

Borsa
dell'Innovazione
e dell'Alta
Tecnologia



Focus on Renewable Energy in Sicily



ITALIAN TRADE AGENCY
ICE - Agenzia per la promozione all'estero e
l'internazionalizzazione delle imprese italiane



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Ministero dello Sviluppo Economico

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A. Historical background of the Renewables in Sicily

Sicily, a Region with a high potential of renewable energy sources, represents an attractive market for investments in the sector.

According to studies of *Ricerca Sistema Energetico-RSE* (GSE) in the medium term the potential generation from hydropower for Sicily is over 30 ktoe, from solar sources is close to 231 ktoe, from wind power it is 360 ktoe, for biomass 292 ktoe, from biogas and bio-liquids 63.5 ktoe and from geothermal 185.1 ktoe.

From 2006 to 2012 the Sicilian energy system has shown a growing trend of the RES plants, especially for the power production. In 2012, the supply of energy from renewable sources was 4709.3GWh, equal to 404.9 ktoe (3079 MW installed), respectively: 1098.8MW from photovoltaic (1206.7 MW until 31 December 2013), 1747.9 MW (1828.5 MW till 30 June 2013) from wind power, 151.3 MW from hydropower and 80.8 MW from Bioenergy. In terms of energy produced GSE has estimated that the generation of energy in 2012 from PV systems was 1492.3 GWh (128.3 ktoe), 2975.7 GWh (225.9 ktoe) from wind power, 171.7 GWh (14.8 ktoe) from hydroelectric plants and the production from bioenergy was around 69.6 GWh (5.98 ktoe). The quantification of the thermal energy generated by RES is no easy task and the GSE is currently involved in the creation of an algorithm to face the problem. Today, the only estimate is extracted from a report by ENEA and it attributes to Sicily 55 ktoe in 2005.

Thanks to the annual report by TERNA SpA it was possible to estimate the trend of power production for each source in Sicily from 1997 to 2013 and results are shown in Figure 1.

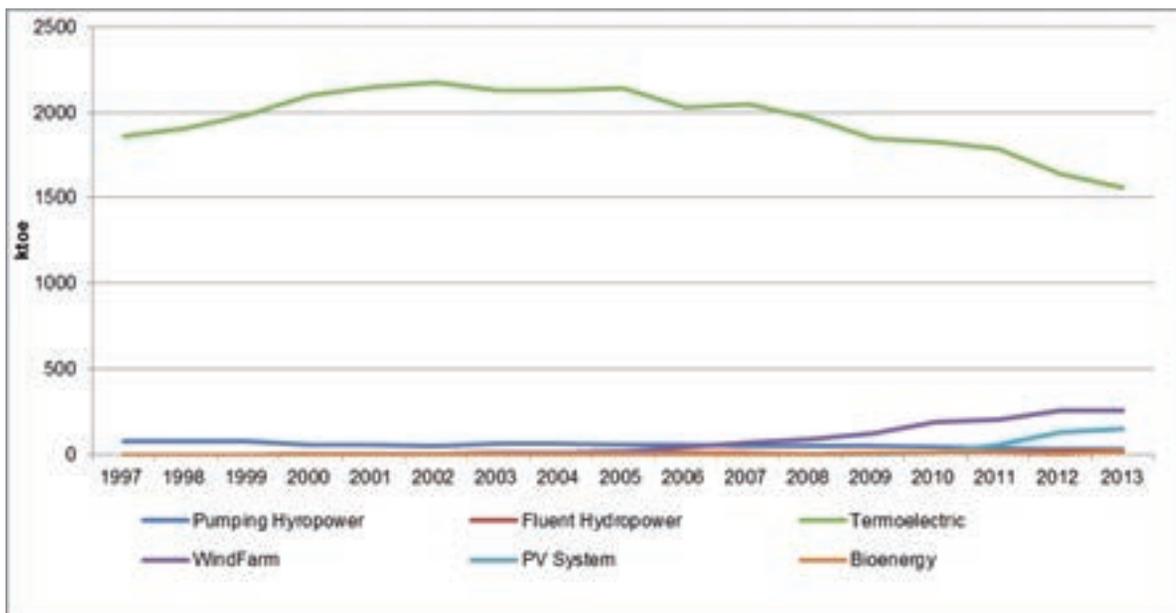


Fig. 1 Trend of power energy production in 1997-2013.

Figure 1 shows that thermolectric plants primarily cover the largest share of electricity consumption. This clearly shows how the Sicilian energy system is still strongly based on the fossil source, especially natural gas, and how the RES are still marginal in the overall Sicilian energy system, even if they have had an important growth in the last years, both in number and in MW installed.

