BEYOND THE ATTITUDE-BEHAVIOUR GAP

SYSTEMS OF MOTIVATIONS, ROUTINES AND HOUSING CHARACTERISTICS IN A DIRECT LOAD CONTROL EXPERIMENT

MATHIEU DURAND-DAUBIN

CÉCILE CARON

ECEEE 2015, GIEN

STARTING POINT

1. Better understand the relationship between attitudes and behaviours in the field of domestic energy consumption

2. Frequent statement : “people don’t do what they say, especially regarding environment friendly actions”

3. In-depth interviews at home tell us a very different story : consistent systems of motivations-material environment-daily routines we called domestic “energy projects”

STARTING POINT

Le Goff family

« No, but actually, in terms of appliances, we don't have no coffee machine, we haven't changed the fridge for 10 years, we don't have no fully equiped, all electric, kitchen. We try to limit appliances. »

STARTING POINT

Le Goff family

ATTITUDE

- *very **deep environmental concerns,** care for future generations and opposition to consumerism*

BEHAVIOUR & MATERIAL

- ***old building** in the town centre to limit car usage and nibbling rural areas*
- *average living room **temperature lower** than average comparable households*
- ***old appliances** are not changed unless they can't be repaired*
- ***homemade** and local products are preferred to industrial ones*

ENERGY CONSUMPTION

- ***electric consumption higher** than average comparable family*
- *off peak hours are not used efficiently*
- *no voluntary extra reduction at critical peak time (experiment)*

→ Different ways to care about the environement

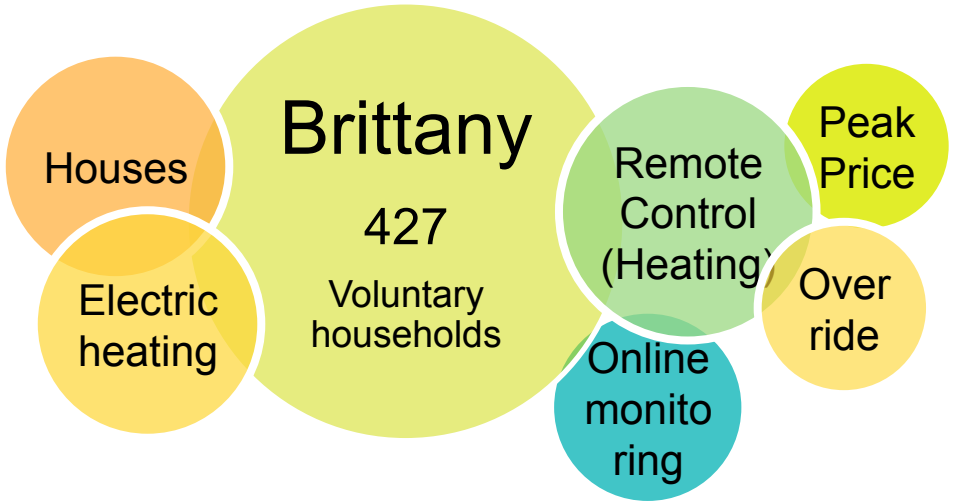
→ Meaningful action, but not what **we** expect

