E-coach : a user centered energy manager

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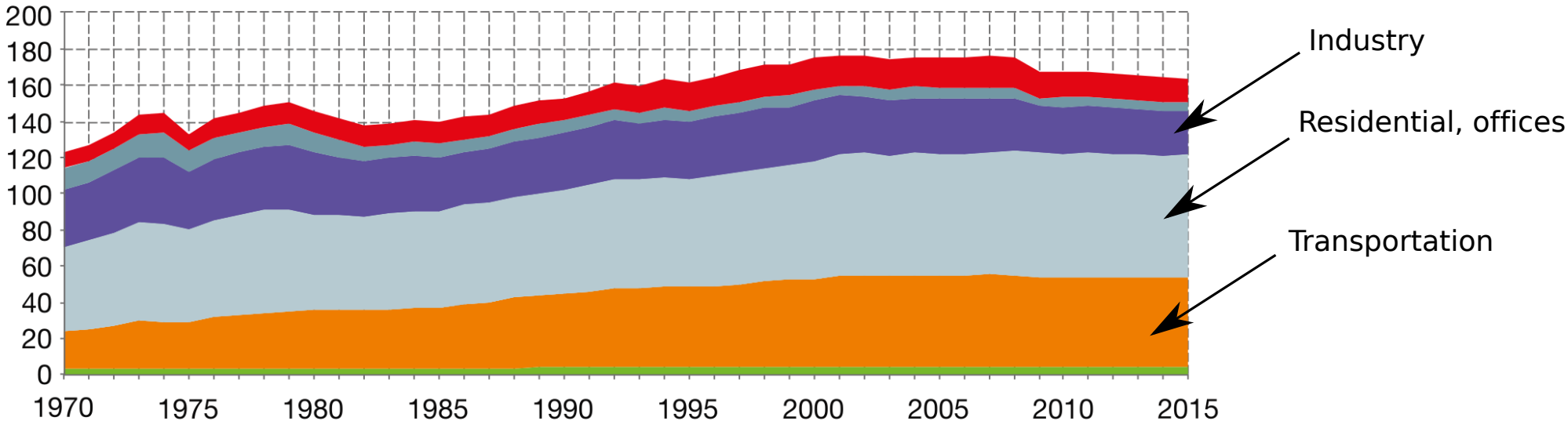
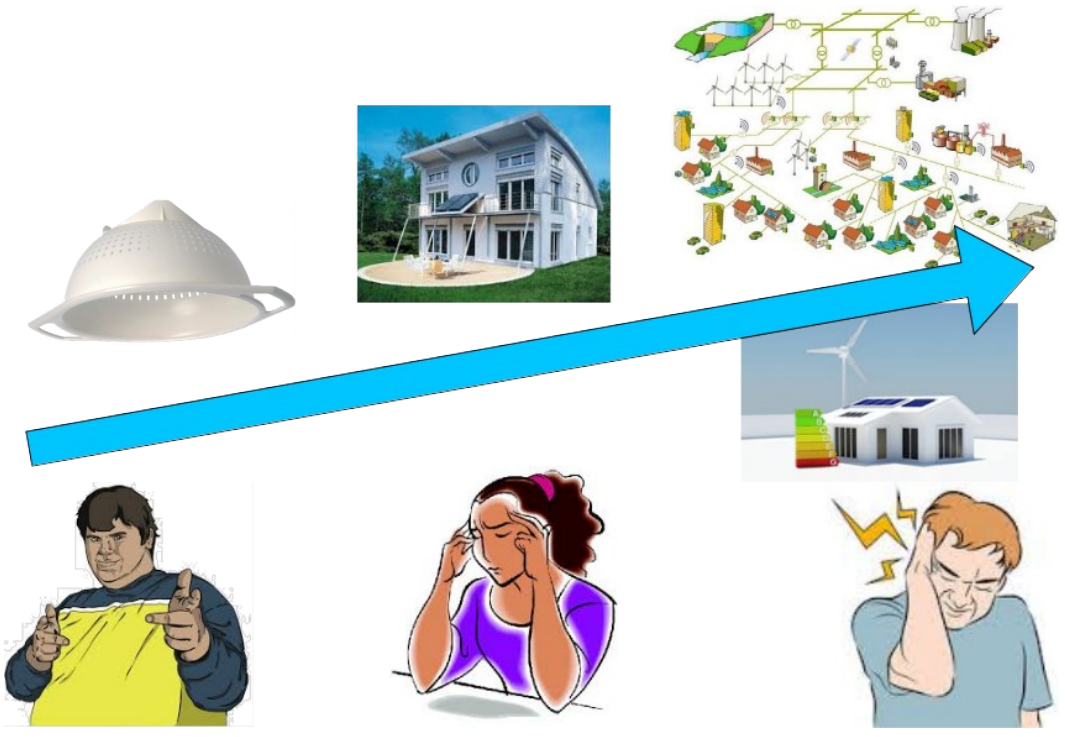
Energy management at home