TERNA's report shows the trends in number, power and energy of PV Systems (Table 1), Wind turbines (Table 2), Hydro (Table 3) and Bioenergy (Table 4) plants in Sicily. Up to December 2013, the active PV systems are 37791, equivalent to 1206.7 MW of installed power. These values correspond to 5.7% of the active plants in Italy and 6.2% of installed power in Italy in December 2013.



	n.	Increase n.	MW	Increase MW	ktoe	Increase ktoe
2006	44	--	0.3	--	0	--
2007	344	+ 300	4.2	+ 3.8	0.13	+ 0.13
2008	1540	+ 1196	17.2	+ 13.0	0.92	+ 0.79
2009	3739	+ 2199	43.9	+ 26.6	2.86	+ 1.94
2010	7974	+ 4235	152.8	+ 108.9	8.34	+ 5.48
2011	18846	+ 10872	836.1	+ 683.2	56.94	+ 48.6
2012	31341	+ 12495	1098.8	+ 262.7	128.34	+ 71.4
2013	37791	+ 6450	1206.7	+ 107.8	148.07	+ 19.73

Table 1 Number and installed power of PV systems in Sicily

	n.	Increase n.	MW	Increase MW	ktoe	Increase ktoe
2008	39	--	794.6	--	89.8	--
2009	49	+10	1147.9	+353.3	124.2	+34.4
2010	62	+13	1435.6	+287.7	189.5	+65.3
2011	82	+20	1680.9	+245.3	201.5	+12.0
2012	89	+7	1747.9	+67.0	255.8	+54.3
2013	95	+6	1828.5	+79.6	257.0	+1.2

Table 2 Wind farms in Sicily

	n.	Increase n.	MW	Increase MW	ktoe	Increase ktoe
2008	17	--	152.1	--	6.0	--
2009	17	--	152.2	+0.1	8.94	+2.9
2010	17	--	152.3	-0.9	12.4	+3.5
2011	17	--	152.3	--	8.4	-4.0
2012	17	--	152.3	--	14.8	+6.4

Table 3 Hydroelectric plants in Sicily

	n.	Increase n.	MW	Increase MW	ktoe	Increase ktoe
2008	5	--	19.0	--	6.7	--
2009	6	+1	25.4	+ 6.4	8.9	+2.2
2010	11	+5	42.2	+ 17.0	13.0	+4.1
2011	34	+23	53.9	+ 11.7	9.4	-3.6
2012	44	+21	80.8	+ 26.9	6.0	-3.4

Table 4 Wind Bio-energy plants in Sicily





As showed in Table 1, among RES the PV systems in Sicily rank first and second in terms of number of plants and power installed respectively. The performance of the installed capacity of PV systems, (see Figures 2 and 3), shows a constant growth for the small photovoltaic (between 0 and 200 kW), both in terms of number and of power; on the contrary, there is a reduction of installations for photovoltaic over 200 kW. This trend is mostly due to the introduction of records of large plants and the reduction of the budget of national incentives, both occurred prior to the fourth and then the fifth “Conto Energia”.

