

## **INNOVATIVE SOLAR PRODUCTS FOR ARCHITECTURAL INTEGRATION: A JOINT IEA TASKS 41 AND 51 WEBSITE**

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### **Abstract**

Despite all the available solar technologies, solar energy systems are still not used enough in cities today. Two IEA SHCP projects, “Task 41: Solar Energy and Architecture” and Task 51 “Solar Energy in Urban Planning”, were initiated to face and help overcome the various barriers slowing down the spread of active solar technologies in architecture (mainly photovoltaics and solar thermal). One of the main barriers is the low number of products conceived for building integration, and the related lack of knowledge among building professionals. A website has been set up in order to address these issues by presenting on one hand the innovative solar products available on the market today and, on the other hand, the information needed to optimally integrate them in the architecture of a building. The design of the website has been conceived to be ergonomic and attractive to architects and their clients, and is structured around the three main active solar technologies: photovoltaics, solar thermal and hybrid systems. By choosing a specific technology and integration approach (roof, façade, balcony...) the user gets access to a selection of appropriate products, presented in the form of synthetic A4 sheets. These sheets include architect oriented information, contact details and pictures, both on the product alone and situation examples in buildings. The website is completed by a set of architects’ oriented documents on the specificities of the different technologies, available for download in the related sections

Keywords: solar energy, architecture, integration, product, website, integrability

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### **1. Introduction**

Despite all the available solar technologies, solar energy systems are still not used enough in buildings today. One of the main reasons lies in a general architects’ reluctance to integrate such systems in their projects. This reluctance comes from several factors: lack of architects’ knowledge in the field, lack of simple dimensioning tools for the early design phase, administrative hurdles and, last but not least, lack of adequate offer in market products designed for building integration, especially for solar thermal[1].

The IEA SHCP project “Task 41: Solar Energy and Architecture” was initiated to face and help overcome these various barriers. The work was articulated into three subtasks, one on the specific solar technologies integration issues (STA), one on tools for architects (STB), and another one on case studies (STC). The project of establishing and maintaining a public website was started within Task 41, and is presently taken over by Task 51.

### **2. Website intents and ergonomics**

The website described in this paper was developed with the intent to address on one hand the lack of architects’ knowledge on active solar technologies (technical specificities, integration issues, architectural possibilities,..)[2,3], and on the other hand, the difficulty to find building oriented products, still very rare in the market today [4,5.]

To tackle the lack of technical knowledge, the website provides simplified information on the use of solar energy in buildings, on the specificities of available active technologies (photovoltaics, solar thermal, hybrid), and a set of architectural integration guidelines (excerpts from Task 41 deliverable DA2: Solar

energy systems in architecture: integration criteria and guidelines) [2]. To help deal with the difficulty to find market products conceived for building integration, the website provides a comprehensive collection of innovative products with an enhanced level of building "integrability".

For a website whose goal is to offer easy information access to users with limited knowledge in the field, ergonomics is fundamental. Simple information on the specific uses of active solar technologies in buildings is available for download in the general "home" section (Fig. 1); external Internet links are presented to complete the information.

