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Effective stakeholder engagement for Low-energy retrofit of public buildings

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1.1 Introduction

- Built environment accounts for large proportion of energy and carbon emission;
- Significant proportion of existing buildings were constructed when there was no strong energy efficiency component within the building regulations;
- These existing old buildings are reaching the end of their useful life;
- Significant cost and environmental impact to replace these buildings with new construction;

1.2 Introduction – Benefits and impacts

- There are a number of benefits and impacts of undertaking low-energy retrofit:
  - Economic: Energy cost savings, economic stimulus, property values and impact on public finances;
  - Societal benefits such as improved comfort, health and productivity of building users;
  - Environmental benefits: reduced air pollution, carbon savings;
  - Energy Systems Benefits: Energy Security, Avoiding need for new generation capacity, reduced peak loads;

1.3 Challenges of low-energy retrofit

- Performance gap;
- Unintended consequences of building energy efficiency improvements;
- Therefore low energy retrofit requires an all-inclusive approach considering building fabric, systems and users behavior;
- A systematic process of pre and post intervention performance evaluation is necessary to deliver the desired comfort, energy reduction;.

RESSEEPE

REtrofitting Solutions and Services for the enhancement of Energy Efficiency in Public Edification

1. General overview

- Starts in **July 2013**
- Duration: **4 years/48 months**
- **25 partners:** From **10 different EU countries**
- **Categories of partner organisation:** Demo-sites, research institutions, industrial partners, social housing companies
- Specialised in **diverse disciplines**: Engineering, energy efficiency, building construction, housing management

1. General overview

- **Aims:**
  - To improve building energy performance through retrofitting
  - To set up a diagnosis methodology for an integrated renovation of public buildings, at building and district level **(Replicability of the solutions)**
  - Development of a systemic view for selection of the most empowering retrofitting mix: low energy renovation of existing public districts.
  - To adapt, demonstrate and validate the technologies in different demo-sites

- **In figures:**
  - Achieve **50% energy savings** accross different types of sites;
  - **Energy consumption** reduction of **66 kWh / m^2 year**
  - **CO2 emissions** reduced to **48,15 kg / m^2 year**
  - A **rehabilitation cost** **under 19% of investment costs** associated with new construction of an equivalent building

Demo Buildings

Demo-sites location

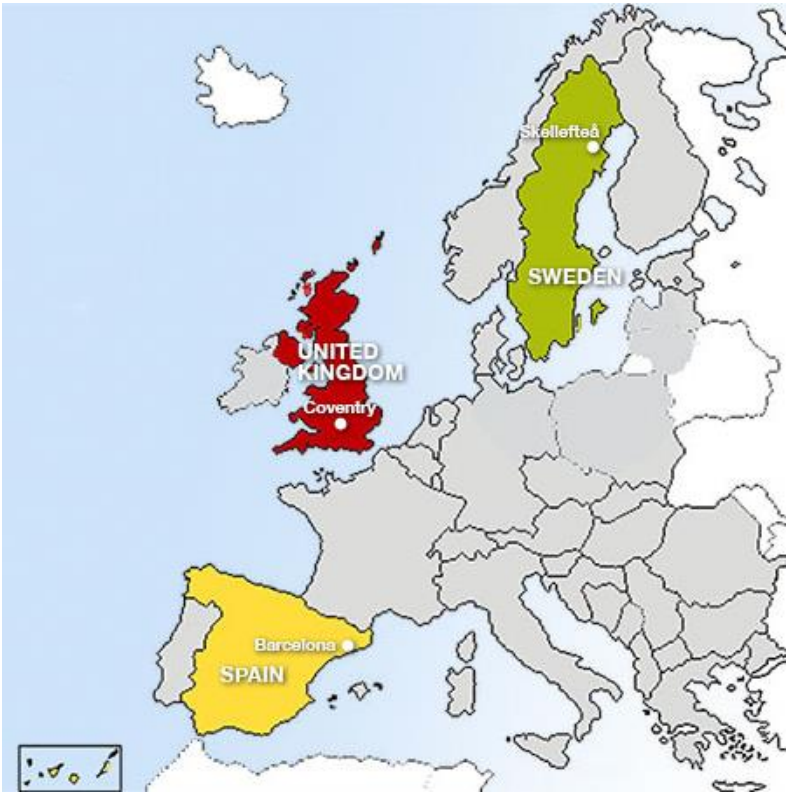
John Laing Building, Coventry University, UK

