



# Active Building Centre: Healthy Living in Low Carbon Homes



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ACTIVE  
BUILDING  
CENTRE  
RESEARCH  
PROGRAMME

# Active Building Centre Research Programme



UK Research  
and Innovation



INDUSTRIAL  
STRATEGY

## Research Community

- 10 collaborative university partners
- 80 built environment and decarbonisation experts.
- Challenge led academic community



## Research Strands

## Research Areas and Activity

1	Technology	Thermal Storage (WP3)	Predictive Control (WP5)	Scale-up platforms (WP17)
2	Data and Monitoring	IoT Platform (WP8)	Monitoring Specification (WP8)	
3	Socio-economics and User Engagement	Post occupancy and user evaluation (WP9)	Socio-Economic Analysis (WP9)	
4	Modelling and Tools	Design and Building Physics (WP7)	Energy Networks and Active Building Scaling (WP10)	Business Models and Economic / Analysis (WP16)

## Benefit Indicators

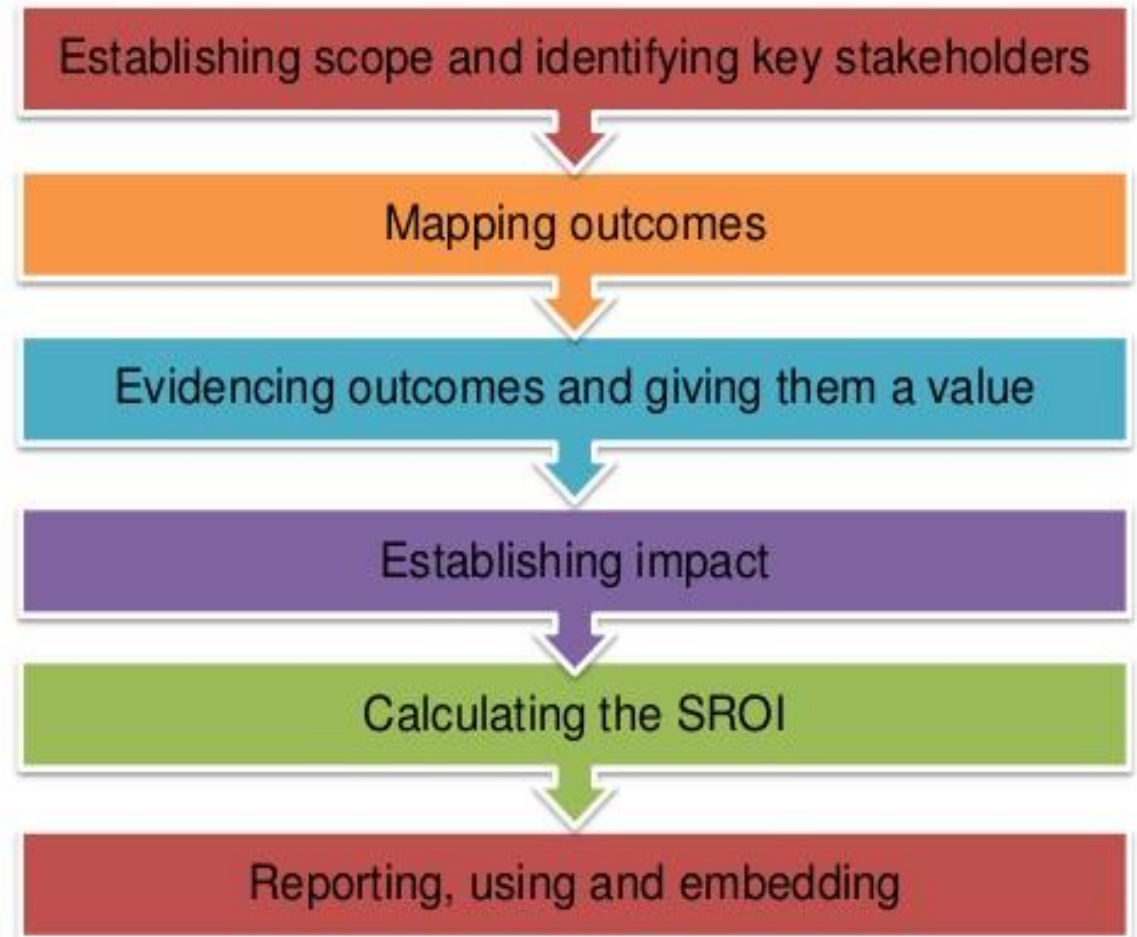
- Reduction in whole life costs
- Reduction in greenhouse gas emissions
- Demonstrate viable business cases
- Reduction in costs
- Uptake of concepts at scale
- Higher levels of lifetime built asset performance

