



Work Package 3: Analysis of Applied Measures

Deliverable 3.3 Presentation of list of innovative technologies implemented

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Authors:

Lorenzo Pagliano, Marco Pietrobon, Salvatore Carlucci
eERG - end-use Efficiency Research Group, Politecnico di Milano

Contribution:

From all National Contact Points

Project management:

Henning Discher, DENA



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Presentation of list of innovative technologies implemented

Version: June 2009

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INNOVATIVE ENERGY SAVING MEASURES

The problem of the lack of a definition

Defining what is an “innovative” energy saving measure is a not easy matter, since there is not a clear and commonly agreed definition of what is an innovative technology.

We proposed a definition of “innovative” which includes the use of new materials, of specific use of know plant systems in an environmental-saving way, advanced control strategies, but also old techniques (like natural ventilation) if designed with modern means, design of microclimate around the building, etc..

Designing and realizing a building according to an high energy conservation standard (i.e. the PassivHaus standard, ...) should be also considered an innovative designing approach.

Proposing a list of innovative energy saving measures

An explicit list was presented. It is organized in four categories:

1. innovative approach to the integrated design;
2. innovative plant systems or strategies;
3. innovative materials;
4. innovative control strategies.

Each category contains the following innovative measures.

1. Innovative approach to integrated design:
 - Design and realization of a building according to an high energy conservation standard.
 - Actions on the microclimate surrounding the building (water evaporation, use of vegetations, cool surfaces) to reduce temperature around the building in summer (which is an action suggested by EPBD);
2. Innovative plant systems or strategies:
 - Desiccant cooling solar driven;
 - Ground exchanger used in free cooling mode in summer;
 - Special plants i.e. thermodynamic energy generation plant, plants capable to use body heat to satisfy energy needs in buildings, ...;
 - Careful design of natural ventilation (e.g. by and its integration with mechanical systems, ...) as suggested for example by the “Hybrid ventilation guidelines” published by IEA;
 - Use of light chimneys (i.e. optic fibres, light tubes, ...)
3. Innovative materials
 - Cool materials (that is materials with a low solar absorptivity applied to roofs or other surfaces to reduce their surface temperature in summer);
 - Thermochromic materials (materials which can change their optical properties as a function of their temperature);
 - Phase change materials (materials which can change their mass properties – specific heat, conductivity and density, ... – or their physic phase, using the latent heat, as a functions of their temperature);
 - Nano-materials (nano-films or monolithic nano-materials i.e. aerogels)



4. Innovative control strategies:

- Control strategies of passive or active techniques based on sensors of operative temperature rather than sensors of air temperature;
- Building performances controlled by a Building Management and Control System (BMCS)
- Mechanical ventilation plant controlled by CO₂ sensors;
- Advanced controls of solar protections (e.g. movable systems, high performance selective glazing, nano-material films...);
- Advanced controls of day-lighting (i.e. daylight sensors, motions detectors, ...)
- Controls for the optimization of the energy use in buildings (i.e. "green button", ...)



LIST OF INNOVATIVE TECHNOLOGIES IMPLEMENTED

General considerations

With support of NCPs, each GB Partner collected data relative to his building in the data collection tool, developed by eERG. Then all data were collected in an overall database, containing information of all GB Partners' buildings. These represent a great amount of important data, that were elaborated and analyzed, delivering also detailed lists and analysis about the innovative technologies applied.

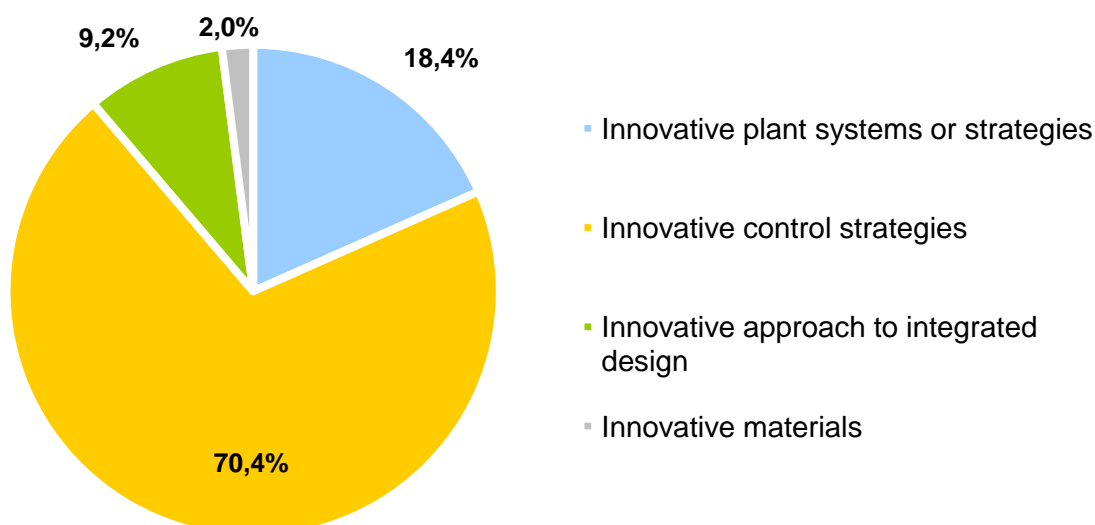
The analysis presented in this document is relative to all GB Partners' buildings projects presented. All available data were considered.

