

# ISAAC news

## EDITORIAL

Dear readers,

Due to the continuous growth of the ISAAC, both in terms of activities and personnel, an internal organization structured in distinct sectors has been defined. For each area, a responsible has been defined.

The **organigram** below shows the new structure reflecting the main field of competence of the Institute.

Regarding photovoltaic, results of the **10<sup>th</sup> test cycle** on modules are presented. These data are now very important at Swiss level, in view of the new remuneration at cost for input into the network of photovoltaic energy.

The **radon competence centre** SUPSI, which will have seat at ISAAC, will be active from January 2008 and will offer teaching,

1

Editorial

2

Photovoltaic

3

Environmental Studies

4

Building Energy  
News  
Calendar  
Good links

measurements and remediation. The **energetic check-up**, neutral service for an energetic evaluation of residential buildings, had a big success and will be offered also in future.

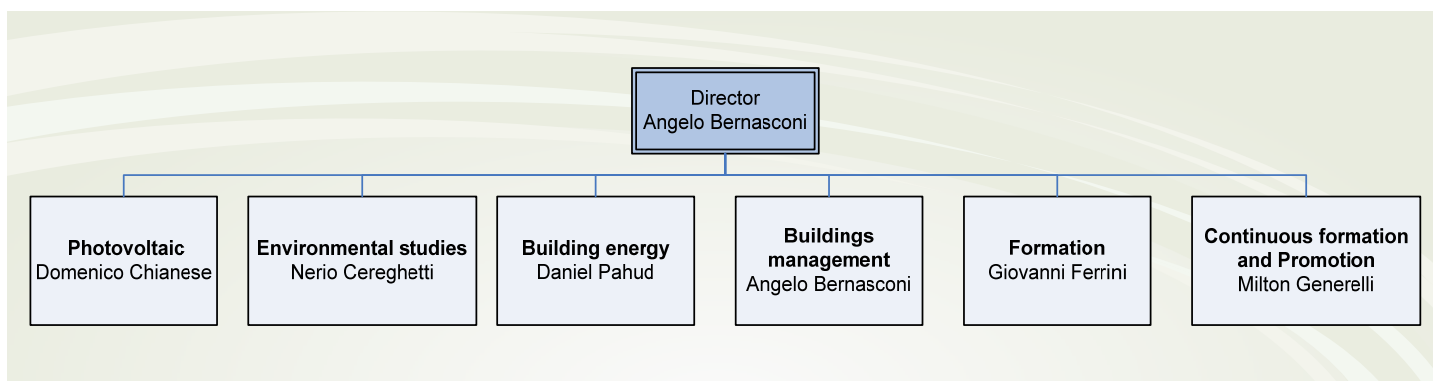
In the new website [www.bipv.ch](http://www.bipv.ch) several information and examples on the integration of photovoltaic in buildings are available in different languages.

## The first Minergie-P® building in Ticino



The new single family house (196 m<sup>2</sup>) located in Osco, Val Leventina, represents the first Minergie-P® certified building in Ticino.