RESEARCH QUESTIONS

1. Can we describe the same kind of “energy projects” based on quantitative data?

2. Does it help us to understand how the load control intervention was received by the participants?

FIELD EXPERIMENT



Heating interrupted 1 or 2 hours, on 20 cold days of winter

Avoided power depends on prior heating practices and weather

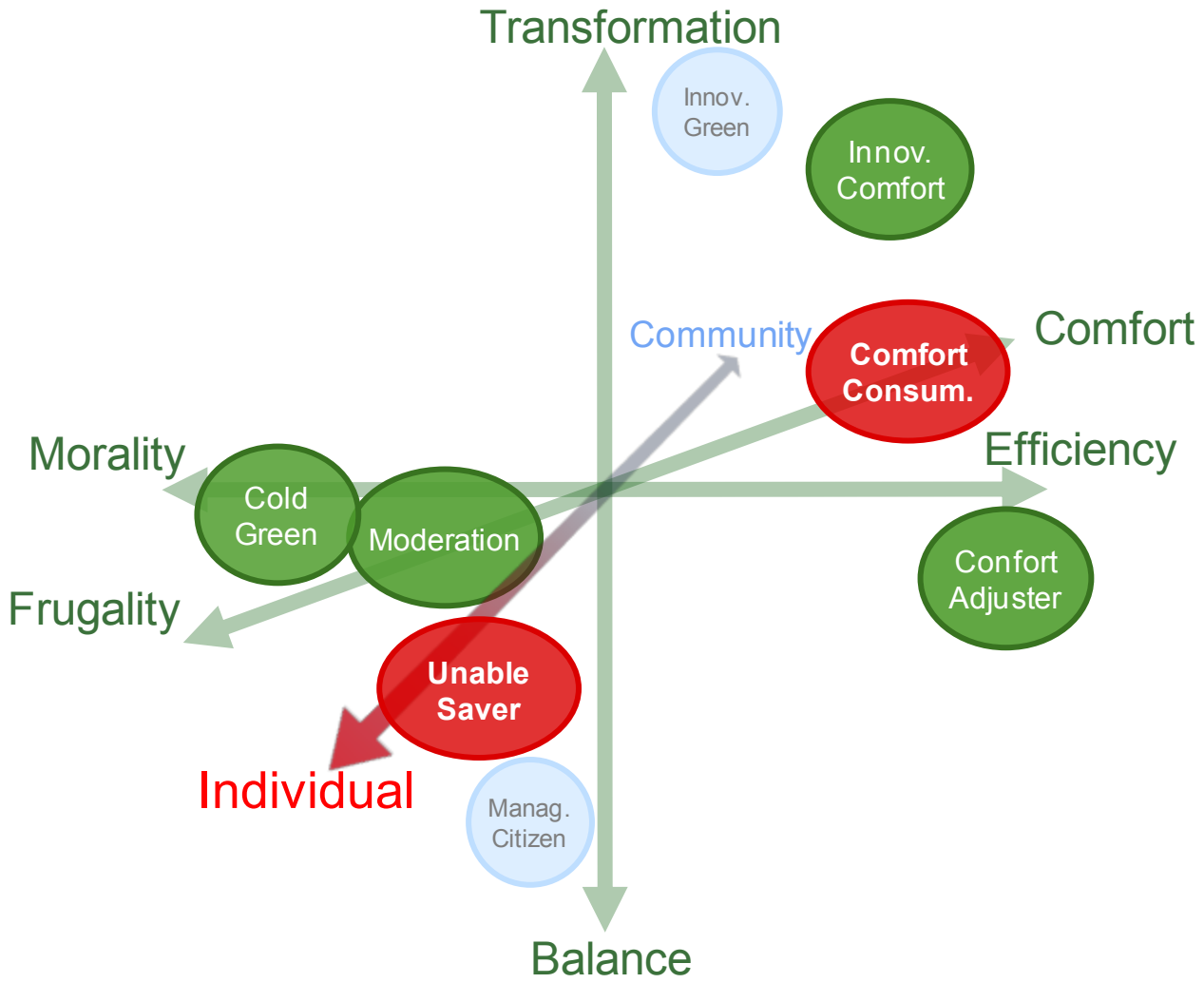
Very low rate (1%), 35% of 79% of the participants did it **once**

LINKING MOTIVATIONS-MATERIAL-ROUTINES

Data collected through questionnaire and monitoring

Motivations and meanings	Good citizenship	Motivation for Direct Load Control
	Money	Motivation for Direct Load Control
	Environment	Motivation for Direct Load Control
	Innovation	Motivation for Direct Load Control
	Comfort	Preference for comfort rather than savings
	Play the game	Not overriding is about “playing the game” rather than considering the need for heating
	Keep control	Would prefer heating not to be controlled remotely
Heating habits	Adjust by hand	Declared usually adjust T° manually
	Online use	Declared using the online consumption monitoring tool
	Off peak use	Declared using off peak hours for electricity consumption
	T°d	Declared T° in the livingroom when occupied in winter
	T°m	Measured average T° in the livingroom in winter
	Cold habit	Declared being cold at home during usual cold spells
	Tsensitiv	Tm varies steeply with outside temperature
Heating equipment and consumption	Elec. Consumption	Measured Average electric consumption in winter with no intervention
	Psensitiv	Electric power demand sensitivity to outside temperature
	Floor Heating	Main heating system is Electric floor heating
	Wood Heating	Main heating system burns Wood
	Radiators	Main heating system is Electric Radiators
Other equipment	Photovoltaïc	Photovoltaïc panels are installed on the roof