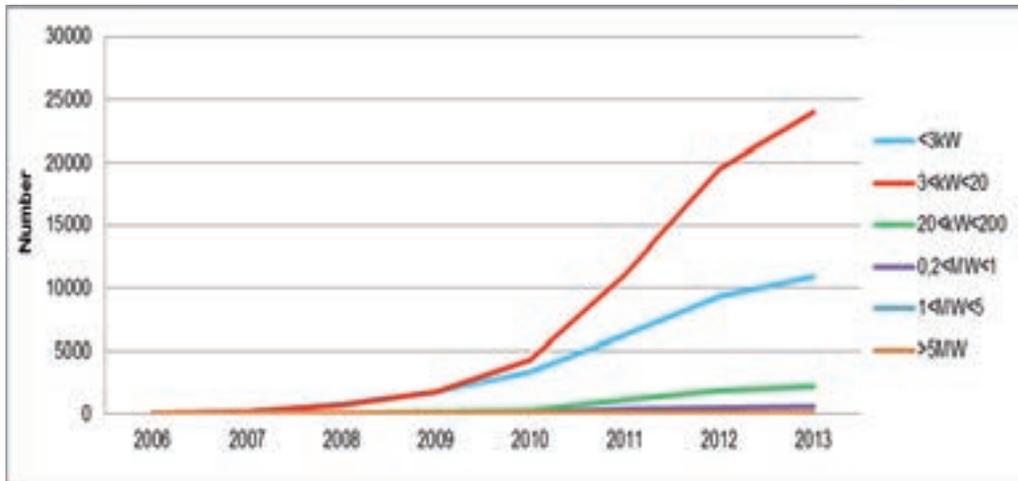


Fig. 2 Number of PV systems by power class in Sicily at December 31, 2013

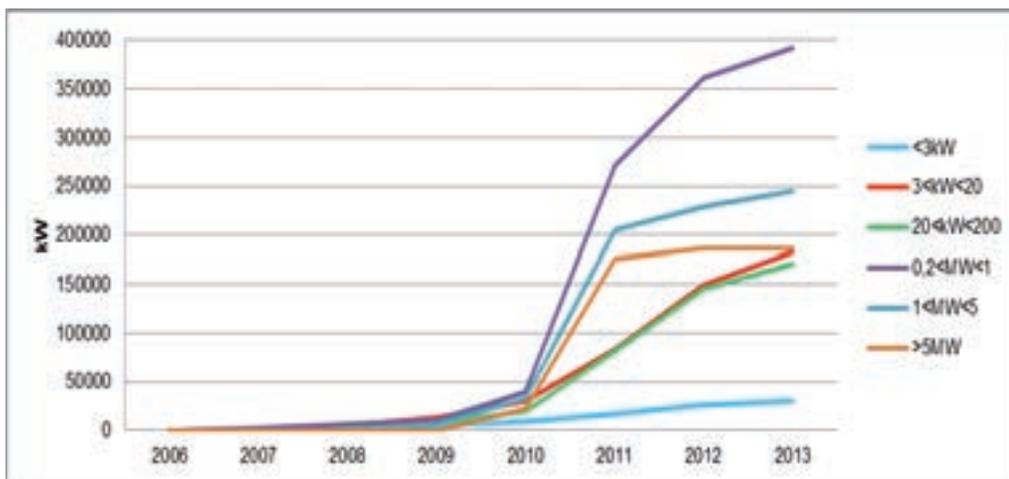


Fig. 3 Installed kW of PV systems by power class in Sicily at December 31, 2013

The data reported in Tables 2, 3 and 4 show that the wind farms are the first RES-related technology in terms of MW installed and generated energy. However, the increase of this source slowed down since 2012, both in terms of power and number of plants. For hydro source, there is no margin of increase because the source is hard linked with the geo-climatic characteristics of Sicily. Bioenergy is today a marginal source and its increase will have to be encouraged by incentive policy of local government.



B. The Renewables District in Sicily

The building sector accounts for more than 40% of primary energy consumption in Europe and causes about 25% of greenhouse gases emissions. The sector is expanding and it is expected to increase its energy consumption. Therefore, the reduction of energy use and the generation of energy from renewable sources in the building sector represents an important measure needed to reduce the European Union's energy dependency and greenhouse gas emissions.

The interaction between the building sector and the renewable energy technologies is of paramount importance to meet the ambitious energy and climate change objectives for 2030: the reduction of greenhouse gas emissions by 40%; the increase of the share of renewable energy to 27%; and a 30% improvement in energy efficiency.

In this context, one of the major Sicilian districts is Ecodomus that works in the field of sustainable building, energy saving and renewable energy technologies applied to the building sector. It obtained the official identification by the Sicilian Department of Productive Activities in March 2012.

The main goal of Ecodomus is to promote collaboration among enterprises (in particular small and medium enterprises - SMEs), research centres and public administration.

This collaboration can help SMEs to improve their economic and environmental competitiveness in the national and international markets by the introduction of the eco-innovation and the eco-design concepts in their productive processes. This collaboration can also help SMEs to improve their knowledge and expertise.

In addition, the district aims to support the public administrations in the definition of sustainable strategies and in the green public procurement.

Ecodomus put together about 160 small and medium enterprises, localized in almost all the territory of Sicily, with a higher density in the territory of Agrigento, in the southwest of Sicily. Other components of Ecodomus are 13 research and education centers, 13 municipalities, 5 public administrations, 8 associations of professionals that work in the field of building and four consortia.

The partners of Ecodomus cover the whole supply chain of the building system and in detail: design of the building, supply and selling of raw materials and energy, construction, operation, maintenance and end-of-life.

Some of the partners are involved in the design process, others are manufacturers and retailers of raw materials, building products, components and renewable energy technologies, others are house-builders, enterprises for demolition and enterprises for the final treatment of building wastes.

An important partner of Ecodomus is the Department of Energy, Information Engineering and Mathematical Models – University of Palermo, which



carries out research activities related on the following topics:

- ▶ Use of renewable energy technologies, as solar cooling plants, solar concentrators, photovoltaic panels, etc.;
- ▶ Life cycle assessment, which is a methodology to assess the energy and environmental impact of products and services during their life cycle. In particular, the LCA is applied to renewable energy technologies (as solar thermal collectors, wind turbines, solar concentrators) and to building products (as tiles, bricks, paints);
- ▶ Design of sustainable buildings and indoor comfort;
- ▶ Environmental certification of products and organizations.

