

Why cooling with the sun energy?

Adriacold project overview and
main achievements

INNOVER EAST

Training course: Innovation service
provision

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project co-ordinator



Main drivers (EU2020 objectives)

- 1) Power energy reduction for building purpose
- 2) Energy local production from RES
- 3) Mitigate the environmental pollution with innovative and efficient energy systems
- 4) New markets development and employment increase

Objectives

„Diffusion of Cooling and Refreshing Technologies using the Solar Energy Resource in the Adriatic Regions“

Project Acronym: **Adriacold**

Project code: 2° ord/0030/1

Website: www.adriacold.eu

- Promotion of the use of renewable (solar) energy for refreshing and cooling needs
- Contribution to the decarbonisation of the Adriatic area
- Study and assessment of the refreshing and cooling requirements (up to 2020)
- Identification of the most effective and appropriate solar cooling technologies
- Technical & economic feasibility study to be used as guideline for potential users
- Set up the first example of transnational network in the Adriatic Regions of pilot plants aiming to facilitate the fast diffusion of solar cooling & heating technologies adoption for buildings summer/winter conditioning

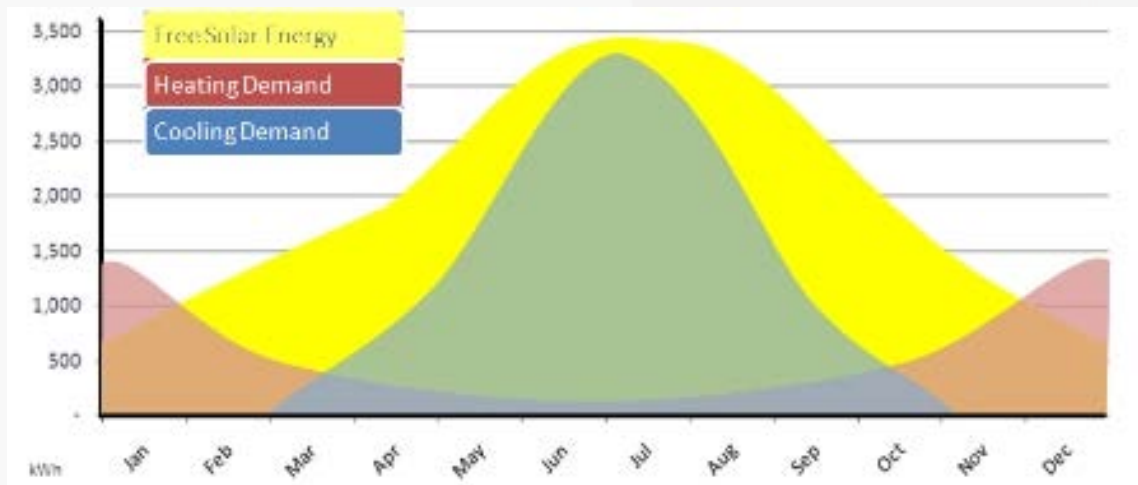
Why a project on solar cooling ?

Solar Cooling offers substantial environmental, financial and social benefits over the conventional compressor driven cooling systems

Very low power consumption against disadvantages with compressor driven systems are that they consume a lot of electricity and use refrigerants which damage the ozone layer of the atmosphere.

Maximum solar radiation available in perfect phase with the cooling demand

Opportunity to cut the power energy demand seasonal peaks



Involved Territories (5) & Partners (12)

- *ITA:*
 - Consorzio per l'AREA di ricerca scientifica e tecnologica di Trieste (Leader)
 - ENEA - Agency for the New Technology, Energy and the Environment, Bari
 - Cortea, Trieste
 - Province of Rimini
- *SLO:*
 - GOLEA - Goriska Local Energy Agency
 - Josef Stefan Institute, Ljubljana
 - Municipality of Piran
- *CRO:*
 - Faculty of Mechanical Engineering and Naval Architecture, Zagreb
 - Regional Energy Agency Kvarner
 - City of Dubrovnik
- *B&H:*
 - Economics Institute Ltd. Banja Luka
- *ALB:*
 - City of Durres

The challenge of a potential market

SC Medium- and small-size plants (less than 200 kWf):