Richard Crossman Building, Coventry University, UK

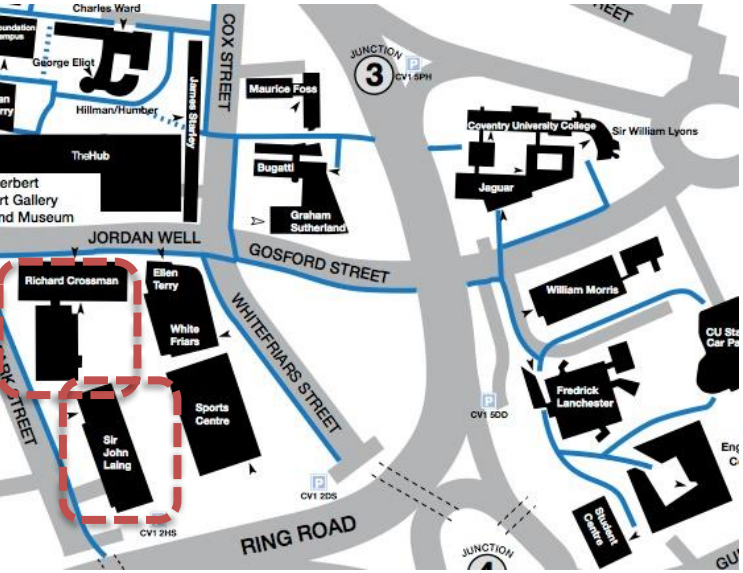
Hospital Parc Tauli, Sabadell, Barcelona, SP

