

Towards an energy equitable model

Incidence of energy cultures in the decarbonisation of energy users in the residential sector.

PhD candidate: Mariona Alcaraz-Corbella

Phd supervisor: Albert Cuchí Burgos

RESEARCH CAFE

updated research plan

2n year

June 2019

Research plan

Table of contents

Preface

Rationale (Why)

Background

Overarching objectives

Motivation and research questions

Methods and process (How)

Trans-disciplinary collaboration.

Explore landscape and stakeholders

Characterise costumers segments: inn Energy cultures clusters:

Determine the decarbonisation paths

Develop and test content and strategies:

Outputs and outcomes (What)

Subtask 0 – Administration, management and logistic

Subtask 1 – Expert network and dissemination

Subtask 2 – Energy Cultures cluster definition

Subtask 3 – Definition of the decarbonisation paths according to Energy Cultures clusters

Subtask 4 – opportunities and barriers to improve their Energy Culture and lower the cost of their decarbonisation paths

Subtask 5 – Standardized and validated research process

Subtask 6 – Define a marketable tool to recollect and treat energy cultures relevant data

Proposed timeline

Budged

Preface

WHY (purpose/cause)

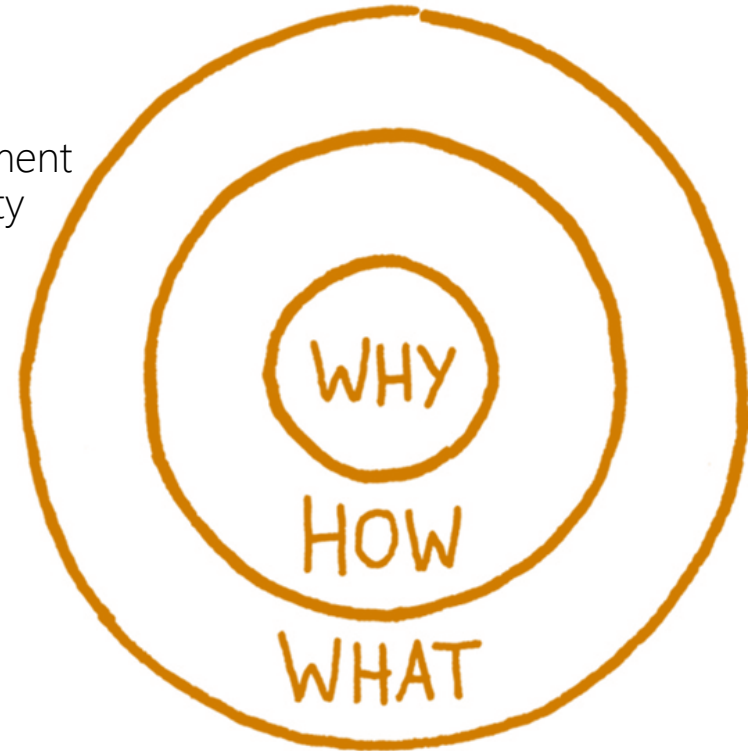
- Challenging the way we intervene in the build environment to foster a greater energy-efficient and equitable society

HOW (process/singularities)

- Practical case-studies
- Trans-disciplinary collaboration
- Innovative and market oriented research

WHAT (product)

- 1 entrepreneurship, innovation and business thesis
- Doctoral thesis

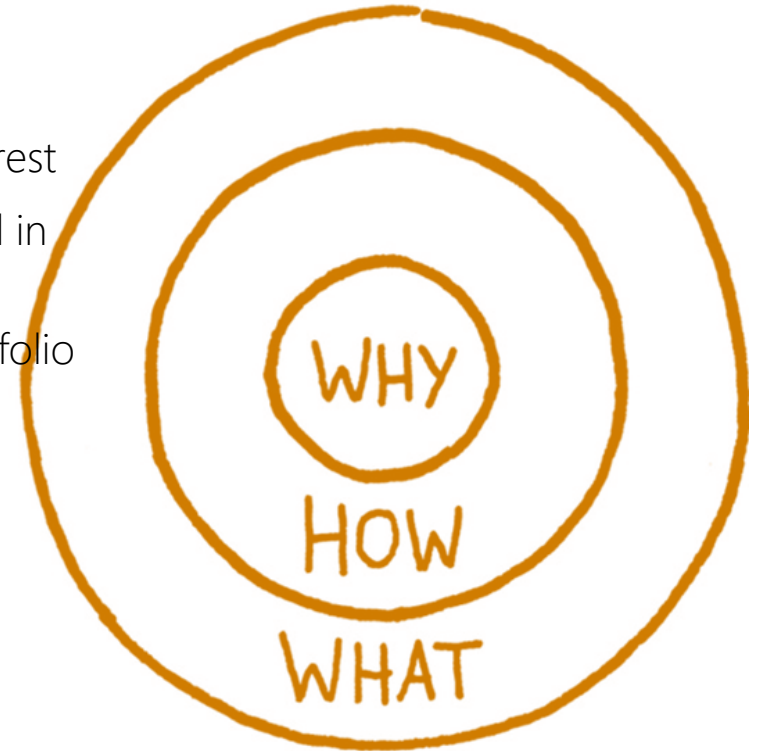


© 2013 Simon Sinek, Inc.

