



Apulian Collaborations and Activities on R&D Energy Issues

Prof. Giuseppe Starace, phd

President of the Scientific Committee of the Apulian Productive District «La Nuova Energia»;
Aggregate Professor of Applied Thermodynamics and Heat Transfer - Department of
Engineering for Innovation at University of Salento.



Agenda

- News on the Apulian Productive Cluster «La Nuova Energia»
- The ways to collaborate in Apulia
- Apulian successful case studies collaboration and R&D issues
- Conclusions





Apulian Productive Cluster of Renewable Energies and of the Energy Efficiency «La Nuova Energia»

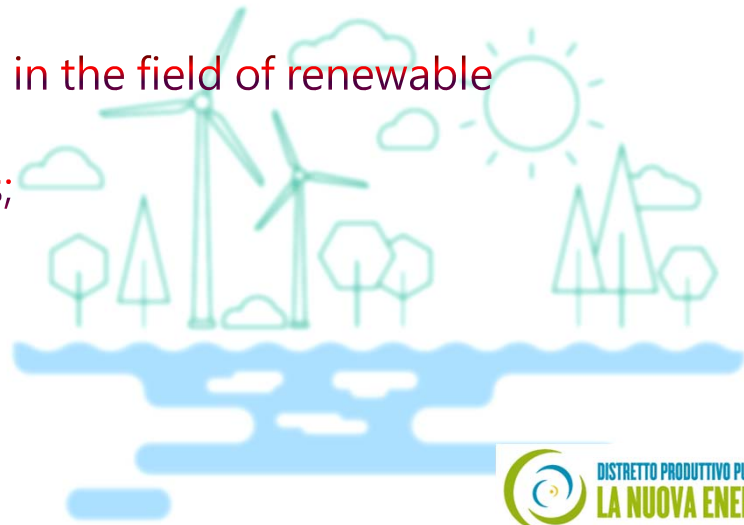
The mission

Developing the common interest to innovation and investments for successful solutions in:

- smart energy production and distribution both from renewable and traditional sources;
- energy efficiency in processes and products;
- smart use of either renewable or traditional sources both in industrial and civil applications.

The associates

- 300 enterprises and professionals operating in the field of renewable energies;
- 13 Local Public Authorities and Associations;
- 9 Universities and Research Centers;
- 10.000 direct and indirect workers.





Apulian Productive Cluster of Renewable Energies and of the Energy Efficiency «La Nuova Energia»

Opportunities

The region Apulia is located in the South East of Italy and shows many favorable characteristics:

- it is sunny and windy;
- agriculture is well developed and is a main source of income and turnover for local enterprises;
- entrepreneurs are vocated to manage innovations and to develop new ideas.

Main programs

The cluster helps associates to reach their own economic and financial targets; at a regional level, its commitment is devoted mainly to:

- cultural support to associates on energy efficiency and energy savings issues;
- collect data on heat and power effective and instantaneous demand in Apulia;
- networking among all the stakeholders and also with regional clusters committed in correlated issues to reach innovation in products and internal processes;
- participate to build up national and regional strategies, standards and laws on energy topics.



The ways to collaborate in Apulia on energy topics

Active stakeholders share the same goals

Universities and Research Centers

Apulian universities with their departments involved in energy issues are known worldwide and are strictly connected with the local economic framework, as well as with international scientific institutions

- Polytechnic of Bari (Engineering and Architecture University);
- University of Salento with its Department of Engineering for Innovation that develops big projects by itself and in the past has exploited many funding opportunities to develop its knowledge;
- University of Bari with its Physics and Chemical Departments;
- Research Centers (i.e.: ENEA, CNR, Cittadella della Ricerca) that manage specific knowledge and share activities and relevant results



The ways to collaborate in Apulia on energy topics

Active stakeholders share the same goals

Big Companies, SMEs and High-Tech Startups

At any turnover dimension, they show:

- proactiveness (ideas come from their needs and are expressed to find new and general solutions);
- ability to support and carry out research activities as well as to develop and manage innovations;
- availability to share results with inventors, funding entities





The ways to collaborate in Apulia on energy topics

Active stakeholders share the same goals

Regional Public Authority «Regione APULIA»

