

Renewable energy generation systems

Along with the envelope solutions, iNSPiRe aims to replace old, centralised heating and cooling systems with new energy generation systems that largely make use of renewable energy sources. Replacing inefficient gas or oil boilers will allow for energy cuts of more than **70%**.

Hydronic modules

EURAC and Manens-Tifs are developing hydronic modules, allowing for the easy integration of components using a number of renewable energy resources in different configurations in heating and cooling systems.

Radiant ceiling panels

The company TRIPAN is responsible for the development and design of energy distribution kits that incorporate a prefabricated modular ceiling compound that includes lighting and low-enthalpy water heating and cooling systems. Two separate kits for residential and office buildings are being developed.

Working in Partnership



The demonstration sites

To demonstrate the effectiveness of the innovations developed in iNSPiRe, construction company Gruppo Industriale Tosoni (GIT) are overseeing three demonstration buildings which will have energy audits carried out before and after the iNSPiRe technology is installed.

The Ludwigsburg site is an example of social housing built in the 1970s. It contains three flats on three stories, and during the renovation process a wooden façade and a roof will be fitted on to the building.

The Madrid site is another example of social housing, this time from the 1950s. This site is five stories high and will also



Test building in Madrid

be fitted with a wooden façade and roof.

The site in Verona is the office area of the factory Officine Tosoni, a sub-company of GIT. This building is two stories high, and 200m² of façade will be fitted on to the front of the building.

iNSPiRe – The holistic approach

Every one of these innovations will help to incrementally push towards the final goal of a **50%** energy consumption reduction in older buildings. This holistic approach to renovation being adopted by iNSPiRe means that by making savings in energy consumption in all possible aspects of a building, a huge overall benefit can be felt when they are brought together in one package.

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 314461.





The residential building at Ciudad de Los Angeles

What is iNSPiRe?

iNSPiRe is a four-year long, EU-funded project that is tackling the problem of high-energy consumption in older buildings by producing systemic “plug and play” renovation packages that can be applied to residential and office buildings. The renovation packages developed by iNSPiRe will reduce the primary energy consumption of a building to lower than 50 kWh/m²/year. The packages will be suitable for a variety of climates while ensuring optimum comfort for the building users. The packages are also being designed to cause as little disruption to normal life during installation, in many cases being fitted without the owner having to move out.

By lowering energy consumption, iNSPiRe solutions will lower energy costs for building users and help reduce the harmful emissions older buildings currently produce. Comfort levels will also be improved internally, while the overall look of the renovated buildings will also be enhanced.

Building stock analysis

Led by UK market intelligence company BSRIA, the building stock analysis has formed the foundation of the iNSPiRe project, providing a detailed picture of the energy demands of residential and office buildings, while at the same time identifying suitable target building types for renovation. This is one of the most comprehensive studies of Europe's buildings stock ever undertaken and is now an invaluable asset for all those involved in construction, planning and building renovation.

Adopted ICT solutions for monitoring

The first step in improving energy management is measuring how, where and when energy is used, and so one of the key objectives of the iNSPiRe project has been to run a monitoring campaign to provide information about the energy performance and indoor thermal comfort of three demonstration buildings – located in Verona, Ludwigsburg and Madrid – before and after renovation.

Lighting

Bartenbach Licht Labor has published an analysis that provides a detailed look into the characteristics and properties of common light sources and luminaires. Recommendations of lighting systems to be used for both residential and office application have already been made, providing a clear roadmap for the proposed renovation packages and some innovative products that combine artificial and natural sources together with heating and cooling solutions in one kit.

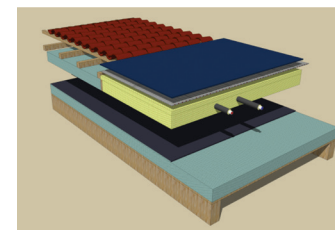
Envelopes

iNSPiRe will develop envelope kits that will be retro-fitted to older buildings. These façades and roof elements will include heating, cooling, natural lighting and energy systems to be used in the building, and it is this systemic approach to renovation that is the novel nature of iNSPiRe. The project will produce four façade kits in total: two made of metal/glass for tertiary purposes and two wooden façades for domestic purposes.

Microheat pump

SIKO Solar have devised a novel micro heat pump (μHP) system. The prototype is an extract air-to-air model in combination with mechanical ventilation with heat recovery system. It is significantly smaller than a typical heat pump, both physically (less than 30cm thick) and in heating capacity terms, allowing it to be integrated easily into the façade.

Solar thermal chiller



Module for the insulation of the roof that integrate solar thermal collectors

Swedish company ClimateWell have been developing a solar thermal collector that captures solar energy, which is then stored inside the component and delivered when needed for both air conditioning and

heating. It works using ClimateWell's patented triple-state absorption technology, using a specially formulated salt to store the energy. Cooling efficiencies are typically **50-60%** and the energy storage capacity is high enough to store a whole day of solar irradiation.