



Energy research Centre of the Netherlands



# EU Standards for Energy Security of Supply

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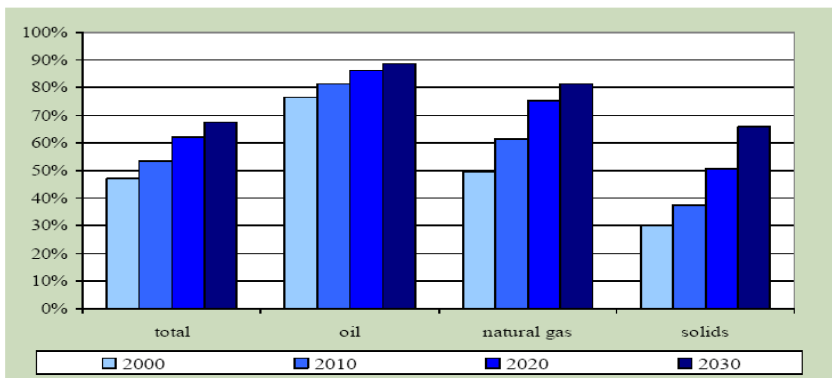
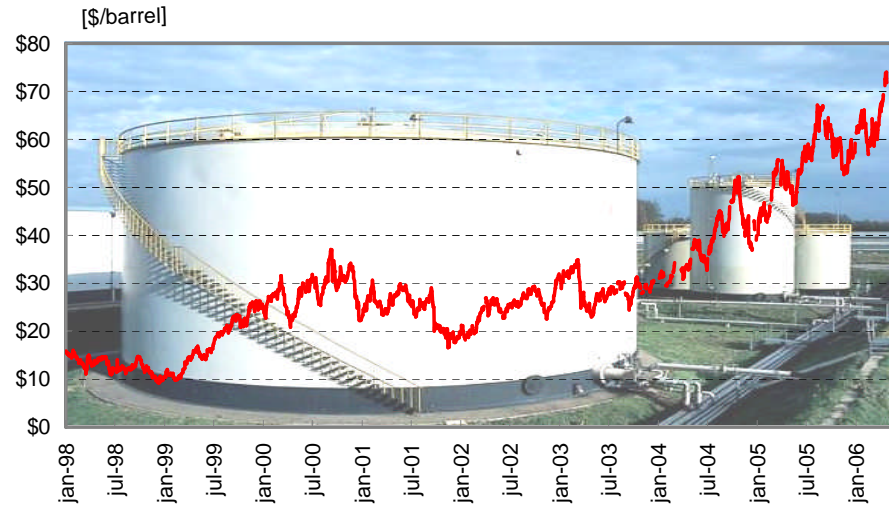


## Content

1. Concerns for energy supply security, but no adequate policy tool
2. EU Standard for Energy Security of Supply: a proposal for strategic energy policy review
3. Examples and discussion
4. Summary and final remarks

# Energy Supply Security Concerns

Increasing oil prices



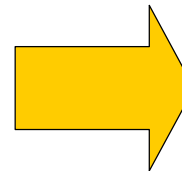
EU 25 Import dependency (%)

## What is energy supply security?

**Continues and uninterrupted availability of energy**

■ Short term - shortage and interruptions caused by:

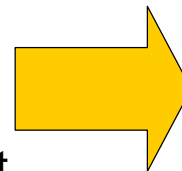
- Technical unreliability
- Natural events
- Market distortions
- Geopolitical tensions



