Proposal number: PS99141

Proposal acronym: REDUCE

**Duration:** 36 months

Project Scale: Medium Scale

**Total Project Budget:** € 649,678

Type of Model Grant Agreement: Framework Contract Procedure Service Contract EISMEA

The overall aim of project REDUCE is to quantify and explain the differences between the performance as reported by national energy rating systems (for residential and non-residential buildings) and suggest how this gap could be reduced in the future. Through the collaboration between three partner universities and the support of multiple industry collaborators REDUCE synthesises and unites five different SEAI RDD projects (completed or ongoing) and utilises this data (with 59 residential buildings and 9 non-residential buildings) to offer insights into the crucial variables that require improvement to ensure resilient and robust design of buildings going forward. REDUCE will compare predictions from DEAP and SBEMie data to measured datasets for heat pumps, secondary heating, space heating, hot water, ventilation, solar photovoltaics (PV), appliances, and lighting, and also determine the effect of the subjective influence of occupants on predictions in the same asset rating systems. Finally, REDUCE will suggest and report on ways in which current asset rating systems can be improved to reduce the performance gap and how design can be improved going forward to ensure buildings perform closer to expectations.

The proposed REDUCE team together contains a wealth of expert level knowledge as well as unique real world experience regarding the how buildings operate in practice and how this relates to the design process and early-stage model based prediction of energy use. It has a proven track record of delivering complex, multi-partner projects that require significant planning and coordination with a focus on impact for the built environment sector from the project findings. The core academic research team, which is a collaboration between MTU,

UCD, and TUS architects and engineers that has considered the expertise of low energy building design as well as building monitoring and post-occupancy evaluation, building on past projects that include not limited SEAI studies outlined originally. INVEST was funded in the 2022 call and is being led by Dr Niamh Power at MTU, whose group will act in a supporting role for REDUCE through data and knowledge sharing collaboration as well as working on the case study and data development work packages. The objectives of REDUCE will directly contribute to improving the gap between actual and predicted energy consumption and go towards Irelands carbon reduction objectives.

There are six main end-users or key stakeholders targeted by project REDUCE (homeowners, educational building operators, researchers, policy makers, government bodies, and Irish or international academics) which can be broadly broken down into four main categories:

1) building homeowners, operators or tenants

As key stakeholders the occupants or building owners of project REDUCE will be engaged with in various capacities from contact for consent to participate in the study, providing access to data for comparison purposes, through to gathering their opinions and perspectives on the energy systems in their homes or premises. It is expected that the feedback from REDUCE will enable these key stakeholders to improve their energy performance and, by extension, REDUCE their operating costs. This has been seen as key due to the current price of energy generally.

2) Researchers and academics

A part of the formation of project REDUCE was to bring together key academics and researchers who have worked tirelessly to get access to buildings for monitoring purposes. Project REDUCE aims to connect multiple researchers and access multiple institutes to foster a spirit of collaborative endeavour. Through the planned open access workshop (at the end of year 1 of the project), REDUCE will aim to provide open-source data to a variety of academics in various capacities and will build on its existing network to sustain the access to data for research in Ireland and further afield.

3) Designers and architects

One of the key collaborators and stakeholders in project REDUCE are industry stakeholders in the form of designers and architects who are seen as key decision makers in the design process. Through the extensive team already committed to making this project a success, it is expected that designers and architects both within and outside of REDUCE will be consulted on their perspectives about the performance gap for dwellings and buildings other than dwellings. REDUCE will also endeavour to assist in updating the early design stage to incorporate a more carbon-resilient and robust, and repeatable energy design methodology, which will assist designers in making improved decisions around the uncertainty in energy modelling at the early stages.

4) Government agencies and policy makers

As part of the project steering group, the SEAI will be a key stakeholder for the project. However, it is expected that policy makers will use the findings of REDUCE to improve design standards and building regulations going forward. The data and knowledge generated from REDUCE will contribute to the improvement of our understanding around the

uncertainty in our predictions and will assist policy makers by providing them with better

assumptions with which to conclude from.