# Social Return on Investment SROI

“Social Return on Investment (SROI) is a framework for measuring and accounting for a much broader concept of value; it seeks to reduce inequality and environmental degradation and improve wellbeing by incorporating social, environmental and economic costs and benefits.

(Nicholls, Lawlor, Neitzer, & Goodspeed, 2009)

## How is SROI Implemented



# Lower carbon homes: what this means for who (value and meaning)



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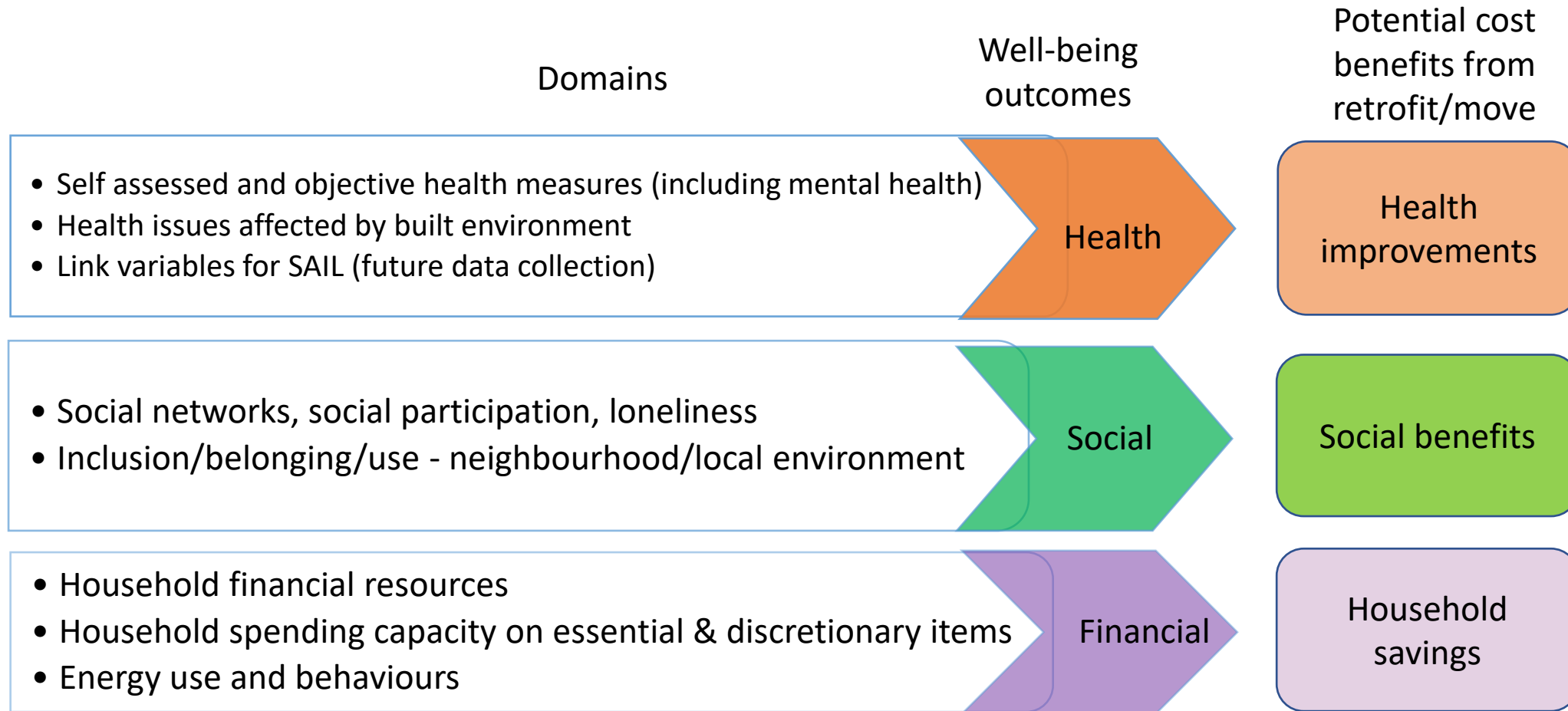
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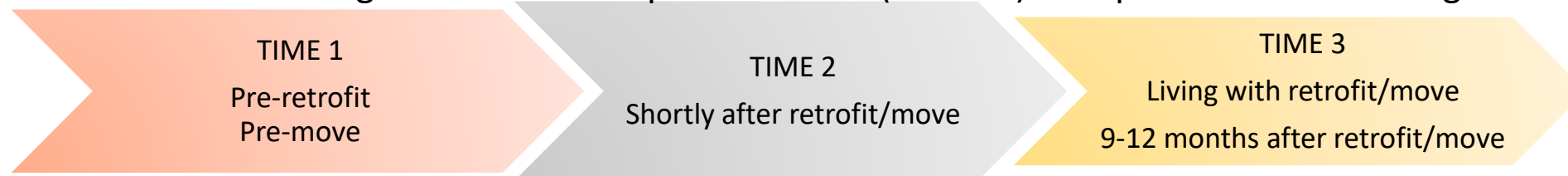
The driving question for energy efficiency projects should also be ‘what does this building mean for those who use it’ and ‘what interventions can be implemented that could co-exist harmoniously with those meanings?’ Fouseki and Cassar (2014)

