

Drivers and Socio Economic Aspects of Energy Use in Europe

Kick-off Meeting

Johannesburg, 3rd November 2005

Timon Wehnert

Institut für Zukunftsstudien und Technologiebewertung, Berlin
Institute for Futures Studies and Technology Assessment, Berlin

Outline

A few words on the IZT

**Societal demands and future needs -
European Energy Delphi**

**Strategic Energy Planning
on community level**

Main Challenges for EnerKey



**IZT – Institut für Zukunftsstudien
und Technologiebewertung, Berlin**
Institute for Futures Studies and Technology Assessment



- **Independent, non-profit research institute, founded in 1981.**
- **Research and consulting on technology foresight and sustainability.**



Project Highlights



The German Research Dialog:

- Long-term stakeholder process
- Developing R&D targets for the German Ministry for Education & Research



The European Energy Delphi:

- Two round Delphi survey among 700 European Energy Experts

Strong expertise in socio-economic assessments
and participatory planning tools



Results from the European Energy Delphi

Technologies and Societal Visions



Scope

1st Europe-wide Delphi Study on Social and Technological Visions in the Energy Sector

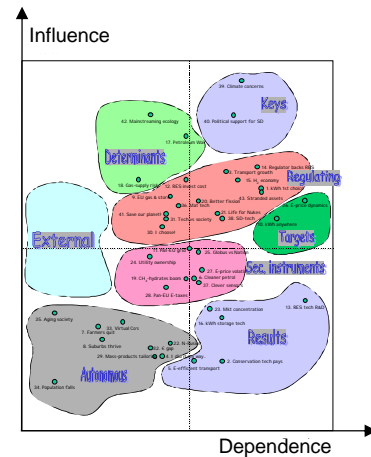
- Time horizon 2030
- EU 25 +
- 2 Delphi rounds
- 700 Energy Experts

Project Duration: October 2002 – September 2004

Cross Impact Analysis on Future Energy Demand

Main drivers for future energy system:

1. **Attitudes towards Global Environment**
 - Climate Concerns
 - Mainstreaming Sustainable Development
2. **Hydrocarbon Bottlenecks**
3. **Technological Developments**



Policy plays major role

Future energy system highly dependent on legal framework:

- Energy policy
(e.g. Germany: Nuclear fade-out)
- Grid access regulation
- Market stimulation for emerging technologies
- Planning and licensing procedures
- Standards



Public Acceptance

Public acceptance is a key factor for energy technologies:

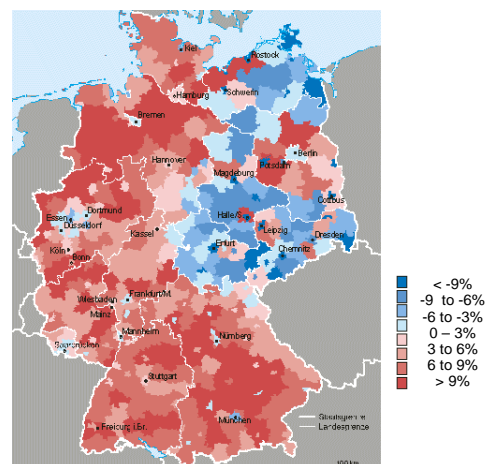
- Nuclear
Perception of risk leads to strong opposition
- Hydro / Wind
Local environmental concerns
- Household appliances
Acceptance / **user friendliness**
key factor for energy efficiency gain



Demographic changes

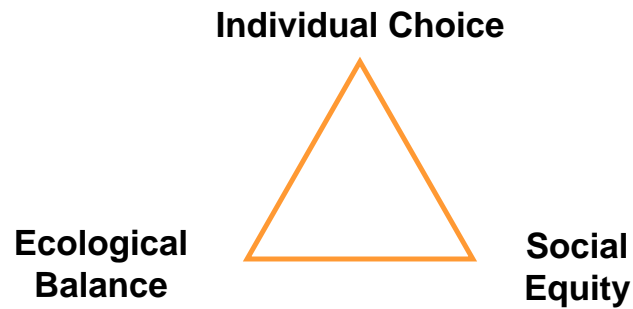
Europe:

- Slight decline up to 2025 and a significant decline after 2025
- Shrinking cities (and regions) already today



⇒ What does this mean for future energy infrastructure?

Three Societal Visions



Which technologies contribute best to each vision?

Main Results of EurEnDel survey

Higher **Energy Efficiency** is top priority independently of the pursued social values

Renewables considered highly beneficial for ecology and security of supply

Strong controversies on role of **nuclear and CO₂ capture and storage**

Main Results of EurEnDel survey (cont.)



Fuels for Transportation: No clear solution – alternative paths with divers fuel mixes

Natural gas has bridging function
High infrastructural needs and risk of dependency

Energy Storage will become key technologies (not only for renewables). Alternatives for H₂ necessary

The SKEP project:

**Integration of Renewable Energies into
Communal Energy Strategies**

Background

Background:

- Conditions for renewables are very favourable in Germany: “feed-in tariffs”.
- Some German Communities have high shares of renewable energies – most don’t.
- Energy efficiency is a vital part of communal energy strategies – renewables are not.

