Hochschule für Technik Stuttgart

Sustainable Energy Competence
University of Applied Science

Project work

Casa Sustenible en Isla Isabela

Summary

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Summary

The reed filtration system offers an opportunity to implement an environmental friendly water treatment concept on Isabela. The counterparts “Ozone” and “Osmosis” are both highly efficient against various types of possible water pollutants. But they contain high-tech components, need a very frequent and profound maintenance and hereby are cost intensive. The reed filtrations system can serve as a reformer for the tap water and, in the Full Concept, lower the pollution in the sewage water. The costs for maintenance and the required maintenance personnel are very low (approx. 325 US$/a [1]) compared to other water treatment plants. The pre-treatment of the tap water is odorless and the post-treatment of the sewage is nearly odorless if the whole reed system is operated correctly. The town Puerto Villamil needs a quality improvement of its own tap water to guarantee the health and well-being for the inhabitants and the tourists visiting this island. Higher concentrations of phosphate or chloride do not account for immediate action because the health of the people seems not directly affected. But a concentration of coliform bacteria 80 times higher than the recommended INEN value is thought-provoking. A reed filtration plant can effectively help of avoiding these bacteria in the water.

Additionally the dual line system is recommended because of its water saving effect. In the case of the office of ambiental administration on Isabela the saving effect is more marginal than the one expected in households or even hotels and restaurants. These building types have a high need of drinking water, a high water consumption from toilets and produce huge volumes of waste water. There the implementation of a dual line system and the re-use of grey water would be an important step of creating a more sustainable water cycle on Isabela.

There are different ways to chill this building. You can chill it passive or active or you can insulate the house to prevent that the heat from outside can get into the building. The most important aspect to chill the building by passive chilling is to use the cúpola. It is quite important, because with the roof rear ventilation, the cúpola works like a chimney that blows the heat out of the building without any technical support. To get a better efficiency of the passive chilling you should install some ventilators under the cúpola to get more air exchange. To get more comfort in the boss and the meeting room you can install an active vapor-compression refrigeration, but it makes only sense when you build higher walls between these rooms.

It is also important for the acoustic to bulid higher walls between the room, to prevent that other people can hear what is spoken in the other rooms.

It is useful to install an uninterruptible power supply in the building to compensate voltage fluctuation and to get the option to accumulate the electrical power of pv-modules to made the building electrically autarc. It is also important to pay attention to the electrical safety like it’s written in the DIN VDE.

To get a comfortable light inside you should use modern LED-lights with a light emission like the sunlight and an extremely high efficiency grade.

[1] Assumption: 1 hour of maintenace per week, wages on Galápagos: $6,25 US\$/h$