This has been our research focus with a particular emphasis on what this may mean for older people

# Conceptual Framework: well-being outcomes, domains & cost benefits of low carbon homes

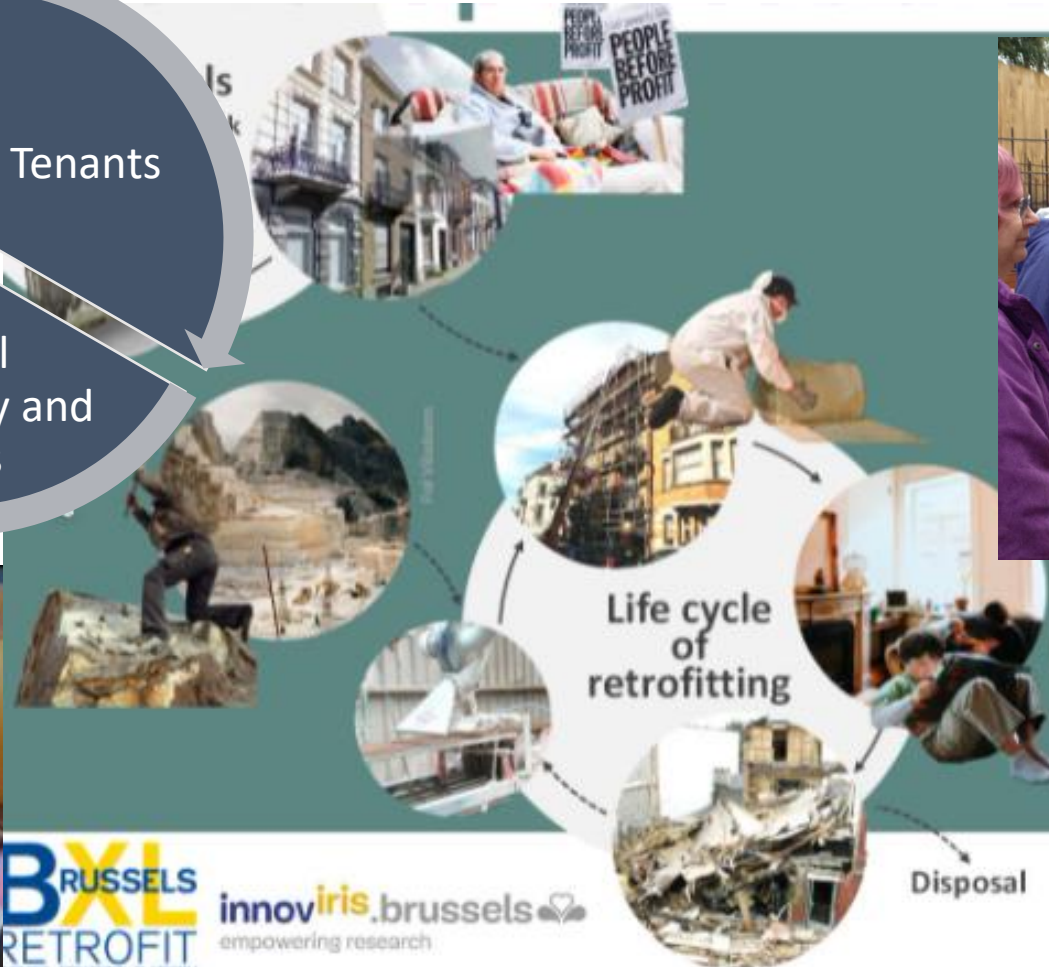


Well-being assessed at two points in time (T1 & T3) to capture outcome changes



# Stakeholder Interviews/Case Studies

As 'experts in their own experiences', citizens and stakeholders should be involved in designing services and policies that relate to those experiences (Cabinet Office [2017](#)).



CABINET STATEMENT

## Written Statement: The Optimised Retrofit Programme 2020-21

Julie James MS, Minister for Housing and Local Government

First published: 6 November 2020

Last updated: 6 November 2020

**68** Partners  
**26** RSLs  
**1,372** Homes  
**£7m** Welsh Government funding





# Drivers to Decarbonise

Welsh Government has committed “to achieve net zero emissions no later than 2050”.

- *There are plans in place to ensure that both new homes are heated and powered only from clean energy sources, but also ensuring our existing housing stock is as energy efficient as possible.*<sup>1</sup>

## Healthy Living in Low Carbon Home team:

Developed a conceptual and methodological framework to underpin our research to understand:

- Wellbeing outcomes of retrofit/moving to new build (SROI)
- Motivations for everyday energy use and behaviours; why people agree/or not to retrofit; or to move and how this relates to wider environmental concerns eg recycling, transport etc.



<sup>1</sup> Julie James (AM) Minister for Housing and Local Government, launched Optimised Retrofit Programme in Aug 2020.

