0.1	µg/l (microgram/liter)
Antimony	5.0	µg/l
Arsenic	10	µg/l
Benzene	1.0	µg/l
Benzopyren	0.01	µg/l
Lead	10	µg/l
Boron	1.0	mg/l
Bromate	10	µg/l
Cadmium	5.0	µg/l
Chrome	50	µg/l
Cyanide	50	µg/l
1,2-Dichlorethane	3.0	µg/l
Epichlorhydrin	0.1	µg/l
Fluoride	1.5	mg/l
Copper	2.0	mg/l
Nickel	20	µg/l
Nitrate	50	mg/l

[5] same as above
[6] http://duz.lebensministerium.at/duz/duz/theme/view/288322/5/450
[7] http://www.ovgw.at/wasser/themen/index_html?uid:int=294
[8] A copy of the regulation can be downloaded (in German) at http://www.ris2.bka.gv.at/GeltendeFassung.wxe?QueryID=Bundesnormen&Gesetzesnummer=20001483&TabbedMenuSelection=BundesrechtTab
[9] A copy of the Directive can be downloaded (in English) at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1998:330:0032:0054:EN:PDF

Nitrite	0.1	mg/l
Pesticides (the regulation includes a list of 57 pesticides considered likely enough to warrant testing)	0.1 (individual) 0.5 (total)	µg/l
Polycyclical aromatic hydrocarbons (PAH)	0.1	µg/l
Quicksilver	1.0	µg/l
Selenium	10	µg/l
Tetrachloroethene	10	µg/l
Trichloroethene	10	µg/l
Trihalomethane	30	µg/l
Vinyl chloride	0.5	µg/l

source: Trinkwasserverordnung, BGBl. II/Nr. 304, August 21, 2001[10]

Physical and Chemical Parameters for Drinking Water

Substance	**Value**	**Unit of Measurement**
Aluminum	0.2	mg/l
Ammonia	0.5	mg/l
Chloride	200	mg/l
Iron	0.2	mg/l
Manganese	0.05	mg/l
Sodium	200	mg/l
Oxidation	5.0	mg/l O_2
Sulfate	250	mg/l
PH level	6.5 - 9.5	PH
Colony-forming units (CFU) at 22 C	100	per ml
Colony-forming units (CFU) at 37 C	20	per ml
Radioactivity: tritium	100	Bq/l

Additional Parameters for Disinfected Drinking Water

Colony-forming units (CFU) at 22 C	10	per ml
Colony-forming units (CFU) at 37 C	10	per ml

source: Trinkwasserverordnung, BGBl. II/Nr. 304, August 21, 2001[11]

Bacterial Paramaters for Drinking Water

E. coli	0	
Enterococcis	0	
Pseudomonas aeruginosa	0	

source: Trinkwasserverordnung, BGBl. II/Nr. 304, August 21, 2001[12]

In addition to these parameters, there are requirements for more subjective criteria such as clarity and the absence of taste and smell.

[10] A copy of the regulation can be downloaded (in German) at: http://www.ris2.bka.gv.at/GeltendeFassung.wxe?QueryID=Bundesnormen&Gesetzesnummer=20001483&TabbedMenuSelection=BundesrechtTab

[11] A copy of the regulation can be downloaded (in German) at: http://www.ris2.bka.gv.at/GeltendeFassung.wxe?QueryID=Bundesnormen&Gesetzesnummer=20001483&TabbedMenuSelection=BundesrechtTab

[12] A copy of the regulation can be downloaded (in German) at: http://www.ris2.bka.gv.at/GeltendeFassung.wxe?QueryID=Bundesnormen&Gesetzesnummer=20001483&TabbedMenuSelection=BundesrechtTab

Providers of drinking water are required to have tests conducted for these parameters by a certified testing institute and provide the information to the provincial authorities. Testing frequency is determined by the volume of water distributed.

Technology currently in use

Because of the high quality of Austria's water sources, drinking water disinfection and treatment is more the exception than the rule. Most disinfection systems are in a stand-by mode. The technology is chlorine or chlorine gas. There are also a handful of activated carbon facilities in areas where higher concentrations of pesticides are a problem.

Metering technology runs the gamut from analog to wireless digital, depending on the philosophy of the water management organization. Many still see the annual visits of an employee to read the meter as a chance to physically check the system and calibrate.

Value chain

The overwhelming majority of waterworks are municipally owned, either in the form of an administrative section, as in Vienna, or as a "privatized" company (a commercially organized and registered entity that is wholly or partly owned by the municipality), as is the case in Graz. The price of water is determined in municipal committees, and costs on average around 1.30 euros (around $2.00) per cubic meter.[13]

Trends

There are three important trends on the water management agenda in Austria: setting up computerized network registries; saving energy; and maintaining the network.

The Environment and Water Management Fund was created in 1959 to provide public funding at a federal level for municipal water projects. Currently, it is offering support for the creation of registries that make an electronic record of municipal water distribution networks. For the larger providers, this is a work in progress: as repairs and maintenance projects are completed, information about the network is entered into the system.

