

**Project name** Aquamin Zuchwil SO, Switzerland

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**Keywords** Zero wastewater, Minergie-P, one family building, small-scale wastewater treatment plant

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**Start of project** 2004

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**End of project** 2007

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**Contact person or organisation** EMPA Dübendorf, Switzerland

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**Short project description / project function** Aquamin is a single-family home located in a residential district in Zuchwil. The design and construction was conducted as a pilot project initiated by the canton Solothurn, EMPA, EAWAG and other partners. It was nationwide the first zero-wastewater house with its own small-scale wastewater treatment plant in the basement of the building. The main goals were to examine safe operation, effluent quality, water recycling, energy consumption and the performance of an alternative wastewater treatment. Besides technologies addressing nutrients and water recycling, the house was built in Minergie-P standard. However, due to the young technology and some difficulties during the project period, in the end the residents chose for the conventional way of wastewater treatment. Nevertheless, the research instituted could gain valuable knowledge for an implementation in future projects.

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**Water** The main point of interest concerning the sector water was the small-scale wastewater treatment plant in the basement. The plant consisted of two reactors with a volume of 1.5 m<sup>3</sup> each. The wastewater was purified biologically and withdrawn through a membrane. The treated wastewater was reused for toilet flushing and gardening. The rest infiltrated into the ground through a biotope in the garden. Moreover, rainwater was collected and used for the washing machine. All in all,

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	the freshwater consumption was reduced by more than a third.
<b>Energy</b>	The building still bears the label Minergie-P, which stands for a passive house. The building has a ventilation system, a high grade building envelope and energy efficient devices. Heat for space heating and hot water is gained from the 10m <sup>2</sup> solar collectors on the rooftop and an additional pellet heating system.
<b>Biomass</b>	Urine was collected separately by NoMix toilets. Subsequently, the phosphate was removed by precipitating Struvit, a fertilizer. The sludge from the wastewater treatment plant was pumped into a filter bag located outside the building. The water flowed back to the treatment plant while the solids were retained in the bag. The solids were further dried at the Eawag with the aim of composting.
<b>Project benefits</b>	Aquamin in Zuchwil was a worldwide unique building. It showed new ways of urban drainage and decentralized wastewater treatment. The concept is particularly interesting for areas without connection to the sewage system.
<b>Project level</b>	Pilot project
<b>Financial scale</b>	not available
<b>Environmental conditions</b>	Climate zone: temperate; Climate type: moderate continental; Latitude: 47.21° N, Longitude: 7.56° E
<b>Altitude</b>	433 meters above sea level
<b>Description of special local conditions</b>	Zuchwil is located in the Swiss Plateau, which is formed of Molasse strata of the glaciers of the last Ice period. It is situated in the plane between rivers and small hills.
<b>Context Zero Emission Buildings</b>	The deployed technology in the wastewater treatment was a pioneer in the field and therefore highly attractive to be installed in future in Zero Emission Buildings. Furthermore, the project was one of the few buildings that included all of the three pillars (Energy, Water, Biomass) of the Zero Emission Concept. This was a great achievement in sustainable building in Switzerland.
<b>Sources</b>	Novatlantis (2004). Das Aquamin-Haus. Abgerufen am 5. Juli 2013 von <a href="http://www.novatlantis.ch/fileadmin/downloads/projekte/bau/G-03_Das_Aquamin-Haus_v3.pdf">http://www.novatlantis.ch/fileadmin/downloads/projekte/bau/G-03_Das_Aquamin-Haus_v3.pdf</a> EAWAG (2010). Single house wastewater treatment with water reuse. Abgerufen am 5. Juli 2013 von <a href="http://www.eawag.ch/forschung/eng/schwerpunkte/abwasser/abwasserloses_haus/index_EN?print=1">http://www.eawag.ch/forschung/eng/schwerpunkte/abwasser/abwasserloses_haus/index_EN?print=1</a> Studer, R. (2005). Eine Kleinstkläranlage für den Hausgebrauch. Solar-Aktiv (57), S.8. Abgerufen am 5. Juli 2013 von <a href="http://www.sses-net.ch/aargau/ServiceArea/PDF/SA_57.pdf">http://www.sses-net.ch/aargau/ServiceArea/PDF/SA_57.pdf</a>