Hospital de Terassa, Barcelona, SP

Balderskollan, Skellefteå, SW



Demo Buildings



John Laing Building

Total floor area – 3,660m²

Current energy use - 223 kWh/m²

Demo site used for prototype testing

Richard Crossman Building

Total floor area – 9,400 m²

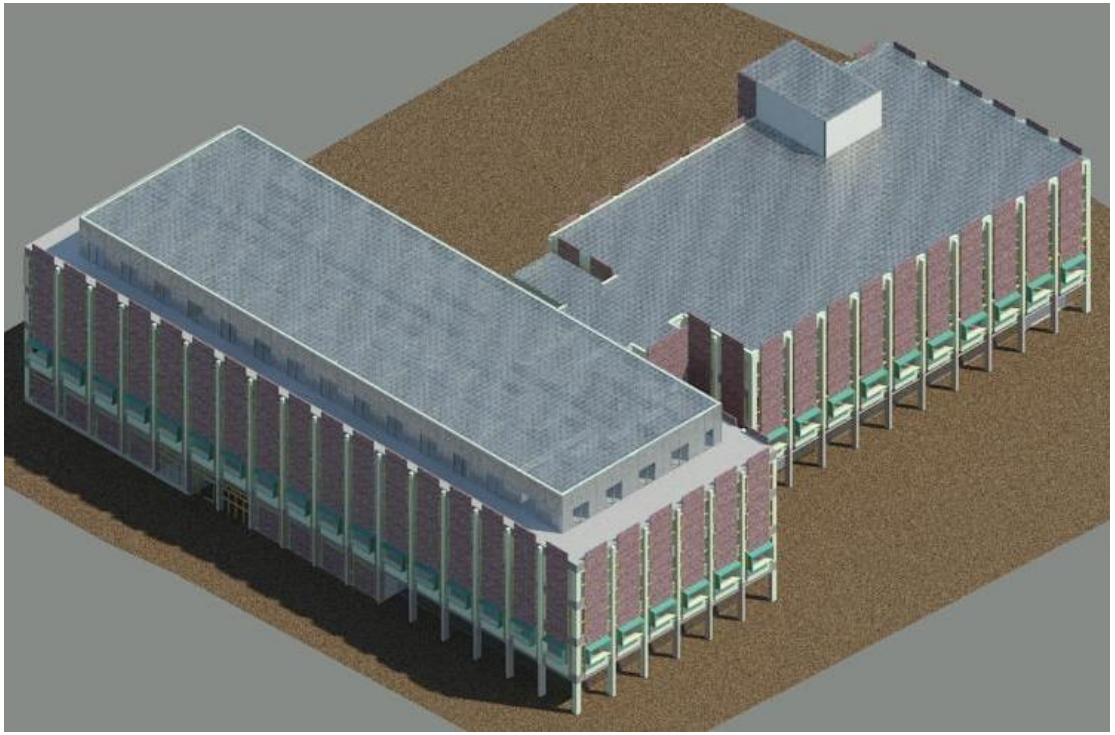
Current energy use - 242 kWh/m²

Conventional retrofitting solutions

RESSEEPE Mix of technologies

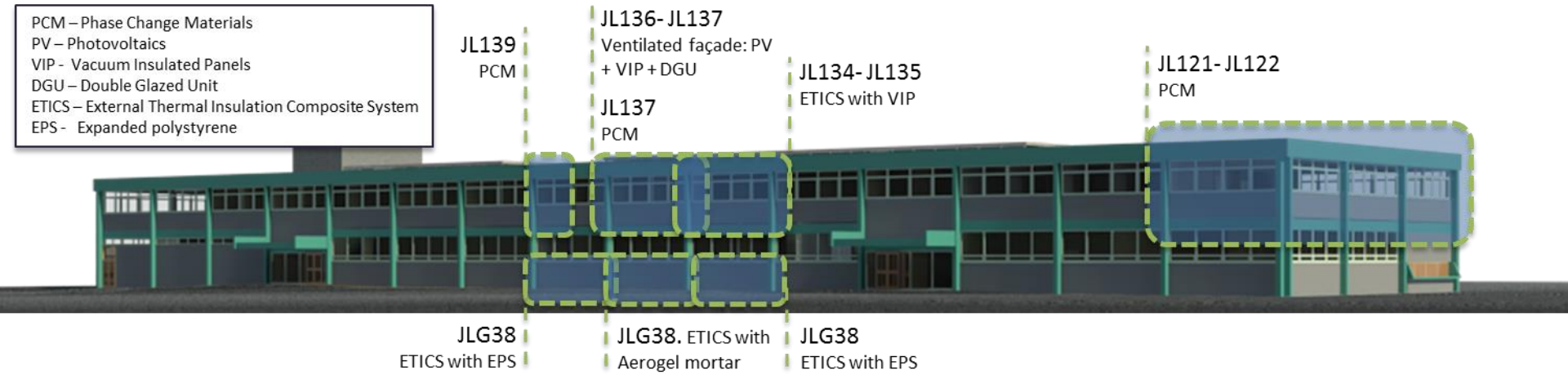
Envelope Elements	Building Services	Lighting	Renewables
Aerogel mortar	HVAC system optimization	LED lighting	Solar thermal collectors
VIP	PCM cooling and storage		Solar PV panels
Ventilated Facade	Seasonal thermal storage		
BIPV System			
EC Glazing			
High Efficiency Glazing			

Innovative Technologies – Richard Crossman Building



- LED lighting
- Photovoltaic panels
- Double Glazed Window Unit
- Curtain wall
- Roof improvement
- BMS panels

Innovative Technologies – John Laing Building



Building Performance Evaluation: User Satisfaction Assessment

- Seeks to ensure that RESSEEPE solutions meet the real needs of end users
- The evaluations will covers: thermal comfort, visual comfort and acoustic comfort of occupants, efficiency of control systems and energy management strategies

Expected results:

- Based on the results of end-user acceptance surveys, guidelines and tailored solutions will be produced.
- It is expected that RESSEEPE technologies will significantly improve indoor environmental quality in the demonstration sites.

