

ENERGY EFFICIENCY FOR EU HISTORIC DISTRICTS SUSTAINABILITY



NEWSLETTER NO. 1

EFFESUS Newsletter | July 2013

EDITORIAL



Welcome to EFFESUS!

Our mission is to reduce the environmental impact of European historic urban districts by learning from the past to ensure a better, sustainable future. I hope you all enjoy our first newsletter. It is the first in a series designed to communicate our findings and progress. Should you need more information please visit our webpage or get in touch. It is an exciting project with many innovations - Stay tuned.

Sincerely
Isabel Rodriguez-Maribona,
EFFESUS coordinator

About EFFESUS

Europe can become the leader in CO₂ emission reduction by applying innovative solutions to its built cultural heritage. According to the European Recovery Plan one of the actions that needs to be taken to tackle the current crisis, is investing in energy efficiency. Historic urban buildings consume 4% of all energy and are responsible for 3% of CO₂ emissions. Therefore, improving energy efficiency in historic buildings and historic districts is essential. However many technologies and products are not acceptable for historic structures due to the necessity of preserving integrity and authenticity. Therefore, the main goal of EFFESUS is to develop and demonstrate through case studies a methodology for assessing and selecting energy efficiency interventions in historic urban districts, based on existing and new technologies that are compatible with heritage values. The term historic urban district means, in the context of EFFESUS, a significant grouping of old buildings, built before 1945 and representative of the period of their construction or history. These buildings do not necessarily have to be protected by heritage legislation. The project is performed by an interdisciplinary consortium of 23 partners from 13 countries.



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European building and urban stock

Structured categorisation and multi-scale data management model



One main objective of EFFESUS is to develop a data model for the assessment and management of energy in historic cities. In the following, tasks involved will be described.

Identification and collection of existing data

In a first step, criteria for the data have been identified. Based on these criteria, existing data sources have been identified and evaluated. A state of the art summary has been made on previous attempts to statistically represent and categorise the building stock. This includes a summary of methods for surveying of districts and categorisation of smaller building stocks.

Establishment of impact indicators

The objective of this task was to establish indicators to assess the impact of energy retrofit measures on historic buildings and districts.

In the process, most relevant indicators for the EFFESUS project were selected with respect to the development of the decision support system (DSS) tool and project goals in general. A common approach for using the indicators has been defined: a five point scale for the evaluation of the related indicators has been established.

Identification and evaluation of European and national policies and legislation related to energy efficiency and cultural heritage conservation

An overview of European and national legislation related to cultural heritage and energy efficiency including charters at the international level, EU directives, and national legal systems was created, in order to define the relationship between heritage legislation and energy efficiency legislation and policies.

The task comprised a questionnaire, which was designed and distributed to all partners. In parallel, information on EU law (e.g. the European Performance of Buildings Directive (EPBD)), international conventions and charters were collected. The collected information shows no direct conflict between legal systems in this survey, neither on international, European or national level. However, the survey also shows that communication and cooperation between relevant authorities can be improved.

Development of a structured organisation and categorisation method

In order to generate a statistical representation of European historic buildings and districts a structured organisation and categorisation method is to be developed.

A state of the art report identifies previous research on categorisation on buildings stocks. There are relevant methods and approaches from previous research and projects, but the EFFESUS project also needs to add parameters specific to historic buildings, heritage protection and values. In the following months a structured organisation and categorisation method will be developed, tested and verified by using the Visby case study.

Development of a multiscale model

The final objective in the first stage is to develop a multiscale data model for the storage of information support for sustainable energy assessment and management at district level. It will include geometric and semantic information at district scale, as well as building scale and its structural components.

