

# PV Financing Best Practice: Shredderwerk Herbertingen Industrial Park (Germany)

---

## General project Description

KRAFTWERK Renewable Power Solutions installed a PV System on a recycling plant in Baden-Württemberg in July 2015, allowing to reach interesting levels of self-consumption even in a commercial setting.

Precisely, the project is located in Herbertingen, a town near Ravensburg (south west germany). The system was installed in July 2014, it is rooftop-mounted and grid-connected and has a capacity of 350,51 kWp. In total, the plant can generate around 340,000 kWh a year.

The client is Shredderwerk Herbertingen a factory specialised in the recycling of wood and steel. According to Kraftwerk, the main driver for the investment has been cost-related, as savings amount to about 50% of the expenses incurred in a fully grid-connected setting (the one the client had before installing the plant). With grid electricity costs potentially rising even more, this system also guarantees hedging against higher expenses in the medium term.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 646554

## **Business case description / economic parameters**

### **Business model**

The factory's load profile clearly shows a weekly variability. Demand on work days is usually more than 1600 kWh, whereas this drops to less than 150 kWh on weekends and bank holidays.

Regardless of this profile, however, more than half of the generated solar energy is used directly by the facility's machinery. Specifically, Kraftwerk mentions an average level of autarky of 44% and a self-consumption level (% of pv generation used on site over total pv generation) of 53%. On work days in high irradiation months, the level of autarky can peak up to 90% and the self-consumption level to more than 70%.

There are two sources of revenue for the client:

1. Savings with respect to the cost of electricity supplied by the grid, which can amount to about 50% of the costs for grid electricity.
2. The sale of excess electricity on the grid at EEG tariffs, particularly valid during weekends and bank holidays.

In total the cost of the project was about 410.000 € and the expected return on investment was about 7,5%.

### **Financing**

The project was privately financed via a combination of equity capital and debt capital:

- 10% of the capital was equity-financed;
- The remaining 90% was financed via a 15-year bank loan with a 2.8% interest.

The amortisation period has been reported to be less than 10 years.

## **Technical project parameters**

The project, as mentioned, has a total capacity of 350,51 kWp and generates around 340,000 kWh/year. In total, 2,260 m<sup>2</sup> of PV modules have been installed. The modules used for the plant are ZNSHINE SOLAR ZXP6 250/255, roof-mounted using the Renusol mounting

system and connected to a Huawei SUN2000-20K inverter. Total installation time was less than three weeks.

## **Stakeholders / companies / PPA**

The stakeholder structure for this project is fairly simple: Kraftwerk acted as a contractor for a privately-owned company (Shredderwerk Hebertingen). The plant is owned and operated by the client and the only PPA in place is between the grid operator and Shredderwerk Hebertingen for the additional electricity required.

## **Replicability / Outlook**

Despite not having a particularly innovative business model in terms of stakeholder and financing, this project is a good example of what level of potential lies in solar power even for smaller industrial applications. The levels of autarky and self-consumption achieved can be well paired, for example, with contracts for the delivery of 100% green electricity from the grid.

The key aspect when analysing these projects, however, is the case specificity. This unique case of commercial self-consumption without the use of storage is, particularly for businesses that have a high base load during the day, an efficient means to reducing operating costs.

Another aspect to consider is the possibility of bypassing the sale of excess electricity on the grid via the EEG. This, of course, means finding a complementary load nearby that would agree to establishing a PPA for the excess electricity. On the one hand, this implies more complexity on the overall system, on the other hand, with EEG tariffs declining, a higher sale price for excess electricity could justify a more complex business case.