Summary of rooftop solar analysis

Location: Aalen, Germany **Date of analysis**: 19.12.2023

***Recommendation**: Install 5 solar panels (7.55 m^2), for a net present value (NPV) of 5,538€, with a payback of 3.18 years.*

1 Main economic results

Financing	NPV (EUR)	Payback (years)	IRR (%/year)	LCOE (EUR/kWh)
Government subsidies and 75% credit	5,538.16	3.18	33.42	0.0895
Government subsidies and 100% credit	5,509.64	0.00	n/a	0.0960
No government subsidies and 100% equity	5,055.71	7.13	13.54	0.0700
No government subsidies and 75% credit	4,227.07	4.45	25.00	0.0953

(All rows are for the same number of panels)

2 Additional results

When an energy storage system with a capacity of 15,498 kWh is employed, the NPV amounts to 3,980.31€. The sensitivity analysis reveals that the NPV is positively correlated with both the electricity purchase price (in €/kWh) and the electricity selling price to the grid (in €/kWh). As these prices increase, the NPV experiences a corresponding increase. Notably, the parameters of loan amount and installation cost emerge as particularly volatile scenarios within the analysis.

3 Main inputs and assumptions

Household and Economics

Electricity Consumption	3,478.48	kWh/year	Inflation	1.9%	per year
Electricity price – buy	0.351	EUR/kWh	Bank loan interest rate	6.7%	per year
Electricity price – sell	0.082	EUR/kWh	Bank loan maturity	15.0	years
	0.071	EUR/kWh	Equity cost of capital	3.1%	per year
	0.062	EUR/kWh			

PV panels

Peak power	435.00	W/panel	System losses	14.0%	of output
Panel area	1.51	m^2/panel	Degradation with age	0.4%	Per year
Useful life	20.00	Years	Maintenance costs	1.0%	Year per panel
Total cost of optimal installation size (without subsidies)				3,927	EUR
Total cost of optimal installation size (after subsidies)				3,927	EUR

The subsidies influence the financing and not the price of the photovoltaic (PV) system.

4 Government subsidies

The Kreditanstalt für Wiederaufbau (KfW), a German financial institution, supports the installation of a solar power system with a favorable interest rate of 5.34% (C Rating). Additionally, a legislative measure supports the sell-to-grid price with a subsidy of up to 8.2 ct/kW.

Some PV panel suppliers

- https://www.idealo.de/preisvergleich/ProductCategory/13073.html
- https://www.stwgd.de/privatkunden/ihre-sonnendach-l%C3%B6sung.html

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