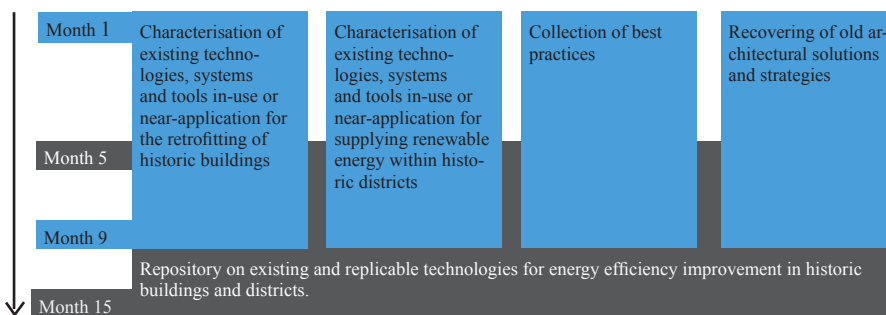
The full validation of the data model will be in the city of Santiago de Compostela. Depending on the availability of data, the model may be applied on the other case studies in the project.

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Achievements of the repository on existing and replicable technologies

for energy efficiency improvement in historic buildings and districts



The final repository will be based on four pillars, shown in the table above. Recently the collection of data for the four pillars has been finalised.

Assessment on existing technologies, systems and tools for the retrofitting of historic buildings

The provided database contains a comprehensive overview on the possible measures which can be applied in order to enhance energy performance of historic buildings: A total of 86 measures have been described. The single measures have been grouped in "retrofit steps", guiding thus the user through the whole process of building retrofit.

Assessment on existing technologies, systems and tools for supplying renewable energy within historic districts

It contains a complete characterisation of the main existing Renewable Energy (RE) technologies used for supplying renewable energy, Seasonal Thermal Energy Storage technologies, and energy distribution networks

such as district heating and cooling. Furthermore, two types of complementary tools, such as RE evaluation tool and RE monitoring tool, are described.

Within this research, a generic characterisation for the RE technologies implementation within historic districts has been done. The following main constraints have been identified as possible limitations: legal protection, suitability and adaptability of RE technologies to historic districts with particular reference to their visual impact.

Collection of best practices

This collection contains best practices examples and relevant initiatives of retrofit interventions at building and district scales. EFFESUS has defined four main criteria for their identification:

- Heritage Significance: That is, respect for and compatibility with historic values and conservation principles. This is assessed against visual and material impacts,

embracing concept and design together with original or historically significant fabric.

- Technical Compatibility: Compatibility with the building fabric, including of moisture movement in relation to a building's structure.
- Environmental Performance: Indoor comfort conditions compatible with human occupancy, including impacts on ventilation and airtightness.
- Energy Supply: The visual and physical impacts of renewable energy installations and systems.

Assessment on passive retrofitting solutions

This contains an overview of traditional principles of "building with climate" in Europe. The climatic analysis demonstrates specific needs for thermal comfort in each climate zone, and analysis of traditional building principles as historic response to the needs. The overriding scope of this task is to create a repository of those solutions for each climate zone, in form of an "idea bank".

Promotion of use of the existing passive principles in a historic building has very little, if any, impact on preserving existing cultural values of the building.

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Case Study in Focus:

Budapest



Interview

The EFFESUS case study in Budapest focuses on the energy-related improvement of existing building components compatible with heritage values. Specifically the historic windows in a classroom of Budapest University of Technology and Economics are in the focus. Today we have the chance to talk to Sara Hrabovszky-Horvath from HOR-BER and to Cezary Misiopceki from NTNU about the ongoing activities.

EFFESUS: What are the special characteristics of these historic windows?

Sara Hrabovszky-Horvath: The traditional double-sash windows in Hungary were widely spread before the World War II constructed with high level of expertise and quality but these windows do not fulfil the energy performance requirements of nowadays. Therefore their refurbishment or replacement is inevitable.

EFFESUS: What are the main challenges regarding the energy-efficient improvement of the windows?

Sara Hrabovszky-Horvath: In case of historic buildings the fenestration is one of the main factors that impacts the façade of the building. Thus the visual impact of alterations to the windows of a historic structure can be significant. It is of importance to the character and appearance of a structure that fenestration patterns should not be

altered. Where replacement of windows has become necessary the materials, glazing divisions and sectional profile of the new windows should be appropriate to the date of the original structure.

EFFESUS: What are the main advantages of the innovative windows developed in EFFESUS?