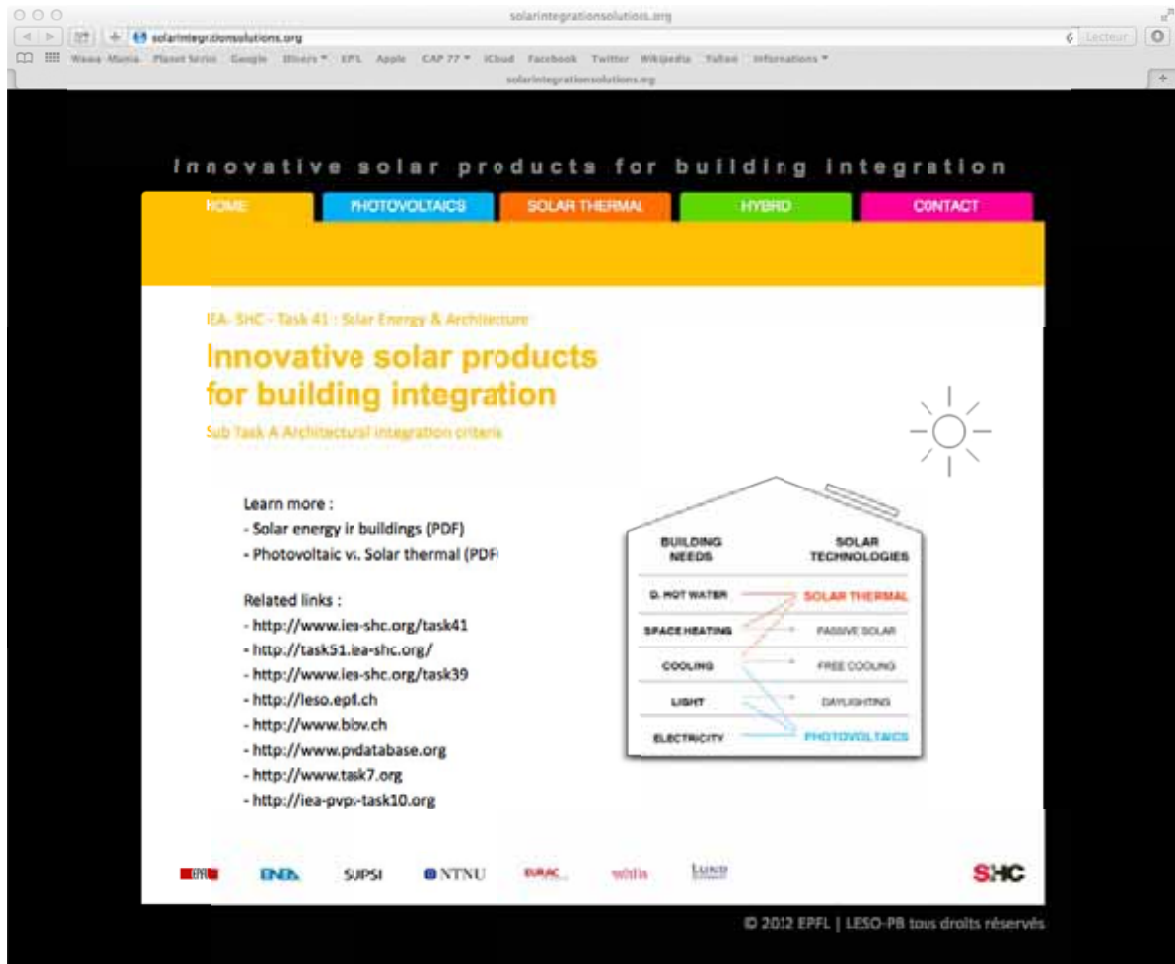


Fig. 1: Home Page (<http://solarintegrationsolutions.org/>)

From the homepage, users can access to three technology specific sections to find suitable products and/or specific information.

The technology sections (Photovoltaics / Solar Thermal / Hybrid) are organised to comply with the needs of both the new user who discovers the solar technologies and the regular user who wants simple and easy access to specific information. Therefore, the concept of the website was based on straightforward access to relevant products.

The pages are designed to present to users either the whole set of sheets on one technology or only the product sheets that might be suited for his building application. Therefore the page offers two sets of selection criteria (Fig. 2):