Preface

WHAT FOR (expected results)

- Greater knowledge about under-explored issue of interest
- Expand and deepen in my professional expertise based in several case studios
- Explore new product/services to reinforce Ciclica's portfolio
- Expand my expert network
- Be eligible for a position in a Research Centre or the Academy



© 2013 Simon Sinek, Inc.

Background

We must intervene in the existing building stock.

- 20% energy consumed in the residential sector in Spain
- By 2050 all buildings should be nZEB by European Directive

The role of users is the main factor which determine the energy consumption in the residential sector.

- User influences, on a more or less determining way, the four factors energy consumption relies on: (1) use and management of spaces and energy consumer systems and devices, (2) Energy demand, (3) systems efficiency rate and (4) energy source.
- The energy consumption in the residential appears to be very discretionary, being difficult to establish correlations between energy consumption and the energy demand and efficiency.

Transitioning to a low-carbon society requires changes to many dimensions including: technologies, practices and social norms.

- It is generally assumed that efficiency gains will lower resource consumption, ignoring the possibility of the Jevons paradox arising.
- The Energy Cultures framework offers a model to assist interdisciplinary research to understand the drivers and interactions that generate heterogeneous patterns of energy-related behaviour at a household level.

Personal background

Personal previous expertise

- Founder and consultant in Synapcity Studio, from 2013 until 2016. Main product: Facilitation on the engagement of employees in the energy management of their building
- More than 20 case studies in schools, offices and other public buildings (library, cultural centre...).

Opportunity to be partner in an European funded project in the Innovation Urban Actions program

- 2017 Founder of Ciclica and main coordinator of projects in the area of Energy Cultures.
- 20017-2020 partner in Vilawatt project; an innovative Public-Private-Citizen organizational structure for energy governance at local level

Overarching objectives

Establish clear Energy Cultures clusters for the Spanish residential sector

Define the potential decarbonisation paths according to the prior characterization

Identify opportunities and barriers for specific audiences to improve their Energy Culture and lower the cost of their decarbonisation paths

Post-thesis: Define an action plan on the energy user in the residential sector and evaluate the actions and decarbonisation costs on an specific population.

NULL HYPOTESIS:

The improvement of the energy-efficiency of the build environment provides opportunities to intervene on the social norms that govern the energy practices of their inhabitants, and provide information on the needs of changes in the external factors that also determine them.

Motivation and research questions

Users and energy culture

What aspects of carbon emissions imputable to the use of energy in the home is the user involved? How can households be grouped according to their energy culture?

Paths for the improvement of efficiency and energy culture

What trajectories can be defined to decarbonize the home based on its energy culture? What is its cost and scope of decarbonization? In which trajectories and how is it advisable to involve changes that exceed the scope of habitability, such as mobility or food?

Barriers and opportunities

What issues determine the user's performance? What are the barriers and opportunities to operate on these issues? What relation does it have with the intervention on the other factors that determine the energy consumption? What changes in material culture can offer more opportunities to intervene in the social norms that govern the energy practices of households? What changes in material culture provide information about the need for changes in external factors? How can we take advantage of them?

Methods and process (How)

Trans-disciplinary collaboration.

UPC, Cíclica, IEA DSM task 24, University of Otago

Explore landscape and stakeholders

Literature review

Assess an multi-approach intervention of a given case-study of an EU funded project

Characterise costumers segments in Energy cultures clusters:

1. Understanding the role of energy users in all the factors that influence the energy consumption
2. Define clusters of material culture (building, installations and services) thought degrees of energy efficiency
3. Establish consumer ranges to distinguish users based on the efficiency of their material culture
4. Characterizing energy users in clusters by their Energy Culture (Practices, Norms, Material Culture, Context)

Define potential paths to intervene in their buildings according to their Energy Culture (social admissible, technically viable and economically possible)

1. Definition of the universe of changes in material culture in the existing building stock according to the different material culture clusters
2. Determination of investments and returns -economic, energy and environmental- of changes in material culture
3. Sorting of material culture changes in the different potential paths according to energy culture.

Develop and test content and strategies: (EU case-study)

1. Uncover the barriers and the opportunities to improve the efficiency and efficacy of the intervention paths (including physical interventions, energy-user advice, legal and financial issues)
2. Assess wich barriers can/cannot be overcome
3. Use social science to hypothesize how to overcome the surmountable barriers

1. Plans exist to fail, they are just a reference
2. Our job is to refine the question until it has an answer

gràcies



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH