EcRoFit – Digital Transformation of the Built Environment Sector

ECROFIT

Building a smart and sustainable future

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BIRMINGHAM CITY University

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Digitisation of the Built Environment Sector

- The Built Environment sector is far behind compared to other sectors. E.g. Health and Finance.

- Digital technology can potentially improve sustainability performance in construction, E.g. operations, compliance, communication and finance.

- Also, managing complex systems and decision-making processes. E.g. mobility, pollution, water, energy, materials etc.

EcRofit is more important today than 3 years ago?

Net Zero Strategy: Build Back Greener

| Heating and Building – 40% of UK emissions come from households - £0.5 billion funding | Transportation – by electrification of UK vehicles and their supply chain | Natural Resources e.g. Wind is main source 1st time in UK! | Support the transition with innovation – £1.5 billion |

Energy is national security - The war in Ukraine

Raised Energy prices incentivise the private sector to invest in energy efficiency solutions as a viable long-term investment.

EcRoFit – A holistic digital approach aims to close the loop

Consists of 4 Work Packages

WP1: Building the iRet Tool – equivalent to SAP

- SAP and ReducedSAP and the results are vague and unrealistic due to being a building physics calculator.

- Better solutions exist, e.g. energy building simulations – calculate every consumption every hour in a year, but:
  - Expensive – Licenses
  - Used by Engineers and Architect (Hard to Learn)
  - Require a long time to build 3D building models.
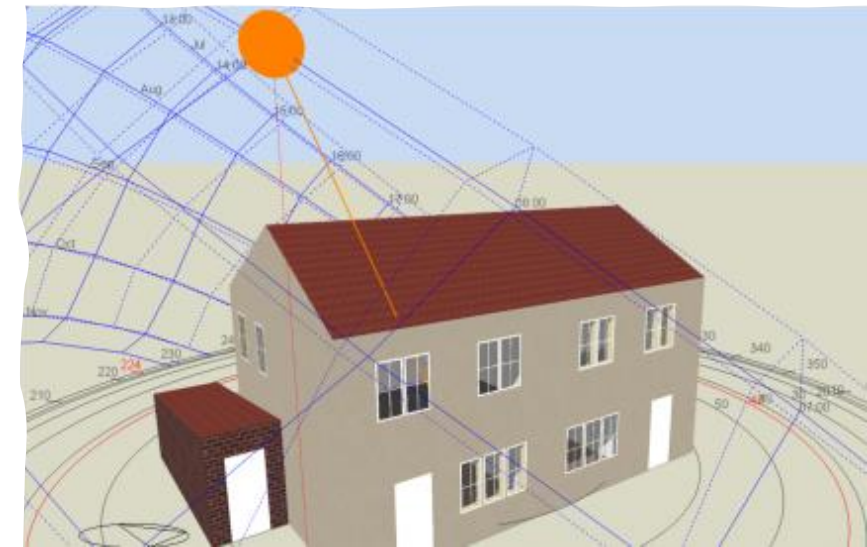
WP1: iRet tool

- Cheap and Easy to use

- It can run on Mobile Devices

- Uses Building Simulation at the back end resulting in more realistic results

- Offers energy audit for current and future weather conditions – helpful in drastically changing weather due to global warming.