- Sub-technologychoice-(s)
- Building area(s) available for the system

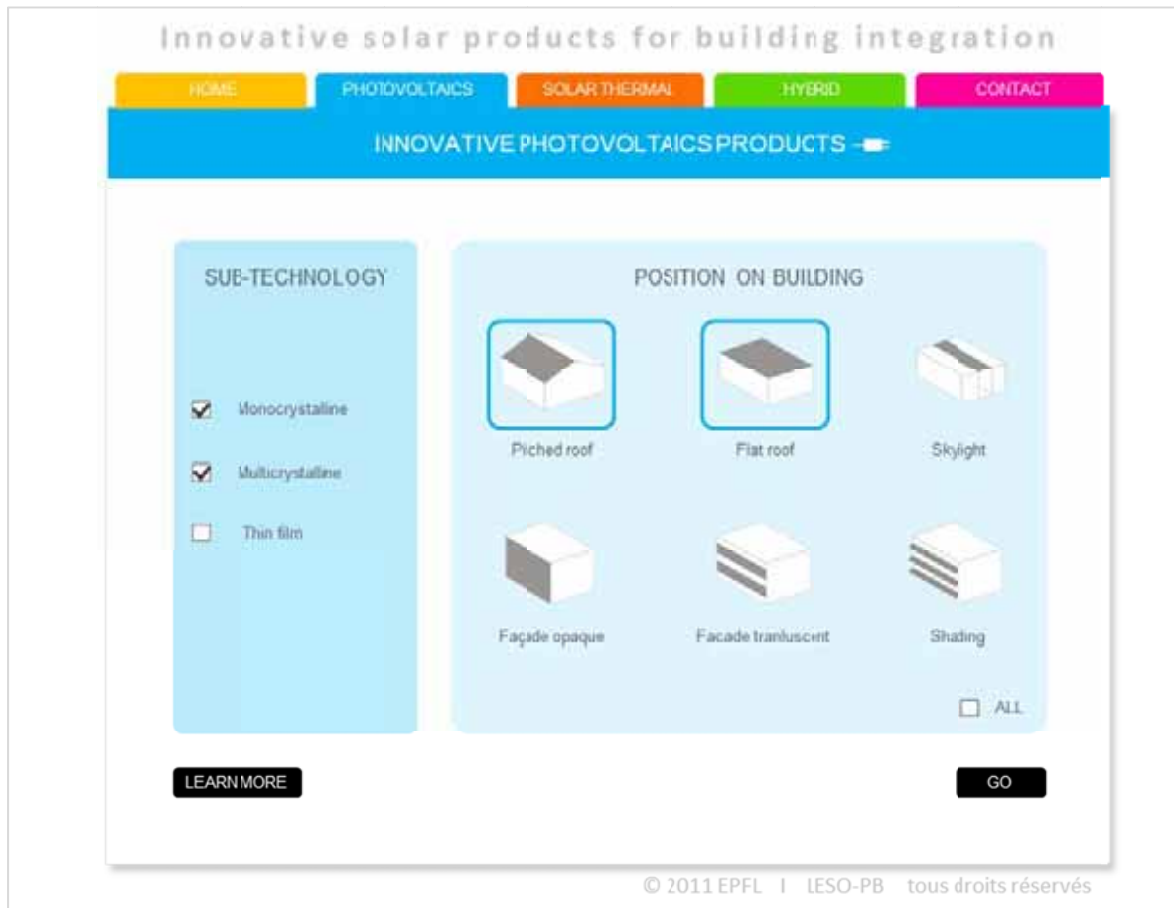


Figure 2: PV selection page

Available sub-technologies are selected via tick-boxes, while possible implementation zones on a building are visualized using icons. The user unaware of the technologies' characteristics can select them all or refer to detailed information using the "LEARN MORE" button. Once the pre-selection completed, the "GO" button launches the sorting process, as explained in the next page (section 5 "Products selection and download" and Fig.4).

### 3. Collection of market products

The collection of existing products suitable or specifically targeted to building/architectural integration was first organised with the contribution of Task 41 experts and is presently updated with the help of Task 51 experts. Photovoltaics and solar thermal specialists scrutinize their respective national markets to come up with a collection of products adapted to integration.

Specific to this task is the need to obtain the maximum information not only on the technical characteristics of the products, but also on their "integrability" characteristics: material and finishing, colour and texture choice, dimension flexibility, jointing, etc.

