

# Energy decisions in heating consumption: results from fuzzy cognitive mapping

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## INTRODUCTION & MOTIVATION

- Residential building sector is a major driver of current energy consumption and associated CO2 emissions
- Majority of the fuel heating system uses still comes from fossil fuels
- In Spain, 18% of total energy is consumed by households, and 44% of that energy is for heating
- Understanding behavioural aspects of energy use and energy saving complement the main factors supporting energy consumption for heating (socioeconomic development, architectural design or climate)
- Policy effectiveness highly depends on behavioural decision-making by households
- Policy makers need to better understand consumers' behaviour to design effective energy savings strategies

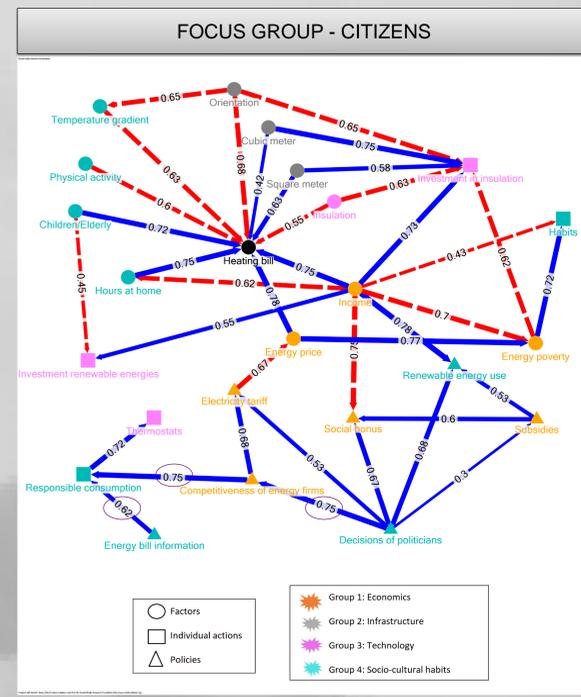
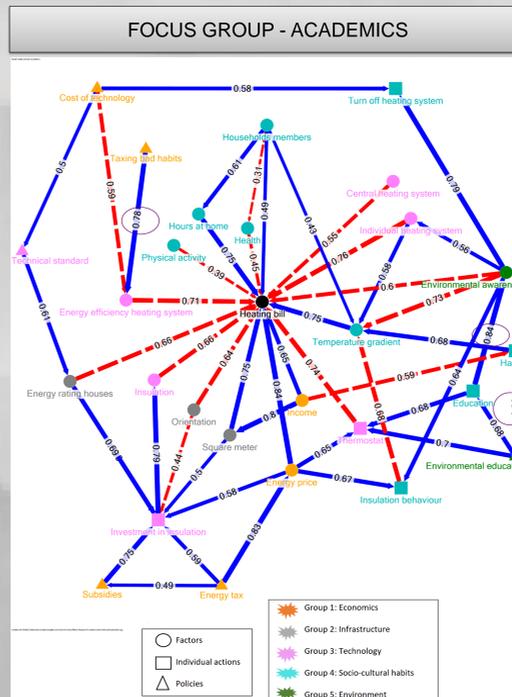
## OBJECTIVES

- To learn more about the determinants of households energy consumption for heating
- To find out what policies can effectively help to encourage low carbon behaviour
- HOW ?
- Assembling knowledge, expertise and perceptions from different social groups: users, researchers and managers of the energy system
- Confronting different population in the same group so as the reach a consensus

## DATA

Focus groups	Participants number and characteristics	When?	Where?
Academic Focus Group	10 participants Experts in energy, environment and climate change	December 20 <sup>th</sup> , 2017	Basque Centre for Climate Change Bilbao, Spain
Citizens Focus Group	8 participants Gender, Studies, Age, Income, Type of dwelling, Member of households, Heating system	January 23 <sup>rd</sup> , 2018	Bilbao, Spain
Energy experts Focus Group	7 participants	January 31 <sup>st</sup> , 2018	Spanish Association for Energy Economics (AEEE in Spanish) Zaragoza, Spain