- iRet is the "middle ground" between complex simulation tools and simple SAP calculators
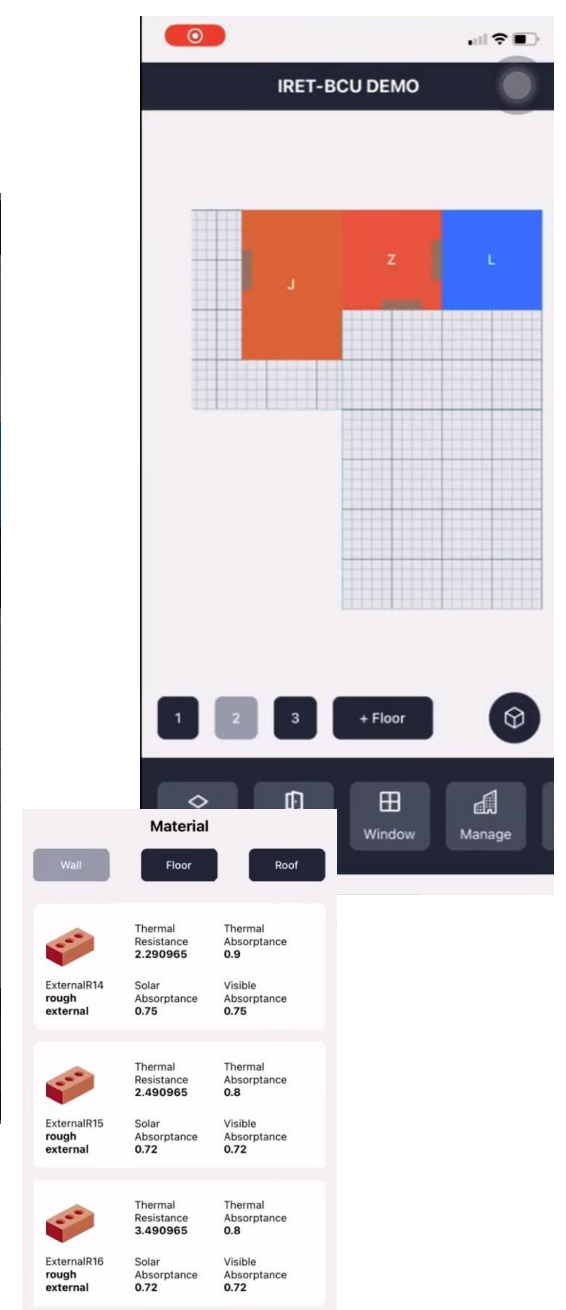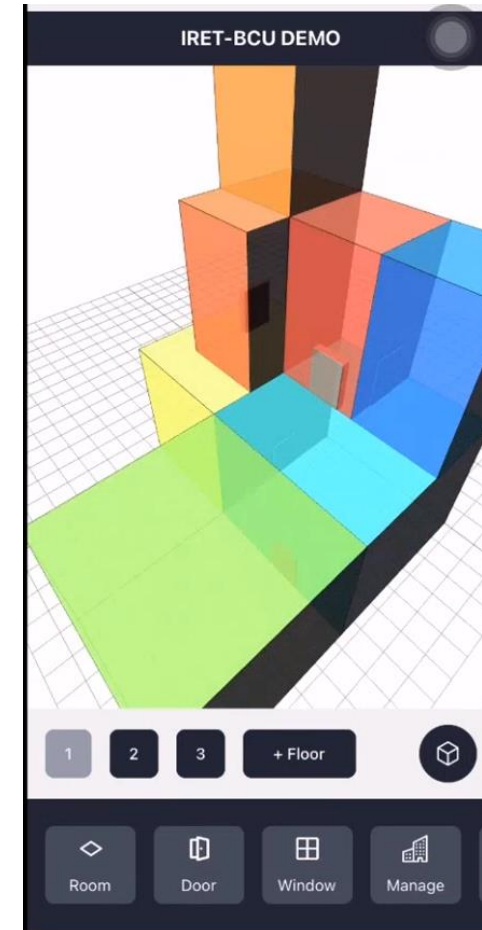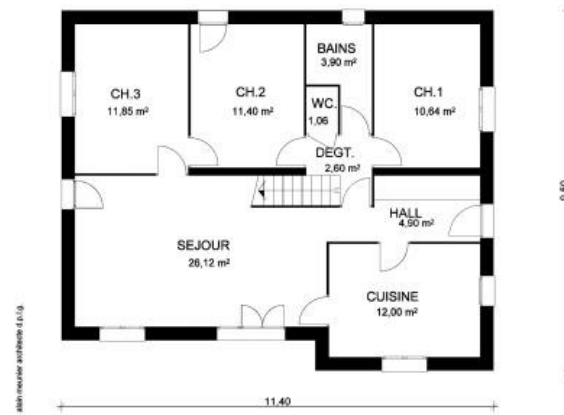
WP1: Closing the Loop! Business involvement