# Differing Values?

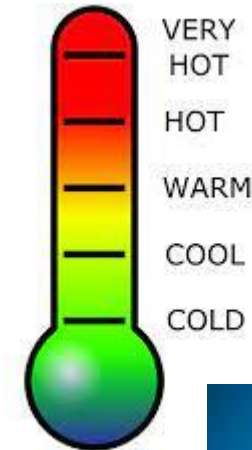
...Obviously the impact on global warming, you know, energy shortages [...] the key thing really is if we can obviously save our tenants money on their energy bills they are likelier to be able to live a healthier life and they may not be seen to be in fuel poverty [...] Also, it helps us, you know, if someone can afford to pay their energy bills potentially then ... then they may be able to pay their rent. (RSL3)

If you're talking about value to people and value to the environment, obviously the biggest thing in decarbonising homes is in the value of having a sustainable – environment, full stop. We all need to do our bit obviously. The big thing about the project is reducing our footprint and also making it so that people can live in a property more comfortably and make sure that they're able to thrive. (RSL4)

We have an opportunity to actually deliver tangible outputs towards that global agenda. And we want to be recognised for that, as an industry and as an organisation. [...] timescales ... are not quite what we were hoping for it to be, i.e. we should have really started talking to the tenants first. RSL5



Ralf Lotys (Sicherlich)    
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# The meaning of home

*For homeowners/occupiers, houses are not just spaces for thermal optimisation. They are cultural objects that carry significant value and exist in a social context. (Sunikka-Blank & Galvin, 2016)*

**Home:** *Safe and comfortable place its the place where I know where things are and how things work, I can escape behind the front door and shut it (particularly at the moment) – where no one will bother me (SF>60)*