Statistics from the ministry of the Environment, Energy and Sea

http://www.statistiques.developpement-durable.gouv.fr/fileadmin/user_upload/Datalab-13-CC-de_l-energie-edition-2016-fevrier2017.pdf&

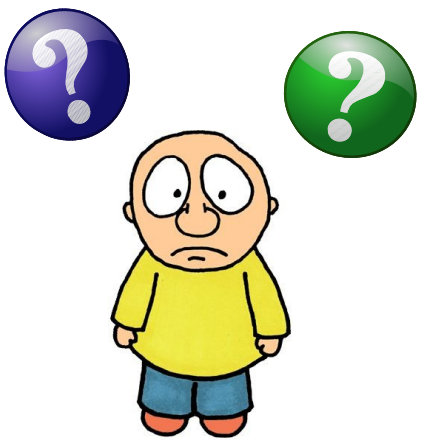
Evolutions

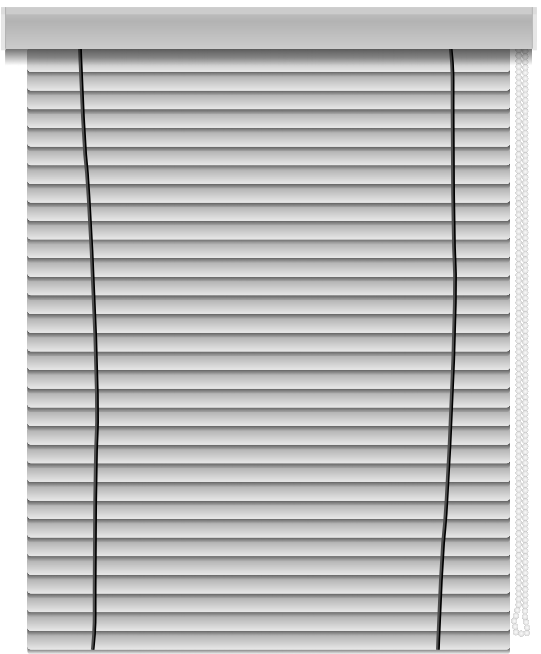


Behavior is the main source of energy loss

Doing instead : automation

Building an “optimal” plan for controlling the appliances





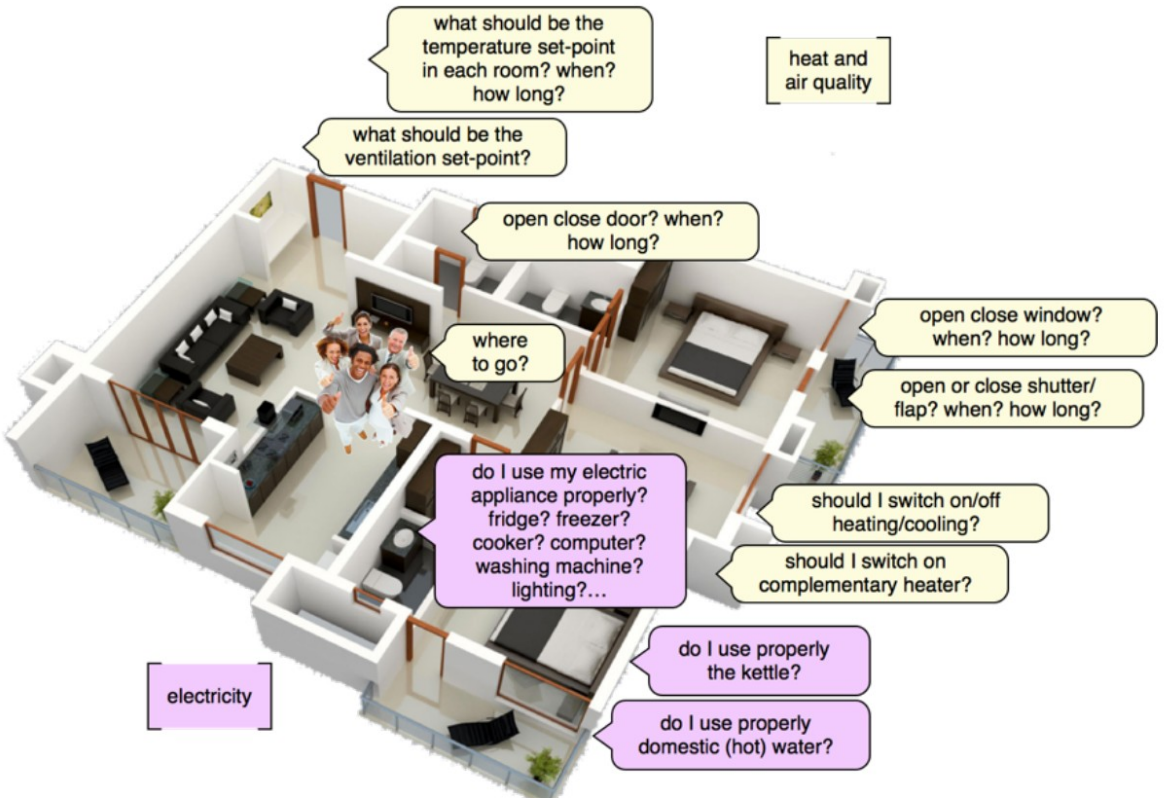
- Why is it closing the blinds ?
- Does it really knows my intentions ?
- Incompleteness of runtime models

- Having the possibility is comfort

Doing with : involvement

- To cooperate with and not to replace
- The inhabitant is the one:
  - Who knows what he wants
  - Who should decide