CLUSTERS OF ENERGY PROJECTS

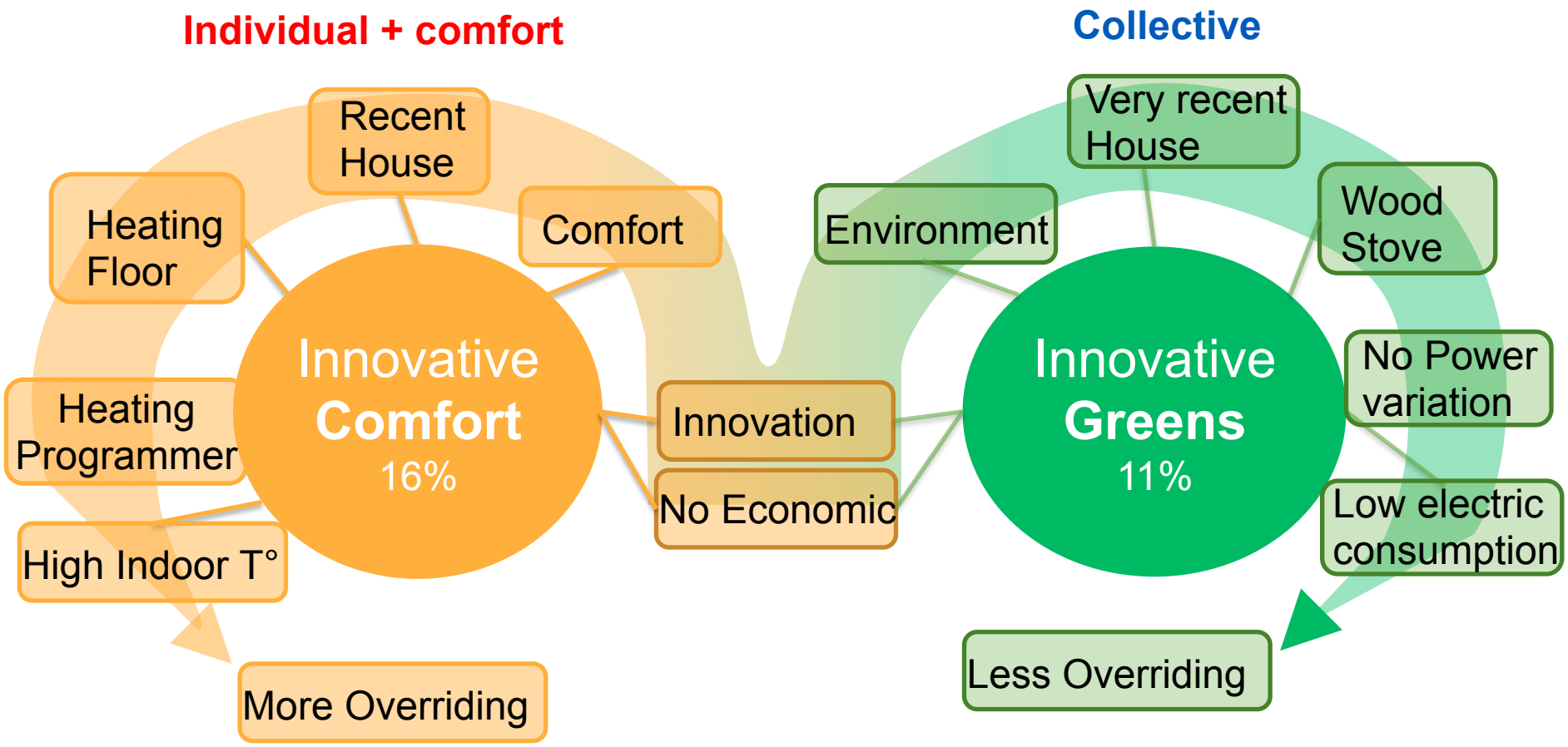


Energy projects description based on their statistically different features →

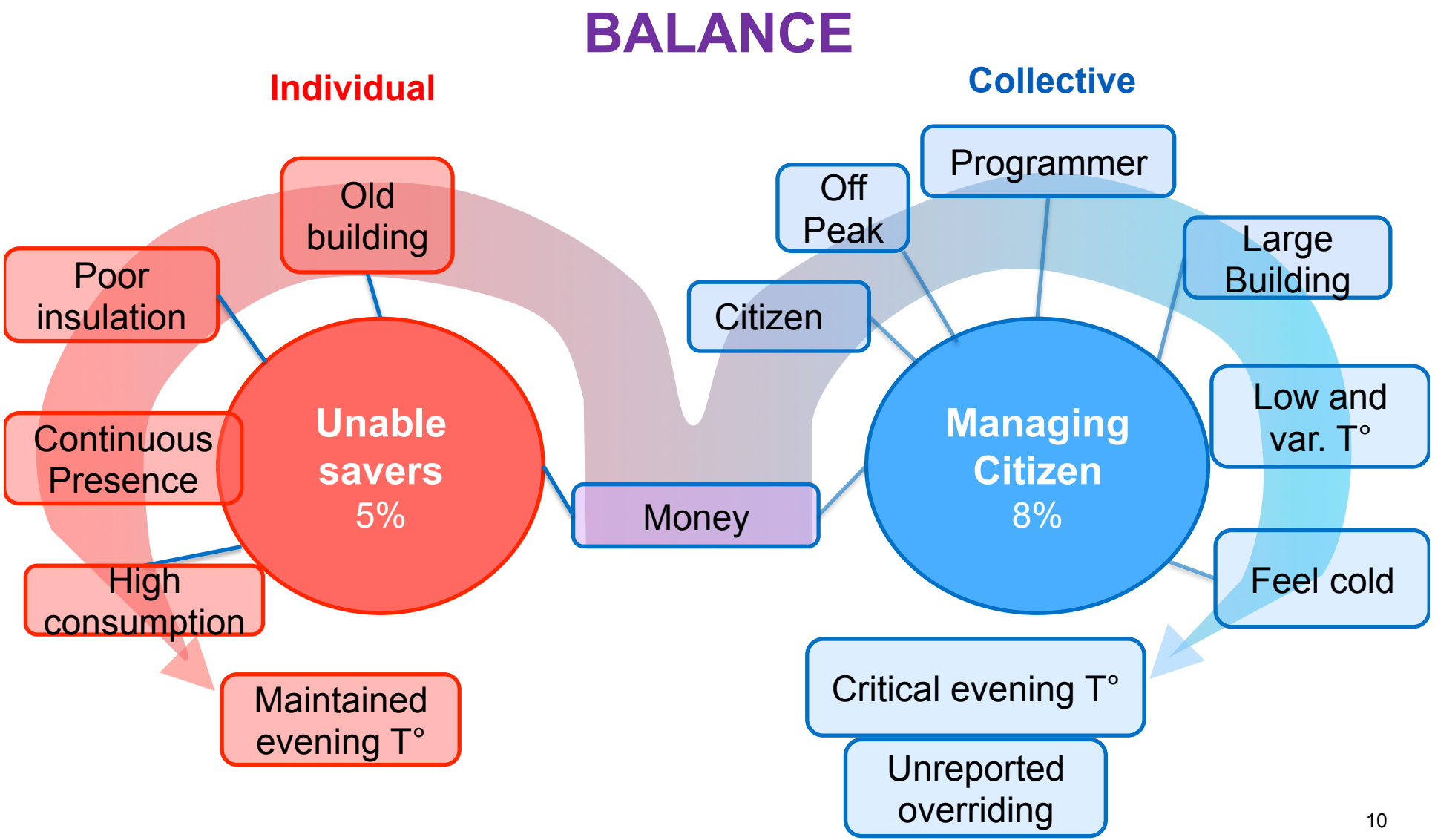
8

CLUSTERS OF ENERGY PROJECTS

TRANSFORMATION



CLUSTERS OF ENERGY PROJECTS

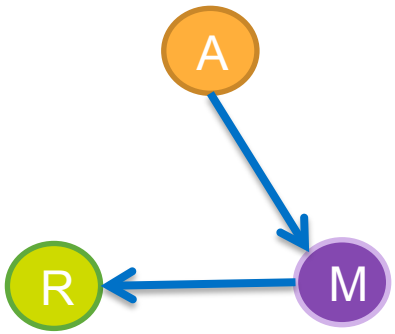


CONCLUSIONS

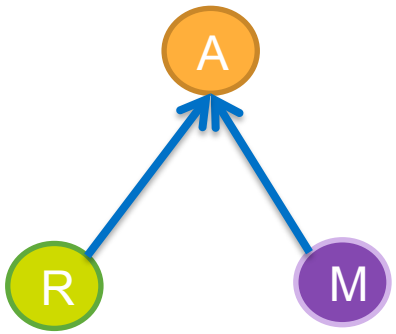
1. A motivation can have several meanings (not a gap)

2. Energy projects are systems in which attitudes (A), routines (R) and material environment (M) build each others

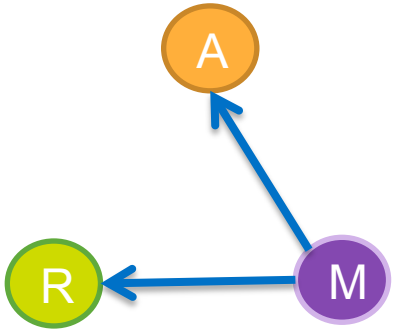
Innovative greens



Unable savers



Comfort adjusters



CONCLUSIONS

1. Direct load control is interpreted differently depending on the *energy project*

2. The advertising of interventions can both select and reshape *energy projects*
    1. Target relevant *energy projects* with the right message
    2. Design tariff and control according to existing *energy projects*

3. Overriding
    1. Higher when strongly involved in comfort (investment or routine)
    2. Lower when T° is maintained (substitution or anticipation)