Ecodomus aims to offer some important services to its partners. In detail:

- ▶ Creation of a label of energy and environmental quality for products and services, in order to promote the small and medium enterprises in the markets as “eco-oriented enterprises” and to increase their competitiveness. To use the label of quality, which will be based on the existing environmental labels, the enterprises will follow specific energy and environmental criteria as, for example, the use of renewable energy sources, the use of local materials, the recycling of their wastes;
- ▶ Diffusion of tools for environmental certification of products (as Ecolabel, environmental product declaration) and environmental certification of organizations (as EMAS registration);
- ▶ Support to the SMEs in the use of eco-efficient and eco-innovative technologies and productive techniques, in order to improve their energy and environmental performance;
- ▶ Support to the enterprises in the assessments of energy and environmental impacts of their products through the application of the Life Cycle Assessment methodology;
- ▶ Development of software that can be used by SMEs for the energy and environmental assessment and for the optimization of productive processes;
- ▶ Creation of a help-desk to assist the enterprises in the certification of the performance of their products (thermo-physical characteristics, resilience, etc.), which are usually carried out in laboratories not located in Sicily and that usually, are characterized by high costs;
- ▶ Organization of training for the employees of SMEs on eco-innovation, environmental technologies, marketing and business management;
- ▶ Creation of a website for the promotion of activities, products and services of the district;
- ▶ Support for the public administrations in the green public procurement.

In the field of renewable energy in Sicily, SMEs of the following districts can also be involved:

- ▶ **Technological district of Micro and Nano systems “Etna Valley”**, located in Catania, aiming at creating a centre of excellence, to attract and educate young talents and researchers with multi-disciplinary expertise; to activate projects for the industrial research and experimentation, to promote the micro and nano systems for the innovation of industrial processes.
- ▶ **Industrial district “Meccatronica”**, promoted by Confindustria Palermo, involves SMEs mainly located in the province of Palermo (63% of SMEs) and in other parts of Sicily. The main product categories are: production of non-ferrous metals and semi-finished, steel casting, manufacture of motor vehicles and parts of motor vehicles, railway materials, products of the automotive sector.
- ▶ **Technological district of Naval Transport**, located in Messina at CNR-ITAE, supporting networking activities, international cooperation, through participation in projects and programs and promoting Joint research, public-private partnership, synergies in the public calls, the implementation of supply chain to maritime research and the identification of opportunities for R&D alliances with foreign partners. SiciliaNavtec technology district includes as members enterprises (e.g. Fincantieri, Intermarine), Universities, Public Research institutions, local governments.
- ▶ Website: www.navtecsicilia.it



C. The Renewables research and technological innovation system in Sicily

Universities promote the renewable research and technological innovation in the Ecodomus District and research centres, including the University of Palermo – DEIM, CNR-ITAE and TESB – Tecnopolo of Energy Smart Building.

1. The Academic Institutions, R&D and technology transfer centers

The University of Palermo – Department of Energy, Information Engineering and Mathematical Models – DEIM

The DEIM department promotes and coordinates the research and the teaching in the following fields: assessment of the energy and environmental performances of products and services, production and management of renewable energy technologies, management of energy and environmental resources.

In detail, the Department carries out research and teaching and contributes to the development of important knowledge in the fields of industrial ecology, life cycle assessment, sustainable building, energy planning, heat transmission, use of renewable energy sources, pollution, and environmental comfort.

The Department of Energy is among the LCA experts that are indicated in the European Platform on LCA of the European Commission – Joint Research Centre.

The main fields of activities are the following:

- ▶ Energy
- ▶ Renewable energy technologies
- ▶ Environmental sustainability
- ▶ Environmental control of the indoor and outdoor environment
- ▶ Heat transmission
- ▶ Life cycle assessment and Eco-design

The Department of energy has participated to the following International Energy Agency Tasks as active member:

- ▶ Task 38 (Solar air conditioning and refrigeration),
- ▶ Task 40 (Towards net zero energy solar buildings),
- ▶ Task 42 (Energy conservation through energy storage).

CNR-ITAE

Consiglio Nazionale delle Ricerche (National Council of Research–Italy) (CNR), is a public organization; its duties are to carry out, promote, spread, transfer and improve research activities in the main sectors of knowledge growth and the application of this research for the scientific, technological, economic and social development of the country.

CNR is composed of 7 main departments. The Institute for Advanced Energy Technologies (CNR-ITAE) is located in Messina (Italy). It belongs



to *Consiglio Nazionale delle Ricerche*, Department: Engineering, ICT and Technologies for Energy and Transportation.

CNR-ITAE research activity started in 1980. The main activities deal with energy technologies, addressing high efficiency and reduction of environmental impacts with regards to the processes of production, transformation, storage and transportation of energy.

