

Soline prototype - System overview

Sanbox is an environment-friendly, compact and integrated source separating sanitary wastewater treatment for touristic facilities based on mechanical and biological processes aimed to reach zero emissions in environment and recycling of nutrients. The benefit of source separation is that nutrients are not sent to sea or fresh water but are recycled and reused. Benefits: (1) reduction of water pollution/eutrophication, (2) reduction of water consumption, (3) water reuse, (4) nutrients reuse on the fields. The specific steps of Soline prototype are: (1) **pre-treatment filters**, (2) **expanded clay based biofilter**, (3) **solar evaporation module**, (4) **self heating with organic material compost reactors**, and (5) **hybrid constructed wetland CW**. Blackwater is pre-treated by filtration with organic filters, solids are recycled into sanitized and nutrient-rich compost, and the liquid fraction is treated by recirculation through an expanded clay-based biofilter and evaporated. Graywater is treated in a constructed wetland where roots of plants in association with microbial biofilm stabilize and enhance the treatment process.



Figure 1 Soline Sanbox prototype with constructed wetland for graywater treatment.



Figure 2 Planting of constructed wetland in March 2011, vacuum toilets.



Figure 3 Blackwater; separation module, buffer tanks and evaporation module.