## RESULTS



## METHODOLOGY

Participatory semi-quantitative method

Fuzzy Cognitive Mapping

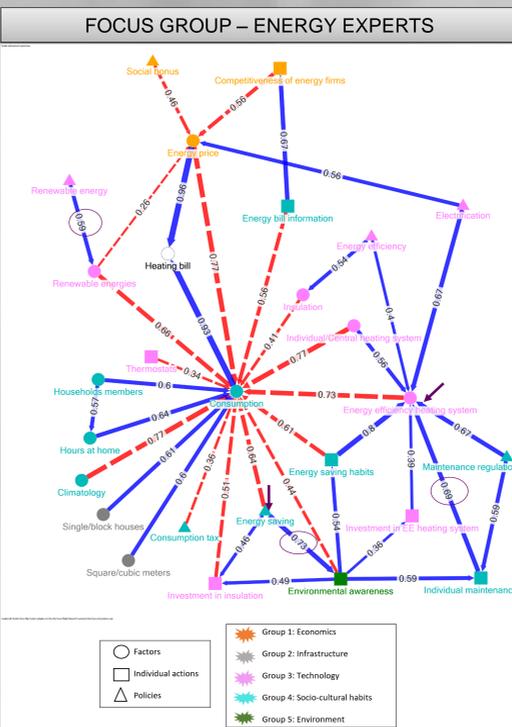
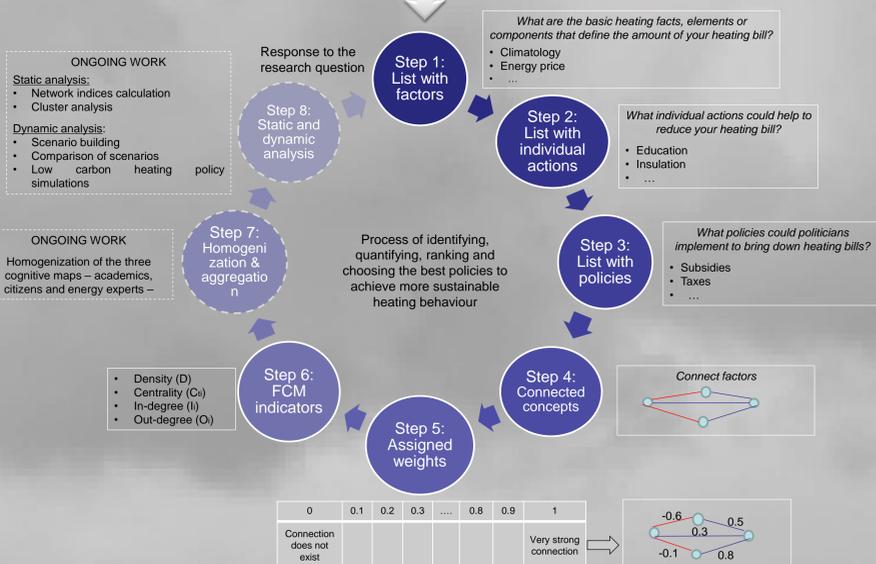
Identifying

**What it is?**  
It is a representation of a belief system in a given domain. It comprises of concepts representing key drivers of the system, and connections between concepts (Kok K., 2009).

Unexpected effects and the strength of causal links identified to support decision making

Research question

What influences the amount of your heating bill?



	Thematic issues							
	Economics	Infrastructure	Socio-cultural habits	Technology	Environment	Energy poverty	Subsidies	Taxes
FG- Academics	✓	✓	✓	✓	✓		✓	✓
FG- Citizens	✓	✓	✓	✓		✓	✓	✓
FG-Energy Experts	✓	✓	✓	✓	✓		✓	✓

## CONCLUSIONS

Effective policy instruments

### Taxing bad habits and/or fossil fuels for heating

- To stimulate use of energy efficient heating systems → to reduce energy consumption
- To motivate investment in insulation
- To implement subsidies or rebate schemes

### Subsidies

- For the use of renewable energy
- To contribute alleviating energy poverty (social bonus)

### Environmental education policies

- Could shift the habits of consumers towards energy savings

### Policies to help people understand energy bills

- To lead to more responsible consumption habits