[0052] In order to technically realize an effective solution using storage, it is necessary to identify the requirements to be met by such a system. These requirements include the following:

[0053] Guaranteed battery life of 20 years

[0054] Low life-cycle costs

[0055] High cycle strength of the battery over its service life

[0056] High total efficiency of approx. 95%, including the battery

[0057] Small size, similar to a commercially available refrigerator

[0058] No operating risks

[0059] High level of reliability over the entire service life

[0060] 5 kWp maximum output

[0061] 5 kWh-8 kWh battery capacity

[0062] Maximum installation time: four hours.

[0063] These requirements are met by high-efficiency lithium-ion batteries, for example. The size of the storage means to be used is defined on the basis of various parameters, such as size of the photovoltaic system, level of own consumption, user's safety needs, cost-effectiveness, etc.

[0064] FIG. **5** shows a metering concept for determining own consumption of the energy generated. Meters **2** and **3** may be integrated in a single device.

[0065] The standalone grid according to the invention is able to provide the currently consumed amount of electricity simultaneously as required. The energy is supplied either directly from the photovoltaic system, from the storage unit or from a combination of both sources. Only when insufficient energy can be supplied from these sources is use made of grid power in order to cover short-term increases in requirements, for example. If the grid is not available due to failure, the system is able to store generated electricity and/or, as a backup, to supply power from the two sources as required, up to a defined amount.

[0066] FIG. **6** illustrates an embodiment according to the invention. The inverter, battery charger and battery module are integrated in a single device. In addition, a backup line is provided which can supply to loads up to a defined amount, as required, in the event of a power failure.

[0067] FIG. **6** shows a schematic view of a standalone grid according to the invention, for optimizing own consumption with the support of photovoltaic power. The standalone grid integrates the inverter, battery module and battery charger in a single device. In addition to the normal connection for grid feed, an additional connection for emergency power supply is provided. Switches S1*a* and S1*b* are used to connect and disconnect loads to the emergency power supply and can be operated by an energy management system.

[0068] The standalone unit according to the invention also includes an intelligent system management system which regulates and monitors the flows of energy and the operation of the components. The energy management system does this by measuring the current load on all three phases in order to determine the level of power to be provided by the inverter.

[0069] Parallel to this, the battery converter, which is a charge controller with a very high efficiency factor, stores any surplus photovoltaic electricity in the battery, or draws from the battery the difference between photovoltaic electricity and the amount of power to be supplied. The standalone unit compensates the highly dynamic fluctuations in power output that are characteristic of photovoltaic electricity and supports the inverter in providing the exact amount of power.

[0070] The system is equipped with a display for showing the user and the fitter key information about the electricity being produced, stored and internally consumed (FIG. **7**). In this way, the system permits a high level of transparency with regard to the performance of the proprietary plant and provides the fitter with important details about system performance and supports him when performing any maintenance work that may be needed.

[0071] FIG. **7** shows system performance information as provided by the display.

[0072] The present invention incorporates many solutions that provide the user of the standalone unit with totally new ways of managing energy intelligently. The system is also built according to the construction kit principle, which means that it can be installed easily by a specialized fitter. Existing photovoltaic systems can also be retrofitted without difficulty.

1. A standalone unit (**110**) for a standalone power grid (**100**), comprising

a photovoltaic unit (**113**) for generating power from renewable resources,

an energy storage unit (**115**) for storing energy,

a consumer connection unit for connecting the standalone unit (**110**) to a consumer unit (**111**) for the consumption of energy,

a grid unit (**114**), in particular an inverter unit, for connecting the standalone unit (**110**) to a power grid, for drawing energy from the power grid and for feeding energy into the power grid, and

an interface unit (**116**) for communicating an energy withdrawal request and/or energy storage request with a second standalone unit (**120**, **130**) which is adapted to send to the second standalone unit (**120**, **130**) the energy storage request to store energy in the second standalone unit (**120**, **130**).

2. The standalone unit (**110**) of claim **1**, wherein the interface unit (**116**) is configured

to receive from the second standalone unit (**120**, **130**) the energy withdrawal request to draw energy from the standalone unit (**110**),

to send to the second standalone unit (**120**, **130**) the energy withdrawal request to draw energy from the second standalone unit (**120**, **130**), and/or

to receive from the second standalone unit (**120**, **130**) the energy storage request to store energy in the standalone unit (**110**).

3. The standalone unit (**110**) of claim **1** wherein the interface unit (**116**) is configured to forward the energy withdrawal request and/or the energy storage request to the second standalone unit (**120**, **130**).

4. The standalone unit (**110**) according to claim **1** wherein the standalone unit (**110**) is also configured to receive the energy withdrawal request and/or the energy storage request from an administrative unit (**140**) of the standalone power grid (**100**).

5. The standalone unit (**110**) of claim **1** wherein the energy storage unit (**115**) is configured to store energy in response to an energy storage request.

6. The standalone unit (**110**) of claim **1** wherein the standalone unit (**110**) is configured to release energy, in particular from the energy storage unit (**115**) and/or from the power generation unit (**113**), in response to an energy withdrawal request submitted to the standalone power grid (**100**).

7. The standalone unit (**110**) of claim **1** wherein the standalone unit (**110**) is configured to receive from the standalone