

Energy return time for aluminium mounting systems

1. Material consumption for mounting racks.

Usually roughly 16.5 kg of aluminium are used per kW (peak capacity) for pitched roof systems.

2. Energy consumption for the winning of aluminium

The electrolysis method that is usually used to extract aluminium of alumina currently uses app. 13.5 kWh/kg (in the beginning it used about 42 kWh/kg, around 1950 it still needed about 21 kWh/kg). If recycling material is used, less energy is needed.

Due to the historic location of the aluminium huts, on average 62 percent of this energy is extracted out of water power.

3. Cumulative energy consumption for the mounting rack of a photovoltaic plant

As “worst case scenario“ we presume 100% new aluminium (made without recycled material):

$13,5 \text{ kWh/kg} \times 16,5 \text{ kg} = 223 \text{ kWh}$ for a plant with 1kW.

This energy is produced within $223 \text{ kWh} / (900 \text{ kWh/a}) = 0.25$ years.

So in the worst case the aluminium frame elongates the energy return time of the plant by 0.25 years!

4. Ignored factors

The energy return time is shortened due to the following factors:

- In the comparing calculation no share for a steel rack has been taken into consideration.
- Due to the restricted life span of a steel rack, you would have to consider the energy content of steel more than once.
- Aluminium can be easily reused. The recycling rate is over 80%. For constructional elements it almost reaches 100%. This means that the effective energy content of the system is only a fractional amount of the calculated number.