

POLIMI interests and possible contribution



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POLIMI company profile



- POLIMI: Politecnico di Milano the largest technical university in Italy. It is a science and technology academia educating engineers, architects and industrial designers.
- Founded in 1937, it has always been based on quality and innovation in teaching and research, resulting in a prolific relationship with the economic and manufacturing world.
- About 40.000 students and “produces” nearly 15% of the Italian engineers.

POLIMI company profile



- “Department of Energy’s father”, founded in the “golden age of nuclear”, employs about 50 academics.
- It is dealing with education and research in various fields: Propulsion and combustion, Machineries and energy systems, Fluid dynamics of machineries, Industrial thermodynamics, Nuclear power technologies, Electrical systems, Chemistry of combustion, Enviromental thermodynamics
- Enviromental thermodynamics: technology development and system analysis in the following research fields: end-use energy efficiency, tri- and cogeneration, heat driven cooling processes, air-conditioning and refrigeration systems, solar cooling and heating systems, building services.

The BEES group

Who? About twelve people, three PhD students.



What? R&D at component and system level, implementation and dissemination of energy efficiency measures and use of solar thermal systems. Thermal driven cooling technologies, Polygeneration, Building physics and efficiency, Solar thermal technologies, Solar Air-conditioning and refrigeration.



How? European projects, R&D for technology providers, end-users, energy service companies, Public administration and local and national authorities.

Daniel's request...

- main interests in the New Task
- ongoing and new R&D projects related to the New Task
- concrete inputs to the Work Plan
- responsibilities within the New Task (involvement by topics)

main interests in the New Task

We believe the two barriers pointed out are the crucial one to overcome: general lack of economic competitiveness, secure long term energy performance and **reliability**

- A interest in the selection of most promising solar cooling applications: it won't be the solution for any need of cooling
- A trace most promising targets (applications) in a background characterized by the national implementations of the RES HEAT and Directive 2010/31/EU
- B the development of a quality procedure for system design, installation and operation: only way to lead to reliability and good performance
- C the creation of a "Solar Cooling Keymark" as tool to guarantee system quality worldwide and support market development in the long term.
- D the dissemination of the results: level of policy makers and training

ongoing and new R&D projects related to the New Task & concrete inputs to the Work Plan



■ MEDISCO concept

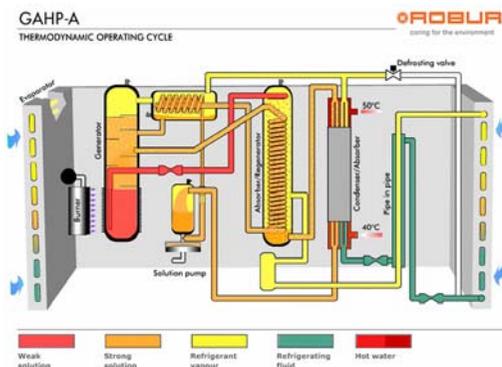
- continue the application of solar cooling to Food & Agro industrial end-users in the Mediterranean: Egypt (MEDISCO model) start April 2011
- an installation is foreseen by the end of 2011
- contribution to → SubT: A, B and C



■ ECOS: further development of new open cycles (DEC):

- simulation campaign on the system performance and laboratory implementation foreseen
- tracing potential end-users for this concept
- contribution to → SubT: A

ongoing and new R&D projects related to the New Task



Label classes (efficiency limits and typical examples)

Class	Limit	Examples
A+++	>120%	Vertical et. GSHP
A++	>104%	Gas-fired Abs. HP
A+	>88%	Best condens+ solar
A	>80%	Best condens
B	>72%	Avg. Condens
C	>64%	Best LT
D	>56%	Avg. LT
E	>48%	Low-end LT
F	>40%	Avg. atmospheric
G	<40%	Low-end atmospheric

Best Gas Abs. HP
Hor. Et. GSHP
Vent. Air HP
Outside Air HP
Low Condens
Best atmo. + solar
Best atmo.
Electric res. + solar
Electric resistance

LLCC 96%**
LLCC 76%*
Base 54%*
Base 45%**

IK
Ecodesign of Boilers
For European Commission, 2006/07
van holsteijn en barma BV

- EU project on - Gas Absorption Heat Pump solution for existing residential buildings – HEAT4U + (National support)

- Lab Performance Verification of gas HP with the following goals:

- 1) certification of performance indexes at standard rating conditions, according to European international and national standards including EN standards;
- 2) labeling of the GAHP Appliance and System according to both European Eco-design and labeling criteria (ErP-Ecoboiler Lot1) and performance criteria of the most important national quality marks;
- 3) performance characterization (e.g., energy efficiency functional dependence with boundary conditions like air temperatures, hot water temperatures and flow rates).

ongoing and new R&D projects related to the New Task

- Preliminary to lab testing: definition of test protocol according to EN standards (EN 12309-1/2 “Gas-fired absorption and adsorption air conditioning and/or heat pump appliances with a net heat input not exceeding 70 kW”). However, preparation and revision of standards on electricity driven heat pumps (EN14511, EN14825) are under way.
- As revision of EN 12309-1/2 is also planned: revision process would harmonize standard rating conditions and performance indexes in order to ease the comparison between gas fired and electricity driven heat pumps.
- Issues like rating conditions at full and part load, primary energy efficiency and seasonal performance indexes will be addressed during such revision.
- contribution to →: SubT.C

ongoing and new R&D projects related to the New Task

- Involved in several solar cooling projects with monitoring: two MEDISCO (old), SOLERA, HIGH-COMBI
- Experience in modeling and simulations at system and components level, mainly used for design and components development
-

responsibilities within the New Task (involvement by topics)

- Involvement major in subtasks A and C
- Minor involvement in subtasks B and D
- Available for a Subtask leadership

Points for a discussion

- Do not put activities in the workplan we do not cover with project budget. They would become difficult to carry out and irrelevant to the real work!!
- Are Subtask A activities covered?
- Proposal for EIE project to contribute SubT A?