As we can see in detail in Deliverable 3.2 - Inventory of applied measures - in general, a large number of energy efficiency improvement actions were applied, quantifiable in a total amount of almost 700 actions declared by the GB+ Partners, applied on the analyzed 85 buildings. So, in average, in each intervention almost 8 actions were applied. This could make us think that GB+ Partners used and holistic integrated approach to improve their buildings projects, by adopting different actions in several technical fields in the same building.

The majority of our Partner uses technologies that are just standard and not very innovative according to our list of innovative measures proposed in previous paragraph. This is reasonable according to building products market rules (like costs, availability, etc.) and experience and knowledge of building designers and other practitioners.

The graph g. 1, below, shows disaggregation by categories above described of the innovative technologies implemented. It shows that main measures are largely about innovative control strategies, secondly innovative plant systems or strategies, finally innovative approach to integrated design and innovative materials

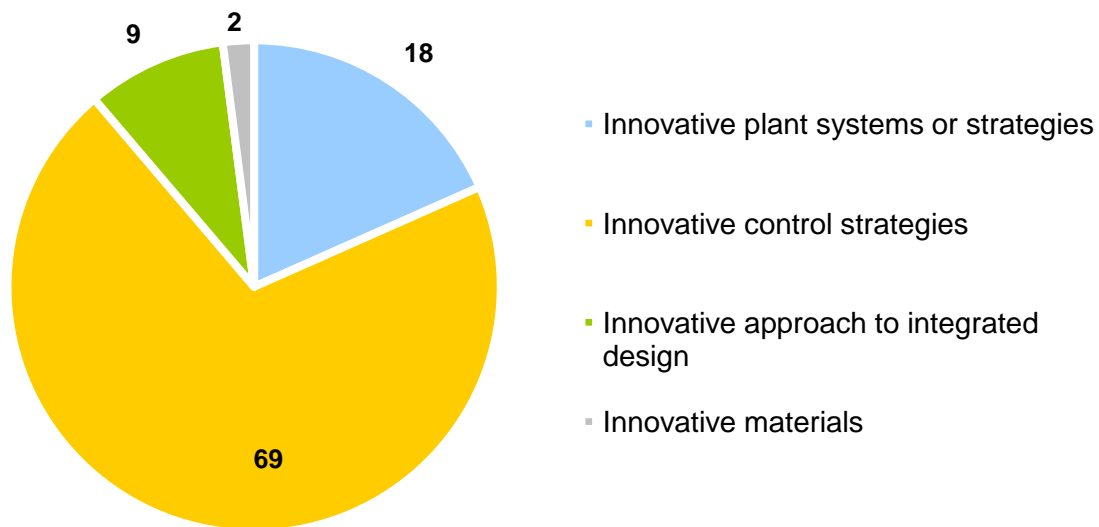
g. 1. Percentage of applied innovative measures by category.





A total amount of about 100 innovative technologies was implemented in a total of 85 considered GB+ Partners' buildings. So more than 1 innovative measures was applied in each buildings, in average.

g. 2. Number of applied innovative measures by category.



Following graphs (g. 3) shows how many times every innovative measure has been applied.