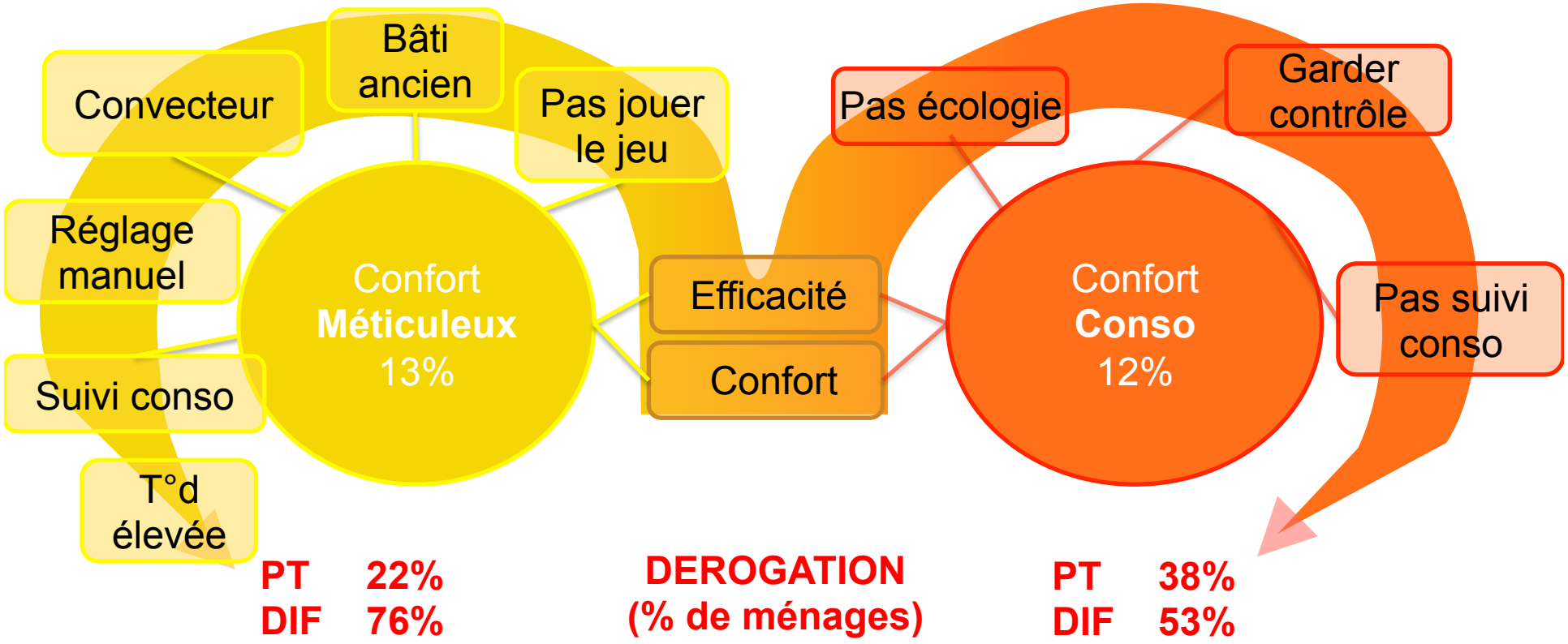
Limitation : people signing up to a Direct Load Control experiment must have much stronger initial projects than others

