

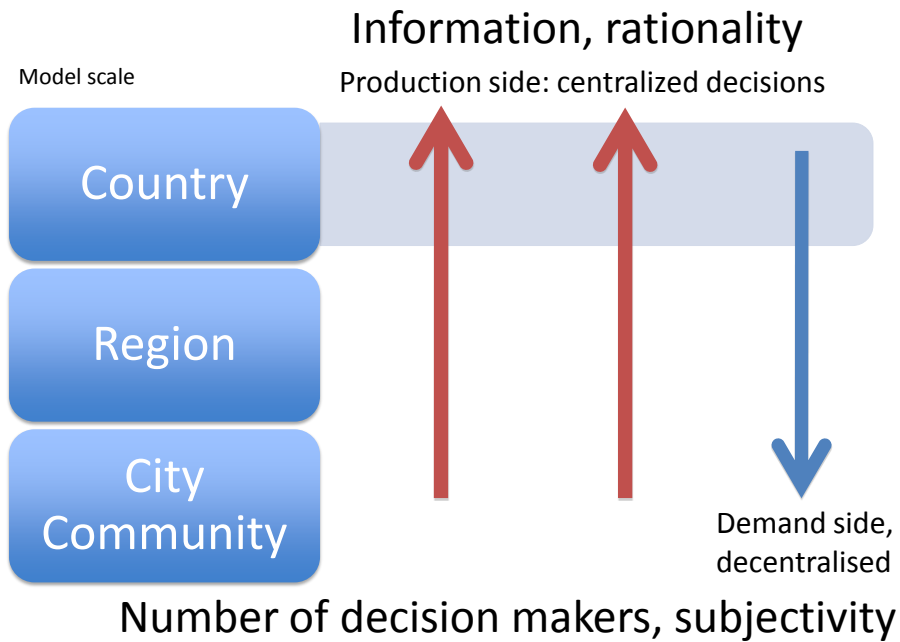
# Social MARKAL: Incorporating behavioral parameters

Roman Kanala

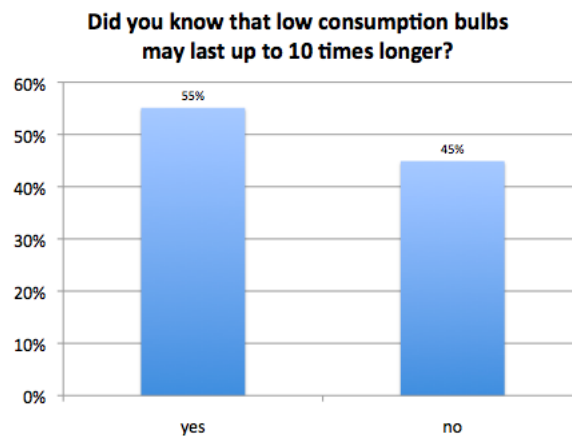
## Models based on economic equilibria

1. hypothesis of perfect information
2. hypothesis of perfect economic rationality

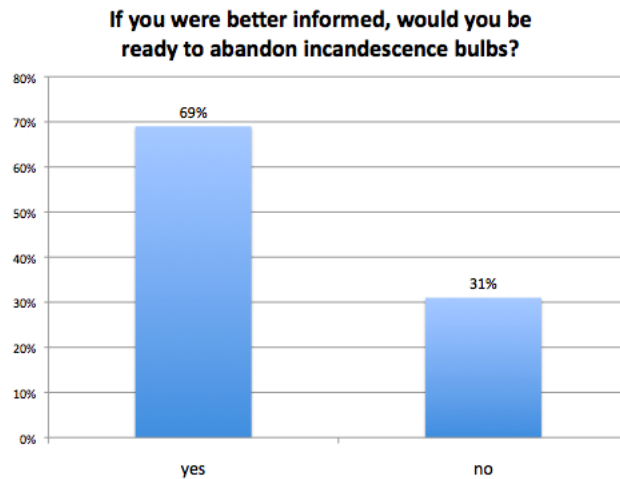
Technology alone cannot explain all the changes.  
Behaviour is an important factor of change.