User satisfaction: Evaluation Process

1

User perception before retrofitting

User satisfaction survey

User characteristics

User experience: Thermal, aural, and lighting comfort; IAQ, level of control, general maintenance

Performance data analysis

2

User acceptance of the selection process

Selection of building typology

Technology selection

Performance assessment

Cost evaluation

3

User acceptance of the installation process

User satisfaction survey

User characteristics

User experience: Level of disruption, Information and communication, Engagement and participation, Satisfaction / User acceptance

4

User perception after retrofitting

User satisfaction survey

Performance data analysis

User acceptance event before retrofitting

- **1st Stakeholder engagement meeting (11.11.2015)**
  - Participants: Internal stakeholders
- **Aim:**
  - Explain what the project is about and to engage them in the project
  - Get stakeholder feedback

Communication:

- Are you familiar with the project? Have you been provided with any information about the project before today?
- What information would you have liked to have? And at what stage of the project?

Engagement: Have you been asked to give your opinion or to contribute to the process? If not, how would you have liked to have been engaged?

Disruption:

- Have you experienced some kind of disruption during the refurbishment?
- In what ways do you think the project has caused disruption to building users?

User acceptance: What is your overall assessment of the refurbishment process?

User acceptance event after retrofitting

- **2nd Stakeholder engagement meeting**
  - Participants: Internal stakeholders
- **Aim:**
  - Explain what the project is about and to engage them in the project
  - Get stakeholders feedback

Stakeholder Engagement - Responses

Communication:

- They were not familiar with the details of the project before that day.
- They had not been provided any information before.

Level and Timeliness of Engagement

- Lack of awareness of the various technologies and their potential impact;
- The participants would have liked more information at an early stage;
- The need to engage a wide group of stakeholder – both internally and externally;

Stakeholder engagement. Lessons learnt

Lessons learnt from the stakeholder engagement:

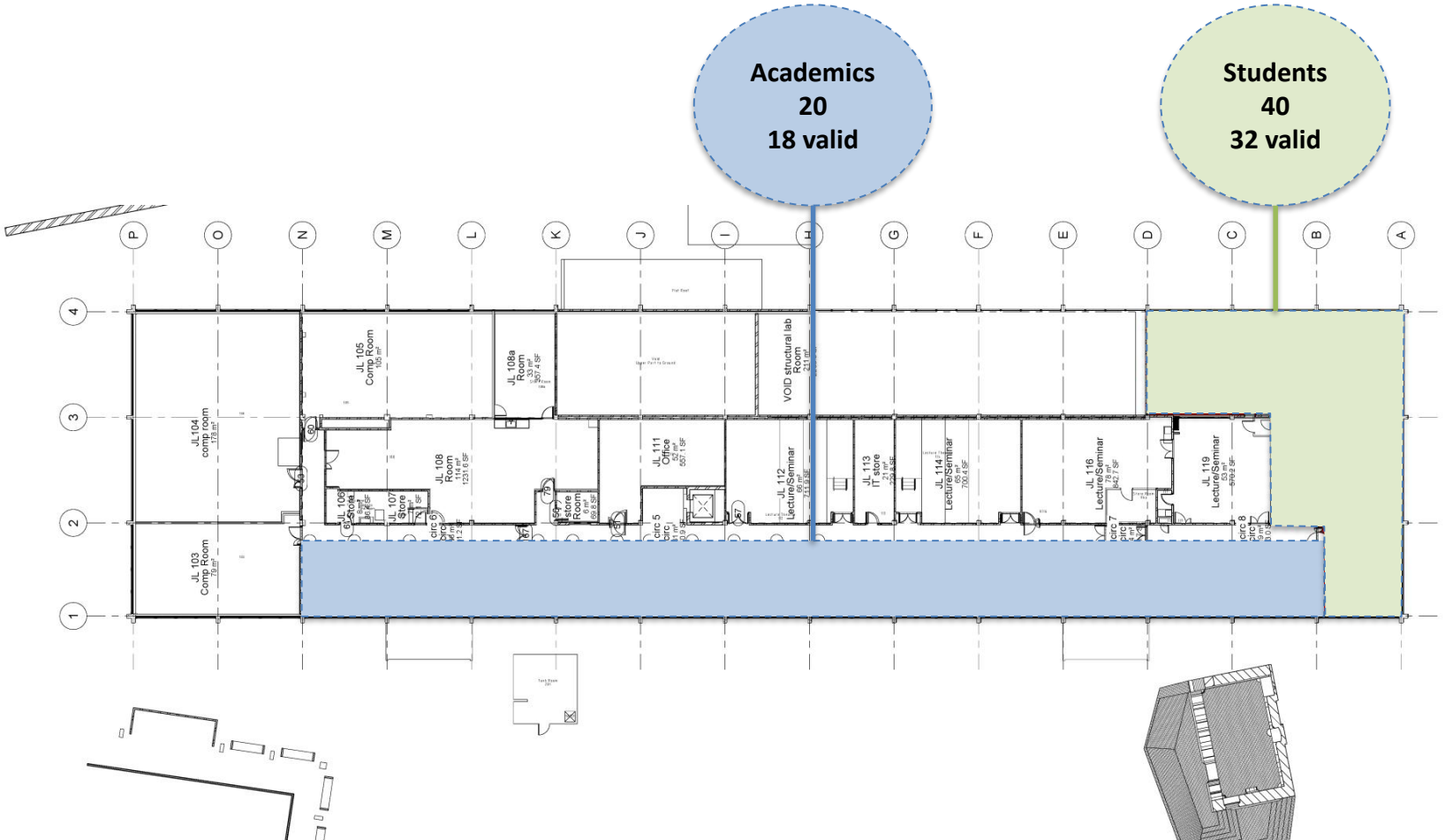
- We should have held wider engagement event at an earlier stage;
- Engage wider stakeholders in the technology selection process;