The institute has two locations covering about 7000 sqm.

Research fields involve batteries, regenerative fuel cells, fuel cells, water electrolysis, hydrogen generation and bio fuels, energy storage, solar energy, heat pumps addressed to electric and thermal applications such as distributed generation, integration with renewables, smart grids, solar cooling, electro-mobility, etc.

In general, the CNR-ITAE has a long and proven experience (around 30 years) in several categories of electrochemical devices especially fuel cells, electrolysers and batteries. CNR-ITAE has contributed to the penetration of fuel cell technology into Europe since the early 80's. CNR-ITAE is particularly active in the field of rechargeable batteries including redox batteries, metal-air and Zebra-type.

The research approach of CNR-ITAE is based on a mixture of basic and applied research, filtered by the economic relevance that the market penetration of the technology requires. Activities and efforts are addressed to the solution of the main technical barriers affecting electrochemical devices. This is carried out by a multi-disciplinary approach, innovating the batteries technology with the up-to-date knowledge in materials science, materials preparation, micro and nano-technologies and system engineering.

- ▶ Website: www.cnr.it
- ▶ Website: www.itae.cnr.it

TESB – Tecnopolo of Energy Smart Building

Tesb is a public-private association that aims at:

- ▶ creating infrastructures for the industrial research, the technology transfer, and the creation of hi-tech enterprises in the smart building sector;
- ▶ creating laboratories for the industrial research and the technology transfer and high- technology business incubators;
- ▶ carrying out programs of industrial research, experimental development and technology transfer;
- ▶ providing scientific, technological, business and financial support to enterprises supporting the creation of high-tech in the incubators through forms of scientific mentoring.

Partners of TESB are: University of Palermo – Department of Energy, Information Engineering and Mathematical Models, CNR-ITAE, ENEA, Ecodomus Consortium, Avens, Onda Energia srl, Xenia, Engineering, Telespazio, D'Appolonia, Sofcpower, Fiamm, Tozzi Sud, Metagroup, Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali (INSTM).

D. The business system

1. The Ecodomus Consortium

The "Ecodomus consortium – Sustainable building, energy efficiency and technologies based on renewable energy sources" was created building upon the experience of the Ecodomus district and out of the interest towards the adoption of techniques aimed at the sustainable optimisation of the energy and environmental performance of the construction sector. The Consortium is the starting nucleus of a project of advanced services for enterprises working in the field of sustainable building.



Ecodomus comprises around 30 enterprises working in the field of sustainable buildings and energy efficiency. While following the same model of the District development pact of sustainable construction and renewable energies, the enterprises of the Ecodomus consortium have been chosen according to their field of competence in order to cover the whole supply chain of sustainable buildings: the design of the building, the supply and selling of raw materials and energy, the commerce of building products, the construction, the use, the maintenance and the end-of-life of building.

Among the most interesting enterprises that cooperate with the Consortium in the context of Sustainable Building and renewable energy technologies, there are Tatano, leader in the heating technology (biomass boilers) and Rimural, leader in the production of sustainable building materials.

- ▶ Website: www.distrettoecodomus.it
- ▶ e-mail: distrettoecodomus@gmail.com

2. Other innovative companies of the renewables sector in Sicily

IDEA

Business sector: **Innovative materials, design of electromechanical devices, CS systems**

IDEA SRL was founded in late 2006 by a group of entrepreneurs and researchers at the University of Palermo in order to perform R&D activities in the fields of innovative materials and industrial engineering. Idea is proposed as an integrator between the research and the industrial community. In particular, the company has expertise in managing complex projects of research and development, the design of electromechanical devices and, thanks to the team of professors from the Department of Chemical Engineering, Management, Computing and Mechanical Engineering of the University of Palermo, has specific know-how in engineering materials and manufacturing processes.

The company is developing a network of innovation-oriented enterprises with the aim to address innovative markets determined by the adoption of an economic model based on environmental sustainability. In that context, Idea is supporting a process of aggregation in the Mechatronics Regional Cluster specifically on concentrated solar systems.

Other current lines of activities include the application of solar energy to desalination processes, development of innovative wind turbines, industrial automation and laboratory instrumentation for characterization of polymers. Many projects are run in collaboration with academic spin-offs and innovative start-ups. For example in the field of bioplastics, a patented application for a biocompatible support system for plant organisms in marine environments has been developed in collaboration with the Biosurvey Ltd, a spin-off of the University of Palermo.

