

EUROPEAN WATER MANAGEMENT, CONSERVATION, TREATMENT  
 KEY LESSONS FOR WESTERN AMERICAN LEADERSHIP

European leadership in wastewater treatment, water-born chemical regulation, water conservation, and public education may inspire American water professionals to consider following these good examples. The 2005 United Nations Millennium Ecosystem Assessment says that the increasing accumulation and discharge of nutrients is a significant environmental challenge. Water treatment accounts for a sizable percent of a municipality's energy budget. Setting tough policy standards will provide an economic niche for solutions-minded entrepreneurs.

**WASTE WATER TREATMENT:  
 Viikinmäki, Helsinki Case Study**

As a case study, we examined Viikinmäki, the water and wastewater treatment plant for the City of Helsinki. This utility serves 1 million residents and treats 103 million m<sup>3</sup> of water per year.

Prior to 1994, Blue-green algae blooms plagued the Gulf of Finland at the hands of excess Nitrogen and Phosphorous. The plant was rebuilt, combining the region's 12 plants into 2. The competence of the new plant – designed for nutrient removal – increased the phytoplankton populations off the coast of Helsinki. Phosphorous discharge declined from 400 t/yr to 20 t/yr; 95% of Phosphorous is now removed. Nitrogen has dropped from 3000 t/yr to 500t/yr, despite a 3% annual increase in Nitrogen influent. All told, 88% of Nitrogen is removed.

Since 1982 dewatered sludge has been converted into a high quality organic fertilizer, composted on site. Today, 50,000 T of sludge is composted and marketed for gardening and landscaping purposes.

Methane is recaptured to produce 2MW of biogas for internal operations. Biogas offsets 50% of the energy the plant demands, reducing the total cost of energy from 40 to 20% of gross operating expenses. Though American water treatment plants and landfills employ biogas, Europeans excel at this. The standard set by the Swedish community Hammarsby Sjostad equates the wastewater generated by one household as sufficient to power the family's gas range!

The Helsinki water plant is underground, eliminating noxious odors and noise, and providing a low point in a flat country for water to flow. This amounts to an Indiana Jones-scale enterprise, with 45 acres below grade. The Gulf

of Finland is shared between Helsinki and St. Petersburg, Russia. Prior to 1995, one third of St. Petersburg (5 million people) discharged untreated wastewater directly into the ocean. The Finnish Ministry of the Environment financed a cooperation with St. Petersburg to treat its water; today 85% is treated. By 2010, 99% will be treated.



**WATER CONSERVATION and DRINKING  
 WATER TREATMENT**

The new eco-community of Hammarsby Sjöstad, outside of Stockholm, adopted a maximum water usage standard of 52G/person/day. Recently, the standard was revised downward to be 26G/person/day. To achieve their goal, filters were installed in all taps, mixing air into the water to reduce the volume used. For comparison, note that average American water use is 350G per person per day.

Another approach to conservation is separately metering water use for tenants within a building. This provides incentives to conserve. The challenge? Retrofitting is costly. The solution? Change the municipal building code to demand separate meters.

Permeable surfaces may be addressed in a building code. Such surfaces gain extra points in

many municipal efficient building codes. In Hammarby Sjostad, they are mandatory. Dual flush toilets are universal across Europe, and provide greater water savings than low-flow toilets alone. A domestic example is the Portland Airport, which retrofitted 100% of their traditional 6.5 gallon flush toilets for \$35-50 a piece.



#### EMERGING CONTAMINANTS:

What plans do we have to monitor synthetic chemicals in the water supply?

The average American is exposed to more than 100 distinct chemicals in their personal-care products everyday. FDA has not assessed 89% of ingredients in cosmetics. The European Union has far more rigid standards for chemical regulation vis-à-vis the EU's Cosmetic Directive. Many cosmetic products currently on the market in the US have a *fraternal* twin in Europe. Take Cover Girl nail polish. The European formula contains no DBP in the formula (a potential carcinogen); similarly, European detergents are formulated differently to meet EU regulations.<sup>1</sup> Given what we already know about estrogen or estrogen mimickers' effect on fish populations, how much more vigilant should we be in monitoring for the presence of synthetic chemicals?

#### STORMWATER MANAGEMENT

Green roofs are much more common in Europe as a mechanism to absorb rainwater that would otherwise drain into the sewer. Man-made wetlands pretreat stormwater in Hammarby

Sjostad. There, houses are arrayed along a central channel where stormwater may run. The streets of the development are paved with highly porous surfaces, per code. Permeable pavers are employed where possible.

#### EDUCATION, COMMUNICATION

Four thousand school children tour the Helsinki water plant per year. Common across Scandinavia is comprehensive youth education on everything from the landfill to the wastewater plant.

In Helsingborg, Sweden, every 4<sup>th</sup> Grader tours the landfill, which employs a full-time public educator.

The result is educating a generation of stewards, well-versed in city infrastructure.

American sustainability metrics typically neglect the impact of wastewater on a region's footprint. Four of twenty-five measures in the Helsinki Sustainable Development Indicators Report relate to water consumption or wastewater treatment.



1. Mark Schapiro's *Exposed: The Toxic Chemistry of Everyday Products and What's at Stake for American Power*