Why is this engagement important?

- To know the real needs of the end users
- The aesthetics impact of the technologies and equipment installed
- The engagement of users in the entire process will help long term performance of the Technologies;

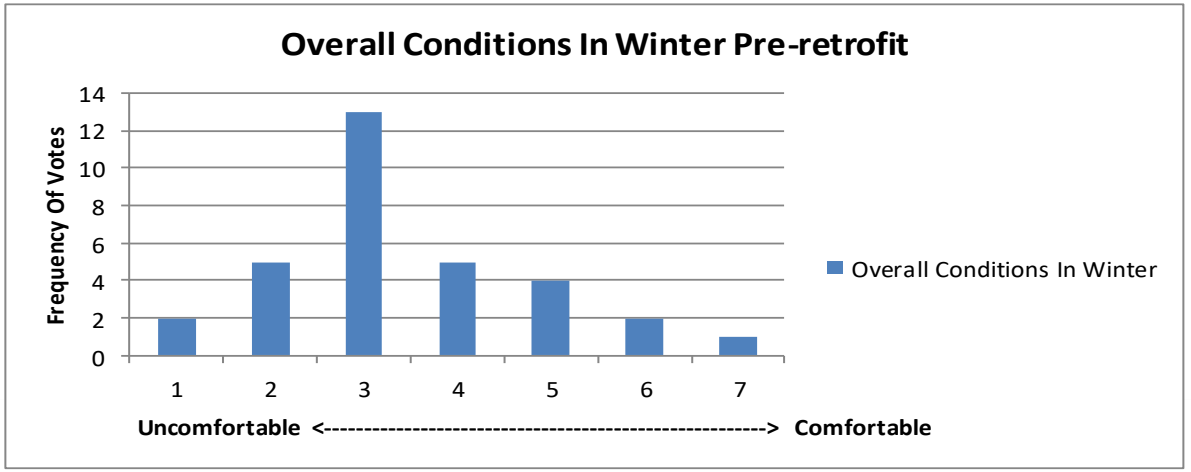
User satisfaction survey