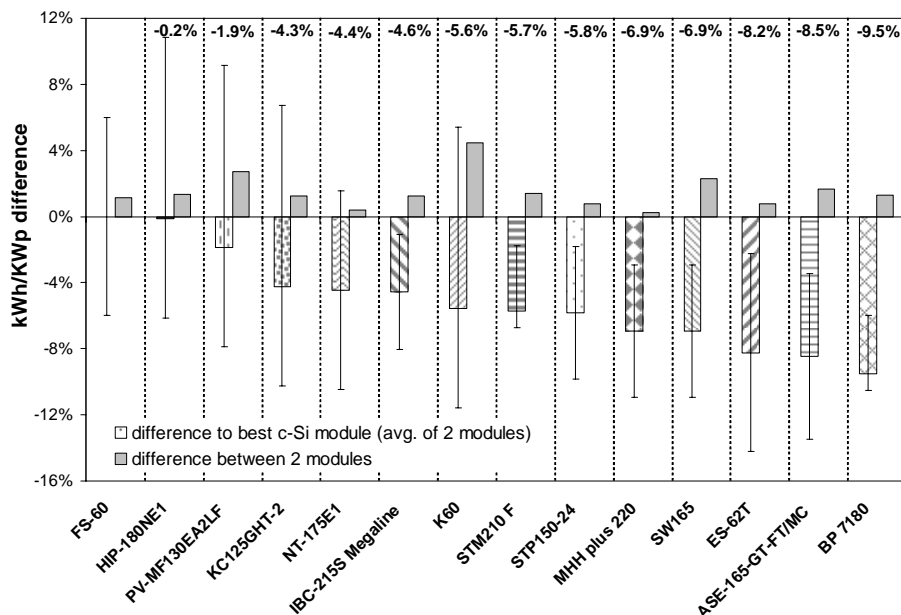
Certification	29.10.2007
Heating	100% solar thermal
Water	100% solar thermal
+ PV plant	2.88 kW



## PHOTOVOLTAICS

### New PV module test results

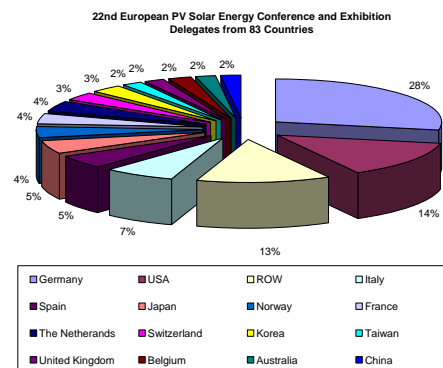
The final PV module test results of cycle 10 are now available. During 15 months, 14 different types of modules (2 modules per type), have been exposed in real outdoor conditions to analyse their electrical behaviour and to compare their energy output. Table below shows the results of the indoor power measurements performed in different phases of the test cycle: Pa: power before exposure (real acquired power); P0: power after initial exposure of approx. 20 kWh/m<sup>2</sup>; P3 and P15: power after 3 and 15 months of exposure. Pn is the nominal power declared by the manufacturer and  $\pm$  the tolerance limits. The first two columns show the differences between the module nominal power and the real one, measured at the begin (Pa) and the end (P15). The last 3 columns lists the total degradation, split into initial degradation, typical for c-Si modules (P0-Pa)/Pa, the first 3 month degradation (P3-Pa)/Pa, and the 1 year degradation (P15-P3)/P3. In 3 months a large percentage of the initial degradation of the thin film (TF) technologies should be occurred so that from there on a direct inter-comparison of c-Si and TF modules is possible. The mean initial power degradation of all c-Si modules has been equal to about -1.1% and



the annual one -to 1.0%. The thin film modules show as expected a stronger degradation especially within the first months. The Graph at the top gives a ranking of the modules respect to the first year energy output. The energy output in kWh/Wp nominal power (Pn) is here compared to the best one of the test cycle. The grey bars corresponds to the difference between the two monitored modules. The error bars are the sum of the power tolerance declaration ( $\pm$ ) and the STC energy measurement accuracy ( $\pm$ 1%). The module with the highest yield resulted to be the CdTe technology directly followed by the HIP technology. Detailed results were published at the last European PV conference held in Milan.

### 22<sup>nd</sup> EPVSEC, Milan 3-7 September 2007

The 22<sup>nd</sup> European Photovoltaic Solar Energy Conference and Exhibition held in Milan, Italy, in September 2007 was again the leading platform and a further milestone for the entire PV-sector.



Around 3,000 scientists, industry representatives and politicians from 83 countries and around 12,000 specialist visitors attended the event. The exhibition with around 520 exhibitors in a show space of 30,000 sqm, is the world's biggest photovoltaics exhibition. The exhibitors came from all corners of the PV Solar sector: Manufacturers of Ingots and Wafers, Solar Cells, PV Modules, Concentrators and Trackers, Manufacturers and Suppliers of Equipment, Distributors, Integrators, Assemblers, Manufacturers of Inverters.