Doing with : involvement

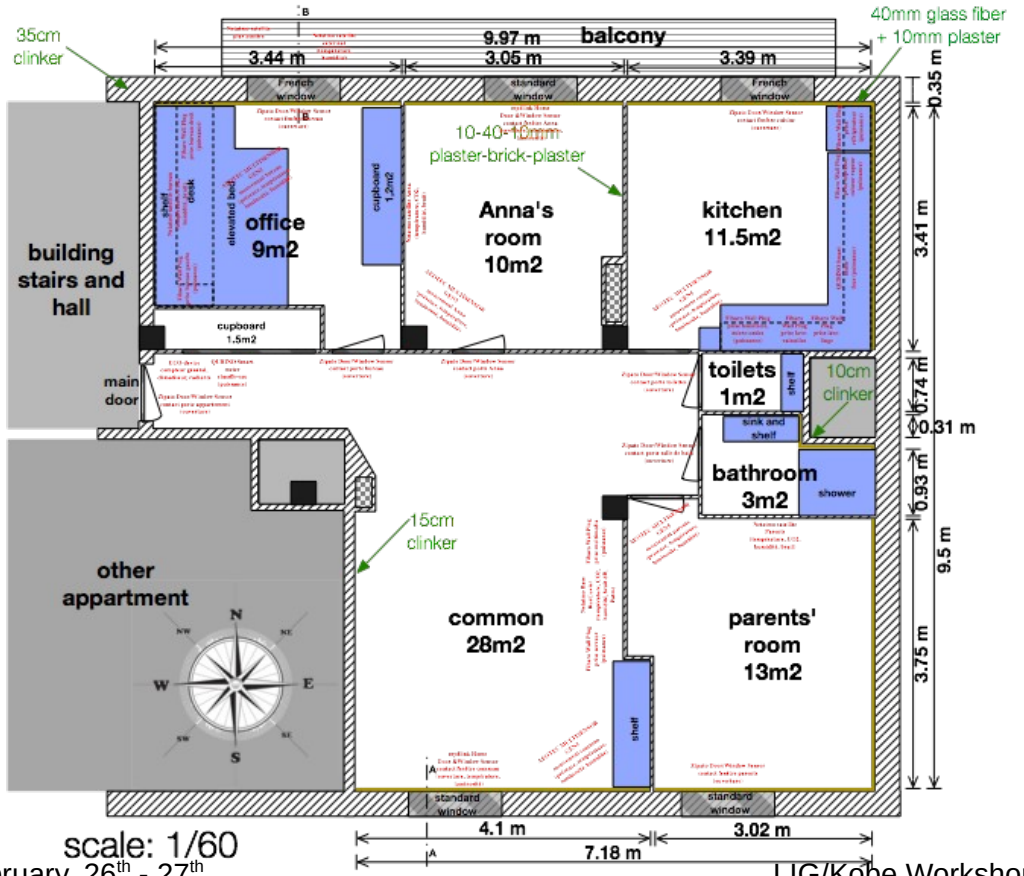


Doing with : involvement

- To help the user to make informed decisions
- To help the user to understand the consequences of his decisions

