



## Enecsys Enables OPTIMAL SOLAR SOLUTIONS

Enecsys Limited was founded in 2003 and develops, manufactures and markets innovative grid-connected micro-inverters for solar photovoltaic systems in residential and commercial applications. The patented technology was originally developed at Cambridge University. Headquartered in Cambridge, UK, Enecsys also has a sales and support office in Bad Homburg, Germany.

intelligent reliable power



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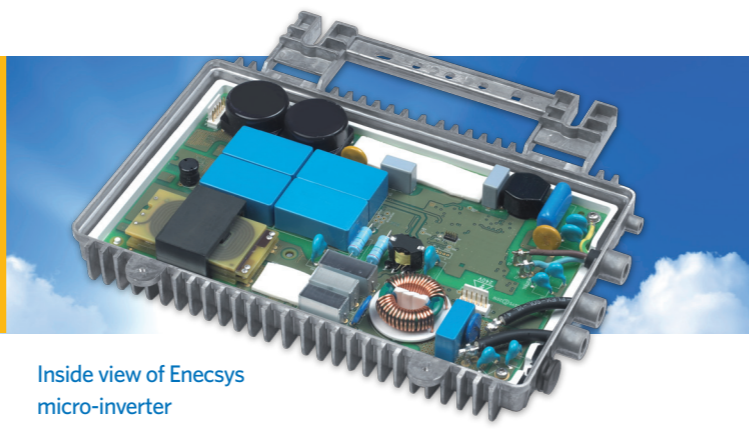




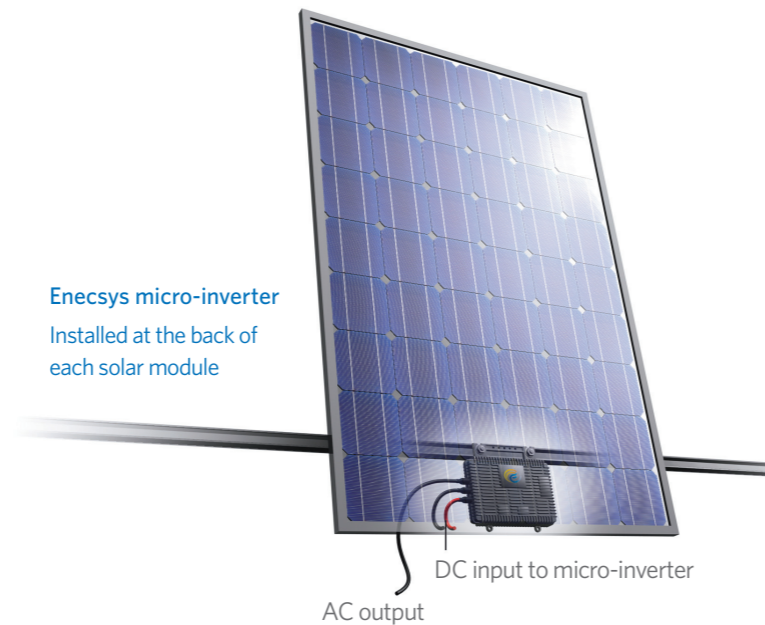
## Micro-inverters that transform the economic model of solar PV

The Enecsys micro-inverter, installed at the back of each solar module, offers a unique and excellent value proposition compared to conventional string or central inverters. Benefits include significantly increased energy harvest and lower lifetime cost of solar photovoltaic systems, increased inverter reliability to match the life of solar modules, comprehensive web-based monitoring and a communications system that analyzes and reports the performance of each solar module within the PV array to enable system performance optimization, simplification of PV array design, ease of installation, and improved safety.

The Enecsys solar grid-connected micro-inverter enhances the growth of residential and commercial markets by substantially improving performance and reducing the cost of solar PV system ownership.



Inside view of Enecsys micro-inverter



Enecsys micro-inverter installed at the back of each solar module

## The Enecsys solar micro-inverter solution elegantly and cost effectively solves many issues created by using conventional string or central inverters.

The Enecsys micro-inverter is a single compact unit that converts the DC power from the solar module to AC power for supply to the electricity grid without the need for a string or central inverter. The AC output from the Enecsys micro-inverter is in-phase with the electricity grid and exhibits high power quality including low harmonic distortion and near unity power factor. The Enecsys micro-inverter solution has a number of distinct advantages:

**Maximized energy harvest** - it maximizes the power harvested from each solar module and therefore the entire PV array. This is accomplished by performing Maximum Power Point Tracking (MPPT) and performance monitoring for each individual solar module. Performing MPPT on each solar module ensures maximum harvest of energy even under partially shaded conditions. Degradation in the performance of any one module, due to module mismatch, shadows from trees or chimneys, or obstructions from leaves or debris, does not degrade the performance of other modules and therefore has minimal impact on the power harvested from the PV array. This typically results in improved power harvest of 5% to 20% from the solar PV system and represents a significant cost/performance advantage depending on applicable site situations.