A second area for which financial support is available from the Environment and Water Management Fund is the replacement of older water pumps with newer and more energy efficient pumps.

The third area of attention is network maintenance. Generally speaking, around 1.5% of the network is replaced yearly as part of routine maintenance activities; that works out to approximately 870 km of pipes per year. Especially the PVC pipes that were installed in the 1970's are causing problems and are candidates for soonest possible replacement. Where possible, no-dig technologies are used for maintenance activities.

Best prospects

- Systems and software for electronically recording water distribution registries
- Energy efficient water pumps
- Equipment for water pipe repair (no dig)
- Testing and monitoring equipment

[13] http://www.ovgw.at/wasser/themen/index_html?uid:int=294

Trade events

There are four trade events that are important for the Austrian drinking water industry, and one additional event that is worth mentioning this year:

1. **ÖVGW Yearly Meeting and Exhibition**. This event takes place annually, each year in a different city in Austria. It is the largest and most important water technology conference in Austria, organized by the Austrian Association for Gas and Water. The next meeting will take place in Graz, May 13 and 14, 2009.

   ÖVGW - Österreichische Vereinigung für das Gas- und Wasserfach
   A-1010 Wien, Schubertring 14
   Tel.: 0043 1 513 15 88-0
   Fax: 0043 1 513 15 88-25
   Web: www.ovgw.at
   Email: office@ovgw.at

2. **IFAT**. This show takes place every three years in Germany and is the largest environmental technology show in Europe. This is show attracts most everyone in the water industry in Austria. The next show is scheduled to take place in 2011.

   IFAT - International Trade Fair for Water – Sewage – Refuse – Recycling
   Messe München GmbH
   Messegelände, 81823 München, Germany
   Tel. 0049 89 9 49 - 1 13 58
   Fax 0049 89 9 49 - 1 13 59
   Web: www.ifat.de
   Email: info@ifat.de

3. **Water Berlin**. This show takes place every three years in Berlin, Germany, and is the largest show in the German-speaking countries that focuses on water and gas. The next show is scheduled for March 30 – April 3, 2009.

   Messe Berlin GmbH
   Messedamm 22
   14055 Berlin, Germany
   Phone: 0049 30 / 3038-0
   Fax: 0049 30 / 3038-2325
   Web: http://www1.messe-berlin.de/vip8_1/website/MesseBerlin/htdocs/www.wasser-berlin/index_e.html
   Email: central@messe-berlin.de

4. **Aquatech**. Aquatech takes place every two years in Amsterdam. It is not as important as the other shows listed for Austrian industry, but two people who were interviewed for this report mentioned it as significant. My feeling is that Austrian players visit Aquatech on the years when IFAT and Water Berlin are not held. The next Aquatech show is scheduled for September 30 – October 3, 2008.

   Amsterdam RAI
   Aquatech
   Postbus 77777
   1070 MS Amsterdam

Tel. 0031 (0)20 549 12 12
Fax: 0031 (0)20 549 18 89
Web: http://www.amsterdam.aquatechtrade.com/aquatechamsterdam2008/e/home
Email: aquatech@rai.nl

5. **International Water Association Congress and Exhibition.** This is a bi-annual show that takes place in a different city every two years and is truly international in scope. In 2008, the event will be held in Vienna.

   International Water Congress
   Web: www.iwa2008vienna.org
   Email: ozaccom@ozaccom.com.au

Section II: Municipal Wastewater Treatment

Infrastructure

In 2006, there were 1,508 sewage treatment plants in Austria with capacities over 50 PE (population equivalents).

Capacity range (PE)	Number of facilities	Percent of facilities	Actual load (PE)
51 to 1,999	867	57.5%	273,583
2,000 to 10,000	388	25.7%	1,159,877
10,001 to 15,000	42	2.8%	362,634
15,001 to 150,000	190	12.6%	5,079,813
over 150,000	21	1.4%	8,045,007
Total	1,508	100%	14,920,912

source: Kommunale Abwasserrichtlinie der EU – 91/271/EWG Österreichischer Bericht 2006[14]

In the above chart we see that most of the plants in Austria are small, however, that the largest plants, though small in number, carry the lion's share of the actual load. These are also the facilities that have the highest technical standards and the best cleaning performance.

As is the case with the drinking water network, Austria's level of canalization is considered to be close to its full potential: according to figures from 2003, 88.9% of the population is connected to a sewage treatment plant with at least 50 PE. Considering the topology and residential structure of the alpine parts of the country, a significantly higher level of canalization is not realistic.[15]

Legal Framework

The legal framework for wastewater treatment in Austria is called the "Wasserrechtsgesetz" and is controlled by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. At the European level, the Water Framework Directive of 2000 sets the legal parameters for water management, including standard monitoring and reporting structures. Austria transposed this directive into national law in 2003.

