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SESSA
Sustainable Energy Specific Support assessment

Final SESSA meeting

Implementing the Internal Market for Electricity

Investing for sustainability

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- & all participants at the Madrid SESSA Conference, May 19-20, 2005

What is meant by “a sustainable energy system for Europe”?

- Lasting & dependable **access to primary energy sources**
- **Adequate capacity** of generation, transmission & distribution
  - Plus security in system operation and power delivery
- Sustainable **environmental impact**
- Adequate **economic development** *(impact on economic European competitiveness)*
- Reasonably fair **universal access** *(Europe & worldwide)* to modern forms of energy supply

What can be done to move our energy model towards a sustainable path?

- Prospective & normative analysis
  - Identify threats / challenges
  - Define targets for action
- Fine tune the mechanisms of response
  - Demand-side measures
  - Renewable energy sources
  - Energy R&D
  - Define the role of nuclear energy
  - Universal access & international cooperation
  - Regulatory instruments
  - Education of public opinion

Prospective & normative analysis

–The “current policies” scenario

–Alternative scenarios

The “current policies” scenario (1)

Positive side

- Energy consumption increasingly decoupled from GDP growth
- Resource limitation does not seem to be a pressing issue for about 20 years *(and later?)*

Concerns

- Most of the growth in energy consumption will come from fossil fuels
- Security of supply: dependence on imports of natural gas (& oil)
- Climate change: increasing carbon emissions
- Scant penetration of renewables despite growth

The “current policies” scenario (2)

Concerns *(cont.)*

- Most energy consumption in buildings & transport
- High uncertainty about the future of nuclear after 2020
- Continuous growth of road & air transport, source of congestion & air quality problems
- A return to coal in the medium term ➔ need for clean coal technologies while oil/gas/nuclear serve as a bridge
- Large increase in price of electricity is expected; impact on competitiveness does not appear to be essential
- Small relative weight of EU in world energy scene

The outcome of prospective evaluation
Main threats / challenges

- Dependence on imports
- Increasing carbon emissions
- Poor penetration of renewables, despite growth
- Need to improve energy efficiency & saving, mostly in transport & building sectors
- Lack of a strategic choice of a sustainable base-load generation of electricity in the medium/long term: advanced nuclear?
- Lack of universal access

“Alternative” scenarios

- Combined effect of some or all of the following measures:
  - Promotion of renewable sources
  - Higher efficiency in final uses
  - Higher energy taxation
  - Emission trading
  - Sectorial measures *(transport, buildings)*
  - Development of new technologies *(carbon sequestration, hydrogen, fuel cells)*
  - Potential availability and acceptance of nuclear

“Alternative” scenarios make a difference

- Carbon emissions drop 25% or more with respect to the “current policies” scenario
- Import dependence is sharply reduced
- Energy prices rise significantly
- Results depend on the intensity and mix of actions, but in general, to avoid hitting sustainability boundaries they require very strong actions in several simultaneous directions
  - Measures are difficult to implement when consumption is very dispersed *(energy saving in buildings & transport)*

The need for normative evaluation
➔ Main guidelines for action

- Targets to achieve desired results, such as
  - How much effort in renewables?
  - What measures for high energy efficiency?
  - New standards & fuels for transportation?
  - What carbon emission limits?
  - Required advances in development of new technologies & the commensurate effort
  - How to meet the expected energy demand?

➔ EU would need to agree on a strategic normative scenario

Mechanisms of response

- Demand-side measures
- Renewable energy sources
- R&D in energy
- Universal access & international cooperation
- Regulatory instruments
- Education of public opinion
- Potential use of nuclear energy

Demand-side measures (DSM) (1)

- Economic relevance of energy, while relatively inexpensive *(insufficient internalization)* ➔
  - Cost-reflective pricing is useful but insufficient to contain consumption for **smaller consumers** ➔ DSM
  - It may be useful to impose targets of energy saving to suppliers or to distributors…
  - …coupled with a market for energy efficiency certificates which creates an incentive for new energy - saving companies (ESCos)
  - Advanced metering & ad hoc tariffs

Demand-side measures (DSM) (2)

- Price measures can be effective in the case of **energy-intensive industries**
  - Here we have a competitiveness problem
  - Then, harmonization (at least European) of regulatory treatment is needed
- Focus on energy significant sectors
  - In the long run, 40% of energy in buildings, 35% in transport & only 25% in industry
- Check final effectiveness of energy efficiency measures *(rebound effect)*

Renewable energy sources (1)

- A large level of penetration of renewables is a key ingredient in any sustainable energy strategy
  - Difficulty in meeting the current targets
  - Progress strongly differs among Member States
    - Focus on the most successful promotion schemes
    - Identify & remove the barriers to penetration
- The challenges of integration into the electricity system
  - Volume of penetration depends on overcoming the present operational limits

Renewable energy sources (2)

- Much R&D in renewables is still needed
  - Precautionary principle would advise to make an extra effort so that electricity production with renewables takes off seriously as soon as possible
- Again, it is important to provide a long-term perspective
  - To reduce the uncertainty of investors
  - To quantify the role of renewables in the overall picture
- Adequate regulatory instruments *(see later)*

Renewable energy sources
Wind

- Technical vs. economical potential
- The difficulty of making a good assessment
- Coincidence in the high potential but not on the concrete figures ➔ ample room for wind penetration
- The challenges of integration into the electricity system
  - Volume of penetration depends on overcoming the present barriers to integration
  - But integration costs seem to be small compared to investment costs ¿?