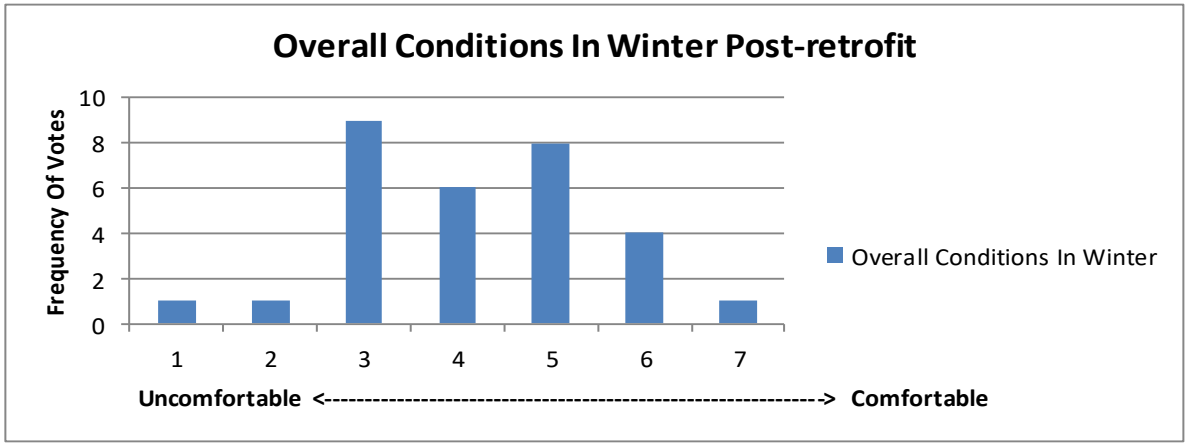
John Laing Building



6. User acceptance assessment – User satisfaction survey

John Laing Building





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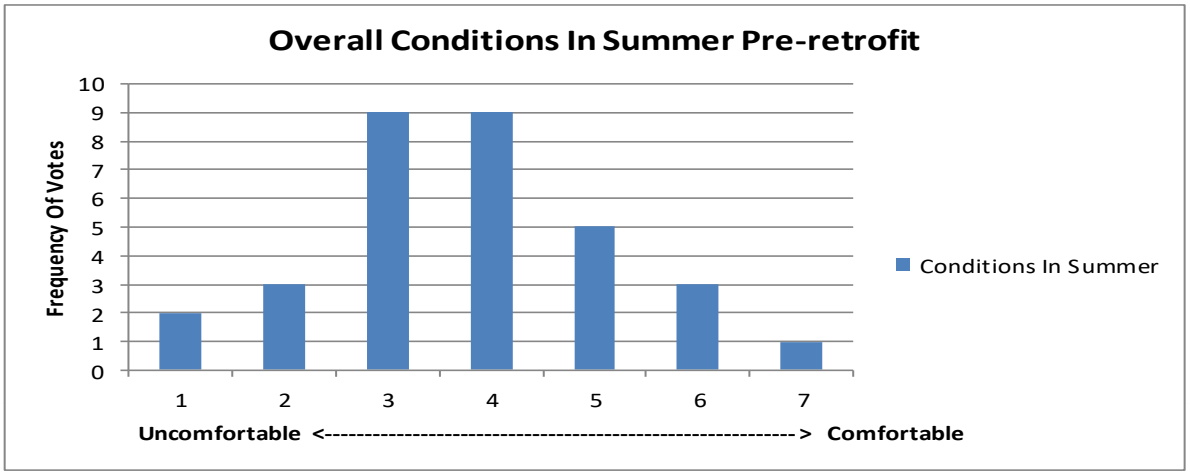
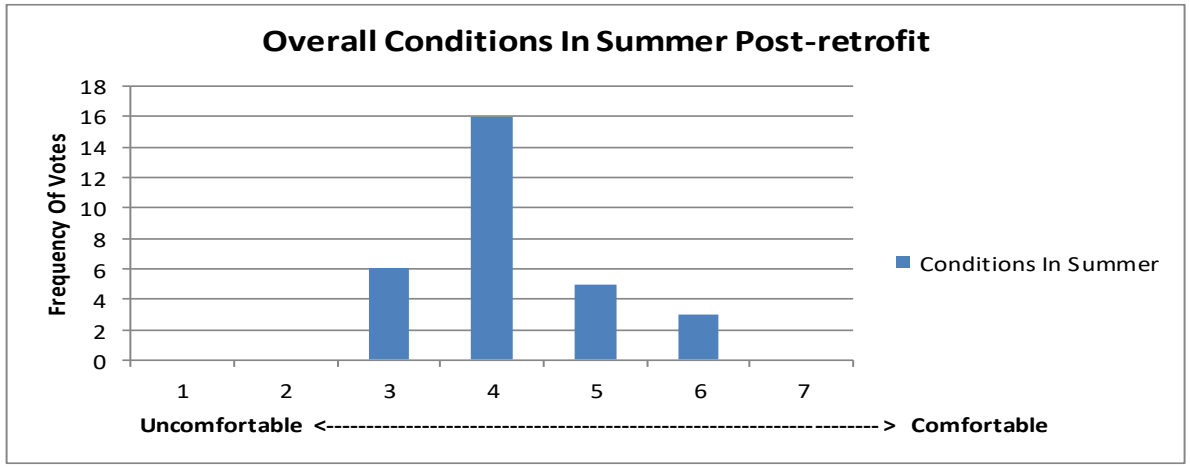
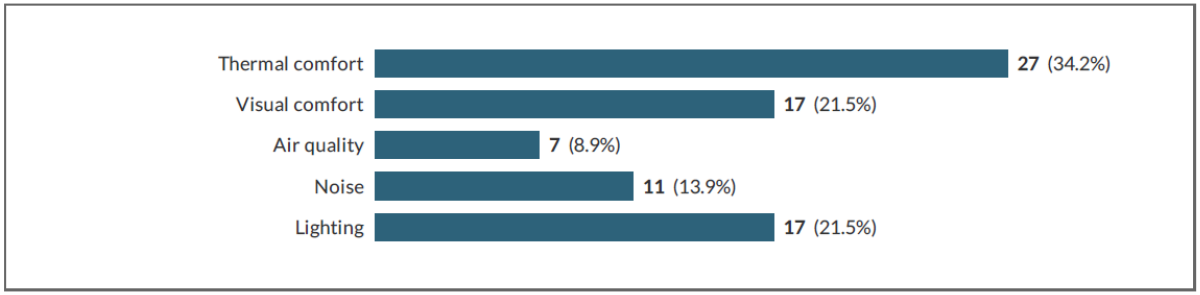




