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# Energy retrofitting of private homes: a challenge

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# ICIS: Maastricht University's scientific institute for sustainable development

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*vision* to provide through research and education the knowledge base for **policymaking and innovation** in the pursuit of sustainability

*mission* to contribute to **knowledge development, innovation, and action** for sustainable development at local and regional levels, as a basis for global sustainability

- multidisciplinary staff
- interdisciplinary approach
- transdisciplinary attitude

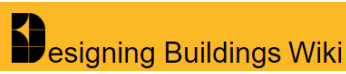


# Retrofitting: ???

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- ‘providing something with a component or feature not fitted during manufacture or adding something that it did not have when first constructed’ 
- For a building: improving the building fabric, and upgrading building services.
- Not: changing the windows or introducing LED lighting
- Energy retrofitting: improving the energy performance of the building as a whole

# Examples of retrofit measures

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- Loft insulation to reduce heat loss and improve comfort
- Wall insulation
- Basement ceiling insulation
- New ventilation system (with heat recovery)
- Upgrading boilers
- New heating systems
- Roof improvement



# Energy retrofitting: not from a technical perspective

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CURRENT RETROFIT RATES: 1% /YR (Building Performances Institute Europe, 2016)

REQUIRED: AT LEAST 3%, PROBABLY MUCH MORE (EC, 2015)

- To retrofit or not... that's the question
- Circumstances for success
- Possible approaches
- Decision-making
- Cost



# Two projects in detail

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## ACE Retrofitting

- Focus on accelerating energy retrofitting of **condominiums** in North West Europe

## ENLEB

- Focus on **neighbourhood approaches** for energy retrofitting (rental and privately owned houses) in the Netherlands and Flanders

## More projects at ICIS on Energy

- HEEC, Energise, RaakPro WoF, Glocull

# ACE Retrofitting

## Accelerating Condominium Energy retrofitting

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Aberdeen, Antwerp, Frankfurt, Liege, Maastricht, Paris

<b>Total budget</b>	<b>4.2 Million €</b>	
<b>Total EU funding</b>	2.5 Million €	60% funding by interreg
<b>UM budget</b>	331,042 €	ICIS, FPN, SBE
<b>EU contribution</b>	198,626 €	60% funding by interreg
<b>Province of Limburg</b>	82,760 €	25% funding by PL

Changeworks, Energy Cities Network (lead), Maastricht University

# Energy retrofitting in condominiums: A common challenge for EU countries



A complex and unattractive market for building professionals

Long decision-making process to develop a renovation project

Avoiding lock-in situations: whole-building-approach

Many buildings constructed before 1980, with low energy efficiency

Financing engineering of a renovation project is complex

A key sector to reach cities' energy and climate targets



# Objectives of the ACE Retrofitting project

(running from September 2016 to March 2020)



©Rodho

Accompanying co-owners and co-owner associations ('demand')



Making demand and supply meet:  
Cities acting as facilitators



pooling and increasing the competencies of building professionals ('supply')

