



# Investment Responses to Carbon Pricing: A Categorization of Decision Processes in Companies

## Preliminary Explorations

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Authors: Karsten Neuhoff and  
Ferdinand M. Vieider



## Motivation

Carbon prices are instituted to create incentives for emission cutting

Economic theory: investments if net present value of certificates higher than cost of the investment

However, organizational reality is quite different:

- no complete information
- no continuous monitoring of all cost-saving possibilities
- financial constraints and limited cognitive resources
- no knowledge of probability distributions under uncertainty

Hence: transmission of market factors into reductions decisions is likely to be imperfect



## Premises

Organizational structures may significantly influence decision making processes

These influence go beyond anything predicted by economic theory thus providing new insights

We want to try and capture some organizational elements that are important for decision making

Ultimately, such insights should allow us to derive conclusions about effectiveness of different policies

In this preliminary exploration, we thus propose three frameworks of increasing complexity

These three frameworks are complementary rather than mutually exclusive



## A simple 2x2 structure

The most parsimonious model possible would consider only two dimensions:

- 1) The importance of the decision itself
- 2) The hierarchical level at which the decision is taken

### Importance: strategic versus tactical decisions

- Strategic decisions are about *whether* to implement a certain choice
- Tactical decisions are about *how* to implement such choices
- Alternative, practical, definition: can be implemented with approved budget or needs ad hoc budget approval

### Level: high level versus low level

Whether a decision is taken at level of top executives or at a lower level in the hierarchy



## A simple 2x2 structure: matrix

	Low Level	High Level
Tactical	<ul style="list-style-type: none"> <li>-Decentralized structure;</li> <li>-energy efficiency measures will depend mostly on initiative of lower level management</li> <li>-there is room for a proactive stance</li> </ul>	<ul style="list-style-type: none"> <li>-centralized structure,</li> <li>-low level management executing decision rules</li> <li>-reactive rather than a proactive stance</li> <li>- slow to adapt small every-day processes</li> </ul>
Strategic	<ul style="list-style-type: none"> <li>-extremely decentralized processes</li> <li>-reaction times reduced</li> <li>-proactive stance is possible</li> <li>-lack of coordination between different departments</li> </ul>	<ul style="list-style-type: none"> <li>-importance of information filtering through to decision makers</li> <li>-Information overflow and cognitive limitations may become important</li> </ul>



## Expansions: Formalization & Complexity

Cost of simplicity: realism & explanatory power

The model can be easily expanded by additional dimensions (Fredrickson, 1986):

### 1) Centralization (see decision level)

-Advantages: quick and wide-ranging actions

-Issues: information flow and cognitive limitations

### 2) Formalization

-Advantages: coherence and goal-orientation

-Issues: reactive action, inhibition of creativity

### 3) Complexity of Organization



## A Behavioral Theory of the Firm

The two preceding frameworks are quite schematic and simplistic (allows quantification, but loss of realism)

Organizational theory adds realism by looking at actual processes:

- Firm as a coalition of individuals with potentially different goals
- common goals are formed through alliances and side payments
- cost saving opportunities are largely unknown
- information is not readily available
- cost-saving initiatives are largely triggered by 'crises'
- saving opportunities exist due to organizational slack
- decisions are reached through 'satisficing' rather than optimization
- success is measured by improvement rather than optimum



## Consequences for Emission Cuts

Which decision making elements may be relevant for emission cutting decisions?

- The role of (expected) emission certificate prices
- The role of net positions (long/short)
- Potential trigger-events for investments
- Status of emission reductions (goal; cost consideration, etc.)
- Role of budget constrains/intra-company conflicts

The development of the decision making process

- Initiation of an investment decision
- Number and type of alternatives typically considered
- Importance of external data or expertise/competitor's actions
- Choice criteria between alternatives



## Conclusion: Questions for Discussion

To what extent are certificate prices and/or net positions important in the decision making processes?

Are any cost-benefit analyses undertaken for investment decisions?

What kind of event is typically at the root of new investment initiatives?

How are alternative investment projects compared or evaluated?

What role do budget constraints, time pressure, etc. play in the process?

Any feedback and/or question is highly welcome!