

Solar system utilisation: Rough estimation

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When you start researching about installing a solar system, with many online calculators and even installation companies in Germany, you get offers for installing a photovoltaic system that look something like this: We will install on your roof a system with X thousand kilowatt-hours per year. With it you can completely cover your current needs in electricity and in addition feed Y kWh of electricity into the public grid. Because of saving the electricity for your own consumption and the fed electricity you get Z thousand Euro per year. This means that the plant will pay for itself in A years.

Normally A is almost always under physiologically important mark in 10 years.

Unfortunately, this is too good to be true at the moment.

In calculations is "forgotten" that the electricity is mostly consumed in your household when no sun shines.

To make the estimation a little more realistic, we need to use at least two adjustment coefficients:

What percentage of generated solar electricity you can use directly in your home power grid.

How much percentage of remaining solar electricity you can use for heating and thus save gas or oil.

These coefficients depend on several factors, e.g. the power of your PV system during the day, your electricity consumption in individual hours of the day, whether you have installed an electricity storage system and its real efficiency.

This document explains the rules for using the table PV-ROI for very rough estimation of the profitability of a PV system on the roof of a house.

The table is available in two functionally identical variants for Windows (Excel) and MacOS/iPad/iPhone (Numbers).

As a result, you can roughly estimate Return Of Investment, ROI, of a system. Real results tend to be worse, because this estimate does not include degradation of solar panels, storage and other equipment. However, it can be neglected if ROI is less than 20 years.

Please use this table as a template for your own calculations. As the author of the table, I assume no liability or responsibility for possible economic or financial consequence of estimated results.

Short explanation for used colours:

Background color	Appearance	Meaning
Green	0 %	Input field
Blue	31	ROI in years
Yellow	50	Secondary results of the calculations

So you can insert your data in green coloured cells to estimate your ROI.

Please also keep in mind that not all parameter combinations or their calculation results make sense or are feasible. For example, it does not make sense to buy a storage but not use it (second row in first two columns). On the other hand, the use in household more than 40% solar electricity in own households without storage only in rare situations achievable.

A more precise calculation can, in my opinion, only be possible through a simulation with the use of realistic generation and consumption profiles. Such simulation can also enable to choose right size of PV system and the storages.

The development of such a simulator is my next goal in this project.