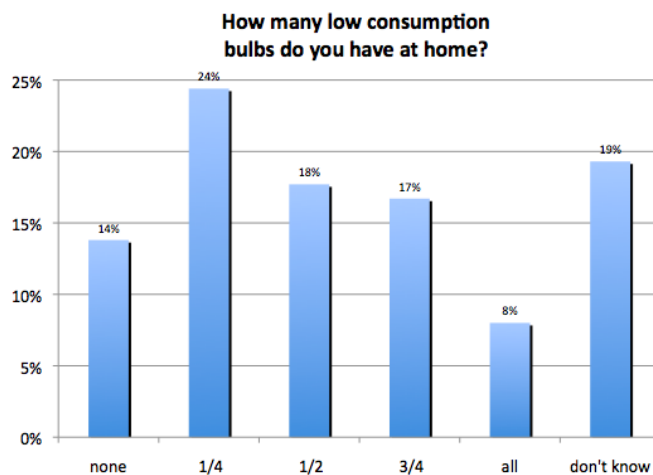
## Issue of perfect information



## Issue of perfect information



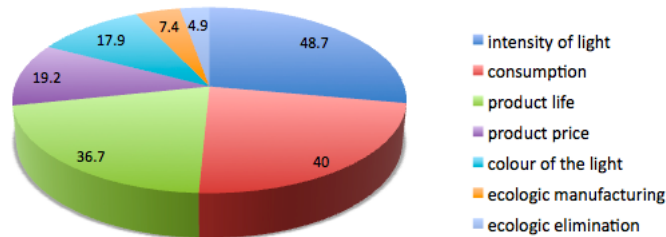
## Issue of perfect economic rationality



One third of people don't have low consumption bulbs or don't know.

# Issue of perfect economic rationality

What are the most important characteristics of a bulb?



While people consider economic parameters first, almost a third of importance is given to non-economic properties.

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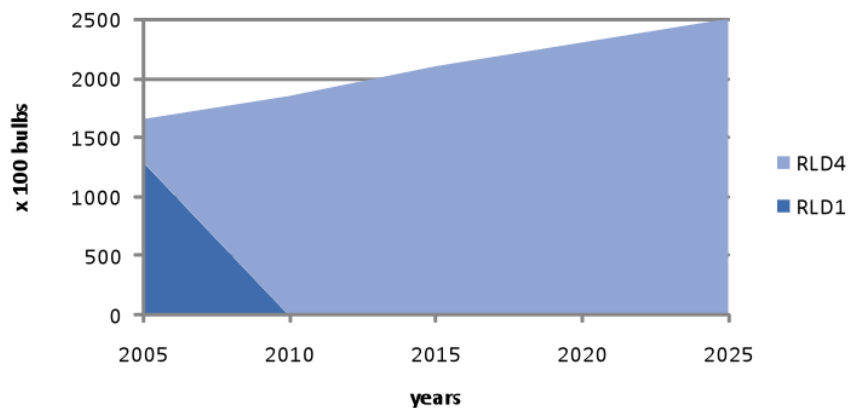
Haute Ecole de Gestion, Genève

- Business school, Social research, LEM – Laboratoire d'étude de marché
- Behavioural studies:
  - Awareness Programs  
informed people change their behaviour more easily
  - Economy of Scope  
Informed people how to better use existing technology apply their skills rather than a technology switch
  - Social behaviour  
willingness / resistance to take optimal decisions

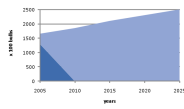
## Social MARKAL

- MARKAL, MARKAL-MACRO, MIP, Stochastic MARKAL, MARKAL-ED, MARKAL-Micro, TIMES
- A new research opportunity: Social MARKAL
  - embedding both technological and behavioural contributions
  - collecting data: surveys, social experiments
  - measuring the importance of
    - habitus
    - willingness / resistance to change
    - environmental awareness / sensitivity
  - identifying drivers, looking for ways to influence them