Within the Wasserrechtsgesetz, one section defines the requirements for treatment and maximum concentrations of individual pollutants in various kinds of industrial and communal wastewater treatment

[14] http://gpool.lfrz.at/gpoolexport/media/file/Lagebericht-2006-NEU.pdf
[15] same as above

facilities. These individual sets of criteria are called wastewater emissions by-laws ("Abwasseremissionsverordnungen" or "AEV").

Water leaving a sewage treatment plant is monitored for a set of six substances for which maximum concentrations have been determined and adopted into law (AEV).

- Biochemical Oxygen Demand in 5 days (BOD)
- Chemical Oxygen Demand (COD)
- Total Organic Carbon (TOC)
- Ammonia (NH)
- Organically Bound Nitrogen (N)
- Phosphorus (P)

The maximum values are determined according to the size of the facility.

	50-500 PE	500-5,000 PE	5,000-50,000 PE	over 50,000 PE
BOD 5	25 mg/liter	20 mg/liter	20 mg/liter	15 mg/liter
COD	90 mg/liter	75 mg/liter	75 mg/liter	75 mg/liter
TOC	30 mg/liter	25 mg/liter	25 mg/liter	25 mg/liter
NH	10 mg/liter	5 mg/liter	5 mg/liter	5 mg/liter
P	-	2 mg/liter	1 mg/liter	1 mg/liter

source: BGB1.Nr. 210/1996 ST0067 AEV für kommunales Abwasser[16]

Technology currently in use

The state of the art technology in sewage treatment is organic activated sludge, whereby the sewage passes through holding areas that contain bacterial agents. At the end of the process, the sludge is collected and dehydrated, then in most cases burned. The large municipal plants in the major cities not only handle the largest flows, but are also the most modern facilities. Thus Austria's scores in removing pollutants from wastewater are, in comparison to other European countries, excellent.

Pollutant	Percent removed 2006
BOD (5)	96%
COD	89%
Nitrates	68%
Phosporus	87%

source: Kommunale Abwasserrichtlinie der EU – 91/271/EWG Österreichischer Bericht 2006[17]

Value chain

Most of the sewage treatment plants in Austria are owned and run by a municipality, or by a "privatized" entity with a commercial structure that is owned in whole or in part by the municipality. Only a handful of truly private companies own or run sewage treatment plants in Austria.

Fees are determined differently in different municipalities. In Vienna, for example, wastewater treatment fees are based on (fresh) water use in cubic meters. Some municipalities calculate the fee in terms of the number of toilets in a particular structure; still others calculate fees based on the size of the structure's roof.

[16] http://www.ris.bka.gv.at/taweb-cgi/taweb
[17] same as above

Trends

The basic structure for wastewater treatment in Austria is already in place: there is sufficient capacity at existing treatment plants to manage (moderately) growing volumes, and canalization is for all intents and purposes complete. The investments that will be made in the coming years will fall into three categories: upgrading the smaller plants, maintaining the facilities and the canals, and repairs/replacement.

Best Prospects

- Equipment for sewer canal monitoring and diagnostics
- Equipment for sewer canal repair (no dig)
- Testing and Monitoring equipment
- Centrifuges

Trade Events

There is only one significant trade show in this area that is attended by most everyone in the water treatment industry in Austria, and this show takes place every three years in Germany:

IFAT - International Trade Fair for Water – Sewage – Refuse – Recycling
Messe München GmbH
Messegelände, 81823 München, Germany
Tel. (+49 89) 9 49 - 1 13 58
Fax (+49 89) 9 49 - 1 13 59
Web: www.ifat.de

Section III: Key Contacts and Sources

OeWAV: Österreichische Wasser- und Abfallwirtschaftsverband
Marc-Aurel-Strasse 5, 1010 Vienna, Austria
Tel. 0043 1 535 57 20, Fax 0043 1 535 4064
Web: www.oewav.at

Gütegemeinschaft Wassertechnik (GWT)
Wiedner Hauptstraße 63, Postfach 333
A-1045 Vienna, Austria
Tel. 0043 5 90900-3296
Web: www.gwt.co.at

ÖVGW - Österreichische Vereinigung für das Gas- und Wasserfach
A-1010 Wien, Schubertring 14
Tel.: 0043 1 513 15 88-0
Fax: 0043 1 513 15 88-25
Web: www.ovgw.at

Federal Ministry of Agriculture, Forestry, Environment and Water Management DVR Stubenring 1, 1012 Vienna, Austria
Tel. 0043 1 711 00-0
Fax: 0043 1 711 00-2140
Web: www.lebensministerium.at

City of Vienna, MA 31
Grabnergasse 4-6, 1060 Vienna, Austria
Tel: 0043 1 599 59
Fax: 0043 1 599 59-7231
Web: www.wien.gv.at/wienwasser

Federal Ministry for Health, Family and Youth
Radetzkystraße 2, 1030 Wien
Tel: 0043 1 711 00-0
Fax: 0043 1 711 00-14300
www.bmgfj.gv.at

For More Information

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