

## Part 1: Renewable Primary Energy – the future evaluation system

The necessity for a sustainable energy future has set us on the path to a scenario where only renewable energy sources will be used. The current evaluation systems for the energy demand of buildings are based on the traditional energy supply system and will no longer work in the future supply structure.

### Only renewable energy!

That is why the Passive House Institute has developed a new, future-proof evaluation system, which also allows evaluation of renewable energy generation. The new evaluation system considers the building to be evaluated in the context of a world where solely renewable energy sources are used. Wind power, solar energy, and hydropower provide primary electricity. Some of this power can be used directly because generation and demand occur simultaneously. A surplus occurs at times with higher energy supply, while at other times there is an energy deficit.

### Storage facilities will be necessary

Storage facilities will provide secondary electricity. Short-term and long-term storage facilities exist in the Passive House Institute model; these are subject to storage losses. In the case of short-term storage (e.g. pumped-storage power plants) these losses are small, roughly 20-30%, while in the case of long-term storage (methane is generated from electricity, and this is reconverted to electricity when required) these are high, about 70%. Some of these losses can however be used in the form of heat for heating or hot water generation. Depending on the type of energy application, the share of primary and secondary electricity differs. The losses in the power generation chain and hence the so-called PER factors (Primary Energy Renewable) also change with this. These factors exhibit a certain dependence on the location; the following factors apply for Central Europe.

### The higher the share of primary energy, the lower the PER factor is

Domestic electricity for example has a relatively high share of primary electricity because the demand throughout the year is fairly constant and energy generators can be well-adjusted to this constant demand. That is why the PER factor of domestic electricity is relatively low with 1.30. Heating is only necessary in winter. In order to have enough energy in winter, some of the electricity has to be generated in the summer and must be stored for the winter with high losses. The PER factor for electricity which is used for heating is therefore relatively high with 1.80. It is therefore particularly essential that as little energy as possible is consumed, especially in winter. Nevertheless, the share of direct electricity is significant even for heating with "heating electricity", and anyone using electricity from a heat pump, which can provide three parts of heat for one part of electricity, will have an extremely efficient heat generation system. If renewable methane is used for heating, then all of the heating energy must be obtained from the inefficient long-term storage, which is not ideal in the future on account of a PER factor of 1.75.

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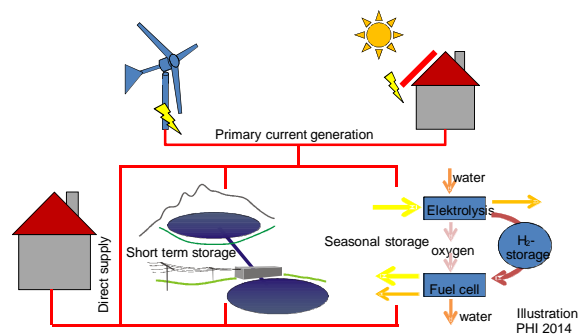


Illustration: The renewable primary energy system

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Further information and sources

[www.passipedia.de](http://www.passipedia.de)

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