Cezary Misiopceki: Different solutions in different cost range will be considered - what hopefully will contribute to more energy retrofits, rather than inappropriate window replacements. New technologies like adhesive low-e coatings will be investigated, but also well-known technologies will be reconsidered for enhancing performance, like usage of shading for night insulation.

EFFESUS: What is the current state of the Budapest case study? What happened so far?

Sara Hrabovszky-Horvath: The measurement of the classroom and the windows has been already done. Currently, the researchers from the Norwegian University of Science and Technology (NTNU) are working on the development of the original windows. After the construction of the new

prototype the next step will be the test in the NTNU laboratories in order to measure the energy improvement results. Finally after the installation of the prototypes in Budapest a continuous monitoring and performance evaluation will be carried out. In the second phase an innovative indoor climate system will be developed in cooperation with our Italian partner RED.

EFFESUS: Which benefits arise from the international cooperation for the Budapest Case Study?

Sara Hrabovszky-Horvath: Due to this international cooperation we get acquainted with the research results of other European countries and share our expertise by working together.

EFFESUS: How can the results and lessons learned from this case study being transferred to similar cases in Hungary or other countries?

Sara Hrabovszky-Horvath: In Hungary these wooden windows were installed from the end of the 1800s until the end of 1970s. Approximately 20% of the existing building stock is provided with this traditional window structures. Therefore the results of the project can be easily transferred.

Fact Sheet Case Study Budapest

Country	Hungary
Climate	Continental
Selected District	Újbuda (XI district)
Case Study Level	Building Intervention
Local coordinator	HOR-BER Ltd., Budapest, Hungary
Technology provider	SNEKKERIET AS, Verdalsøra, Norway
Scientific Advisory	Norwegian University of Science and Technology (NTNU), Trondheim, Norway



Partners in Focus:

Tecnalia Research & Innovation is the first RTO in Spain. The Sustainable Construction Division works to drive transformation of construction through innovative environmentally-friendly construction and urban planning technologies. Tecnalia is responsible for the overall coordination of the project and leads the development of conceptualisation, results integration and strategies for decision making by combining the building stock model, the historic district geographical information system (HISD-GIS), the repository and the new technologies developed.

The Fraunhofer Gesellschaft is the largest organisation for applied research in Europe. It consists of 66 institutes of which two are involved in EFFESUS.

The Fraunhofer-Institute for Building Physics IBP focuses its work on research, development, testing, demonstration and consulting in the various fields of building physics. Fraunhofer IBP is the scientific coordinator of the project and leads the development of smart management and integration of renewable and energy efficiency solutions for historic dis-

tricts. Moreover it is responsible for the training of professionals.

The Fraunhofer-Center for Central and Eastern Europe MOEZ focuses on questions regarding the internationalisation of research, development and innovation. Fraunhofer MOEZ is responsible for devising a coherent market launch strategy for technologies developed by EFFESUS as well as for the development of target-group specific concepts for the continuous dialogue with different stakeholders.

Upcoming Events

3rd European Workshop on Cultural Heritage Preservation (EWCHP) on September 16th till 18th 2013, in Bozen / Bolzano, Italy. More information can be found here: EWCHP
 Further upcoming events: www.effesus.eu

Project Partners:

TECNALIA Research & Innovation / Fraunhofer-Gesellschaft / R.E.D. SRL / Integrated Information Systems / SNEKKERIET VERDAL AS / SAMPAŞ Nanotechnology / D'APPOLONIA SPA / Consortium of the City of Santiago de Compostela / ACCIONA Infrastructures S.A./ Gotland University / EURAC RESEARCH / Delap & Waller EcoCo Ltd. / Active Space Technologies S.A. / Dennis Rodwell / National Research Council – Institute of Atmospheric Sciences and Climate / University of Stuttgart – Institute of Materials Testing / Norwegian University of Science and Technology / BOFIMEX BOUWSTOFFEN BV / Historic Scotland / A. Proctor Group Ltd. / HOR-BER Ltd. / SAS GOUAS / Advanced Management Solutions Ltd.

EFFESUS Key Facts

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