# 10 Focus groups in the 6 cities: what do people flag?

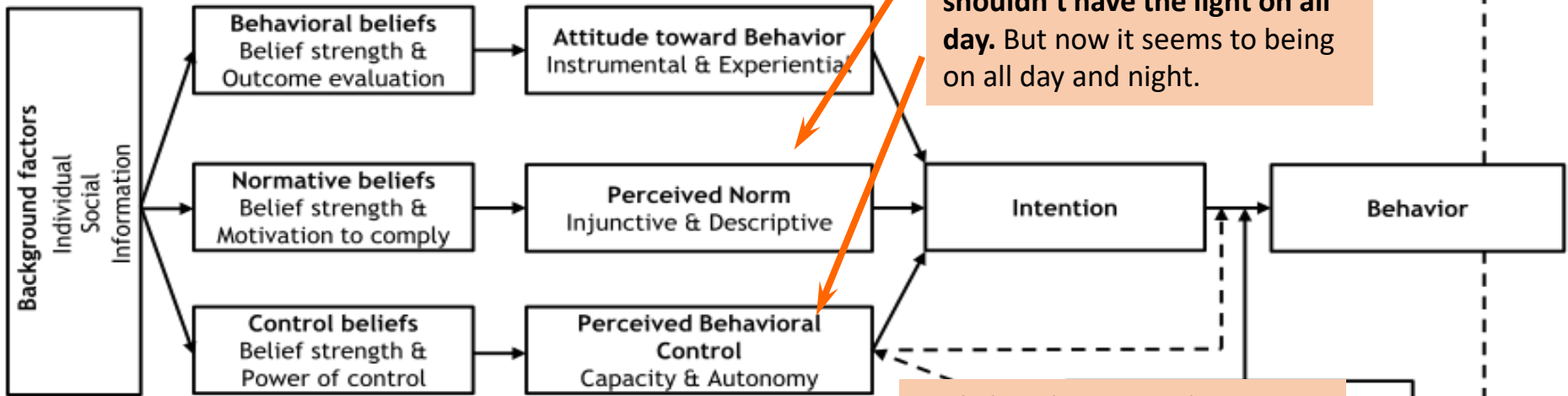
## Preliminary results



- Subsidies not reliable/not continuous
- Decision-making as a group is problematic
- Old people do not want to invest, but also young people...
- Insufficient legal incentives/sanctions
- Not enough known about the various options
- No clear data about the benefits



# Focus groups in the 6 cities: what do people flag? Preliminary results



In our common landing the light is controlled, I suppose, by the council. But I read years ago we shouldn't have the light on all day. But now it seems to be on all day and night.

And also, there must be some better way to insulate the front door of an apartment so that draught doesn't come in. I just can't find that solution

# Energy retrofitting in your condominium



# Financial barriers for condominiums



- Energy retrofit is a big investment: Mostly financed by reserves, but sometimes these are not existing or not efficiently managed
- Not clear what costs and benefits are
- Address split incentive owner/renter
- Transferable loans are needed; financial structure for the whole building is needed;
- Too many parties to be contacted, no “single desk” : confusing and not efficient
- Condo budget-management is often not transparent

# Financial models report

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## Various models:

- Own savings
- Energy performance contracting
- Leasing
- Topping up
- Service cost model
- Crowd in vestment
- .....

## Framework for assessing financial models

## Financial Solutions for Condominium Retrofitting

23.08.2018

*Prepared by Maastricht University - Deliverable D.T4.1.1*

1	Executive Summary .....	4
2	Introduction .....	6
2.1	Assumptions.....	12
2.2	Aims .....	12
3	Flowcharts and Tool Overview.....	13
4	Criteria for Frameworks .....	19
4.1	Criteria Theoretical Framework .....	20
4.2	Criteria Practical Framework.....	24

# ENLEB

## EnergieNeutraal en LEvensloopbestendig Bouwen

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Avans Foundation , Eindhoven University of Technology, Hellas  
Rectifiers, Maastricht University, TIORC cooperative

<b>Total budget</b>	<b>1.5 Million €</b>	
<b>Total EU funding</b>	0.75 Million €	50% funding by interreg
<b>UM budget</b>	213,780 €	ICIS, FPN, SBE
<b>EU contribution</b>	106,890 €	

KampC (lead), Thomas More University, University Colleges  
Leuven-Limburg, Zonnige Kempen

# Neighbourhoods and demo-houses

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- Help citizens to retrofit their house
- Develop an integrated concept
- Based on co-creation and self-support