The most significant and cutting-edge technologies developed by IDEA are two different CS systems: an HCPV collector and a Linear Fresnel



collector. The first one is concentrating at 2.000x that is at the present leading edge for such devices. Conversion efficiency exceeds 30% and the system cogenerates hot water at 90°C that can be even used to drive an absorption chiller. Tracker is light and modular and it can be installed on roofs for building integrated plants. The second one is the Linear Fresnel Collector (LFC) system, where the solar radiation is concentrated on a thermal fluid by an array of mirrors that constantly tracks the sun position during the day. The thermal power at 250–300°C is stored and can be used for cooling, heating and for electric power generation. It is very light, modular and easy to assemble. Idea is supplying ready to install solar cooling units combining LFCs with efficient absorption chillers. A specific design for small scale CSP systems has been developed integrating molten salts heat storage and ORC generators.

- ▶ Website: www.ideasrl.it
- ▶ e-mail: info@ideasrl.it

SBSKIN - SMART BUILDING SKIN S.R.L.

Business sector: Sustainable Architecture, Solutions for Building Integration of Photovoltaic, Innovative Glassblocks

SBSkin – Smart Building Skin s.r.l. is a technological start-up and academic spin-off of the University of Palermo, which develops novel building products for sustainable Architecture. The company, arisen from an academic research on the energy improvement of glassblock carried out over the last years by the co-founders, aims at the development and sale of high technological and aesthetic quality products to turn buildings from energy consumers to energy producers while reducing the overall building energy consumption. SBSkin developed and patented novel multifunctional translucent glassblock components that enable to optimize buildings energy performance while enhancing their aesthetics – all that at reasonable costs.

SBSkin products are precast, dry-assembled and prestressed glassblock components, which enable to build at the same time building envelope and PV system. Façades and roofs are translucent, energy efficient and “photovoltaic”, as well as provided of: high values of thermal and acoustic insulation; light transmission tunable according to the requirements of each installation; possibility of producing clean energy, thanks to the integration of the glassblock with 3rd generation solar cells (DSC); high customizability in terms of color, design and transparency for the realization of out-and-out façade drawings. Thanks to these features, SBSkin products actively contribute to the control of building energy consumption from non-renewable sources and to the reduction of green house gases emission in the atmosphere.

Unlike existing solutions for building integration of photovoltaic, SBSkin products are fully customizable in terms of colors, transparency and design to adapt to architectural vision and customers’ needs.

SBSkin glassblock panels are easy to assemble and maintain, and can be used to make buildings elegant, translucent and sustainable.

SBSkin team is made of young and dedicated researchers, architects and engineers who invest resources, part-time/full-time commitment, different competences, team group capacity and broad international work experience.

INNOVATIVE GLASSBLOCKS – SBSkin developed and patented a series of novel glassblock configurations, with the aim to optimize their energy performance:

- ▶ High insulating glassblock modified through a plastic thermal belt, for outside installations.
- ▶ Photovoltaic glassblock, integrated with third generation solar cells (DSCs), for outside installations (roofs and façades).
- ▶ Photovoltaic and high insulating glassblock, integrated with third generation solar cells (DSCs), for outside installations (roofs and façades).





DRY-ASSEMBLED GLASSBLOCK COMPONENTS – SBskin developed and patented also an innovative glassblock assembly system, totally dry, for the construction of precast panels for building roofs and façades, which can be constituted of standard glassblocks already existing in the market or by SBskin's novel glassblocks.

The dry system drastically reduces installation times and costs, guaranteeing at the same time excellent performance of structural resistance and high aesthetic quality.

SBskin provides consultancy services for the research of customized solutions in order to respond to designers' need and specific necessities of each project.

SBskin won several awards and business competitions; among them, the prize uPsTart Paolo Traci, as part of the 8th edition of the Best Practices Award for Innovation.

It was also selected to have access to the funds of MISE – Italian Ministry of Economic Growth (Smart & Start) as a financial support for the development of the company.

- ▶ Website: www.sbskin.it
- ▶ e-mail: info@sbskin.it

APWonders

Business sector: **Wind turbines**

APWonders Srl is a spin-off of the University of Palermo and it is included in the special Italian section for Innovative Start-up. The idea of establishing a new start-up was born from the desire to bring to market the vertical axis wind turbine invented by Prof. Antonio Pantano. The wind turbine represents the initial core business, but the belief that other three innovative products can be successfully brought to market has strongly contributed to the decision to start a new company.

The founders of APWonders are prof. Antonio Pantano, CEO and Director of Design, and Giovanni Pantano. Antonio Pantano boasts a solid education in mechanical design established through an Italian degree, a Masters and a Ph.D. achieved in the US, and two years as a researcher at the MIT. His technical excellence meets with the entrepreneurial experience of the second founder, Giovanni Pantano, who greatly contributed to the birth and growth of the new start-up. Giovanni Pantano was the founder and CEO for more than 40 years of companies that have achieved national level and sizes exceeding 100 employees.