THANK YOU

PROJETS ET PRATIQUES ÉNERGÉTIQUES LIÉES

CONFORT

Example : two clusters leading to different reactions to remote control

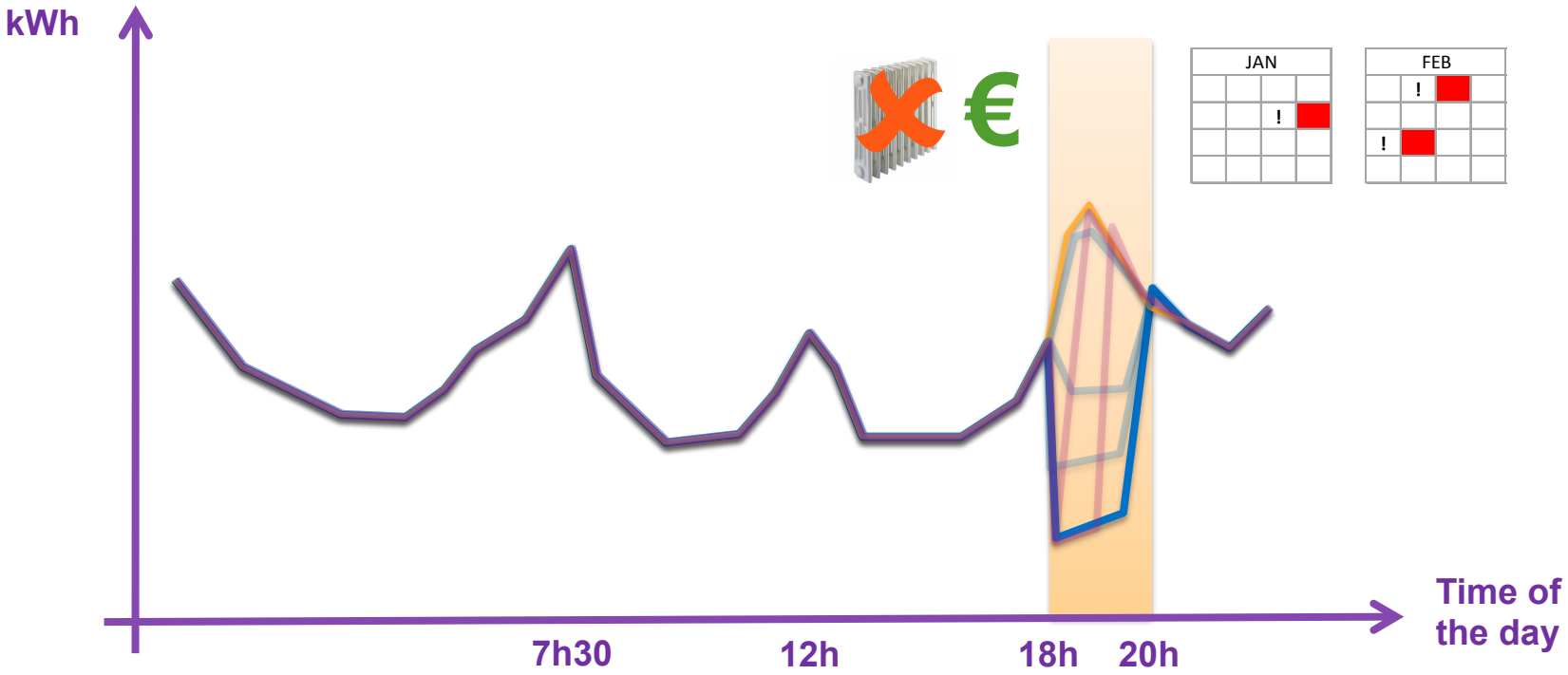


Professions intermédiaires, jeunes enfants

Employés, bas revenus

ELECTRICITY PEAK DEMAND AND MITIGATIONS

Critical Peak pricing and Remote load control



Avoided power:

- Usual heating practices
- Weather

Diversity of people involvement:

- Adaptation : anticipation, substitution, clothing
- Overriding

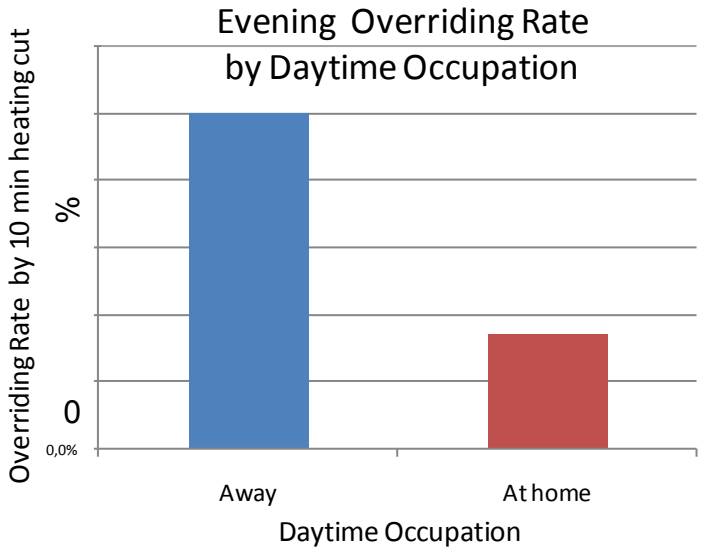
OVERRIDING

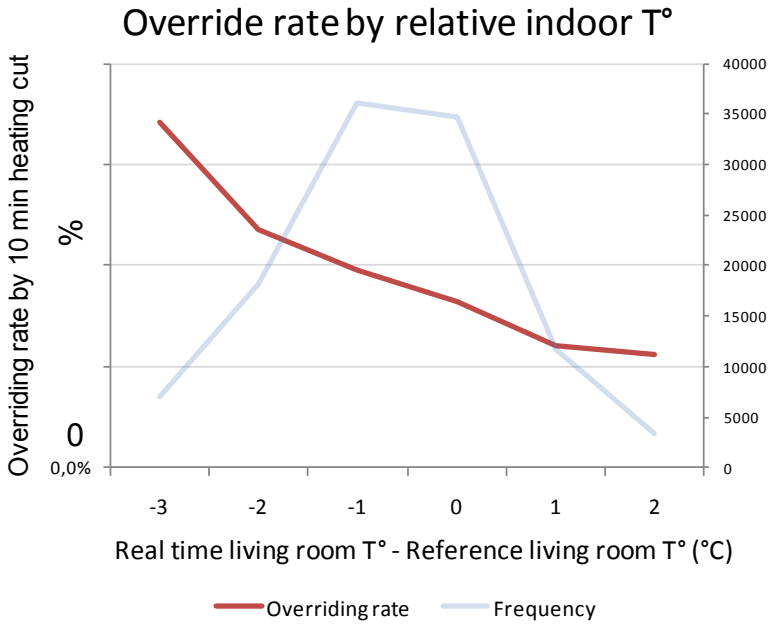
Very low rate (1%), 35% of 79% of the participants did it **once**

Practical situations constrain and enable reactions

- Occupants presence during the day
- Difference between expected and actual indoor temperature
- Alternative heating system (wood) availability