MODULE	power verifications			degradations		
	tolerance	(Pa-Pn)/Pn (%)	(P15-Pn)/Pn (%)	(P0-Pa)/Pa (%)	(P3-Pa)/Pa (%)	(P15-P3)/P3 (%)
Mitsubishi PV-MF130EA2LF	+ 10 / - 5%	0.1%	-0.7%	-2.2%	-0.3%	-0.6%
Suntech STP150-24	± 3%	0.1%	-1.5%	-1.2%	-0.6%	-1.0%
Kyocera KC125GHT-2	+ 10 / - 5%	-1.0%	-3.1%	-1.6%	-1.1%	-1.1%
RWE ASE-165-GT-FT	± 4%	-2.0%	-6.1%	-2.7%	-2.7%	-1.4%
Solarwatt MHHplus220	± 3%	-3.8%	-8.2%	-2.9%	-4.1%	-0.5%
IBC-215S Megaline	± 2.5%	-2.2%	-2.4%	0.6%	0.4%	-0.7%
Solar World SW165	± 3%	-1.3%	-3.4%	-0.1%	-0.4%	-1.7%
BP Solar BP7180	- 0 / + 2.5%	-2.9%	-5.5%	-1.6%	-1.3%	-1.3%
Sharp NT-175E1	± 5%	-0.6%	-2.2%	-1.0%	-0.1%	-1.5%
Sanyo HIP180NE1	+ 10 / - 5%	0.2%	-2.0%	0.3%	-0.3%	-2.0%
Sunpower STM210 F	- 0 / + 3%	-2.6%	-4.8%	0.2%	-1.0%	-1.4%
First Solar FS-60	± 5%	NaN	-3.5%	NaN	NaN	-1.9%
Kaneka K60	+ 10 / - 5%	39.9%	-7.0%	NaN	-27.2%	-8.7%
UniSolar ES-62T	± 5%	3.6%	-12.3%	NaN	-11.1%	-4.7%