Reduce energy crisis and minimize effects

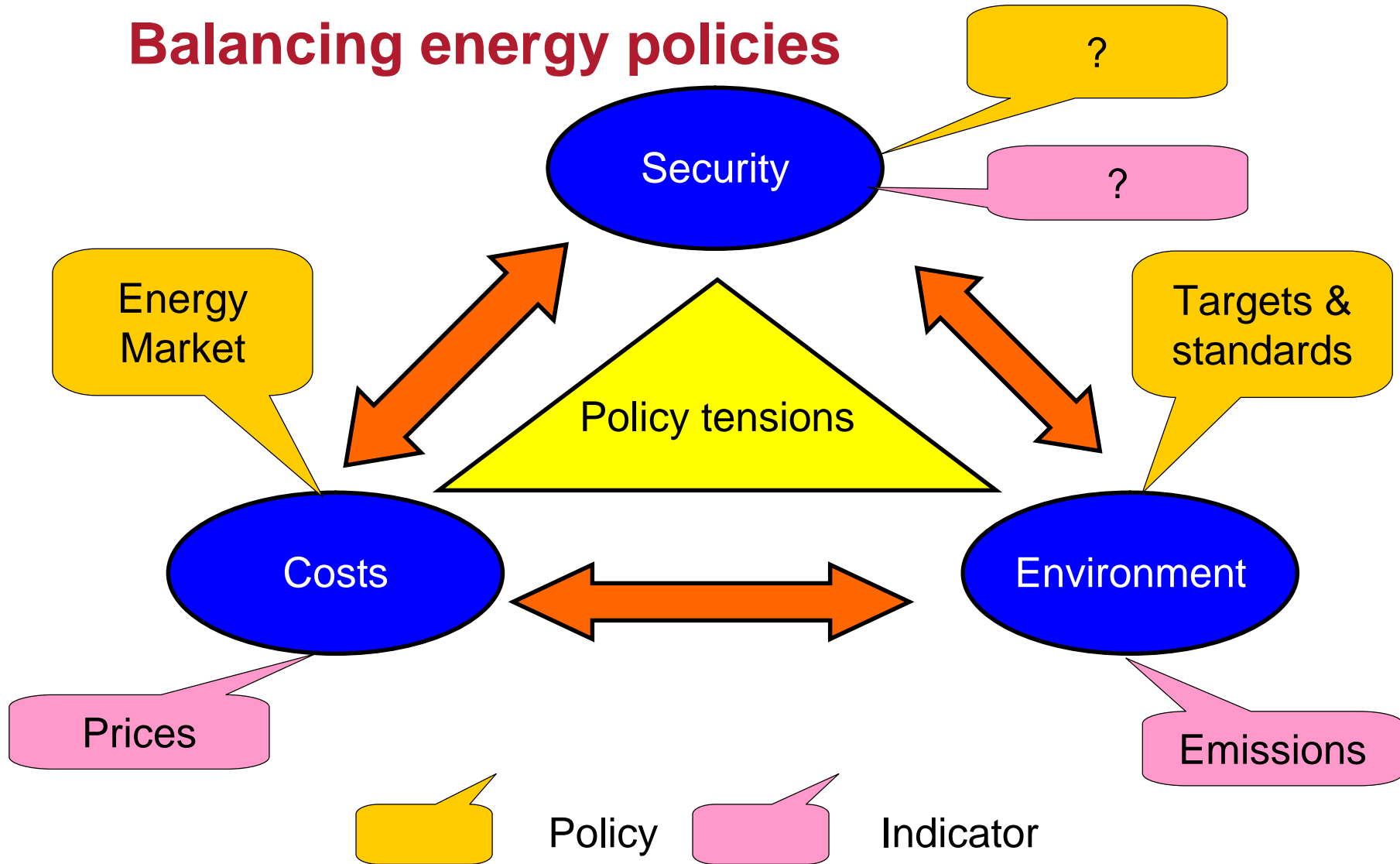
■ Long term - changing vulnerability:

- Availability primary energy sources
- Secondary energy supply (transport fuels, electricity, heat)



Change structure of the energy supply system

# Balancing energy policies



## EU energy supply security policy

- Energy supply security is no longer a national issue
  - EU internal energy market
  - Energy imports is a common problem
- EU green paper: strategic energy policy review

### Proposed tool: **EU Standards for Security of Supply**

- Enables discussion, evaluation, assessment, review of EU and MS SoS policy and adaptation where necessary
- Improves efficiency & coherency of EU energy SoS policies

- But:
  - Supply security remains prime responsibility of the market  
→ governments monitor with “macro” responsibility.
  - National energy mix remains sovereignty of MS.
  - Compatibility with IEA-commitments must be warranted

