

## A new generation of hybrid inverters

Hans Oppermann  
Sun Power Solartechnik GmbH  
Marktplatz 2-4, D-61118 Bad Vilbel  
Tel.: 06101-58 45 50, Fax : 06101-58 45 60  
[hans.oppermann@sunpower.de](mailto:hans.oppermann@sunpower.de)  
[www.sunpower.de](http://www.sunpower.de)

Sun Power Solartechnik GmbH has been founded 1980 and since that time is engaged in power conditioning equipment for renewable energy systems. This paper presents the new inverter concept and gives different approaches for hybrid energy concepts using an isolated network.

At a standard hybrid system the solar generator energy is feed via a charge controller to the battery set. The output of the wind generator is rectified, a separate charge controller is used for the adaptation to the battery bank. The diesel generator energy output as well is rectified and feed via an additional charge controller to the battery. A common inverter may be used to provide AC voltage to the isolated grid. As a back-up supply the diesel generator can be switched directly to the AC grid. The system control or management usually is effected by an external unit. All system parameters are collected separately and serve as basis for the decisions of the system control.

The advanced hybrid system concept incorporates a central management unit based on a bi-directional inverter. This new concept has substantial advantages compared to the previously mentioned standard configuration. The new design provides not only a standardised solution for hybrid power plants but additionally increases the efficiency and reduces the cost.

The concept of the Central Hybrid Power Conditioning Unit leads to a high integration of functions, achieving several advantages:

- Interconnections between the different system components are already realised internally, wiring faults are thus avoided.
- The different regulators are optimally matched, providing :
- mpp-tracking of solar and wind generator output, and elimination of AC-DC-AC conversion of the diesel generator output.
- All functions are comprised in a central rack, reducing power conditioning costs, system costs, commissioning, and mounting expenses.
- All inputs and outputs are centrally supervised and controlled. A central system management influences all user-relevant control functions without necessity of additional transducers and status signals.