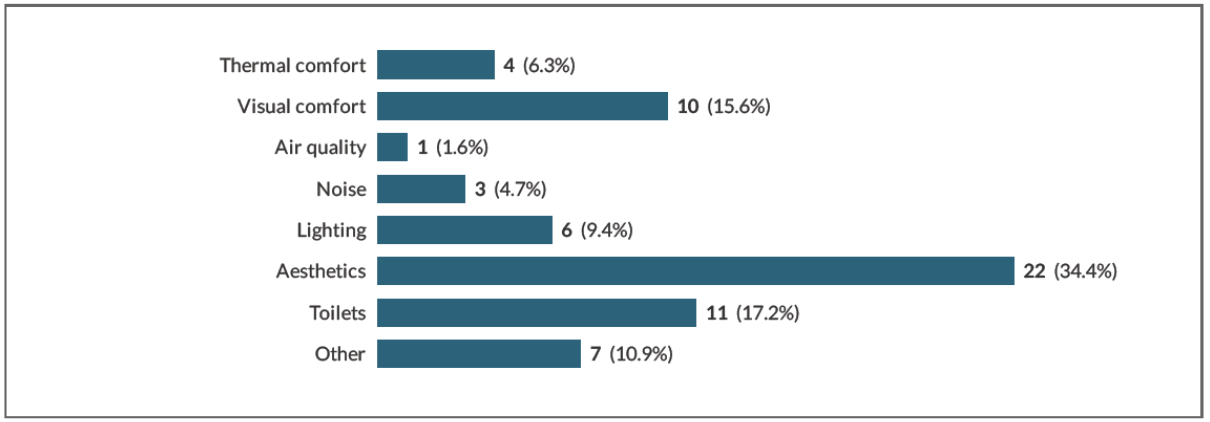
6. User acceptance assessment – User satisfaction survey