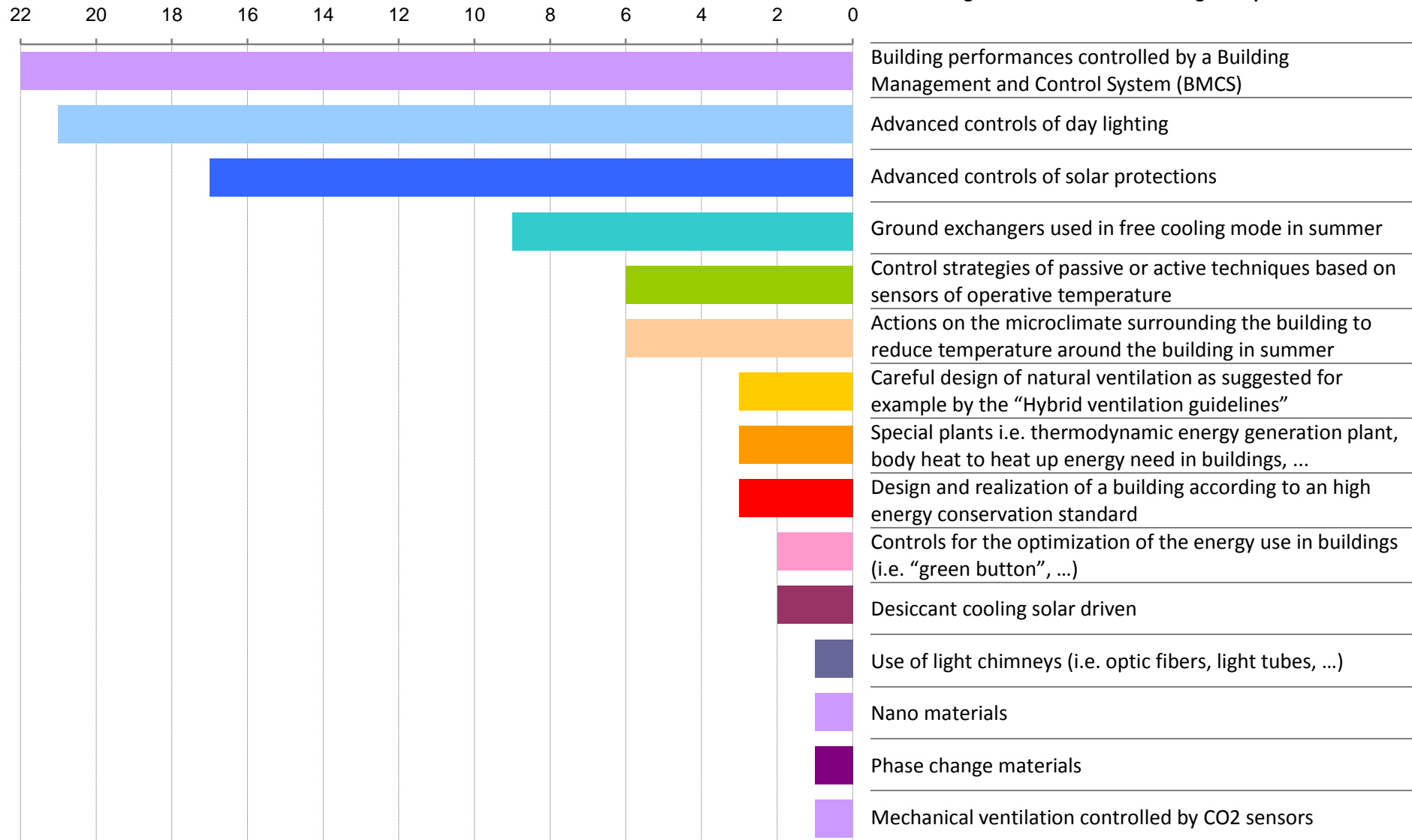
The four innovative measures more recurrent are

- building performances controlled by a Building Management and Control System (BMCS),
- advanced controls of day lighting,
- advanced controls of solar protections,
- ground exchangers (air or water based) used in free cooling mode during summer and advanced controls of day-lighting (i.e. day-lighting sensors, motions detectors, ...).

We can see more detailed about all innovative technologies implemented in the following pages.



g. 3. All innovative technologies implemented.

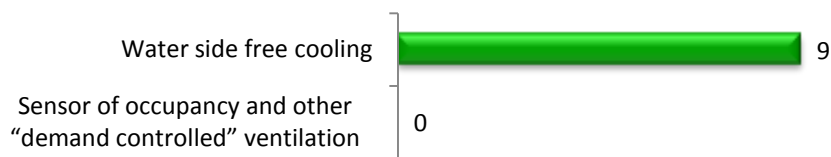




Detailed list of innovative technologies implemented

This paragraph presents a more detailed list of innovative technologies implemented, divided by different technical fields of buildings, in whom innovative measures have been applied.

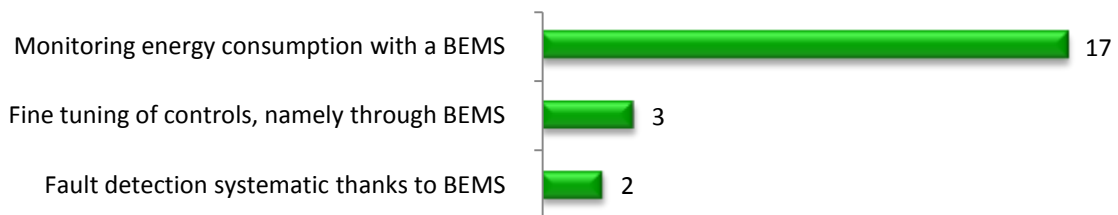
g. 4. Innovative technologies implemented in COOLING SYSTEM.



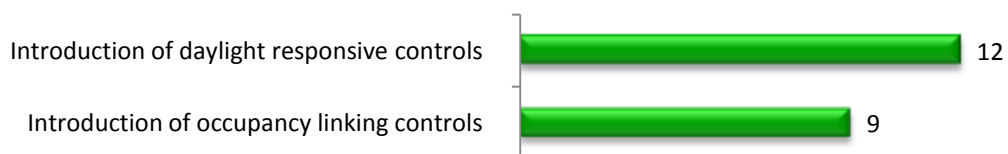
g. 5. Innovative technologies implemented in SOLAR PROTECTION.



g. 6. Innovative technologies implemented in BUILDING MANAGEMENT SYSTEMS.



g. 7. Innovative technologies implemented in LIGHTING SYSTEMS.



g. 8. Innovative technologies implemented in type of set-point temperature and comfort control.