*but the disruption internally, I mean, [...] if the house was say - you had just moved into the property and you are doing it then, okay fine. Some of the homes ...are very well decorated, nice carpets, they have been there a long time **and they have really made it their home**, [...] the wallpaper is immaculate, we can't match that, you know. ...you've got to try and think of the best way to do things, because it's their home...would I do that in my own home? RSL3*

*The first people that came here they sacked them –they didn't know what they were doing [...]they flooded the house it was pouring down through the sockets and switches.[...] **I sat there and just cried.** AR5 F>65; retrofit*



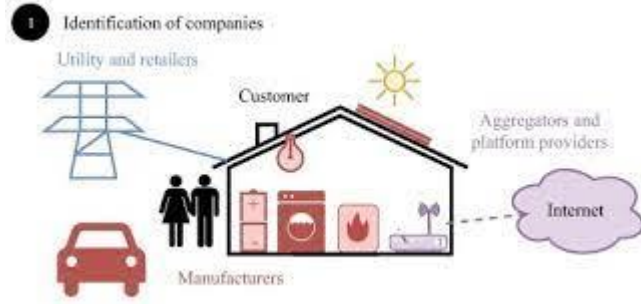
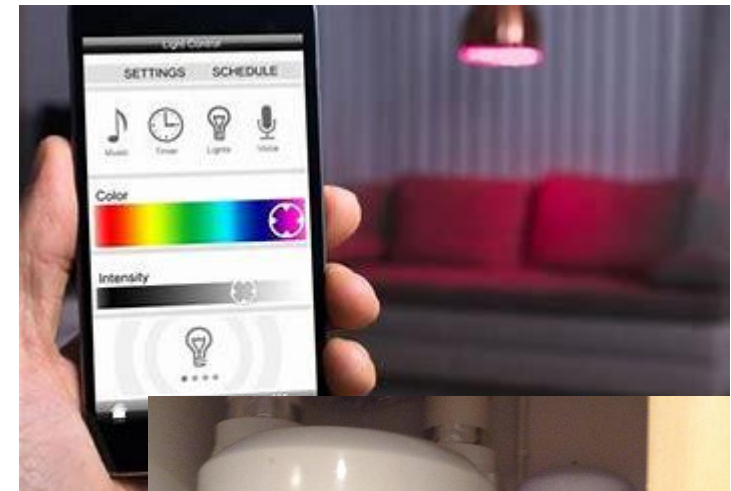
*Well I love the layout of it., I'm in love with the windows, they let in so much light ...I can open them to get the full effect of the wind and the air coming in. I mean my skin isn't drying out from too much central heating - it's nice and warm when the heating has been on all day, you're not feeling like, oh I can't breathe, there's no air. (Participant (F) –new build social housing)*

# Energy behaviours'

Adopting new technologies involves acknowledging cognitive, symbolic and practical responses (Wrapson and Devine-Wright, 2014).

*Because the house is really warm anyway provided you understand like you need to sort of keep your windows closed ideally [...] . But it's weird because in our old house the natural thing you do is open all the windows. But to keep it cool you shut the windows and then the vents in the ceiling release cooling in all of the rooms. They said if the room is getting a bit too cool we open the door to sort of allow the air to circulate. (BB2 – new home)*

*If I go out the house –the app turns the heating off- My husband is at home freezing! (AR2001 -retrofit)*



Heat pump

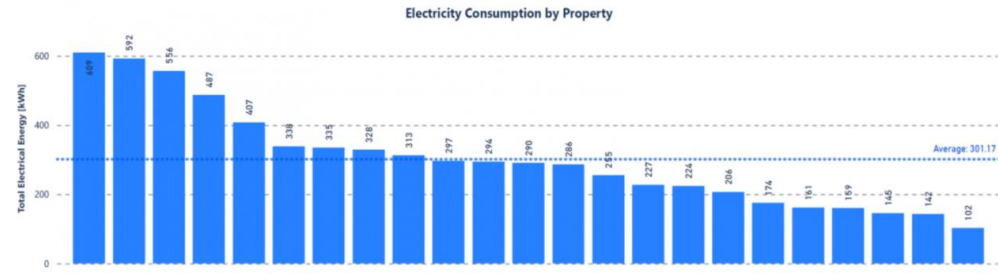


Figure 1: Example of household compared section of the energy report showing monthly electricity consumption for each of the monitored properties

[Energy use awareness leads to easy financial savings \(abc-rp.com\)](http://abc-rp.com)

# The 'value' of energy

Energy use is also linked to values, with the provision of heat and a cosy home being embedded in social practices of hospitality (Day & Hitchings, 2011).

