New approaches to secure Europe’s energy supplies
First SECURE stakeholders meeting

LONG-TERM ENERGY SECURITY RISKS FOR EUROPE:
A SECTOR-SPECIFIC APPROACH

Arianna Checchi

Brussels, 29 January 2009
OUTLINE

• General context of the paper
• Structure of the paper
• Introduction:
  - a sector-specific approach
  - the concept of security of supply
  - supply risk analysis
• Part 1- Specific supply risks for the major energy sources:
  - oil
  - natural gas
  - coal
  - nuclear
  - renewable energy sources
• Classification of security of supply risks in the EU
GENERAL CONTEXT OF THE PAPER

• This study is based on a background document initially conceived for the SECURE project: “Background paper on long-term security strategy for Europe”
• Work Package 3 (task 3.1)
• The paper is still a work in progress
• The next focus will be on the policy options to face EU energy supply risks: global/EU/Member States’ level
• It will eventually turn into a CEPS book by the end of 2009
INTRODUCTION
1. The concept of security of supply
2. Supply Risk Analysis
3. EU Energy Trends
4. General policy context and current developments

SPECIFIC SUPPLY RISKS FOR THE MAJOR ENERGY SOURCES
1. Oil
2. Natural Gas
3. Coal
4. Nuclear
5. New Renewables

CROSS-CUTTING ISSUES
1. Energy efficiency
2. Electricity
3. Europe’s external energy policy
4. Environment and climate change

CONCLUDING REMARKS
A SECTOR-SPECIFIC APPROACH

• **Objective**: to move away from generalisations on security of energy supply

• There are fuel-specific diversities in the EU:
  → different risks for each energy source
  → needs for sector-specific qualifications
  → as a consequence, solutions must be sector-specific

• **Outcome**: to build a map from which policy-makers can identify sector-specific policy-options

Origins of this approach:
- IEA, Natural Gas Security Study (1995)

Other CEPS works based on this approach:
- INDES working papers (2004)
THE CONCEPT OF SECURITY OF SUPPLY

• Elusive and controversial definition but two common features:
  a) reasonable prices
  b) uninterrupted availability
• Economic view vs political view
  - Economic view: energy matters are subject to market rules only
  - Political view: energy policy depends on foreign policy, hard power and national security
• Energy policy vs climate change policy

Complementarity and integration of the two dimensions
ENERGY SUPPLY RISK ANALYSIS

RISKS
- Geological
- Geopolitical
- Economic
- Technical
- Environmental

FUELS
- Oil
- Natural gas
- Coal
- Nuclear
- Renewable sources

CROSS-CUTTING ISSUES
- Electricity
- Energy efficiency
- Climate change
- External energy policy
  Cross-cutting issues
OIL

• Rising demand in the transport sector, declining oil production and increasing oil import dependence

• Transport risks:
  - by pipelines: aging infrastructures; political risks
  - by tankers: chokepoints vulnerability to piracy, accidents

• Competition for global resources:
  - increasing demand in developing countries
  - oil peak

• Oil price volatility:
  - high prices: negative impacts on the overall economy
  - low prices: negative impacts on energy investments and on the development of a low-carbon economy
NATURAL GAS

• Rising demand, declining production and increasing import dependence

• External risks:
  - under-investment in gas producing countries
  - exporters’ reliability risks
  - transit risks

• Internal risks:
  - short term: investment to cope with low-probability events
  - long-term: ability of the market to provide timing signals for investment in transmission and distribution
COAL

• Both demand and production of coal has decreased in the EU and import dependence is expected to rise

• **Long-term**: coal imports are regionally diversified; from stable countries; abundant; safe transport

• **Short-term**: a) supply disruptions due to technical accidents, extreme weather conditions, underinvestment; b) changing global demand structures

• Environmental risks associated to extraction and combustion of coal and high climate change risks
NUCLEAR ENERGY

ADVANTAGES

• Increasing competitiveness
• Indigenous fuel
• Small uranium consumption
• Low-carbon intensity

RISKS

• High investment risks
• High safety risks
• Waste disposal problem
• Public opinion’s opposition
• Uranium availability
RENEWABLE ENERGY SOURCES

ADVANTAGES
• Reduced import dependence from fossil fuels
• Structural advantages
  - storability
  - abundant availability
  - transportability
• Reduced energy price risks and energy price volatility
• Low CO2 content

RISKS
• Structural drawbacks:
  - intermittency
  - seasonality variation
  - needs for back-up capacity
• Infant industry: high costs
• Possible RES import dependence
## Classification of Security of Supply Risks:
### Geological & Geopolitical Risks

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Events</th>
<th>Price rise</th>
<th>Probability in 20 years</th>
<th>Duration</th>
<th>Fuel affected</th>
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<td>Resource depletion/shortage</td>
<td>Lack of investment; extraction difficulties; unsustainable global demand; political constraints</td>
<td>Yes</td>
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<td><strong>Geopolitical risks</strong></td>
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<td>Voluntary output reduction</td>
<td>Quotas on production (by OPEC cartel; by a possible gas cartel); supply cut-off</td>
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<td>Involuntary output reduction</td>
<td>Civil unrest; political turmoil; war; terrorism</td>
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<td>Transport and transit risk</td>
<td>Transport: sea-lane bottlenecks; lack of investment; piracy Transit: political instability of transit countries; tense relations with exporting countries</td>
<td>Yes</td>
<td>Yes /No</td>
<td>Low-medium-high</td>
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<td>Under-investment</td>
<td>Transition towards liberalisation; lack of investment incentives; capital shortage; public opinion opposition</td>
<td>No</td>
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<td>Market disruption</td>
<td>Regulatory failure/shortcoming</td>
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<td>Price fluctuation</td>
<td>Supply-demand imbalance; lack of spare capacity; speculation</td>
<td>Yes</td>
<td>Yes</td>
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## Classification of Security of Supply Risks: Environmental & Technical Risks

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<td>Accidents</td>
<td>Major oil spill (land or sea)</td>
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<td>Nuclear accident</td>
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<td>Increasing greenhouse gas emissions</td>
<td>Yes</td>
<td>Yes</td>
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<td>From production</td>
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<td>Coal extraction and combustion</td>
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<td>Radioactive waste form nuclear</td>
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<td>Unsustainable biomass production</td>
<td>No</td>
<td>No</td>
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<td>Decades</td>
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<td>Technical risks</td>
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<td>System failure</td>
<td>Extreme weather conditions; under-investment;</td>
<td>Yes/No</td>
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<td>Medium</td>
<td>Days, weeks</td>
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<td>technical neglect; major pipeline burst</td>
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<tr>
<td>Intermittency risks</td>
<td>Absence/low inputs (e.g sun, wind)</td>
<td>No</td>
<td>No</td>
<td>Medium</td>
<td>Hours, days</td>
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</table>
THANK YOU FOR YOUR ATTENTION

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