

## SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

The STSM applicant submits this report for approval to the STSM coordinator

**Action number: CA16232**

**STSM title: Identification of Vulnerable Homes from the Fuel Poverty Concept.**

**Indicator and Assessment Model**

**STSM start and end date: 15/02/2018 to 13/04/2018**

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### PURPOSE OF THE STSM/

This stay has taken place for three months (January – April) at Sustainable Housing & Urban Studies Unit (SHUSU) at the University of Salford. The author was awarded with a bursary award by Eaga Charitable Trust to cover part of the costs during this stay (the university's bench fees and the accommodation costs). Then, the opportunity to have been awarded with this bursary has allowed him to cover the rest of the costs to the end of the stay (by means of economy travel, subsistence and the attendance at different events to spread his research).

This research to date has been developed within the Spanish context and takes into consideration the current situation of this issue in Spain. The analysis of the Energy Poverty (EP) context in a national and international level, during my three years of PhD, has allowed me to define the Index of Vulnerable Homes (IVH). The EP issue is a global problem that has been accentuated in Spain due to the economic crisis, has given rise to government and political interest, and has achieved high public impact. No official definition has been established, in contrast to other countries such as United Kingdom, Ireland, France, and Slovakia. Given its history in addressing EP, the UK may be considered as a reference country in combatting it, mainly for its policies and good research groups. The possibility of having carried out this stay at the University of Salford has helped me to broaden this research focus beyond my current discipline, thereby improving the current IVH definition by introducing some specialised modelling techniques. Furthermore, I took part in different fuel poverty events during my stay in the UK, being useful to both the dissemination of my research throughout the best network of EP researchers possible and my personal career development.

The overall aim of this stay has been to apply key social-science concepts to the IVH and expand the focus of my initial work. To this end, the first action during the stay was adapting the IVH to the British context (it was focused on England initially). Then a case study was defined to apply the IVH enabling me to analyse the IVH's results from its application in England and its first application in Spain. Furthermore, a comparative analysis between the IVH and the official EP indicators, the Low Income High Cost (LIHC) indicator and the 10% measure, was made in order to evaluate and highlight the potential of the IVH.

### **DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS**

The combination of quantitative methods (systematic empirical investigation of observable phenomena via statistical) and qualitative methods (aimed to measure something particular) were used to carry out this study. The work carried out during this stay can be divided into three main parts:

The first part, by means of the adaptation of the IVH, details the information needed to apply the IVH to the British context, its application to a standard case study in England, and a comparative analysis with the current FP indicators (the 10% and LIHC indicators).

The second part, after the adaptation of the IVH to the British context, shows the application of the IVH to an inner-city area of the Broughton ward within the East Salford neighbourhood to assess the different vulnerable situation depending on the households defined. Then, best practices to reduce current situation of vulnerability: best energy efficiency improvement and optimal financial benefit, are analysed.

The third part, representing the evaluation of the IVH's results, evaluates the assessment of households' vulnerability provided by the IVH after comparing the IVH's assessment with households' evidence.

Three main information sources were used to carry out this work: the English Housing Survey (EHS), the normative UNE EN 15251, and a designed survey. The EHS collects information from households on housing circumstances and is used for official statistics on EP in England. Furthermore, the EHS includes a household questionnaire, a physical assessment of the property, and a desk-based market value assessment. The adaptive model evaluates whether households are comfortable in their house when the relationship between outdoor and indoor temperature is within an established thermal-comfort range. And the survey was designed taking into consideration the minimum data required to apply the IVH. Highlight that working within the Sustainable Housing & Urban Studies Unit (SHUSU), so as the collaboration of the Applied Buildings and Energy Research Group (ABERG), was key factor to develop this survey.

Author considers essential to note that although there is a wide range of methodologies used to yield a solution to the addressed issue, none does allow for an objective comparison of approaches, leading most impact to be achieved. This innovative methodology, the IVH, can be considered a comprehensive approach to identify and assess different situations of vulnerability.

### **DESCRIPTION OF THE MAIN RESULTS OBTAINED**

The main outcomes after this stay can be listed as follow:

- The IVH is the first indicator of vulnerable homes adapted to the British context.
- It provides an assessment of vulnerability in terms of its consequence and intensity within the British context that leads to the possibility of evaluating the optimal retrofit measurement in order to improve households' quality of life, by promoting energy efficiency.
- The IVH can be considered a novel tool which would enable the English government, as well as other countries and governments, to improve the quality of life of citizens if applied together with good cost-effective policies, by evaluating the social benefit of an energy efficiency intervention for vulnerable homes.
- It is the first multi-dimensional indicator that relates technical aspects (characteristics of the dwelling) and social aspects (quality of life of the households, in terms of thermal comfort) providing households' health conditions and the Health-Related Quality-Life Cost to the English National Health Service depending on the situation of vulnerability.
- This work brings together key findings that will strengthen the assessment capacity in terms of vulnerability across different European contexts, as well as across the world, primarily by providing an evidence-based case study in England for measuring household vulnerability.

**FUTURE COLLABORATIONS (if applicable)**

Although there is not future collaboration arranged, the lack of suitable definitions and measures in most EU member states leads the proposed research to provide an initial model for future EU studies, in terms of vulnerable homes, setting the possibility of international collaborations. In this context, dissemination funding would therefore be welcome by the author to make possible attend at different events and conferences, so as exchange funding to support his movement.