

## REC Reducing Energy Payback Time

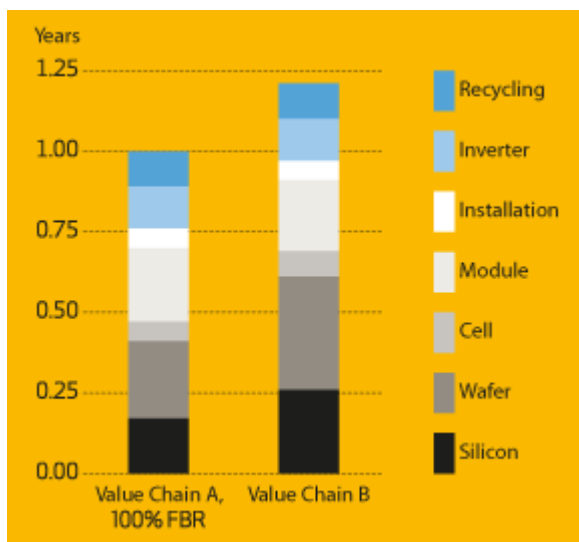
A photovoltaic module's Energy Payback Time is the time it takes for the module to generate the same amount of energy required for its manufacture. The lower this figure, the faster the module can make a contribution to a cleaner energy future.

To understand the environmental impact of our REC module, REC commissioned the independent Dutch research institute ECN ([www.ecn.nl](http://www.ecn.nl)) to analyze the complete lifecycle of an REC module according to the standard ISO 14040 for the first quarter of 2011. This followed from a similar study we conducted in 2007.

The 2011 results for the energy consumed throughout the lifetime of a module are in the lowest in the industry, even with the inclusion of recycling. In 2007, the Energy Payback Time (EPBT) of an REC module was 1.4 years. Today, we have reduced it to one year thanks to continuous technological innovation throughout the value chain. With the ownership of the complete solar value chain, REC was able to provide comprehensive data from the whole lifecycle, giving the customer a complete overview of the environmental impact of solar module production.

For the study, ECN analyzed REC's production data and calculated the primary energy consumption involved during each step of production, including raw material extraction and all transportation up to when the module is assembled, to recycling. Generic data for installation and recycling was used to calculate the EPBT of a complete system. The data is based on a yearly solar insolation value of 1700 kWh/m<sup>2</sup>, which is a typical value for a Southern European Mediterranean location such as Barcelona or a mid-US location such as New Jersey.

The energy used in different production sites impacts the EPBT of a module. The EPBT of REC products manufactured in different locations using different technologies are compared to transparently show the environmental impact of REC production.



- Value chain A: Modules containing 100% silicon produced using the proprietary Fluidized Bed Reactor (FBR) process in the USA, wafers and cells produced in Norway and modules assembled in Singapore have an EPBT of 1.0 years.

- Value chain B: Modules containing silicon produced using a mix of the proprietary FBR and Siemens reactor processes in the USA and wafers and cells produced in Singapore have an EPBT of 1.2 years.