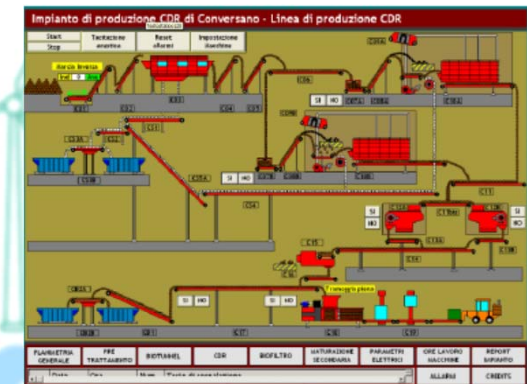
Releases calls open either to public entities or to private enterprises or to specific targets for giving public (European, National and Regional) funding for

- research and innovation on energy issues (products, processes, procedures);
- building refurbishment finalized to energy efficiency
- collaborations among local (or even not Apulian but with an Apulian operation site);
- investments even in ordinary assets (such as machinery or plants) only if connected to energy savings or energy efficiency;
- attracting new partners from outside Apulia to settle locally and to share their expertise and increase the employment level.



The ways to collaborate in Apulia on energy topics

Energy efficiency improving, recycling and renewable production plants





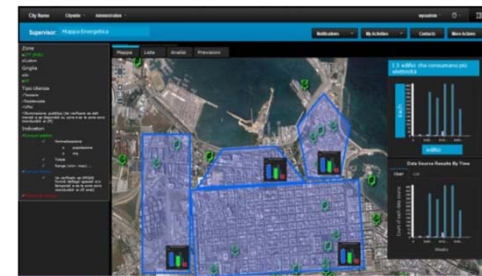
Apulian successful case studies of collaboration

UCCSM (Urban Control Center for Smart Metropolitan Cities)

- supported by European Regional Development Fund in the «Apulian Technology Clusters SMARTPUGLIA 2020» program;
- Budget: 2M€; Duration: 2016-2018.

Goals

- Developing an innovative dashboard and decision support tool for efficient urban governance at a metropolitan level;
- Investigating solutions to effectively measure the city energy performance and proficiently support the decision maker in determining the optimal action plan for implementing smartness strategies in the city energy governance.





Apulian successful case studies of collaboration

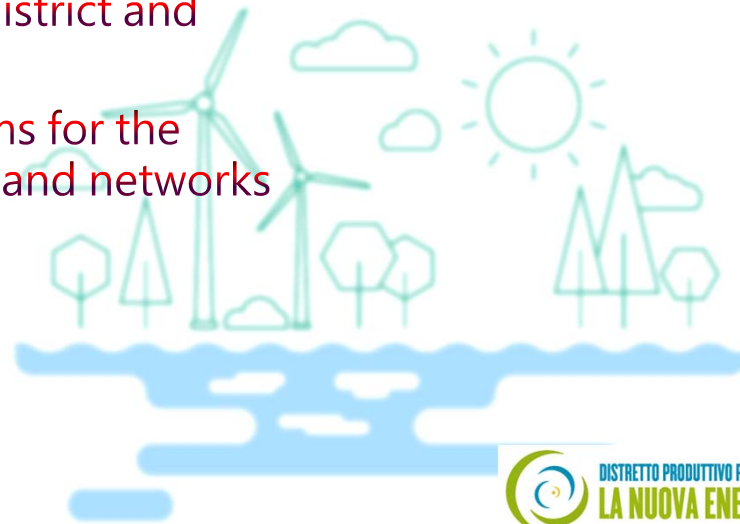
RES NOVAE (Networks, Building, Roads, New Virtuous Objectives for Environment and Energy)

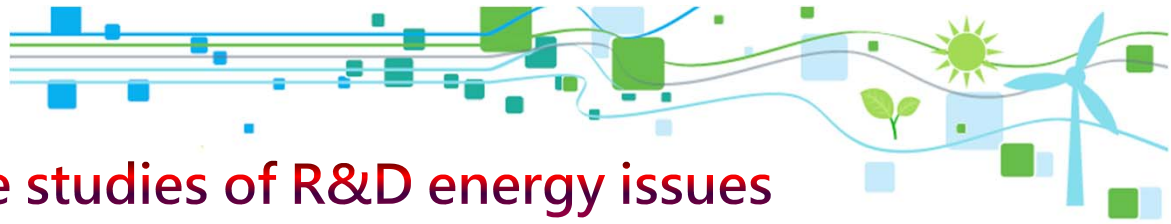
- supported by the Italian Ministry of research in the «Smart Cities and Communities and Social Innovation» program;
- Budget: 24M€; duration: 2013-2015



