

SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

Action number: CA16232. European Energy Poverty: Agenda Co-Creation and Knowledge Innovation (ENGAGER 2017-2021)

STSM title: Iberian Peninsula methods review and replication of experiences, as a starting point for an Energy Poverty Analysis specific for the south European region

STSM start and end date: 15/01/2019 to 15/03/2019

Grantee name: Fernando Martín-Consuegra

PURPOSE OF THE STSM:

The STSM was held in the Center for Environmental and Sustainability Research (CENSE), at the Faculty of Science and Technology of NOVA University of Lisbon (FCT-NOVA), Portugal, within the Energy and Climate group. The Spanish visitor is a researcher, architect from the Instituto “Eduardo Torroja” of Construction Sciences of the Spanish National Research Council (IETcc-CSIC), developed part of his PhD on the Energy Poverty risk caused by urban vulnerability and the inefficiency of buildings. The results of the STSM are to be applied on the HABITARES project, being held at the home institution (2018-2021).

The general objective was the interchange of experiences for the development of common approaches on the Iberian Peninsula countries (Portugal and Spain), for the definition of indexes and the mapping of energy poverty risk. The aim was to advance towards a proposition of a specific framework for Southern European region, with temperate Mediterranean climatic conditions, that could eventually be included in a possible operational European energy poverty framework.

The specific aim of this STSM was to learn the methodologies for energy poverty identification and assessment, through the combination of diverse techniques applied in Portugal:

- Statistical data
- Archetype buildings simulation
- Energy certificates of housing
- Smart meters technology
- Door to door surveys (occupancy, equipments)
- ...

The application on the Spanish context will be the adjustment and validation of urban energy models from inefficient and vulnerable quarters assessed by HABITARES project. The project is dedicated to energy refurbishment of social housing. The idea is to develop a simplified methodology for the calibration of energy consumption for space heating and cooling estimations and the comfort gap, through data obtained from smart meters and door to door surveys.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSM

1st Part (15-31 January)

The first two weeks of the STSM were dedicated to meetings and presentations of the CENSE and IETcc, including:

- Coordination meeting of the Grantee with the STSM coordinator Dr. João Pedro Gouveia. 15th January 2019
- Energy Poverty Morning Session. Presentations and discussion at CENSE: state of the art on measuring EP techniques, through indexes and mapping, developed in Portugal and Spain. 21th January
 - EP related research made by CENSE for Portugal. Indexes and different techniques of measuring, building stock analysis, energy certificates and smart meters data. (João Pedro Gouveia)
 - Space Heating and cooling, mapping the comfort gap in Portugal (Pedro Palma)
 - Mapping Energy Poverty in Portugal and UK at a high resolution (Katherine Mahoney)
 - Energy Poverty associated to building vulnerability in Madrid, Spain. (Fernando Martín-Consuegra)
- Assistance to different events of dissemination of the activities from the host Institution.
 - FCT-NOVA Postdocs Annual Meeting - organized by LUPA Postdoctoral Association, at FCT NOVA, Auditório 204 / Edifício IV, on January 25, 2019. Including presentations of the main research lines of CENSE group.
 - Melting Pot + science. "Lupsmart - Life Cycle Analysis". António Galvão, 23 January 2019.

2nd part (February)

The following 4 weeks were dedicated to work on the different possibilities of collaboration. Three concrete research collaboration activities are proposed and developed:

- A compilation of experiences aimed at the identification of areas at risk of energy poverty carried out in the Iberian Peninsula is proposed. For this, the indicators developed in Portugal and Spain are compared in different scales
- Various workshops to develop a review paper about mapping initiatives and indexes were held. It started with a review of experiences in UK, Portugal and Spain. After discussion, the decision of including in the review the experiences found in all other countries is made. After working on the review of different research papers, a second workshop was held, a first version of a table resuming the characteristics of each study is proposed and discussed. 8 – 15 Feb
- Exploration of the application of smart meters methodologies developed in Portugal for EP analysis on the HABITARES project, Madrid (Spain). Collection of data about energy consumption in several social housing in Madrid. Plotting of the data in order to ask for technical assistance from João Pedro Gouveia.

During this period of the STSM, the grantee participated on the COST '*Prospects and limits of indicators: Scalar perspectives on energy poverty metrics*' workshop held in FCT-NOVA Lisbon on the 22nd and 23rd of February 2019 featuring 14 researchers from a wide range of European countries and academic disciplines. The STSM participant delivered in the morning session a complementary talk presentation of energy poverty indicators developed in Spain: *Energy inequality caused by the obsolescence of residential buildings. Urban imbalances in the case of Madrid.*

3rd part (1st – 15th March)

The two last weeks were dedicated to the organization of collaborations and results. A meeting was held with Joao Pedro Gouveia, Pedro Palma, Katherine Mahoney for the structuration of a review paper about mapping initiatives and indexes, with the objective of publishing this methodology and the findings.

A meeting about research based on smart meters data pointed the difficulty of addressing in Spain studies with the characteristics of the Portuguese methodology, due to the lack of data. An adaptation of the method is proposed for particular cases of Spanish social housing in Madrid from HABITARES project.

The results of the comparison of Portuguese and Spanish methodologies is proposed for publication in a book edited by Universidad Autónoma Metropolitana de Mexico, whose researchers are interested in compiling, analysing and publishing European experiences related to sustainable architecture.

A presentation of the work of giSCHE research group (IETcc – CSIC, Madrid, Spain) in the CENSE, at the Melting Pot+Science "Human on the loop - architecture energy research" was done by the Grantee. Invitation for the continuation of collaboration between both groups was done (13th March).

DESCRIPTION OF THE MAIN RESULTS OBTAINED

Three main research products have been proposed and were developed:

- A Chapter of the book “*Arquitectura bioclimática sostenible en Europa, 2a edición*” edited by Universidad Autónoma Metropolitana de México, has been accepted for publication with the title “*Pobreza energética: experiencias europeas de analisis nacional, regional y urbano. El caso de la Península Iberica*”. The papers resumes, analises and compares the state of the art of the experiences on Energy Poverty assesment being held in the two countries.
- A proposal for a communication paper was submitted to the 10th edition of the European Congress on Energy Efficiency and Sustainability in Architecture and Urbanism (EESAP 10) that will be held in Vitoria (Spain) with the title: *Energy consumption and comfort gap in social housing through smart meters and surveys analysis in Madrid (Spain)*. Smart metering technology for Energy Poverty detection developed in Portugal is being studied for its replication in Spain. 10 particular cases of social housing units, monitored by proyecto HABITARES, will be presented.
- Proposal for a scientific review paper on mapping and indexes initiatives for EP. The paper is under development.

FUTURE COLLABORATIONS

Collaboration has continuity by the work on the scientific review paper on initiatives for mapping and indexes development for Energy Poverty. The proposed paper will fit into Working Group 2, led by Dr Harriet Thomson and Dr Siddharth Sareen, whose objective is to develop an operational European energy poverty framework.

Smart metering technology for Energy Poverty detection developed in Portugal is being studied for its replication in Spain on 10 cases of social housing. The results will be discussed with researchers of CENSE and presented in an international conference.

Host for STSMs in the Instituto Eduardo Torroja de ciencias de la construcción (CSIC – Madrid, Spain) are offered for Portuguese predoc and postdoc researchers from CENSE. Suitable proposals should go around the thematic of construction sciences. More precisely the giSCHE has expertise on energy efficiency and assessment of the environmental impact of buildings, including social impacts of Energy Poverty caused by vulnerability of buildings.