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  CHAPTER II  CHAPTER III  CHAPTER IV

Introduction

Significance and Market Relevance of Photovoltaics

Option for Climate Policy
Energetic Potential

Economic Policy - Market Potential

Case Study SHELL

The role of solar power

Case Study BRITISH PETROLEUM

Conclusions

Indicators of Ecological structural change

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

<table>
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<tr>
<th>Year</th>
<th>Shell Employees Worldwide</th>
<th>British Petroleum Employees Worldwide</th>
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<tr>
<td>1992</td>
<td>127000</td>
<td>53700</td>
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<tr>
<td>1994</td>
<td>106000</td>
<td></td>
</tr>
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<td>1996</td>
<td>101000</td>
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<table>
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<tr>
<th>Year</th>
<th>Shell Turnover Mio. US $</th>
<th>British Petroleum Turnover Mio. US $</th>
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<tr>
<td>1992</td>
<td>128,420</td>
<td>58,852</td>
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<td>1994</td>
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<td>1994</td>
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<td>1996</td>
<td>8,886</td>
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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

Enforcing environmental Institutions/Framework

Proactive Strategy

Symbolic Actions
Communications, PR

Reactive Strategy

Diversification
Adaptation

Ecological Effectivity

Reframing

Reaction

Reorientation

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Ecological learning processes
Factors of Influence for an Ecological Transformation in the Oil Industry

Ecological Problems
  e.g.
  - Rising CO2 Concentration in the Atmosphere
  - Frequency und Volatility of Environmental Catastrophies
    – Climate Change

Transformation by External Systems

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

Influence on Energymix and Energy Demand

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<th>today</th>
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<td>fossile Energies</td>
<td>Renewable Energies</td>
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Literature:


BP SOLAR (ED.): Der Solar Ratgeber, Hamburg 1997


DEUTSCHE SHELL AG (ED.): Fakten und Argumente - Aktuelle Themen aus der Mineralölwirtschaft. Hamburg, November 1997,


DEUTSCHE SHELL AG (ED.): Shell (Ed.): Erneuerbare Energie: Shell setzt auf Solarenergie und Biomasse, Hamburg 1997

DEUTSCHE SHELL AG (ED.): Presseerklärungen Nr. 37/1997, Nr. 36/1997

DYLICK, THOMAS ET AL.: Ökologie und Wettbewerbsfähigkeit, Zürich 1997


HERKSTRÖTER, CORNELIUS: Dilemmata multinationaler Unternehmen, Hamb urg 1997

LEHMANN, HARRY/REETZ, TORSTEN: Zukunftsenergien - Strategien einer neuen Energiepolitik, Berlin 1995


MINSCH, JÜRGE ET AL.: Mut zum ökologischen Umbau - Innovationsstrategien für Unternehmen, Politik und Akteurnetze, Basel 1996


PONTENAGEL, IRM: Das Potential erneuerbarer Energien in de Europäischen Union, Berlin Heidelberg 1995

SHELL SOLAR ENERGY B.V. (ED.): Connetcting you to the sun, Helmond o.J.


VON WEIZSÄCKER, ERNST ULRICH/LOVINS, AMORY: Faktor vier. Doppelter Wohlstand - halbierter Naturverbrauch, München 1995


WÜSTENHAGEN, ROLF: Greening Goliaths versus Multiplying Davids: Pfade einer Coevolution ökologischer Massenmärkte und nachhaltiger Nischen, IWÖ - Diskussionsbeitrag Nr. 57, St. Gallen 1998