How can renewables best be promoted on community level?

Target and Methods

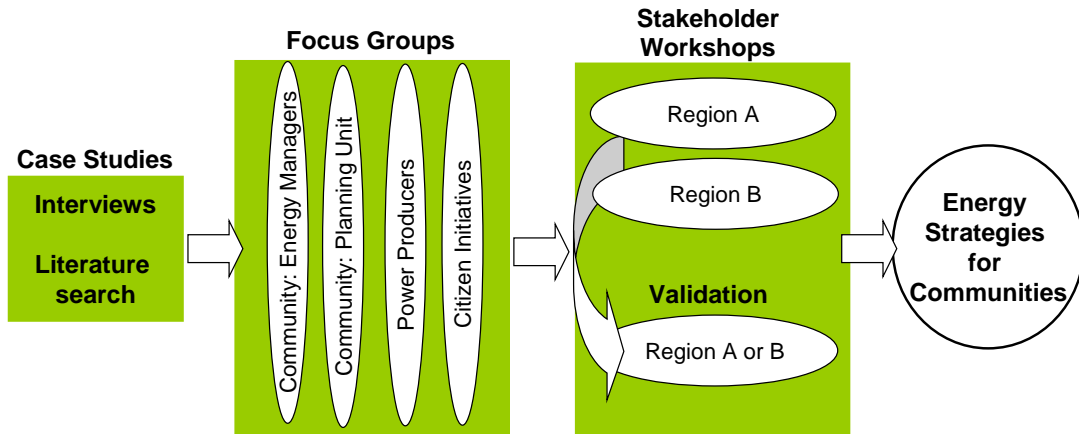
Target

- **Develop Energy Strategies for Communities** which include an optimal use of renewable energy sources.
- Identify lanes of actions for engaged actors

Method

- **Participatory workshops** for main stakeholder groups

Methodology



First results to be expected in Summer 2006...

Main Challenges for Enerkey Project

From a socio economic perspective the main challenge will be to identify:

Indicators for Energy Planning

Which targets are connected to energy strategies?
Which indicators are best suited for energy planning in the Gauteng region?

Relevant Actors to be involved

Who needs to be involved in the project with respect to:

- Know-how
- Representation of relevant Stakeholders
- Implementation



Thank you!

Project results available on:
www.izt.de



Backup

Main Global Drivers

Main drivers for energy scenarios (IEA):

1. **Speed of Technological Change**
2. **Attitudes towards Global Environment**
3. economic growth
4. population growth
5. globalisation and degree of market openness
6. structure of power and governance
7. global security issues

ranking according to „ENERGY TO 2050 Scenarios for a Sustainable Future“; IEA 2003

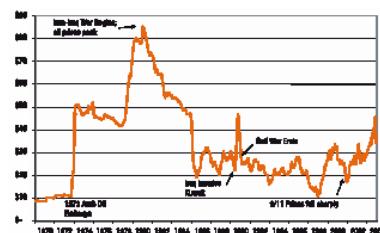
Timon Wehnert, IZT - EnerKey, Johannesburg, 3rd November 2005

21

Energy Prices

Most influential drivers:

- Energy price volatility
- Oil (and Gas) prices
- Market support and subsidies



⇒ Security of supply arguments in favour of Renewables and Storage

Timon Wehnert, IZT - EnerKey, Johannesburg, 3rd November 2005

22



Objectives

Prospective:
Long-term trends in energy technology development

Normative:
Technology Assessment regarding societal needs

Development of R&D policy recommendations

→ Focus on emerging technologies



Energy Efficiency

2010 2020 2030 2040

„Never“

Energy Efficiency in Industry

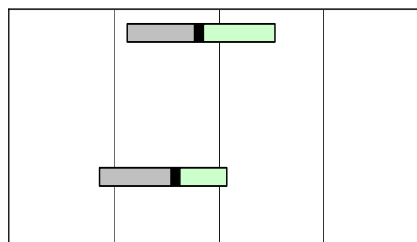
Industrial energy consumption in Europe is reduced by 50% per produced unit through novel production processes

2%

Low-energy Buildings

Low-energy buildings with intelligent power systems make up >50% of all new buildings in Europe

1%



Legend:

25% Quartile Mean Value 75% Quartile



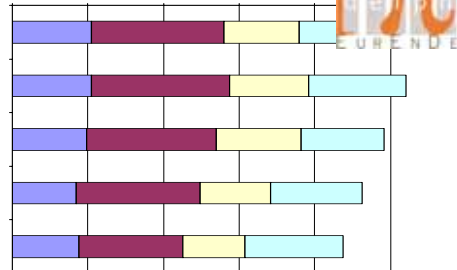
Experts / Knowledgeable / Familiar

Delphi Statements Positive Impacts



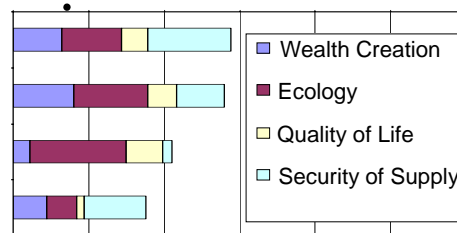
Top 5:

- 25% Renewables
- Energy efficiency in industry
- Low-energy houses
- H2 from renewables
- Energy storage for renewable energy systems



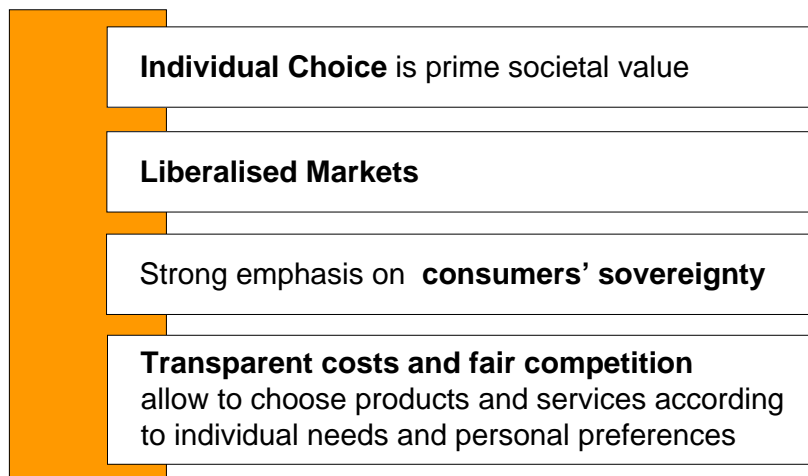
Bottom:

- Plasma-technology for fusion
- Superconducting materials
- CO₂ sequestration and storage
- Safe Fission



Individual Choice

Vision 1 „Individual Choice“ is based on:

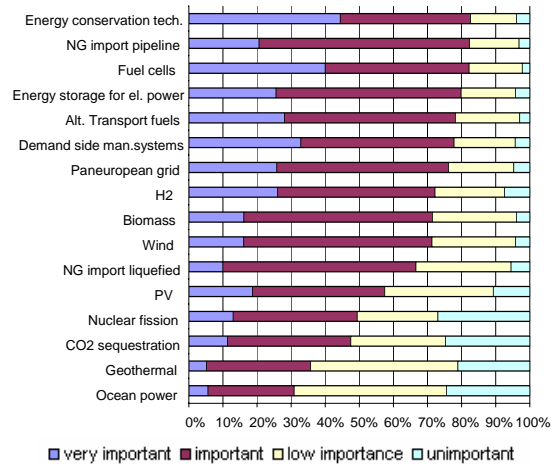


Individual Choice

Which Technologies / Energy Sources are Important?

Top 5:

- Energy Conservation Technologies
- Natural Gas Imports (Pipelines)
- Fuel Cells
- Energy Storage (Electrical)
- Alternative Fuels



Ecological Balance

Vision 2 „Ecological Balance“ is based on:

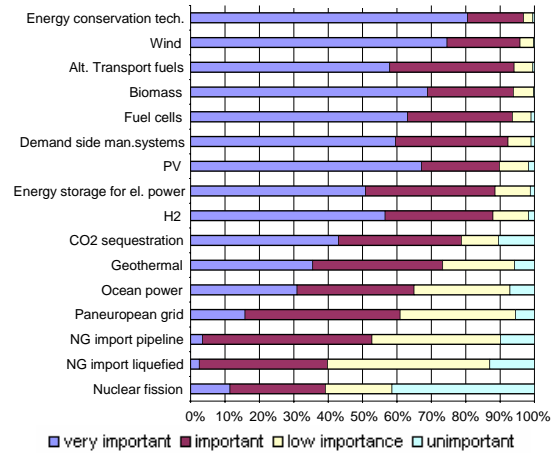
- To live a live in balance with nature**
- Protection of the ecosystem** is prime political target
- The **polluter pays principle** is strictly enforced
- Precautionary principle and closed cycles** are state of the art in industry
- Higher Costs** for ecological sound solutions are accepted by the consumers

Ecological Balance

Which Technologies / Energy Sources are Important?

Top 5:

- Energy Conservation Technologies
- Wind
- Alternative Fuels
- Biomass
- Fuel Cells



Social Equity

Vision 3 „Social Equity“ is based on:

Greatest possible **social equity** is prime moral value in Europe in 2030

European Policy aims at **Minimising income disparities**

Social responsibility as high priority in industry

Employment intensive alternatives are being favoured

Society is willing to socialise costs. **Burden sharing** to foster equity is widely accepted



Social Equity

Which Technologies / Energy Sources are Important?

Top 5:

- Energy Conservation Technologies
- Demand-side Management
- Biomass
- Wind
- Alternative Fuels