## The Three Components of the Standard

### Crisis Capability (CC) Index

- Quantitative indicator
- Assessment of supply disruption risks and capability to mitigate these risks

### Supply/Demand (S/D) Index

- Quantitative indicator
- Based on the demand and supply structure
- For assessment of the today's energy supply security as well as in the medium and longer term

### Multilateral actions

- Qualitative considerations
- Multilateral actions securing long-term supplier/consumer relations

# The Standard and the Process

## The Standard

- A standard is normative: a measure of a desired state
- Relative or absolute value
- Criterion or benchmark
- Two quantitative values: S/D Index and CC Index

## The Process

- Conceptual phase
  - Agreement on the parameters used in the S/D and CC Index
  - Agreement on the combined or separate use of the S/D and CC Index
  - Establishment of SoS Standard
- Operational phase
  - Security of Supply Standard used in a review process
  - Evaluation of policy scenario's



## Crisis Capability Index (1)

- Risk assessment (RA):
  - Vulnerability: risk probability and impact  
*Check list: 37 risks,*  
*Value: no risk - low risk – medium risk - high risk → 0-3*
  
- Mitigation Program Assessment (MA)
  - Emergency stocks
  - Demand restraint, rationing
  - Fuel switching
  - Reserve capacities & locked-in productions  
*Check list: 15 mitigation options*  
*Value: n.a.- implemented - implemented & tested → 0-2*
  
- Assessment by Member State governments
  - Confidential information (vulnerability), no standardised information available

# Crisis Capability Index (2)

## Risk assessment (RA)

			Value*
Domestic primary energy production	Oil	Technical constraint	
		Environmental constraint	
	Natural gas	Technical constraint	
		Environmental constraint	
	Coal	Technical constraint	
		Environmental constraint	
Renewable (e.g. wind, hydro)	Technical constraint		
	Environmental constraint		
Energy conversion	Power plants	Technical constraint	
		Environmental constraint	
	Refineries	Technical constraint	
Inland energy transport	Gas pipelines	Operational failures	
		Vulnerability nodes	
	Electricity lines	Operational failures	
		Vulnerability nodes	
Energy import	Supply constraints oil	Political risks	
		Environmental constraints	
		Technical constraints	
	Supply constraints natural gas	Political risks	
		Environmental constraints	
		Technical constraints	
	Supply constraints electricity	Political risks	
		Technical constraints	
	Sea transport routes oil	Political risks	
		Environmental constraints	
	Sea transport routes gas	Political risks	
		Environmental constraints	
		Technical constraints	
	Land transport routes gas	Political risks	
		Environmental constraints	
	Land transport routes electricity	Political risks	
		Environmental constraints	
		Technical constraints	
Total score:			max. 111