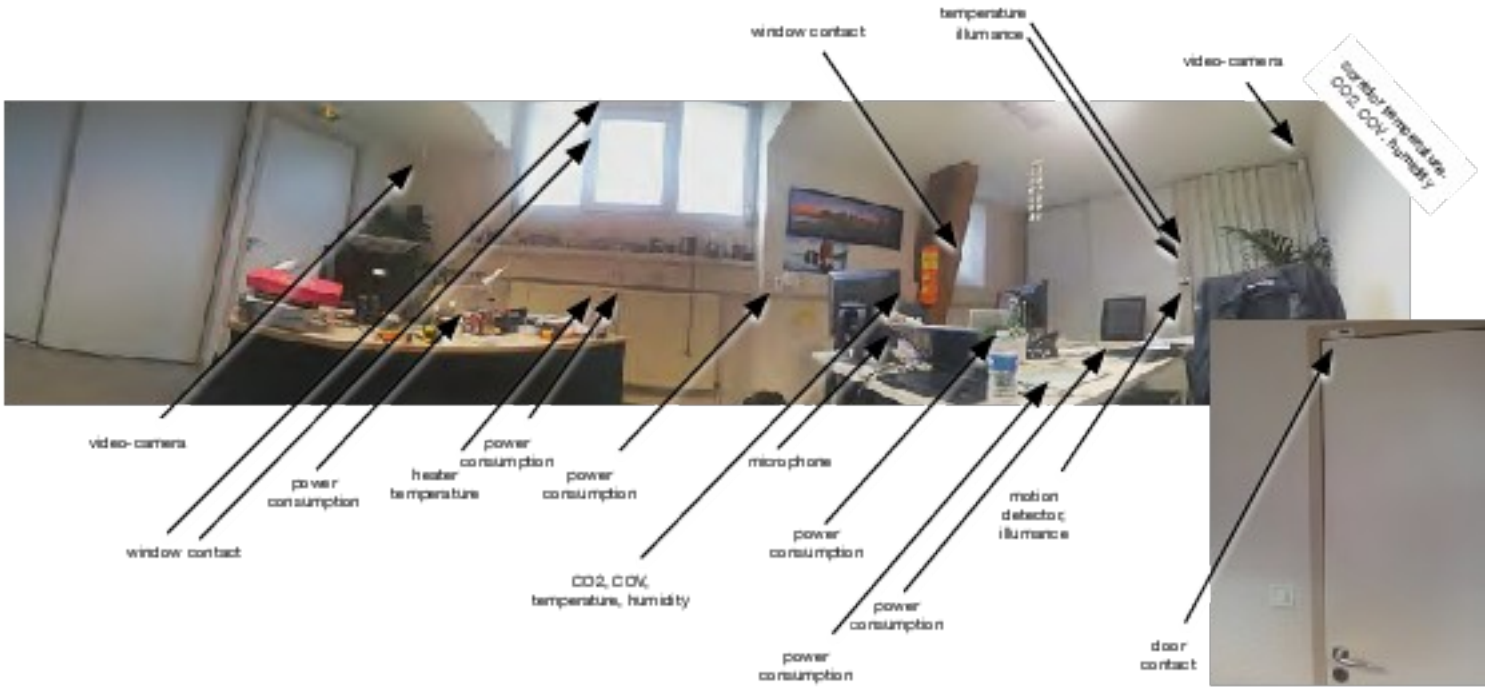
Explanation Service

Sensors



- 70 sensors
- Indoor
  - Contacts
  - Power-meters
  - Temperatures
  - Humidity
  - CO2
  - Motions
  - Luminosity
- Outdoor
  - Temperature
  - Wind
  - Luminosity

Sensors


window contact
temperature
illumance
video-camera
interior temperature,
CO2, COV, humidity
video-camera
window contact
power
consumption
heater
temperature
power
consumption
power
consumption
CO2, COV,
temperature, humidity
microphone
power
consumption
power
consumption
power
consumption
motion
detector,
illumance
door
contact

Objectives

- 3 categories of sensors :
  - Context : weather, outside temperature, ...
  - Environment : CO2, inside temperature, humidity, ...
  - Actions detectors : doors opening, windows opening, …
- Objective :
  - Find causal relations between (context, action) and environment
- Small amount of data
- Add expert knowledge : a physical model
- Physical model : to predict, not to explain
  - Causality is implicit and not explicit
  - Must be extracted through simulation

