

## General information:

- Technology developer: Solarcentury (United Kingdom)
- Date of issue: 2009

## Aims and Objectives:

Solar electric roof slate "C21e" technology has been developed with the support of Europe (public) grants. The main objective of this technology is to supply dwelling's owners with half of their electricity needs.

These slates offer an excellent performance per m<sup>2</sup> while being compatible with a wide range of natural and artificial slates, providing a perfect complement to a traditional slate roof.

Solar roof slates C21e gathers, among others, the 4 following advantages:

- No extra planning: C21e slates sit flush with standard roofing slates, to provide a traditional finish. It protects dwellings from the elements and produces power for your households. This aesthetically suitability is particularly adapted in areas where other renewable energy options are considered unsuitable.
- Ease of installation: Fitted to standard wooden battens using traditional roofing practice, with one solar slate covering the width of several conventional slates.
- No specialist skills: Designed to be installed by slaters, as part of the roof build.
- Fast to fit: Faster to fit than traditional slate, with all of the electrical work carried out within the building.



Example of a smooth integration of Solar roof slates C21e

In addition, for information purpose, Solarcentury has also developed a thermal roof tile (C21t) capable of providing dwellings with two thirds of their domestic hot water needs.

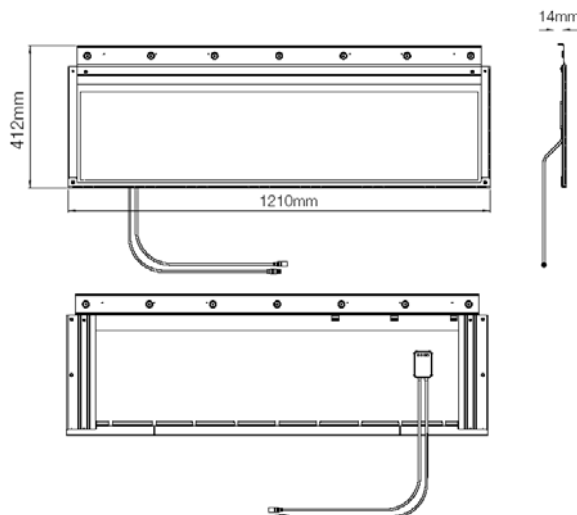
Therefore, combining the two Solarcentury slates (C21e and C21t) gives the opportunity to benefit from a completely integrated solar thermal and solar electric roofing system.