APWonders Srl has already been awarded with an important prize: the "Bright Future Ideas Award", January 23, 2014, Palazzo Mezzanotte, home of the Italian Stock Exchange.

Furthermore, APWonders Srl has won both the calls Smart and Start of Invitalia, which provides grants to support the costs of initial investment for new businesses wishing to exploit economically the research results, and was admitted to the funding requested.



The goal of the company is to grow rapidly differentiating innovative products designed and then marketed according to the proposed business model. The two founders, Antonio and Giovanni Salvatore Pantano, and the initial collaborators of APWonders Srl ensure broad and unquestioned experience, as well as adequate capacity to support each functional areas of their competence.

- ▶ Website: www.apwonders.com
- ▶ e-mail: info@apwonders.com

SABER Technology SRL

Business sector: Innovative photovoltaic plants, solar trackers, wind turbines, biomass from agriculture, bio-composites for industrial and civil engineering applications

The company was founded by Prof. B. Zuccarello and Dr. S. Vivona with the initial goal of producing a particular PV dual-axis sensor less solar tracker having high pointing accuracy and low operating costs, as well as for the realization of innovative photovoltaic plants in Italy.

This first activity exploited the Patent No. 0001386079 entitled “Composite and irreversible mechanism without clearance for innovative solar trackers” allowing the production of several thousand solar trackers sold all over the country, for the installation of various MW of photovoltaic plans, including solar concentration. This activity has lead to a business volume of various Meuro.

Through its subsidiary company called “Procube SRL” the SABER Technology SRL has carried out several R&D public programs, as that called “Materials and Research for boating – Development of new composite sandwich structures for recreational boating” (Materiali e Ricerca per la Nautica – Sviluppo di nuove strutture sandwich composite per nautica da diporto), approved and financed by the Italian Ministry of University and Scientific Research (MIUR – art. 11 of the Ministerial Decree 593 of 2007 – DD No. 3005/Ric. of 12.23.2005). The program involved also the University of Palermo and primary Sicilian Shipyards as AICON YACHTS SPA. In this field, innovative sandwiches structures for pleasure boats have been properly developed. It has received several commissions from important shipyards, employing various engineers and technicians.

In recent years wherein the construction of new photovoltaic plants in Italy has decreased substantially due to the elimination of the public incentive and also the manufacturing of pleasure boats has decreased significantly, the company has diversified its activity engaging in the management of various photovoltaic plants (several MW), as well as in the exploitation of biomass energy from agriculture, and in the production of bio-composites using innovative natural fibers produced in the South of Italy (as agave, broom etc) and wool from the local sheep farms.

In the field of the exploitation of the biomass energy from agriculture, the company has developed the project called “ECODENS – Eco-stabilization of the pomace by densification with pruning residues”. This project has been approved by the Region of Sicily, and it has been financed with European funds PSR 2007-2013 (DDG 839 of 07.13.2011). This program is devoted to the research and the development of an innovative and efficient industrial process for the production of biofuels (pellet) from pomace and residues of agricultural pruning (see www.ecodens.it). It involves the University of Palermo, Confagricoltura (Italian association of farmers) and various SMEs operating in the in the field of Renewable Energy. The project has allowed the development of various installations for the densification of the biomasses that can be used by the same energy intensive farms, through the development of a particular and innovative boiler for the production of cheese and similar typical dairy products.

In the field of the Bio-composites, the company SABER Technology SRL is carrying out several research and manufacturing projects including a project funded by the Sicilian Region focusing on the exploitation of Sicilian natural fibers (agave, wool, broom and prickly pear) for the production of bio-composites for industrial and civil engineering applications. In detail, the project involves the development of





experimental fields for the production of bio-fibers (agave etc) and the manufacturing of bio-composite panels and laminates by using proper matrixes.

Recently, SABER Technology SRL has developed a vertical axis wind turbine characterised by innovative technology, reliability and low cost.

- ▶ Website: www.saber-technology.eu
- ▶ e-mail: sabertechnologysrl@gmail.com

I-Labs s.r.l

Business sector: **Renewable energy production systems, wind turbines**

I-Labs s.r.l is a start-up working in research and development of renewable energy production systems. I-Labs mission is to create products for a better future with a special attention to diffused generation.

I-Labs is now developing I-Turbine, an innovative small vertical axis wind turbine oriented to households, SMEs and public administrations for urban installations.

It has been designed to work better in urban and suburban wind conditions and to be installed close to people. Small wind turbines are in fact, within photovoltaic panels, the best systems to produce diffused energy.

I-Turbine is characterized by several innovations regarding electronics and control, materials, design and customisation. An advanced inverter developed with the researchers of ISSIA-CNR, thanks to neural algorithms, optimizes the maximum power point tracking and boosts the electrical energy production. I-Turbine's blades are made with an innovative composite material obtained by basalt fibers and a special eco-resin; this material has improved mechanical characteristics than the classic fiberglass and a lower environmental impact.