Richard Crossman Building

Key indoor environmental problems before refurbishment



What are the key improvements after refurbishment



Challenges and lessons learnt: Installation process

International project coordination

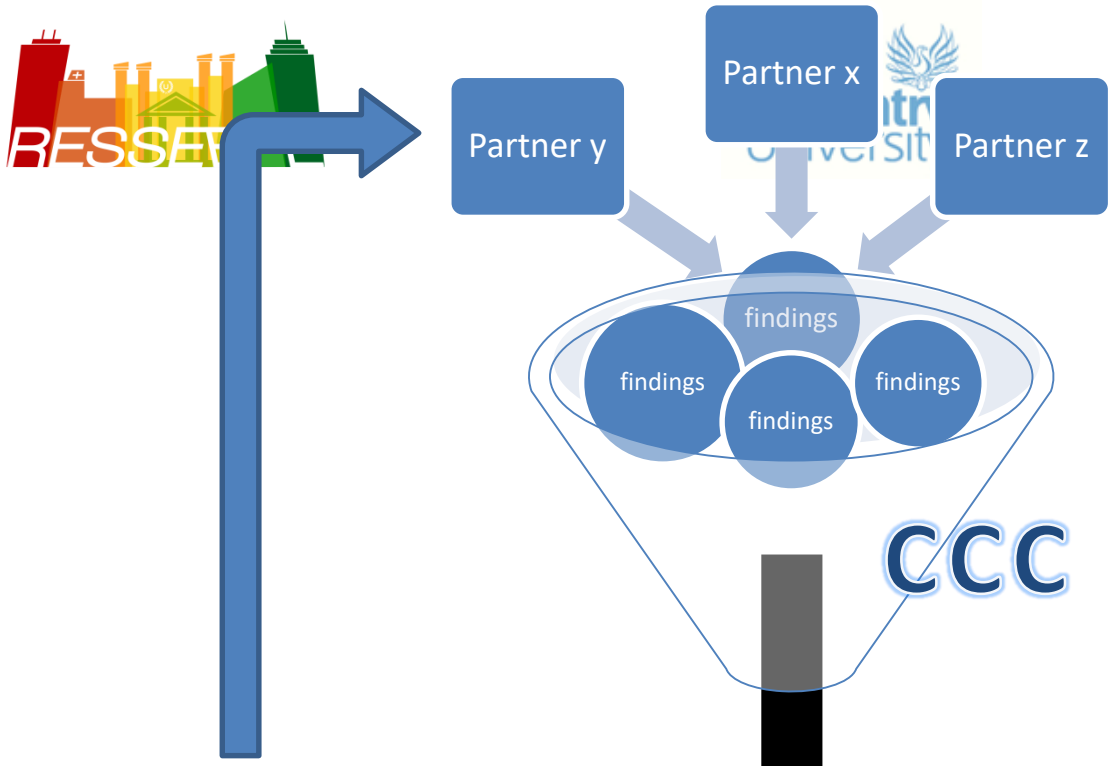
- High Complexity – Therefore need systematic and coordinated process
- Non awareness of local regulations or systems such as Health and safety

Industrial Partners – Technical challenges

- Whole system interaction is unknown;
- Challenge with preparing method statements to install state of the art technologies;
- Experts in technology may not be aware of construction techniques and vice versa; local contractors are unfamiliar with state of art technology specification;
- Just manufacturing and distribution of the product;
- Lack of accurate existing building data;

Aesthetics:

- Matching the aesthetic of existing design when using innovative technology



Back to all partners	Social Media	eNEWSLETTER	Monthly
Meeting with External Stakeholders, Professional bodies and SMES			Quarterly
Findings as part of our courses	Outreach events; Focus Groups, Event for all External Stakeholders	Invitations to Demo Sites, Workshops targeting external stakeholders	Annually

THANK YOU FOR YOUR ATTENTION!

Useful links

http://www.resseepe-project.eu/

https://twitter.com/RESSEEPE

http://www.linkedin.com/grp/home?gid=6504902

https://www.youtube.com/user/resseepe