## A Short Description of the Technology

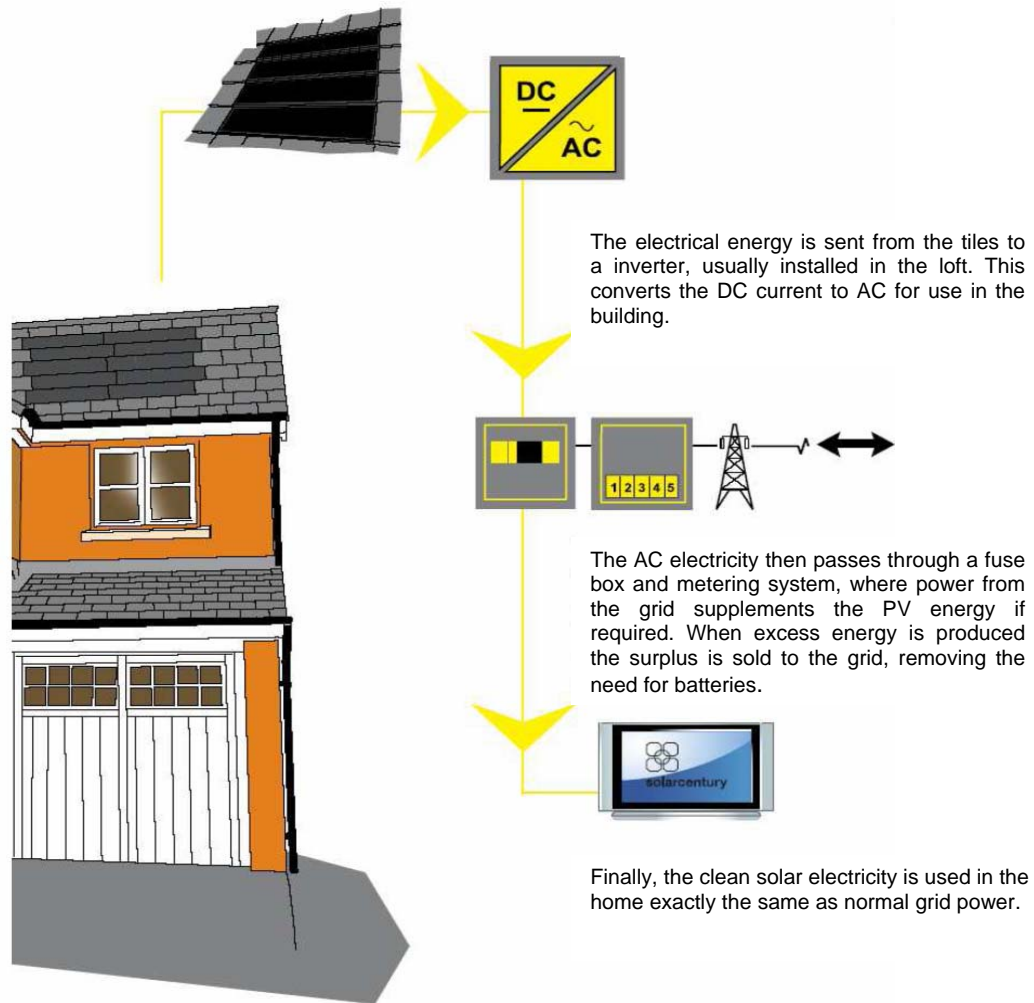
Discreet 'SunPower' PV laminate blends superbly with regular roof tiles offering an unrivalled aesthetic, and back mounted contact strips increase active area and reduce surface glare, typical with standard solar cell technology. C21e solar roof slates sit flush with standard roofing slates, to provide a traditional finish. Many dimensions are available which permits a great compatibility with numerous natural slates.

### The technologies show a great energy efficiency level:

- Solar roof slates C21e delivers power output 52 Wp per tile, less than eight square metres per KWp (kilowatt peak).
- Back mounted contact strips increase the effective collector area and reduce surface glare, typical with standard solar cell technology.
- Integrated "thru-flow" ventilation enhances PV performance.
- The "super subtle" sunpower laminate delivers maximum efficiency.



**Solar roof slates C21e's Functioning:**



**Solar roof slates C21e's electrical specification:**

Photovoltaic cell technology	Monocrystalline	
Cell Dimensions	125 x 125 mm	
Power <sup>(1)</sup>	52 Wp	
Wp/m <sup>2</sup> (600x300)	143	
Wp/m <sup>2</sup> (500x250)	143	
Wp/m <sup>2</sup> (320x220)	136	
Laminate size (active area)	1174 x 318 mm	
Number of cells	18	
Cell efficiency	20 %	
Module efficiency	14.9 %	
Maximum power voltage*	9.80 V	
Maximum power current*	5.30 A	
Open circuit voltage*	12.0 V	
Short circuit current*	5.55 A	
Maximum system voltage	600 V DC	
Temperature coefficient of the open-circuit voltage	-0.0342 V/°C	-0.286 %/°C
Temperature coefficient of the short-circuit current	2.27 mA/°C	0.028 %/°C
Temperature coefficient of the power	-0.38 %/°C	
Cables	Class II double insulated 4mm cable	
Connectors	Standard MC IP65 push fit connectors	

(1) Measured under Standard Test Conditions of 1000W/m2 irradiance, AM 1.5 spectrum, 25°C cell temperature.

\* Values of current, voltage and power +/- 10%

The project aims at promoting and widespread disseminating EU innovative Research and Technology Development and Demonstration results, as well as eco-sustainability criteria in building sector, which include:

- energy efficient building materials, components and systems not yet introduced into the building market or in their first market phase;
- innovative applications of heating/cooling and power supply technologies, combined with the use of renewable energy sources, in building sector;
- best EU demonstration eco-building projects.

## Results and Achievements:

Solar roof slates C21e successfully demonstrated that electricity production for dwellings can combine high efficiency and smooth integration with traditional roofs.

## Possible application area:

Dwellings and SMEs buildings.

## Reference:

The technology's development took place in United Kingdom and has been supported by European public grants

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