I-Turbine has also a monitoring and control system able to communicate production levels and operating state to customers and producer; in this way customer can always know how many energy the turbine is producing and thanks to an accelerometer the producer can monitor the turbine in order to operate preventive maintenance.

Lastly we are working on customization and integration: consumer customers can choose different colors according to their wishes while business customers can also have custom products integrating in the turbine billboards in order to transform the turbine in a green marketing tools.

I-Turbine will be produced in different size having nominal power of 1, 3, 5 and 10 kW at 11 m/s wind speed.

- ▶ Website: www.facebook.com/ilabssrl
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ADESSO ENERGIA

Business sector: Hybrid solar system, biomass, bio solar, photovoltaic, micro and mini wind, energy efficiency

Adesso Energia s.r.l. is an innovative start-up born from the experience of companies and professionals committed to promoting an environmental culture aimed at sustainable development through the intelligent management of the available resources .

The primary objective of the company is to promote new technologies for the production of energy to combine with those already known.

In that regard, a Memorandum of Understanding was signed with the University of Enna (Unikore) to carry out research, innovation and technology transfer of a prototype system, of high-efficiency cogeneration, CAR for the controlled production of heat and power from solar hybrid origin and biomass that uses innovative technology integrated with the traditional ones.

With a multidisciplinary team of engineers, lawyers, economists and environmental experts, Adesso Energia s.r.l. offers full consultancy for the study, design and construction of plants using renewable energy sources, assisting the client at all stages of the process so that the investment proves productive, providing its customers with the ability to access personalized turn-key services able to meet the individual specific needs. Adesso Energia main fields of activity are:

- ▶ hybrid solar system / biomass/ bio solar
 - ▶ photovoltaic
 - ▶ micro and mini wind
 - ▶ energy efficiency
 - ▶ monitoring and management of renewable energy systems
 - ▶ services to find financing and to create start-ups
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- ▶ www.adessoenergia.it
 - ▶ info@adessoenergia.it

E. Project proposals submitted to the BIAT

Company	Title of the Project
ADESSO ENERGIA SRL	AE BIO SOLAR - Hybrid System for the Production of Electrical Energy
APWONDERS SRL	Oscillating Blades Wind Turbine
IDEA SRL	Polygenerative Concentrating Solar Systems
I-LABS SRL	I-Turbine - A New Generation of Small Wind Turbine
SABER TECHNOLOGY SRL	Low Cost Vertical Axis Wind Turbine
SBSKIN - SMART BUILDING SKIN SRL	Multifunctional Glassblock Components for Active Solar Façades



The Italian Trade Agency - ICE is the Government agency that supports the globalization of Italian firms, implementing the strategies of the Ministry of Economic Development.

The Italian Trade Agency - ICE helps to develop, facilitate and promote Italian economic and trade relations with foreign countries, focusing on the needs of SME's, their associations and partnerships.

The Italian Trade Agency - ICE sustains Italian firms in their internationalization processes, in the marketing of Italian goods and services while promoting the "Made In Italy" image around the world, and it is directly involved in attracting foreign direct investments.

The Italian Trade Agency - ICE provides information, support and consultancy to Italian companies on foreign markets, promoting and fostering exports and cooperation in all areas - industry (consumer and capital goods), agricultural technology and agri-food, services, and training - with the aim of increasing and making more effective their presence on international markets.

The Italian Trade Agency - ICE works closely with the Italian Regions, the network of the Italian Chambers of Commerce, business organizations and other public and private entities.

The Italian Trade Agency - ICE headquarters is in Rome, with a large network of offices around the world and acts as "Trade Promotion Sections" of the Italian Embassies or Consulates.

The BIAT

Funded under the Cohesion Action Plan of the Economic Development Ministry, the BIAT - Innovation and High Technology Lab, is an initiative designed to enable the enterprises and research systems of Italy's so-called Convergence Regions - Campania, Calabria, Apulia and Sicily - to express their full potential for innovation and excellence. BIAT is part of the program of activities of the Italian Presidency of the EU.

The event is organised by the Italian Trade Agency in collaboration with Confindustria (the Confederation of Italian industry), the Convergence Regional Governments and Campania in.Hub.

BIAT aims to promote the placing on the market and/or the transfer of innovative products and services or high technology and intangible assets (patents in particular) by matching commercial and technology supply and demand between start ups, innovative SMEs, business networks, universities, technology parks and foreign counterparts.

BIAT aims to put in place a systematic offering of industrial application opportunities from which all entrepreneurs can benefit.





CONFINDUSTRIA



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REGIONE SICILIA