- PUBLIC BUILDING (i.g. offices, schools, kindergarden, sport center)
- AGRICULTURE (i.g. greenhouses)
- AGROINDUSTRY(i.e. wineries, small diaries)
- TOURIST ACCOMODATION (i.g. hotels, camping sites, marinas, farm holidays)
- COMMERCIAL BUILDING (i.g. small shopping centers)

Target beneficiaries

- **Public administrators** that can promote and buy this type of innovative cooling systems using renewable energy sources
- **Professionals, manufacturing companies and relevant industry associations** that can enter new markets with innovative products
- **Researchers** that can have access to actual fresh experimental data to be compared with theoretical ones
- **Owners/managers of hotels, fitness centre, greenhouses, nursing homes, small shopping canters** that can understand if they can save money installing cooling systems based on the solar cooling technologies.

The Pilot Plants innovative network

Total 6 pilot plants (in the range of 15 - 50 kW)*

- ✓Italy (3) - Trieste, Rimini and Bari
- ✓Slovenia (1) - Piran
- ✓Croatia (2) - Rijeka and Dubrovnik.



*Main purpose is to investigate the pilot performances in terms of energy saving and efficiency and not the economic return of investments

Key outputs issued so far

- ✓ A common template & methodologies to understand the potential territory cooling energy demand have been created as well building energy audits performed
- ✓ a report “Energy use for cooling and potential of solar assisted cooling in the public, hotel and tourist, agriculture and service sector” has been released encompassing around nr. 300 buildings located in 5 IPA Countries (AL, BiH, HR, IT and SI).
- ✓ Many technical reports have been produced to well asses and compare the pilot plants final characteristics and expected performances.
- ✓ A common monitoring layout and data acquisition procedures have been designed
- ✓ Nr. 6 solar cooling pilot plants have been installed with an investments for a total of 800.000 Eur. In Croatia they are the very first ones!
- ✓ Nr. 10 pre-feasibility studies on solar cooling systems done with a preliminary investment payback period calculation (5 hotels, 1 school, 1 winery, 1 wellness centre, 1 elderly home and 1 hospital)

Key outputs almost ready to be issued

- ✓ Final report on performances, yield and other indicators regarding the nr.6 SC pilot plants
- ✓ Case studies report consisting in economic, energetic and environmental analyses
- ✓ Hands-on guidelines to suggest how to successfully implement a SC system thus overcoming possible constrains

Results exploitation

Lesson learned: “THE SC technology is very promising but

- 1) There is still lack of knowledge in both SC design & setting up stages
- 2) There are not enough collected field data under real operating conditions
- 3) The SC market is still underdeveloped as *“Today, about 1000 solar cooling systems are installed worldwide, where the market has grown in the last 8 years between 40 and 70% per year”* (source: WIREs Energy Environ 2015, 4:229–234. doi: 10.1002/wene.132)
- 4) The chiller & solar collector equipment are still too expensive
- 5) From medium sized power on (> 100 KWf) an economical advantage was proved. This is not yet true for the lower sized plants (<100 kwf). According to project studies it seems that the 40% reduction of investment costs allows having very interesting payback (i.e. less than 10 years). In this sense, the availability of public subsidies seems absolutely necessary.

Results exploitation

New actions (for a new project)

- 1) Wider diffusion of technical documentation/training among professionals, manufacturing companies and relevant industry associations that can enter new markets with innovative products
- 2) Increasing the network of SC plants showing the most suitable technologies for specific applications & users
- 3) Creating a DB filled-in with actual monitoring data of SC plants installed in the most promising area, such as the Mediterranean with mild winters and sunny summers
- 4) Carrying out a stronger dissemination of the results obtained addressing both Local authorities with the aim to include this technology in their energy development strategic plan

project coordinator



project partners

Cortea



PROVINCIA
DI RIMINI

ENEA

Agencia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile



Institut "Jožef Stefan"
Ljubljana, Slovenija



OBČINA PIRANO
COMUNE DI PIRANO



REA
KVARNER



DURA
Illegitima agencija Grada Dubrovnika
City of Dubrovnik Development Agency

**Economics
Institute**
Banja Luka



BASHKIA DURRES

THANKS FOR YOUR LISTENING !

For further information please write to:

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