**Enhanced monitoring capability** - performance monitoring of the PV array is highly enhanced as each module's performance can be viewed separately, a capability not available with string inverters. This uniquely provides users and installers with real-time detailed information to ensure that the solar system performance is optimized over the life of the installation. The information can be used to promptly detect performance issues and pinpoint the exact location of the problem, which provides precise guidance for required maintenance, a capability not possible with string inverter systems. The micro-inverter is equipped with a robust built-in wireless communication system that connects to the internet via a gateway to provide detailed performance information on-line from anywhere.

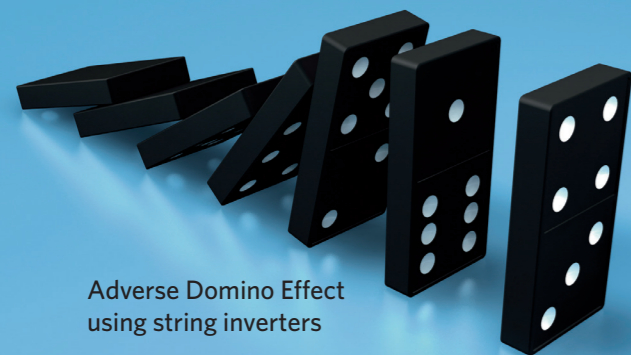
**Improved safety** - as power conversion from DC to AC is done at each solar module, high voltage DC wiring is eliminated, making the solar system intrinsically safer, and specialized DC practices or equipment are not required for installation.

**Increased lifetime and reliability** - it eliminates the single most common cause of failure in solar PV systems, the string or central inverter, which typically requires replacement at least once over the life of the solar modules, adding significant cost. Enecsys solar micro-inverters have been designed for high reliability, to have a life expectancy of 25 years and thereby matching the life expectancy of solar modules, to operate in real world conditions from -40 degrees C to +85 degrees C without degradation of performance, and achieve a peak efficiency of 95% over the temperature range. In order to achieve this high level of reliability, the Enecsys micro-inverter embodies three key attributes: a patented rugged topology, a component line based on high temperature rating and ruggedness, and a unique and patented energy storage technique that enables the use of long-life thin film capacitors instead of less reliable electrolytic capacitors.

**Simplified PV array design and installation** - with the use of Enecsys easy-to-install micro-inverters, solar modules can be installed on any available roof space without complicated adjustments for shading issues and the size of the solar array can easily be changed without re-sizing the string or central inverter. This results in ease of design, lower cost of installation and future flexibility for PV systems compared to when conventional inverters are used. Also, installers do not need to match the performance levels of adjacent solar modules in order to optimize the performance of the PV array.

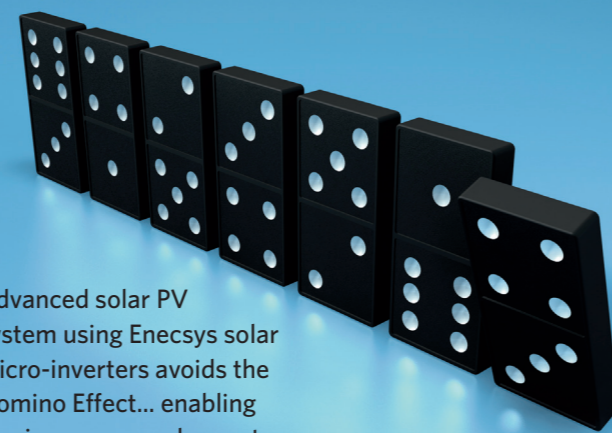


## The Problem

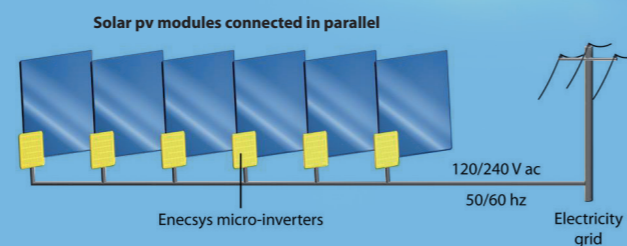
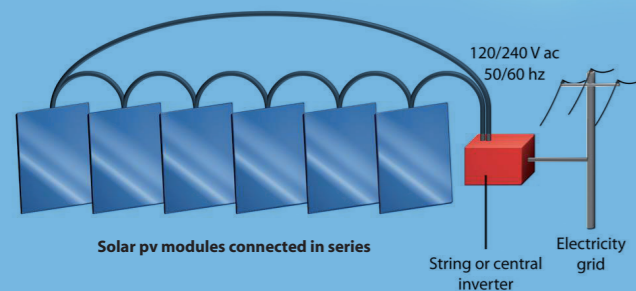


Adverse Domino Effect using string inverters

## The Solution



Advanced solar PV system using Enecsys solar micro-inverters avoids the Domino Effect... enabling maximum energy harvest



Comprehensive Monitoring

The Gateway  
Communication device to connect the monitoring system to the internet



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