# Perspectives on behaviour in organizations

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### **Overview of presentation**

- Historical perspective
- "Energy efficiency gap"-debate of the 1990's
- The market and the firm in economic theories

### Oil shock!

#### Crude oil prices 1861-2014 US dollars per barrel Yom Kippur war World events Fears of shortage in US Iranian revolution Post-war reconstruction Growth of Venezuelan Netback pricing Asian financial crisis Loss of Iranian introduced production supplies Pennsylvanian oil boom Sumatra Discovery of East Texas field Suez crisis Arab Russian Iraq Invasion of Iraq oil exports production Spindletop, invaded Spring' discovered began began Texas Kuwait 130 120 110 100 90 80 70 60 50 40 30 20 10 1861-69 1870-79 1880-89 1890-99 1900-09 1910-19 1920-29 1930-39 1940-49 1950-59 1960-69 1970-79 1980-89 1990-99 2000-09 2010-19 0 \$ 2014 1861-1944 US average. \$ money of the day 1945-1983 Arabian Light posted at Ras Tanura. 1984-2014 Brent dated.

### Energy conservation!

- USA:
  - Petrol rationing, speed limits, hatchbacks
  - Energy conservation programme 1977
- OECD: International Energy Agency 1974
  - Sharing information, reduce oil dependence, promote energy efficiency, coordinate oil storage
- OPEC in control, not multinational oil companies
  - Governments and firms became certain that the old times were gone

### Sweden: Oil, nuclear and ee

- In May 1973: Moratorium on nuclear (8 had permit to build, of which 1 had started)
- An explosion in public debate on energy matters 1973-1975
- Pulp and paper industry:
  - Collaboration between firms
  - 37 conservation projects, 14 biofuel projects
  - Gathered information from all firms, comparisons

# The energy efficiency gap

- A debate among researchers, technologists and economists
- Getting closer to organizations and behaviour
- "Bottom-up" methodology: Many efficient technologies available but not used!

### Economists doubted "win-win"

#### Gas plant CCS retrofit -Abatement cost Coal CCS retrofit -€ per tCO,e Iron and steel CCS new build -60 Low penetration wind -Coal CCS new build Cars plug-in hybrid Power plant biomass 50 - Residential electronics co-firing Degraded forest reforestation -Reduced intensive -Residential appliances Nuclear 40 agriculture conversion Pastureland afforestation Retrofit residential HVAC High penetration wind 30 Degraded land restoration Tillage and residue mgmt Solar PV-2<sup>nd</sup> generation biofuels Solar CSP 20 Insulation retrofit (residential) **Building efficiency** Cars full hybrid new build 10 - Waste recycling 0 35 15 20 Organic soil restoration 25 30 38 -10 Abatement potential - Geothermal -20 Grassland management GtCO<sub>2</sub>e per year - Reduced pastureland conversion -30 Reduced slash and burn agriculture conversion -40 - Small hydro 1<sup>st</sup> generation biofuels -50 Rice management Efficiency improvements other industry -60 Electricity from landfill gas -70 Clinker substitution by fly ash Cropland nutrient management -80 Motor systems efficiency -90 Insulation retrofit (commercial) Lighting – switch incandescent to LED (residential) -100

Global GHG abatement cost curve beyond business-as-usual - 2030

Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO<sub>2</sub>e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play. Source: Global GHG Abatement Cost Curve v2.0

## The debate

### Barriers (Sorrell 1999)

- Heterogeneity
- Access to capital
- Imperfect information
- Adverse selection
- Split incentives
- Principle-agent problems
- Bounded rationality
- Inertia
- Power
- And six more

### "Market failures"

- Barriers exists but cannot be the base for policies, only market failures can.
  Some of the barriers are failures, but not all of them
- The market is a price system essentially
- The firm only combines factors of production according to their prices

### Jaffe & Stavins 1998

Figure 1. Alternative Notions of the Energy-Efficiency Gap



### What about the firm?

- Coase (1937) there is no price mechanism within the firm: "Why is there any organization?" A cost using the price mechanism (transaction costs)
- Keynes (1936) uncertainty about the future, abstaining from long-term investments, following (imitating)

## A biological metaphor

- Nelson & Winter (1982) An Evolutionary Theory of Economic Change
- Routines determine behaviour
  - heritable and selectable (genes)
- Search: irreversible, uncertainty, contingent
  modifies routines (mutations)
- Firms selected in dynamic competition
  - some routines flourish and other disappear

### Energy management routines

- Researchers have found a lack of attention on energy matters within organizations
- Stimulate the introduction of energy management systems
- Create an environment that selects firms with desired attention to energy efficiency

## Conclusion

- The firm (organizations) is neglected in dominant economic theory
- Theories about organizations are important for analyses and policies
- A broader set of theories is needed
- It seems as some price changes are more important than others

### The very long run



### "Market failure"

#### The perfect market

- The market is a price system
- Everyone knows what is needed to know
- "The best information is an invoice"

#### **Deviations**

- Monopolies, oligopolies
- Externalities
- Asymmetric information
- Etc ?