– nothing like having direct heat at my feet (AB member)

I do like to go to a bed in a freezing cold bed, I find it easier to fall asleep, so I do have my bedroom windows open from the moment I get up till the moment I go to sleep, there's no radiator on in the bedroom and the door is closed. [...] I mean I do my drying in my bedroom, purely because I've got the window open constantly, I find it only takes about 16 hours for my clothes to dry and because I do the washing at night, which is when energy is cheaper, I then wake up in the morning and hang my washing up and by the time I go to bed, most days, they're completely dry. (Participant (F) –new build social housing)



# Early learnings

## **Thoughts from our Expert panel:**

*The model (theory of change) can help to determine which is the best approach (impact and cost).[...]we can also tease out better participation and engagement models [...] to ensure the success of such programmes. (S- RB)*

*Transition is only going to succeed if people are being involved in the process from the outset. Our relationship is not about kwh but is more emotional – to affect people’s behaviour will involve, finances, attitudes, security confidence etc. (S-BS)*

## **Registered Social Landlords and Local Authorities**

*We had about three months to spend it (funding) LA1*

*Yeah that's the problem isn't it it's all driven by deadlines. RSL2*

*So it's really new to me, I had no idea really about anything to do with decarbonisation..... so i'm learning with them (tenants) [...] But there's a lot to learn (RSL 1)*

*So now I've arranged city and guilds energy awareness training and we'll roll that out for our neighborhood officers and we'll roll it out for tenants, as well as try and spread the words, the message wider. LA1*

*There may be unintended outcomes for those who are already marginalized – we risk making situations worse – not bringing them on the journey. We need to match the different agendas RSL3*

# References

About Us - Active Building Centre Research Programme (abc-rp.com)

<https://www.activebuildingcentre.com/>

- Dyakova, M. (2017). Investment for health and well-being: a review of the social return on investment from public health policies to support implementing the Sustainable Development Goals by building on Health 2020.
- Ellis P. Judson & Cecily Maller (2014) Housing renovations and energy efficiency: insights from homeowners' practices, *Building Research & Information*, 42:4, 501-511, DOI: 10.1080/09613218.2014.894808
- Fouseki, K., & Cassar, M. (2014). Energy efficiency in heritage buildings—future challenges and research needs.
- Galvin, R., & Sunikka-Blank, M. (2014). The UK homeowner-retrofitter as an innovator in a socio-technical system. *Energy Policy*, 74, 655-662.
- Gram-Hanssen, K. (2014). Retrofitting owner-occupied housing: remember the people. vbn.aau.dk. In: *Building Research and Information*, Vol. 42, No. 4, 2014, p. 393-397
- Ingle, A., Moezzi, M., Lutzenhiser, L., & Diamond, R. (2014). Better home energy audit modelling: incorporating inhabitant behaviours. *Building Research & Information*, 42(4), 409-421.
- Nicholls, J., Lawlor, E., Neitzert, E., & Goodspeed, T. (2009). *A guide to social return on investment*. Office of the Third Sector, Cabinet Office.
- Shove, E. (2010). Beyond the ABC: climate change policy and theories of social change. *Environment and planning A*, 42(6), 1273-1285.
- Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. Sage.
- UK Energy Research Centre(UKERC). Public engagement with energy: broadening evidence, policy and practice. UKERC briefing note by Jason Chilvers, Helen Pallett and Tom Hargreaves (Science, Society & Sustainability (3S) Research Group, University of East Anglia)
- Welsh Government 1- (12 June 2019, the Welsh Minister for Environment, Energy and Rural Affairs). <https://gov.wales/written-statement-response-committee-climate-changes-net-zero-report>
- Devine-Wright, P., Wrapson, W., Henshaw, V., & Guy, S. (2014). Low carbon heating and older adults: comfort, cosiness and glow. *Building Research & Information*, 42(3), 288-299.