

SUSTOUR-MED

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KA210-VET - Small-scale partnerships in vocational education and training



Good Practices: Green Village

Practice number	2.2
Name of the Practice	Green Solution House
Theme	1. <i>Waste Management</i> 2. <i>Energy Efficiency</i>
Type	3. <i>Case Study</i>
Developer / initiator	Green Solution House (GSH)
Short description	Green Solution House (GSH) is a small, 4-star Danish hotel and conference centre which is based on a holistic approach to sustainability and circularity, integrated in almost all aspects of its operation. The environmental initiatives cover a variety of accommodation, food, energy and water-related aspects of hospitality services.
Goal	To design and operate a truly sustainable small hotel business in a holistic way.
Detailed description	Green Solution House (GSH) is a small, 4-star Danish hotel and conference centre with 20 employees and 92 rooms, established in 2009. GSH is a gently renovated and refurbished hotel building with newly built conference facilities and a large newly built green area. The hotel is based on a holistic approach to sustainability and circularity, integrated in almost all aspects of its operation. The environmental initiatives cover a variety of accommodation, food, energy and water-related aspects of hospitality services. The hotel perceives itself to be a 'living lab' that not only embraces new green technologies, but seeks to demonstrate the latest technological, organisational and other sustainable and circular developments in the building industry. This is partly achieved through a regenerative business model, whereby monetary revenue from the hotel and conference centre is channelled into funding the ongoing integration of new solutions and assessing already installed systems and

products. In this sense, the GSH is a demonstration product for advanced sustainability and circular solutions in the hospitality sector.

The environmental profile is thus a core selling point of the hotel and large parts of the hotel and conference space are used for visualizing and documenting the varying environmental solutions to guests and other visitors. In total, the GSH has adapted 75 new or adapted 'green solutions' encompassing circular energy and water systems, upcycled furniture, reusable carpets, curtains and paints, elimination of food waste, local supplies of foods and building materials, and interaction with the surrounding landscape and biotopes.

GSH produces energy. Solar cells integrated into the facades and glazed ceilings generate electricity and an on-site pyrolysis plant converts organic waste into electricity and heat. Additional hot water is generated with a solar thermal plant integrated into the landscape. A 30-year old swimming pool has been renovated and converted into a highly insulated energy storage system for excess heat. The solar thermal plant and excess heat from the pyrolysis plant heat and store water throughout the year, supplying in-floor heating and potable hot water for the hotel. Energy production and energy consumption correlated to individual building zones is monitored and displayed. If surplus energy is generated, it supplies the Bornholm electricity grid.

The Pyrolysis Plant produces energy from food leftovers. All food scraps and organic materials from the hotel restaurant are fed into a pyrolysis plant that uses carbon-based waste. The pyrolysis process heats the waste, breaking it down to produce natural gas and char. A cyclone separates off the gas leaving biochar, which is valuable as an additive for the gardens. The gas is combusted and generates heat and electricity. Excess heat is stored onsite as hot water in a swimming pool, repurposed as a thermal energy storage system.

Energy Generating Skylights. The VELUX Modular Skylights provide modular windows that produce minimal material waste during production whilst the integrated photovoltaics generate energy. As a special option for Green Solution House, one third of the modular skylights have been fitted with integrated photovoltaics. The cells produce electricity equivalent to what is required for two homes per year. There are 196 VELUX Modular Skylights at Green Solution House, 68 of which have integrated PV cells. The 98 m² of photovoltaics produce approximately 7.077 kWh per year.

Innovativeness	A holistic approach to designing and operating a small hotel by integrating sustainability principles in all aspects of its operation
Financial aspect	€€€ = <i>Considerable investment</i>
Country	<i>Denmark</i>
Target Group	<i>small hotels</i>
Transferability	These kinds of approaches are key for small hotels in the Mediterranean. Renewable energy solutions can differ, given that the amount of sunlight in the region can indeed provide more opportunities for effective solar energy production, plus heating and heat conservation systems might not be relevant for small hotels in the targeted region.
Website and/or relevant links	https://bornholmhotels.dk/hotel-gsh/