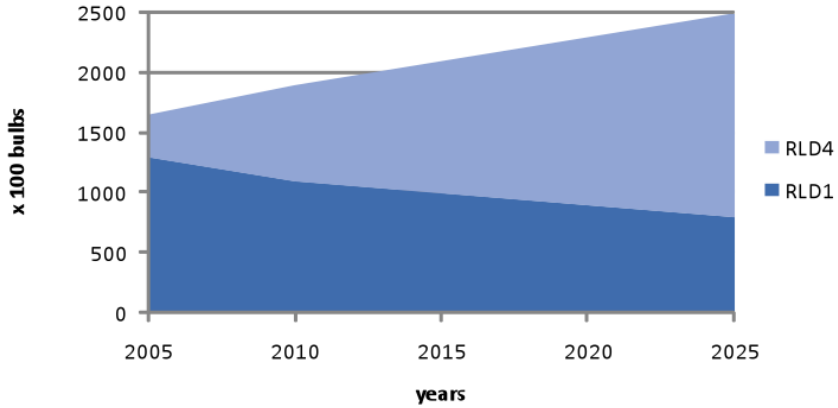
## Unconstrained MARKAL



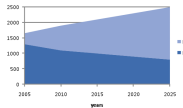
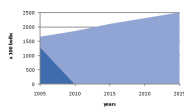
Economic rationality is pushing to replace immediately all incandescent bulbs by low consumption bulbs



# With bounds

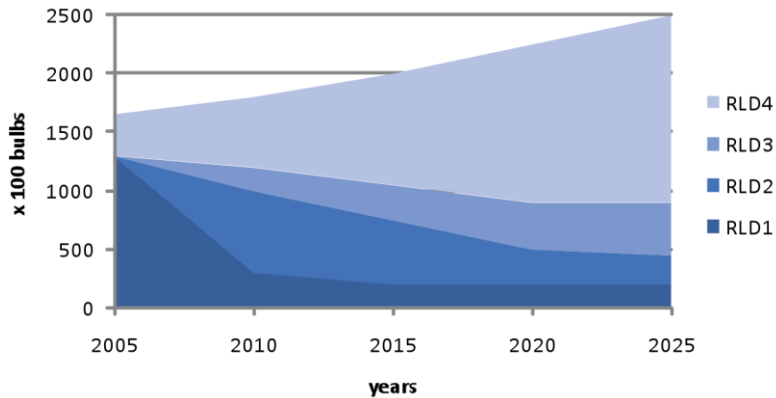


Modeler can set up bounds on technologies to better describe the real behaviour.



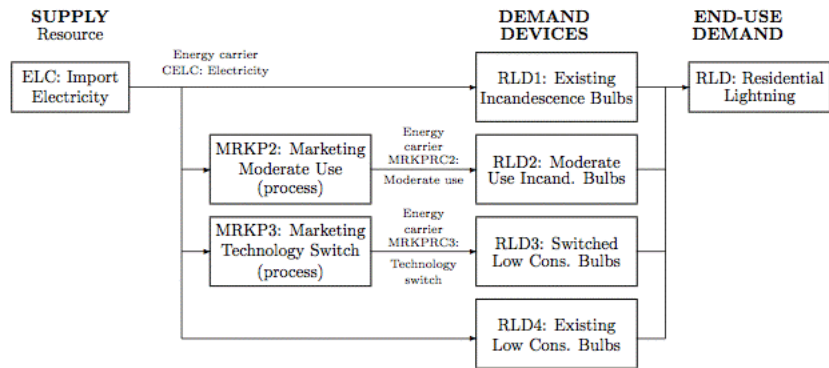
# Social MARKAL

## Using marketing process technologies



Marketing process technologies: coefficients can be measured.

## Introducing process technologies: marketing



## Social MARKAL Protocol

- Generating hypotheses, awareness campaign design to remove barriers for a change
- Testing hypotheses: sociological survey
- Constructing behavioural change scenarios
- Introducing data into MARKAL, scenarios

## Paper published on SSRN.com

Socio-Markal (Somarkal): First Modeling Attempts in  
the Nyon Residential and Commercial Sectors Taking  
into Account Behavioural Uncertainties

Emmanuel Fragniere , Roman Kanala , Denis Lavigne , Francesco Moresino ,  
Alexandre De Sousa , Cedric Cubizolle , Christian Decurnex and Gustave Nguene

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1522143](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1522143)