Renewable energy sources
Solar

- Very high potential, assumed some essential technological developments take place
  - PV might be a major source of electricity generation by 2040
  - It is not clear what BAU means any more
  - Widely apart estimates of investment costs
  - Integration: Reduction in needs for transmission lines

Investing for sustainability

Fine tune regulatory instruments *(examples)*

- Promotion of renewables
  - Identify / encourage the most successful / efficient methods
  - Avoid double counting *(e.g. feed-in tariffs on top of a market price that is affected by CO2 emission trading)*
  - Note that the benefits of most renewable sources accrue locally
- The EU emission trading scheme
  - Avoid allocating allowances on the basis of historical emissions for the present period ➔ no incentive towards a capacity mix with lower carbon emissions
  - No justification to give allowances whose cost is recovered by higher *(because of CO2)* electricity prices

R&D in energy (1)

- *"The only route to a sustainable energy system is through new or improved energy technologies that will have to be found through R&D"*
- EU-funded *(as well as MS & private industry funded)* research has decreased dramatically over the last 25 years
- The new energy technologies that are needed will not be delivered quickly
- Much uncertainty: R&D must be carried out across a wide range of technology options

R&D in energy (2)

- The volume of R&D effort in energy must be commensurate with the relevance of the challenge & the need for results ➔ significant increase is needed
- The increased R&D effort should start now & will have to continue over a long period of time
- The selected topics for R&D in energy must be those where a technical breakthrough would dramatically improve our chances of making our energy system sustainable

Nuclear energy (1)

- There are strong positive & negative points
  - No (or small) greenhouse gas emissions
  - Widely spread & seemingly abundant resources
  - Safety concerns although significant improvements have been made
  - Proliferation & terrorism
  - Disposal of radioactive waste
  - Economic viability of future plants in liberalized markets
  - Social acceptability: subjective attitude towards risk
  - It is a significant part of present supply of electricity in the EU

Nuclear energy (2)

- Potential of nuclear energy under a sustainable development perspective
  - Pros & cons are both strong
  - Extremely difficult to abandon nuclear power in the short term: at least it may provide a bridge while ***actively*** exploring other options, as we need diversification & flexibility
  - Expertise must be organized in such a manner that controversies & contradictions are manifest so that officials can make decisions with their consideration: A new SESSA project on nuclear energy & its alternatives?

Universal access & international cooperation (1)

- 1.6 billion people without access
- Forecasts: negligible absolute decrease by 2030
- The need for a wider understanding of energy sustainability
- The need for a new paradigm in energy supply when the worldwide & long-term picture is contemplated
- The strong relationship between access to electricity & economic development
- Low in priorities of governments
- Broadening access in rural areas does not require large quantities

Universal access & international cooperation (2)

- Aid programs for energy access in developing countries have to be thought over again
  - Do not confuse just access to modern forms of energy for the poor with climate change issues
  - General electricity regulatory reforms will do no good ➔ specific measures will be needed
  - Public *(or private via ad hoc regulation)* funds will be needed for electrification *(they may result from restructuring processes in parallel)*
  - Good government, market reform & stable investment climate are essential
  - Strategies should be tailored to the specific needs of each society
  - Sound economic & regulatory principles
    - E.g. implement subsidies that facilitate investment and not ones that subsidize consumption

Key issues concerning competitiveness

- We need stronger actions for energy sustainability, while maintaining at the same time industry competitiveness
- These actions should be considered an opportunity *(given its inevitability)* rather than a hindrance
  - by providing strong incentives and therefore
  - by helping to achieve objectives at a lower cost & early
- Governments should act as facilitators
  - clear goals
  - appropriate institutional frameworks

General recommendations

General recommendations (1)

The lack of sustainability of our energy model will require strong changes in energy consumption & production patterns in the medium & long term; then

1. Move up energy in the political agenda
2. Rally public opinion around one major issue: the fight against climate change
3. Use a normative approach to establish specific long-term targets & guidelines to get there & check the consistency of any proposed package of measures with the long-term targets
4. Precautionary strategy: favor a multiplicity of approaches

General recommendations (2)

5. Reconcile markets & public policy by making clear strategic choices, removing uncertainties, using market mechanisms whenever possible & correct market failures whenever needed
6. Reduce regulatory uncertainty by a credible commitment of governments & regulators to long-term guidelines & targets
7. Policies affecting the energy sector should be made more consistent & harmonized at EU level *(emission allowances allocation, support to renewables, biofuels, strategy for acquisition of gas, etc.),* while trying to find the right equilibrium between regulatory measures adopted at MS & EU-levels

General recommendations (3)

8. Incorporate all countries to the solution: engage in "environmental diplomacy"
   - Nothing substantial can be achieved without the cooperation of the major players, as the USA
   - Maintain strong relationship with fuel-supplying countries
   - New aid strategies to facilitate energy access to deprived populations
9. It is necessary to educate & communicate better, open a public debate on the energy model & promote a radical change in attitudes towards a responsible use of energy

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End of presentation

Thank you for your attention