Ecological oriented structural change in the Oil Industries?
The role of Photovoltaics for SHELL and BP

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Abstract:

As the real effects of environmental change dawn on society, businesses are becoming more and more concerned about the impacts of their core activities on the environment. Transformed business strategies might be an approach of tackling the challenges. The paper examines starting points of transformations by highlighting the role of photovoltaics for selected multinational oil and gas suppliers (Shell, British Petroleum). Therefore it follows a three step methodology:

1. Current developments and perspectives of the photovoltaic industries are described in the context of global energy supply.
2. The activities of Shell and BP in the Photovoltaic market are described and compared with the core businesses of the examined MNCs. (history, turnover and prospects of the photovoltaic business Shell and BP, Connex to the general business principles, MNC Statements concerning CO2 emission reductions and commitment to Sustainable Development, strategic meaning of photovoltaics for the examined companies)
3. A set of interpretations will be developed in respect to possible evaluations for the engagement of the oil and gas industries in renewable energies. (Indicators for defensive, pragmatic and proactive environmental business policies, contribution to structural change etc.)

The paper carries out the prospects of photovoltaic activities on a possible ecological restructuring of the oil and gas industries. It gives a glance at current policies of the investigated MNCs and analyses future prospects of structural change in the oil and gas industries.
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CHAPTER I
Introduction

CHAPTER II
Significance and Market Relevance of Photovoltaics
- Option for Climate Policy
- Energetic Potential
- Economic Policy - Market Potential

CHAPTER III
Case Study SHELL
Case Study BRITISH PETROLEUM
- The role of solar power

CHAPTER IV
EVALUATION
Conclusions
- Indicators of Ecological structural change

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Solar energy – a climate policy Option ? - A hypothetical calculation

➢ Electric Power Sales in Germany 1997
   454 bn. KWh (VDEW 1998).

➢ Average Performance of a modern Solar panel per year on 1 m² ca. 100 KWh/a.
   (e.g. Module BP SEP 750: 120 KWh/a)

➢ Hypothetical needed area for total substitution by solar power (rough estimate):
   
   \[ a = \frac{454 \times 10^9 \text{ KWh}}{100 \text{ KWh/sqm}} = 4540 \text{ km}^2 \]

➢ Corresponds to 1,3 % of the area of the FRG
   (356 910 qkm)

Source: own calculations (data: VDEW 1998, BP 1998),
Scenario Market Growth and Cost-Decline of Photovoltaics

Source: http://www.shell.com/h/renew/images/fig3.gif

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Design Case Studies

General Information Shell → General Information BP

Solardivision Shell → Solardivision BP

Internetsite/PR Shell → Internetsite/PR BP

Lobbying Shell → Lobbying BP

Evaluation

Policy framework of ecological Restructuring in the Oil industries
### Basic figures Shell and British Petroleum

<table>
<thead>
<tr>
<th></th>
<th>Shell</th>
<th>British Petroleum (UK - GAAP)</th>
</tr>
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<tbody>
<tr>
<td>Employees</td>
<td>127000</td>
<td>106000</td>
</tr>
<tr>
<td>Worldwide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turnover</td>
<td>128,420</td>
<td>129,109</td>
</tr>
<tr>
<td>Mio. US $</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Profits</td>
<td>5,369</td>
<td>6,267</td>
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<tr>
<td>Mio. US $</td>
<td></td>
<td></td>
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Source: Shell Annual Report 1996
Source: BP Annual Report 1996
Basic information Shell

- Shell Solar Netherlands:
  Manufacturing Capacity: 5 MWp/y (End 1997)

- Strategic target: 10 % share Global market until 2005,


- New Projects:
  Manufacturing site in Gelsenkirchen/Germany (with Pilkington Solar International)
  Investments 30 Mio. DM, 25 Mwp/y

Sources: van der Veer 1997, Watts 1997
Basic Information BP Solar

- Activities:
  ca. 100 Mio. $ Turnover worldwide.
  MWp Production/year (End 1997)

- (Current) Strategic target: 1 bn. $ Turnover worldwide until 2007

- Long term investment

- New Projects:
  Manufacturing Site Fairfield (Ca),
  1998 10 Mwp/y
Business policies: Stages of Structural Change - Development of Options

- Proactive Strategy
  - Symbolic Actions
  - Communications, PR
  - Reactive Strategy
    - Ecological Market Diversification
    - Adaptation

- Reorientation
  - Enforcing environmental Institutions/Framework

- Reframing
  - Ecological Effectivity

Ecological learning processes

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Factors of Influence for an Ecological Transformation in the Oil Industry

<table>
<thead>
<tr>
<th>Ecological Problems</th>
<th>e.g.</th>
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<tr>
<td>- Rising CO2 Concentration in the Atmosphere</td>
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<td>- Frequency and Volatility of Environmental Catastrophes</td>
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<td>– Climate Change</td>
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Transformation by External Systems

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<tr>
<th>Public</th>
<th>Policy</th>
<th>Market</th>
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<tr>
<td>• Discussion role of MNCs</td>
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<td>• &quot;Schwarze Peter&quot; Risk</td>
<td></td>
<td></td>
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<tr>
<td>• New Emission Reduction targets</td>
<td></td>
<td></td>
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<tr>
<td>• International Treaties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Liberalisation of Energy markets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• New Markets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Changing Incentives</td>
<td></td>
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Learning processes on different Levels
- Negation
- Perception
- Acceptance
- Tackling of ecological Problems

Influence on Energymix and Energy Demand

<table>
<thead>
<tr>
<th>today</th>
<th>Medium term</th>
<th>Long-term</th>
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<tr>
<td>fossile Energies</td>
<td>Renewable Energies</td>
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