Triangel hotel rooftop PV, Finland

The Triangel travel centre is a planned silent retreat to be built on the shore of Hämeenjärvi lake. The owner would like to offer travelers a destination to enjoy silence and foster creativity. The main site would be an estate-like 4 star hotel, on the shore of the lake, with additional 2 and 4 person wooden cottages scattered around an idyllic meadow amidst wildflowers. The centre is to offer travelers and also companies a place to slow down, relax and enjoy the Finnish countryside. The area is ideally located a half hour drive away from Oulu city centre, and 40 minutes from Oulu airport. The travel centre would utilize renewable energy as far as possible. The potential energy technologies considered are solar rooftop photovoltaics, heat pumps, and micro-district heat using renewable methane.

**Energy generation potential:**

Solar PV tiles are to be installed on the roofs of the hotel building and the cottages, and traditional PVs on the barn. This corresponds to a 244 kWp nominal power, estimated to generate 175 MWh electricity a year (blue area). This would cover the hotel’s energy needs (orange area) during March-September, with a sizeable surplus.

**Investment and payback time**

Solar tiles are some 10% more expensive than regular solar PVs. In Finland, the average cost for solar PV installation is 1250 €/kWp. The total cost of roofing and installation is estimated to be 509 000 €. Expecting a 25% state subsidy, the payback time is over 30 years, due to the low price electricity is can be sold to the grid. Adding electricity storage could improve the profitability of the project.
**Assets**

The area is currently used mainly as an agricultural area for feed cultivation and grazing for a herd of 50 cattle. Part of the herd will be kept for landscaping purposes and also for additional income. The sight of grazing cattle will also add to the rural idyll. Apart from the lakeside hotel, 20 cottages are to be built. The current barn is to be renovated, and new parts will be used as a wood workshop.

**Technology**

Considering that the asset is a travel centre, aesthetics play an important role. For this reason, the pilot opts for solar tiles. These are virtually indistinguishable from regular tiles, and have a similar lifetime to conventional roofing material. Installation is easy as well. The solar power generation potential is similar to traditional PV panels. As the tiles replace conventional roofing material, this will mean savings in roofing costs.

**Sustainability assessment**

The hotel main building and cottages can host a max of 200 persons at the time. The buildings are planned to be built as low energy buildings using up to 40% renewable energy. The potential for CO₂ reduction is most sizable. If solar power is used as an electricity source, some 1310.3 tonnes of CO₂ equivalent would be saved in total over the next 30 years. Care will also be taken to preserve the local habitat as much as possible and growing only plants compatible with local biodiversity.