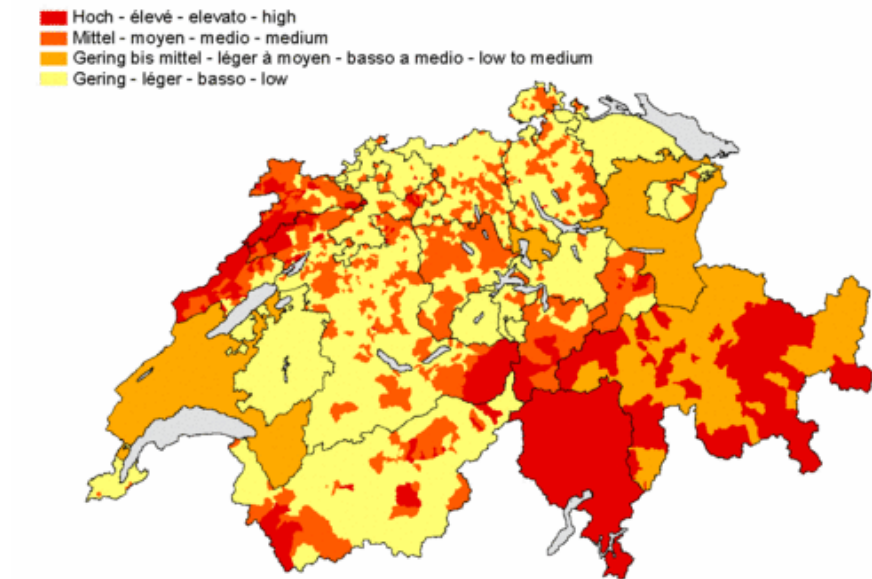
## ENVIRONMENTAL STUDIES

### *Radon competence centre SUPSI: teaching, measurements and remediation*

At SUPSI a Centre of competence has been created to face one of the most dangerous indoor contaminant: radon, the second cause of lung cancer after cigarette smoke (see box with FAQ). The Centre is managed by staff members of various units of the Dipartimento Ambiente Costruzioni e Design (more precisely ISAAC, LTS e IST) and is recognized by the Federal Office of Public Health (FOPH) as an official measuring laboratory in Switzerland. Measuring procedures are further accredited according to ISO standard 17025 regulating testing and calibration laboratories. Staff members of the Centre have a long experience in this domain, have undergone further specialization according to the requirements of FOPH and cover a wide area of domains related to radon, ranging from fundamental knowledge (geology, physics and biology) to the practical know-how necessary for remediation (engineering, architecture, material science).

Since several years, SUPSI is collaborating with federal and cantonal authorities during measurement campaigns carried out in Ticino, the area in Switzerland most affected by residential radon. In the last two years over 40 consultants went through specialization according to FOPH standards. These consultants are officially recognized from the cantonal public health authorities for remediation of contaminated buildings.

The Centre plays a neutral role in consultancy on radon remediation for both private citizens and for engineers, offering also measurement and proposals of remediation as services. The Centre represents therefore a considerable support for private citizens facing high concentrations of radon in their homes and for engi-



neers responsible for the correct application of standards in the leaving environment (professional standard SIA-180 on thermal insulation, requiring proper confinement of radon contaminated air coming from the soil in area at risk, like Ticino).

A measurement campaign during the time frame 2005-2010 is aimed to detect all premises with high radon concentrations. This operation is organized by the cantonal Public health department and implemented by our Centre and together with the local Civil protection. Roughly, 50'000 to 60'000 buildings will be measured during this campaign, few thousands are expected to present a radon concentration higher than the limits allowed by the Swiss law (the upper limit in Switzerland for residential and holiday premises is 1'000 Bq/m<sup>3</sup>). According to the law, all premises have to be remediated by 2014. Our Centre will offer an excellent service for accomplishing this ambitious task.

#### **What is radon?**

Radon is a rare gas formed in the earth's crust by the radioactive decay of uranium. It can readily enter buildings through gaps and become a component part of the ambient air we breathe. In Switzerland, radon is responsible for around 40 % of the annual radiation sustained by the population.

#### **Is radon dangerous?**

In Switzerland, 8.5 % of lung cancers are attributable to radon. This gas accounts for 240 deaths a year and is the second biggest cause of lung cancer after smoking.

#### **Are there any houses in Switzerland which are unsuitable for human habitation because of radon?**

The upper limit in Switzerland for residential and holiday premises is 1'000 Bq/m<sup>3</sup>. This limit is exceeded in around 5000 buildings. These buildings will need to be renovated to rule out any significant risk to health.

#### **How can I protect myself against radon?**

In new buildings a simple sealed concrete slab provides very good protection. In regions with elevated radon concentrations, the installation of a ventilated crawl space is recommended.

#### **What is the cost of anti-radon renovation measures?**

Simple renovation measures can be implemented for just a few hundred francs. Complex renovations, however, can cost several tens of thousands of francs.

## BUILDING ENERGY

### Energetic check-up

Since the beginning of March, ISAAC, in collaboration with WWF of southern Switzerland, offers the possibility to run energy audits in residential buildings. By means of examining the building's state and structure, as well as taking into account the owner's needs and reasons, it is possible to prepare an energy report with site-specific solutions, aiming at reducing the building's energy consumption and environmental impact. The audit includes a simplified energy balance and calculates the energy consumed by the existing electrical appliances, heating and lighting systems. Thanks to an economic budget evaluation, based on ecological and energy-efficiency criteria, it is possible to plan carefully the renovation measures needed to enhance energy efficiency. The success achieved in this energy audit campaign shows how owners have become increasingly more sensitive to energy saving and environmental protection issues. The energy audit campaign will continue until the end of the year.

## News

### New Federal Energy Act

Facilities that were put into operation after 1 January 2006 are officially regarded as new installations,

and can thus start claiming the new remuneration for input into the network once the new legal provisions

enter into effect (probably beginning of 2009).