\*no risk: 0; low risk: 1; medium risk: 2; high risk: 3

$$RA = value/1,11$$

## Mitigation Program Assessment (MA)

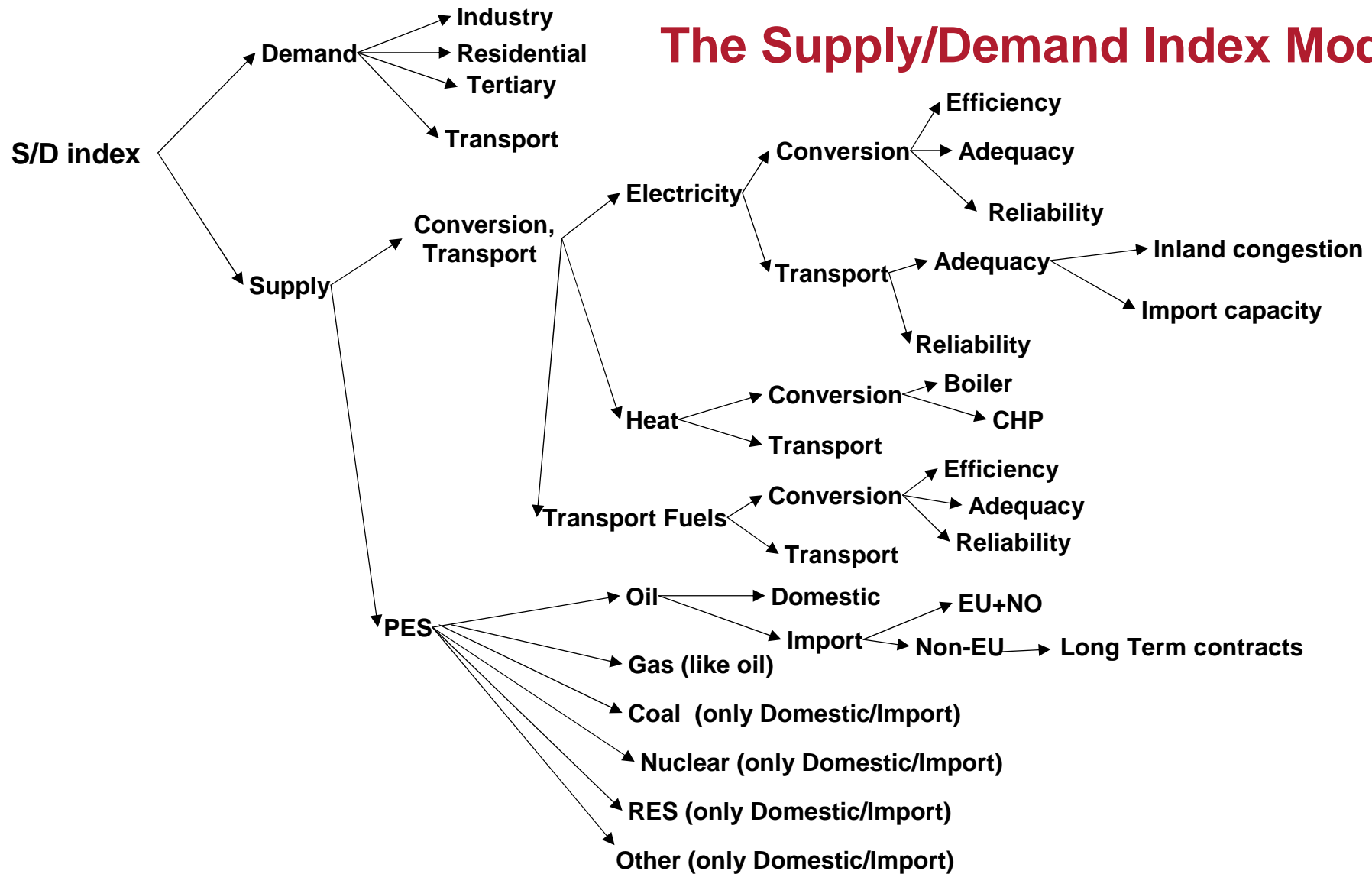
			Value*
Emergency stocks	Oil	Oil stocks	
	Gas	Gas reserves (LNG and UGS)	
Demand restraint and rationing	Electricity	Demand response contracts	
		Rationing procedures	
	Gas transport fuels	Interruptible contracts	
Fuel switch capabilities	Electricity	Rationing procedures	
		Multi fuel capacity (i.e. oil/gas) power plants	
	Heat	Multi fuel capacity (i.e. oil/gas) industrial boilers	
Reserve capacity	Transport fuels	Multi fuel engines (e.g. petrol vs. LPG or CNG, petrol or diesel vs. biofuels)	
		Import capacity	
	Electricity	Generation reserves	
Locked-in production	Gas	Reserve capacity transmission pipelines	
	Refineries	Spare capacity for production transport fuels	
Locked-in production	Oil	Domestic oil production	
	Gas	Domestic gas production	
Total score:			max. 30