Goals

- Monitoring of the energy flows at a grid, district and building level
- Developing decision and control algorithms for the optimal energy management of buildings and networks of buildings



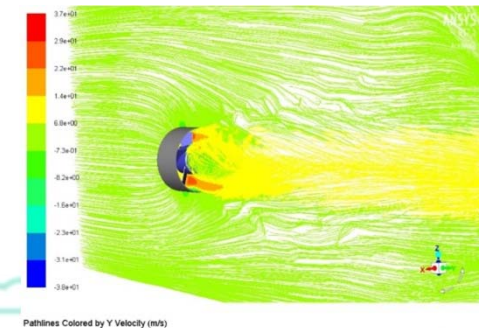


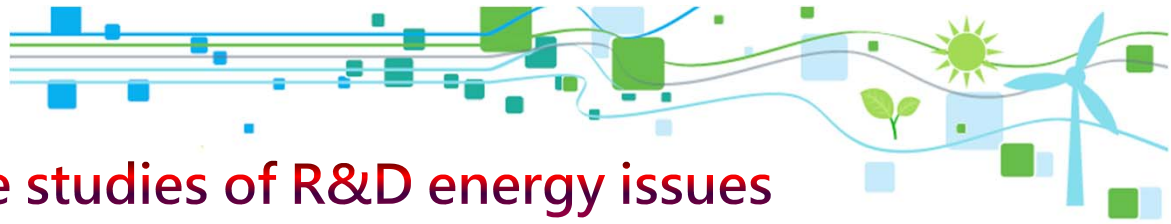
Apulian successful case studies of R&D energy issues

Design of a novel open space test rig for small-scale wind turbines

A complete approach to build up an affordable research tool. Actions to:

- design a test bench by a purposely made CFD model to adopt the correct geometries;
 - reproduce the real open field surroundings and all the associated phenomena and eliminating the scale effect of wind tunnels;
 - build a cluster of axial fans to provide an adjustable airflow rate to the wind turbine, thus reproducing multiple operating conditions;
 - providing adjustable geometries of the turbine by a rail;
- it is suitable for testing both horizontal and vertical axis wind turbines.





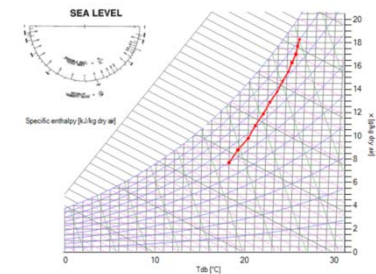
Apulian successful case studies of R&D energy issues

Effective performance of evaporative condensers

A wide experimental campaign and the application of a purposely optimized analytical model were performed.

Actions were:

- a test bench was purposely designed to reproduce at small scale the phenomena while controlling all the parameters affecting the evaporative condenser performance;
- a wide sensitivity analysis was carried out to investigate the real behaviour;
- data collected at small scale are useful to extend results at full scale combining in the effective geometry real local phenomena;
- a hybrid method set up at the University of Salento was applied to understand and then predict overall performance of countercurrent evaporative condensers.



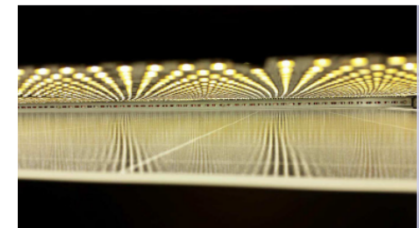


Apulian successful case studies of collaboration

Solar simulator to decrease maintenance costs of photovoltaics plants

Inspecting panel efficiency at the plant site:

- a mobile test unit was purposely studied, set up and tested;
- a high matching between solar and artificial led based artificial light were reached;
- defects of panels were found in very short lighting lamp tests.





Conclusions

ENERGY TOPICS

Networking in Apulia is a consolidated practice by Clusters specialized on energy issues

- new actors are welcome to exploit the high potential of the territory in terms of skills, culture and opportunities;
- new productive, development as well as research sites can express their full potential in Apulia and the Cluster "La nuova energia" is the ideal association to do it;
- examples of successful cases are at all levels and are witness of what is really possible;
- both public entities and authorities and private companies have created a favorable environment to experiment innovation and R&D initiatives on energy issues;
- new programs are ongoing and new results will be soon available.