Differential explanations

Optimized day

energy model

comparison

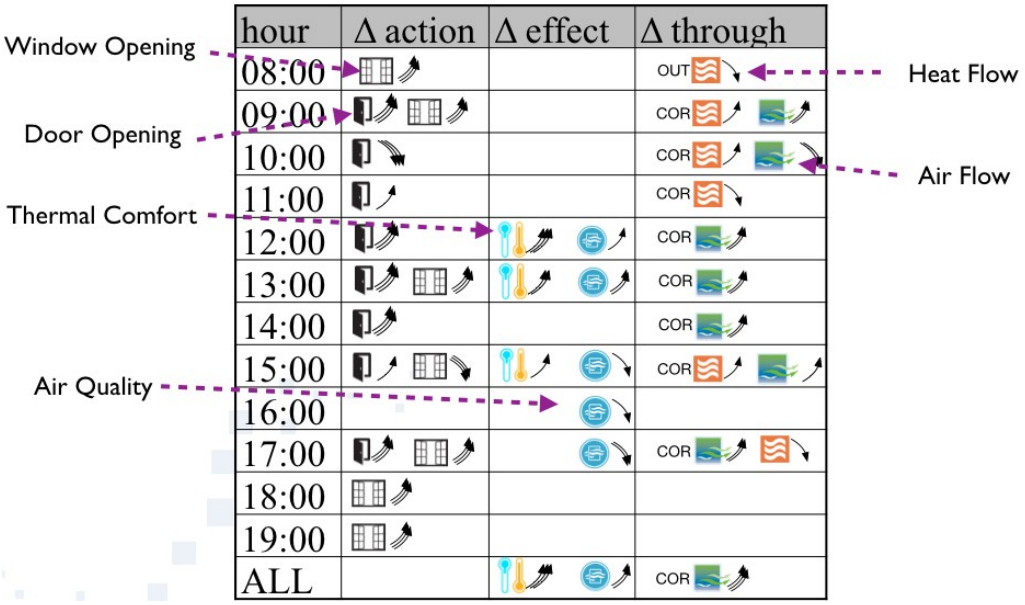
analyzed day

differential explanations

understand

change routine

Result



- Describes how we can change our behavior
- Does not really explains

- If I am not here at 10h00 to close the door, is it a problem ?
- Is it really important ?
- Causality

Differential explanations

Optimized day

energy model

comparison

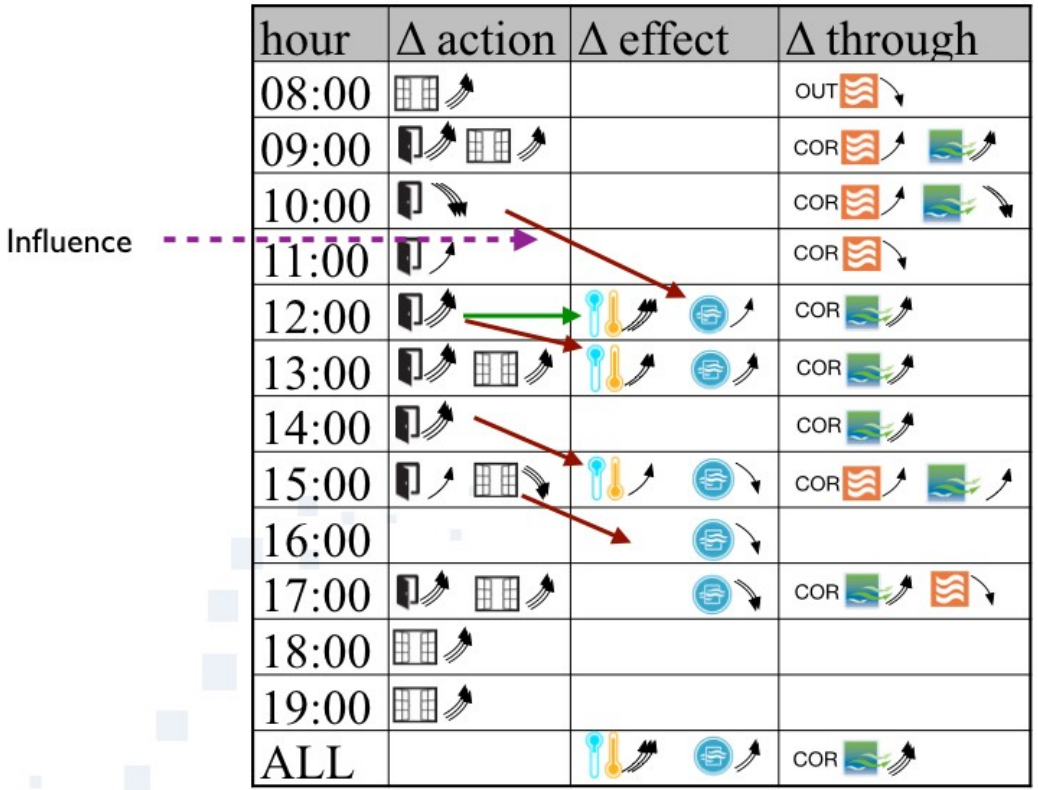
Optimized day without the 1 action

differential explanations

understand

change routine

Differential explanation with influence



- Dans le créneau horaire 09h-10h, si vous aviez laissé la porte et la fenêtre ouvertes beaucoup plus longtemps, il y aurait eu un léger flux thermique ainsi qu'un courant d'air sensible vers le couloir .... et d'une façon globale le confort thermique aurait augmenté beaucoup et la qualité de l'air aurait augmentée un peu.

And other services

- Replay
- Mirror
- What-if
- etc.

Questions ?