\*not available: 0; implemented: 1; implemented and tested: 2

$$MA = value/0,3$$

If  $RA > MA$   
**CC-Index =  $MA/RA * 100$**

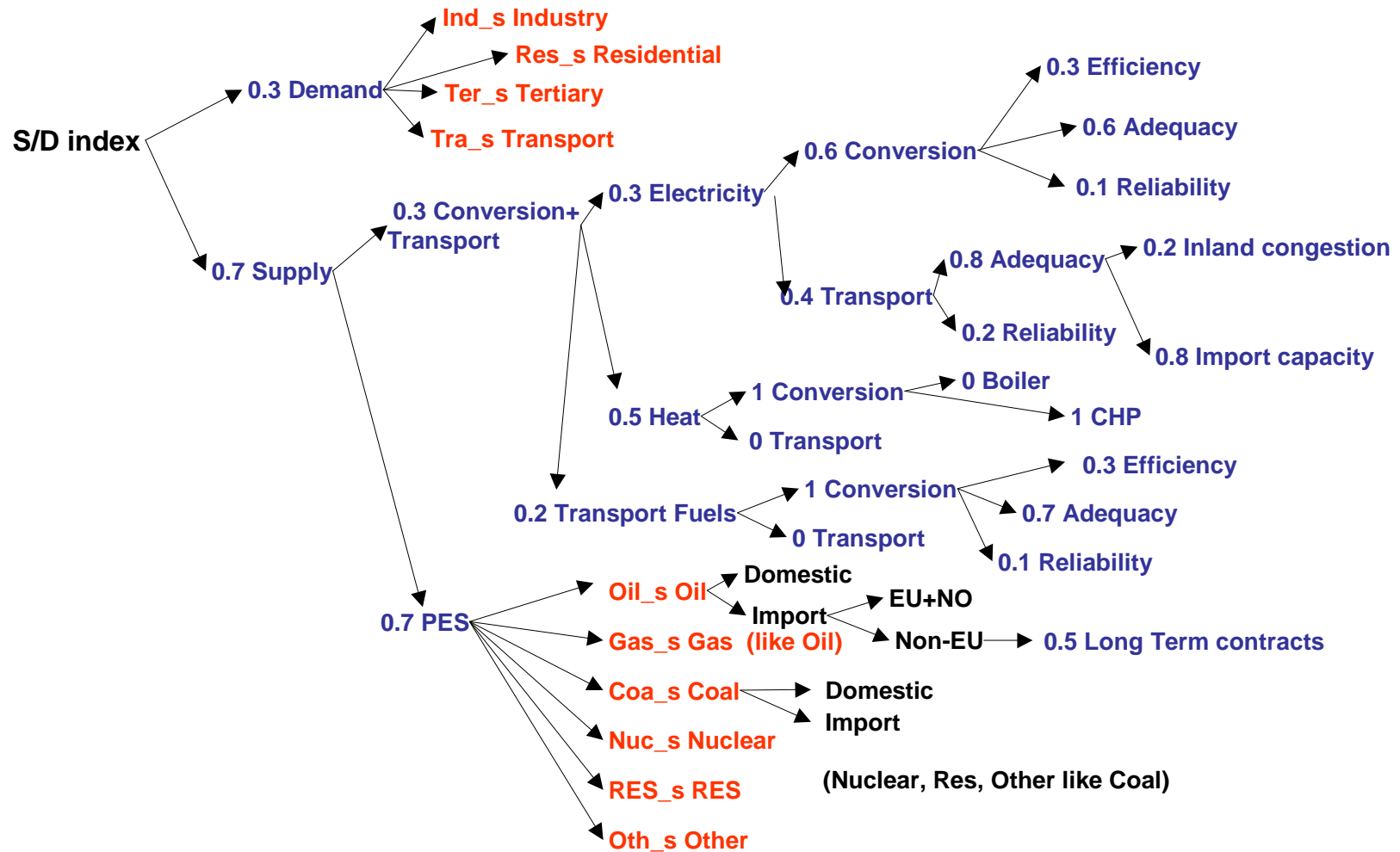
# The Supply/Demand Index Model



## The S/D Index: how?

- Branches have weights
  - Expert judgement (subjective)
  - Physical (objective) relative shares (PES, sectoral demand)
- End of branches: scores 0-100 by scoring rules
  - Scoring rules combination of physical (objective) entities and (subjective) criteria
- Total S/D index score by combination of weights and sub-scores