### 4. Presentation of available innovative products

To be able to present in an attractive, yet synthetic way the needed information, a sheet template was developed, to be used in publications and for the website. It presents the advantage of having a good level of uniformity, while letting enough freedom for expressing product's specificities.

Having one sheet per product makes it easier to maintain the website when adding new products or removing obsolete ones.

The template comprises 6 zones (Fig. 3):

- a) Product brand and description
- b) Evaluation table of integrability characteristics
- c) Technical drawing(s)
- d) Picture(s) of implementation example(s)
- e) Product technology group
- f) Possible use on building part(s)

**f**



**a**

**RHEINZINK® QUICK STEP Solar Thermie**  
**RHEINZINK (SCHWEIZ) AG**  
 Täferstrasse 18  
 5405 Baden-Dättwil  
 info@rheinzink.ch  
 http://www.rheinzink.ch

QUICK STEP Solar Thermie is a very innovative, low efficiency, unglazed system for roofs, produced by the roof and façade manufacturer Rheinzink. The active modules, available in two grey shades, have been developed to be integrated into the standard Rheinzink QUICK STEP roof covering system, so that active modules look exactly like the traditional non active ones: field positioning and dimensioning is not anymore an issue. The system is conceived as a proper active roof system (recently also proposed for façade use).  
 Even though its energy performances are low due to the light colour of the absorber and the lack of selective treatment, the building integration potential is very high and shows the importance of involving building manufacturer in the development of new products for building integration.

**b**

**ST "Integrability"**

Multifunctional element	+
Shape & size flexibility	+/-
Glazing: surface texture choice	⊖
Absorber: surface texture choice	+
Absorber colour choice	+/-
Joining options	+
Availability of dummies	+
Complete construction system	+

**e**

**c**



- 1 Wärmedämmung
- 2 Schutzkassette, einseitig
- 3 RHEINZINK®-Oberfläche
- 4 Systemkantung inkl. Systembefestiger
- 5 Flurträger
- 6 Sammelrohr mit Backverbindung
- 7 flexibler Elektroanschluss

Abb. 7: Übergangenelemente QUICK STEP Solar Thermie

**d**



**f**

**e**

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The second zone (b) consists in a table evaluating the product integrability potential using the criteria established within the Tasks:

- Multifunctionality
- Shape and size flexibility
- Glazing texture choice
- Absorber texture choice/ Absorber texture adequacy
- Absorber colour choice/ Absorber colour adequacy
- Jointing options/ jointing adequacy
- Availability of dummies
- Part of a complete construction system

The third zone (c) is dedicated to technical information, showing close view(s) or drawing(s) of the product, while the last specific zone (d) is dedicated to global pictures of the product on site and application examples.

The two remaining zones are common to all sheets. Zone “e” highlights the technical family of the product (photovoltaic thin film, unglazed flat plate collectors...) while the zone (f) indicates the area(s) of the building where the product can be installed.

## 5. Product selection and download

The crossed choice of sub-technology type and building location (fig.2) brings to the user the whole set of sheets corresponding to his criteria/wishes/research (Fig. 4). In the selection example of Fig. 2, all monocrystalline and multicrystalline products adapted for pitched or flat roofs are presented.



Figure 4: Sheets pre-selection page

The option is open to download all sheets (“ALL”) or just a subset by clicking the relevant ones. The pdf format of the sheets makes them readable on all media, including tablets like iPad for instance, while keeping the file size limited (under 400Ko).

## 6. Conclusion

The presented website, developed within Task 41 and further operated within Task 51, represents a significant result of IEA SHCP common work. By addressing major barriers to the use of active solar technologies, this site should improve architects' knowledge and increase their willingness to use solar. Complemented by the Task 41 and Task 51 other publications and references [6,7,8,9], this represents a complete and up-to-date source of information for the successful integration of solar energy in buildings and cities.

## 7. Acknowledgements

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