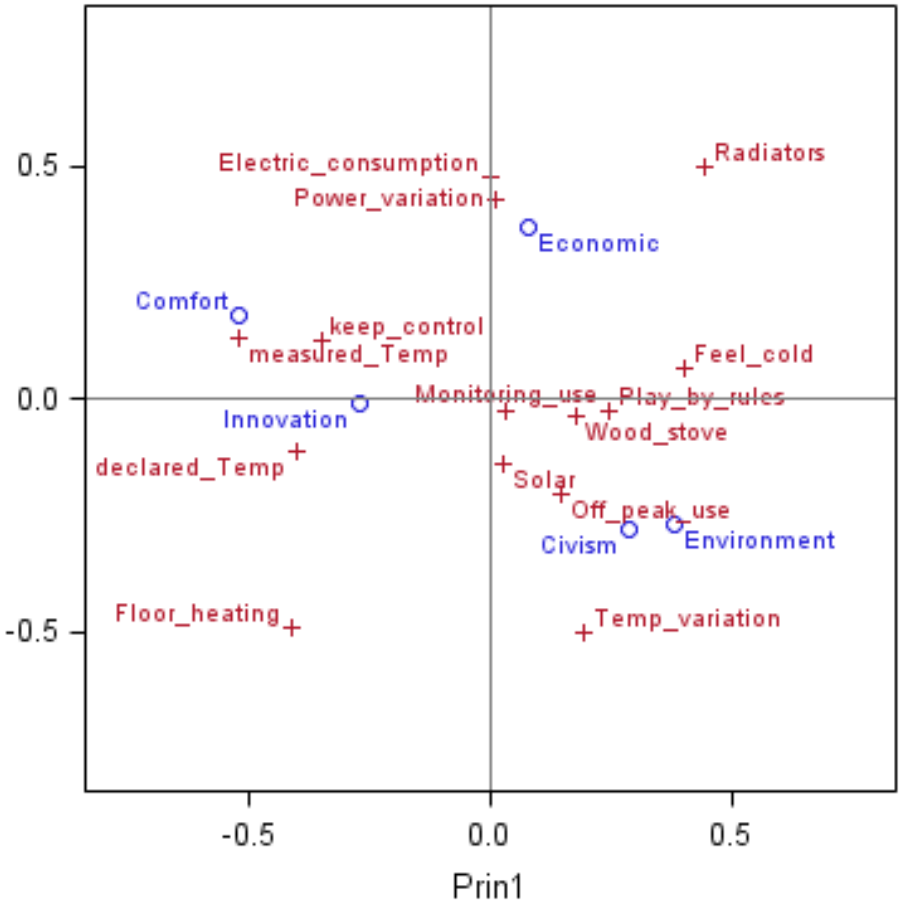
→ Explain most of the “overriding” behaviour