# 9 Neighbourhood baselines

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## Verduurzamingspotentie

Wijken met in theorie een hoge verduurzamingspotentie



## Bevolkingsopbouw

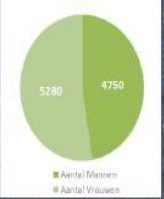
**Geslacht**  
Meer vrouwen dan mannen

**Leeftijd**  
Relatief veel mensen tussen 15 en 25 jaar en 25 en 45 jaar oud

**Herkomst**  
Relatief meer allochtonen, vooral westers en Marokkaans

### Geslacht

Woningbezitters en huurders in het gemeentelijk gebied



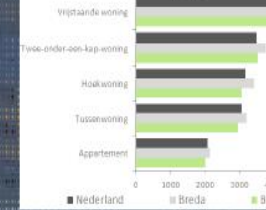
## Energie

**Vrijstaande Woningen**  
Vrijstaande woningen gebruiken substantieel meer energie dan gemiddeld

**Aardgasverbruik**  
Hoog dan gemiddeld voor alle woningtypes behalve appartementen

### Gemiddeld Elektriciteitsverbruik

Per woningtype



## Energieverbruik

Buurtten met een hoog gemiddeld gas of elektriciteitsverbruik

### Hoog Gemiddeld Elektriciteitsverbruik

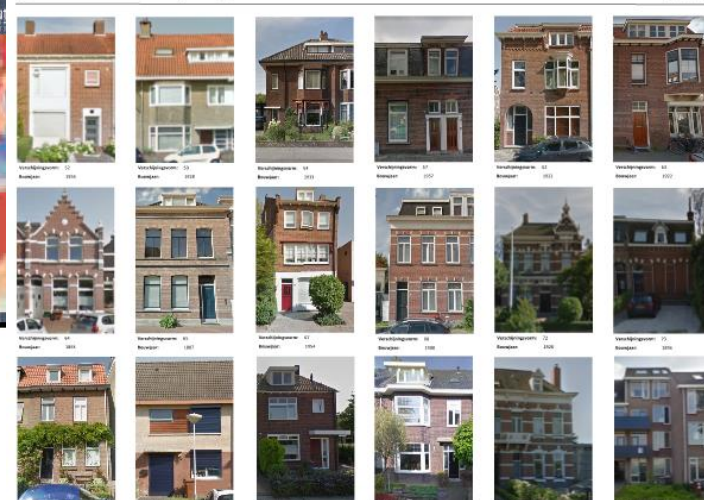
V.h. Prinsenbeek  
Hagebeemd  
Emer  
Steenakker

### Hoog Gemiddeld Gasverbruik

Nieuw Wolfslaar  
V.h. Prinsenbeek  
Effen-Rith  
Mastbos  
V.h. Ulvenhout



### DAKFAMILIES



Social  
Economic  
Building types

# Current activities: Co-creation in a variety of neighbourhood & demo approaches

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- What does an approach consist of?
- How does the approach fit with the neighbourhood characteristics?
- What level of participation is needed throughout the customer journey?
- What new business models are useful for the supply chain

# Some other products (WIP)

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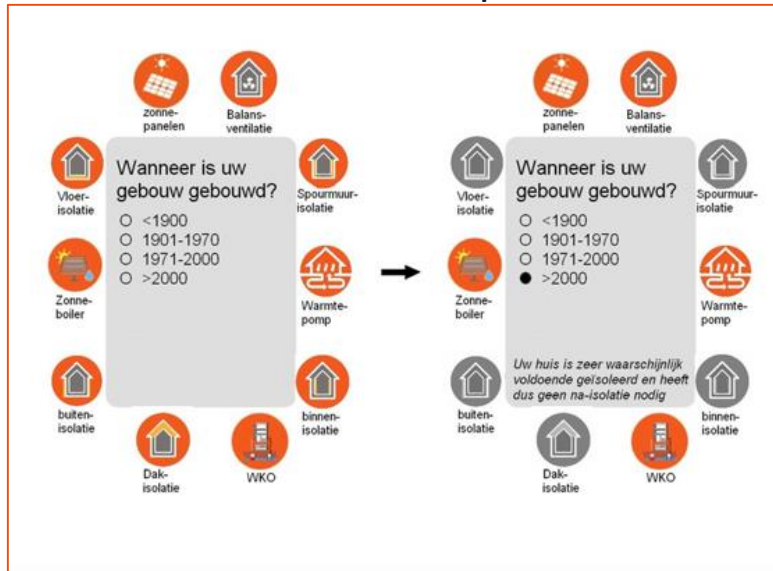


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## Ontwerp concept mobiele DC-unit



## Tool: menu of options



## Pop-up E-nulwoning



# Key elements of the two projects

- Increase energy retrofit rate
- Focus on the societal side
- Involve students
- Connect scientific knowledge to practical problems
- Acknowledge different interests and look for acceptable solutions

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# Thank you!

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## Current Research



### ENLEB

ENLEB is a project in which Flemish and Dutch partners work together to encourage citizens to make their homes energy neutral and adaptable to meeting changing needs through all life phases.

▶ [Read more](#)



### ACE Retrofitting

ACE Retrofitting (Accelerating Condominium Energy Retrofitting) will help condominiums to overcome legal, social and financial barriers of retrofitting.

▶ [Read more](#)



### STRASUS

The STRASUS (strategic sustainability for logistics) project aims to "gamify" the creation and, above all, the active implementation of a sustainability strategy (CSR) for small and medium enterprises (SMEs).

▶ [Read more](#)



### HEEC Project

The project is part of Joint Scientific Thematic Research Programme (JSTP) –



### Smarterlab

The SmarterLabs project aims to develop a Smart City Living Lab approach to



### TRANSIT

TRANSIT is an ambitious research project that will develop a theory of



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