The method of remuneration for input into the network at cost offsets the ecological added value: in other words, the produced electricity can no longer be sold via "green power" exchanges. However, the option still exists of directly marketing green power, but in this case the entitlement to remuneration

for input into the network no longer applies.

The remuneration for input into the network at cost is based on the calculable service life of the facility (for a maximum of 25 years).

Once the foreseen maximum additional costs are reached, no further facilities can claim an entitlement to input remuneration at cost.

## Calendar

### Continuous formation courses

- **Minergie® Certification** (2 one-day courses)  
13<sup>th</sup> February and 14<sup>th</sup> March 2008

- **MinergieP® Certification**  
14<sup>th</sup> March 2008

SUPSI Trevano, Switzerland  
[www.isaac.supsi.ch](http://www.isaac.supsi.ch)

### Klimahouse 2008

17-20 January 2008  
Bolzano, Italy

[www.fierabolzano.it/klimahouse2008](http://www.fierabolzano.it/klimahouse2008)

### Conference & Exhibition: 23<sup>rd</sup> Photovoltaic Symposium

5-7 March 2008  
Bad Staffelstein, Germany  
[www.otti.de](http://www.otti.de)

### 9<sup>th</sup> Solarexpo

15-17 May 2008  
Verona, Italy  
[www.solarexpo.com](http://www.solarexpo.com)

## Good links

[www.bipv.ch](http://www.bipv.ch)

Homepage of the ISAAC website on building integration of PV

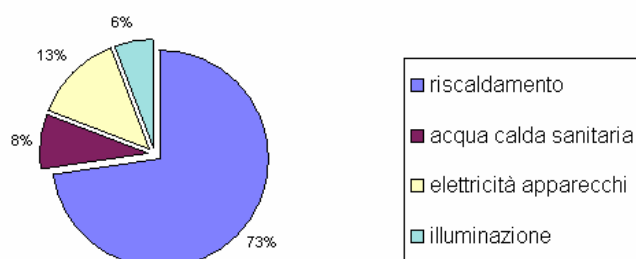
[www.supsi.ch/radon](http://www.supsi.ch/radon)

Homepage of the SUPSI website on radon centre of competence

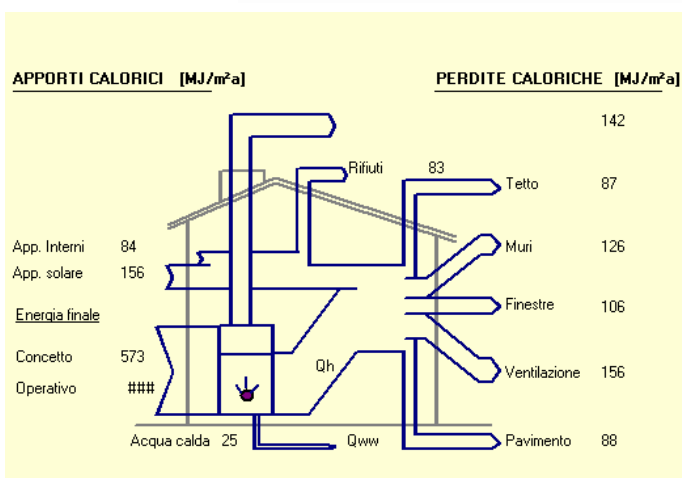
## ACKNOWLEDGEMENTS



### Ripartizione dei consumi in energia primaria [%]



Indice energetico	E	625	MJ/m2
fabbisogno termico calcolato a partire dai consumi Qh	Qh	434	MJ/m2



### SUPSI-Trevano

Dipartimento  
Ambiente  
Costruzione e Design  
ISAAC, CP 105  
CH-6952 Canobbio

Tel. +41 58 666 63 51  
Fax +41 58 666 63 49  
[isaac@supsi.ch](mailto:isaac@supsi.ch)  
[www.isaac.supsi.ch](http://www.isaac.supsi.ch)