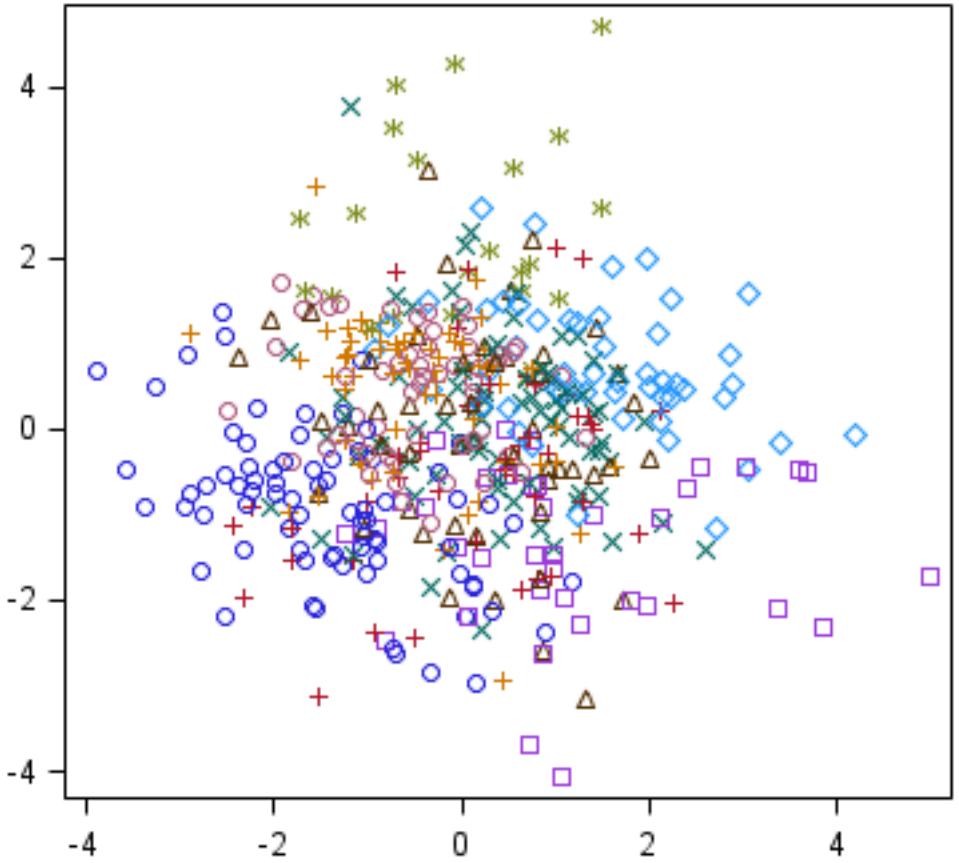




CLUSTERS OF ENERGY PROJECTS

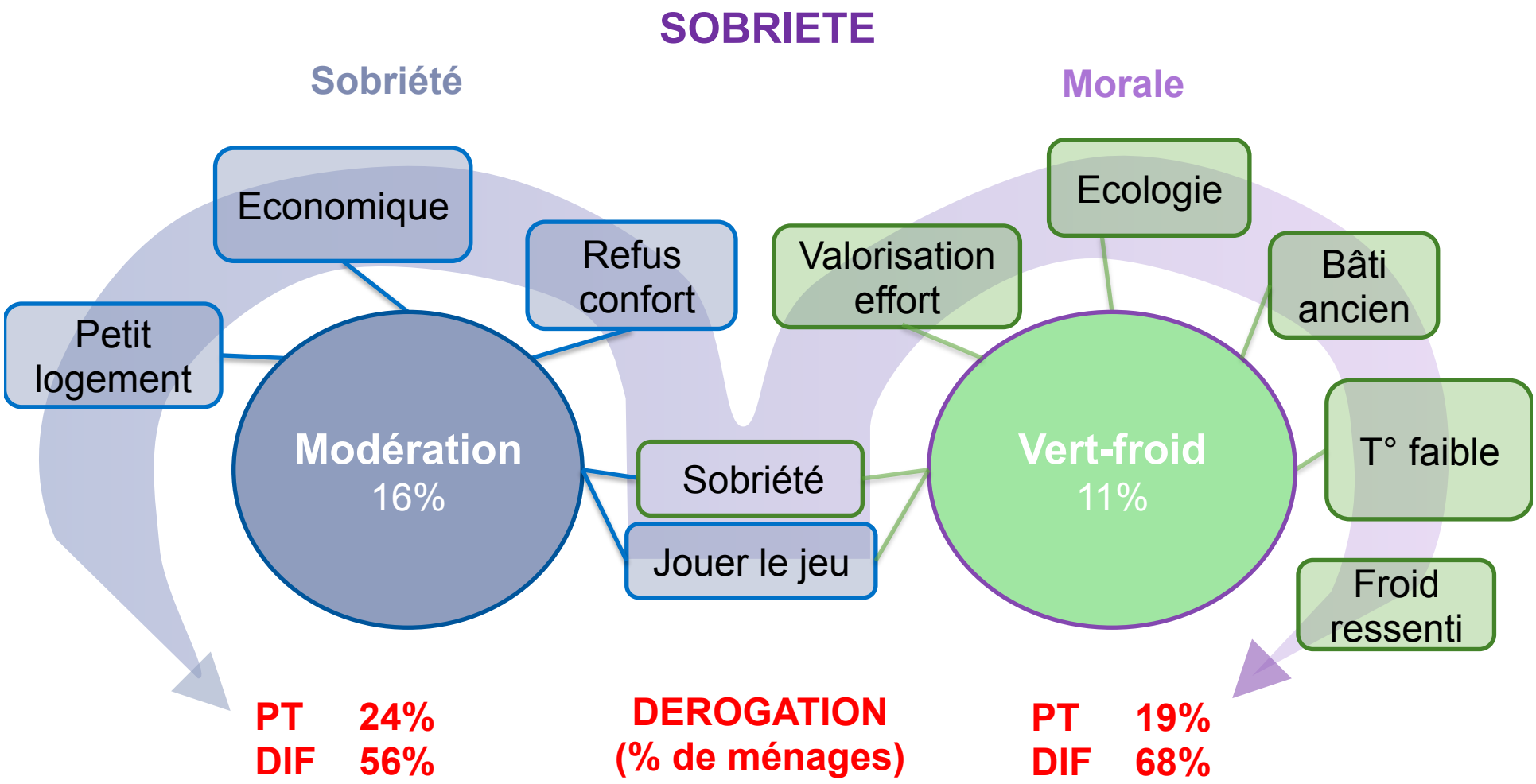
Quantitative representation of the links between motivations, heating behaviours and heating system





17

PROJETS ET PRATIQUES ÉNERGÉTIQUES LIÉES



ENERGY PROJECTS AND PEOPLE INVOLVEMENT

How can we improve our intervention ?
What does this tell us about participants flexibility ?
Should it be targeted on specific households, with which argument ?

From the qualitative interviews, we've seen participants can express strong views on energy, in relation with their daily routines, and material environment : "energy projects"

1. Can we describe distinct **energy projects** from the **questionnaire and monitoring**
    1. motivations to take part in the experiment
    2. heating routines,
    3. material environment

2. Do these projects allow to understand consumption levels, flexibility, or overriding rates ?