Local suppliers of renewable energy and energy-efficient products can use the portal to specify their products and add them to the iRet system.
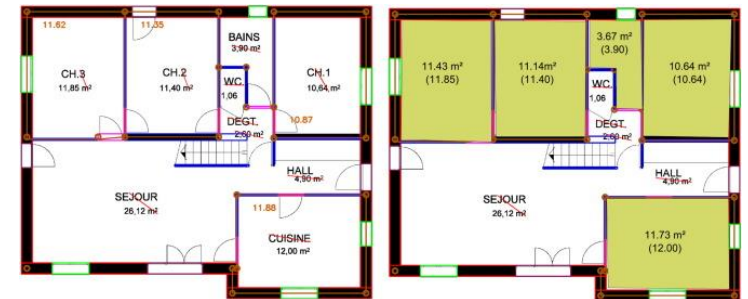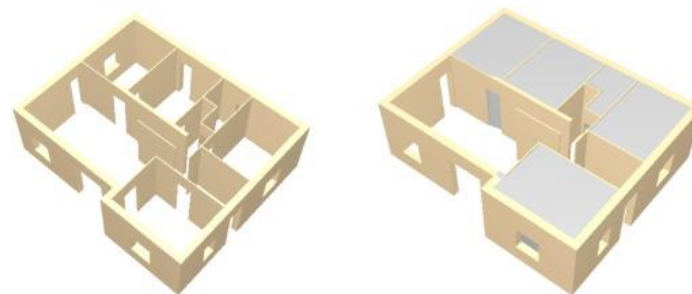
Benefits

- Companies test the effectiveness of their product with different building types.
- Their products will be used in the simulation and will be recommended to customers if proven effective – Not a result of marketing and advertising

WP2 Smart Sketcher: D2 to 3D models

Plan du Rez de Chaussée

Caption

Color	Label
Red	Outdoor Wall
Blue	Indoor Wall
Green	Outdoor window
Purple	Outdoor door
Magenta	Indoor door
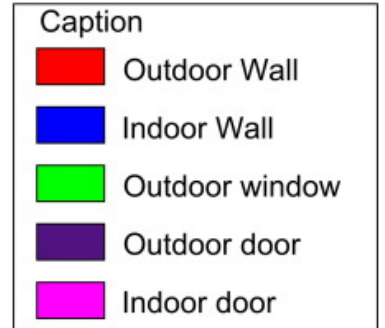
SEAL: Self-supervised Embodied Active Learning using Exploration and 3D Consistency

WP3: 10 R&D Projects

Conducting 10 R&D to support enterprises with cutting-edge solutions involving AI, Data Analytics, Advance Software Engineering. For example:

THE USE OF IRET TOOL AND DESIGNBUILDER TO MINIMIZE THE PERFORMANCE GAP - **DARK MATTER LABS**.	INDOOR AIR QUALITY MONITORING AND ANALYSIS - **TRICAS CONSTRUCTION LTD AND COVATIC LTD**.	DEVELOPMENT OF GREEN ENERGY EXPERTS SOCIAL MEDIA PLATFORM - **BEATTIE PASSIVE LTD**.	DEVELOPMENT OF AI TOOL TO IDENTIFY HOME APPLIANCE TO BE USED AS A PLUG-IN IN THE IRET TOOL – **SMART BIG DATA LTD**.	AI TO EFFECTIVELY CONTROL COOLING AND HEATING IN DOMESTIC BUILDINGS – **INNOVATION CONSULTING AND SOLUTIONS.**	LIFE CYCLE ANALYSIS FOR EMBODIED CARBON - **WALSALL HOUSING TRADING LTD**	COMMUNITY RENEWABLE ENERGY ASSISTANT FOR DECISION MAKING – **BLOCKCHAIN LTD. & VERGROOT LTD**	**……. MORE**

WP4: Offering CPDs to businesses

- Offering unique CPD to over 80 enterprises in AI for Built Environments.
  - Spread the awareness how digital transformation can support traditional construction industries
  - Encouraging digital businesses to enter the built environment sector to help achieve the NetZero targets.

EcRoFit Winner of the West Midlands Tech Award 2022

- The award was given for developing Artificial Intelligence and Optimisation-based innovative tools that generate solutions to enhance property performance toward achieving Net Zero Standard.

- The project also upskills eligible businesses in Data and AI with its innovative CPD offering to bring more digital players in the built environment sector, which is far behind compared to other sectors such as finance.

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