# S/D Index: weights & scores

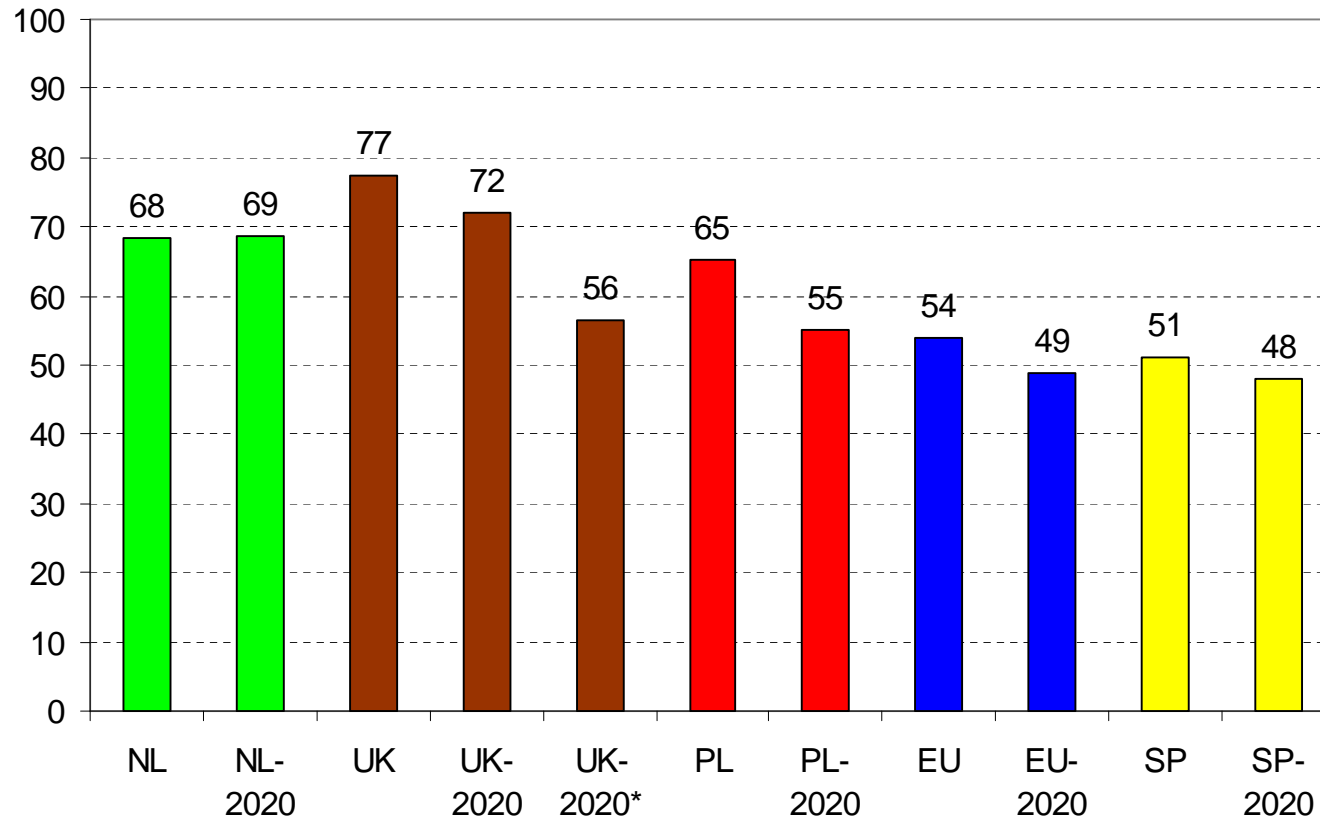


## S/D Index Examples

- S/D Index value range: 0-100
- Sub-index values (demand, conversion & energy transport, primary energy sources): 0-100
  
- EU-25 and 4 Member States (**NL, UK, PL, SP**)
- 'Today' and 2020
- Data sources:
  - Eurostat (2002/2003): energy balances
  - EC Trends to 2030 Baseline scenarios (2000-2030)
  - EC benchmarking energy markets reports
  - UCTE and individual TSO (2005, electricity)
  - IEA (2003, origins of imports)
  - Odyssee (2003, EU-15+NO, energy intensities)
  - Country specific scenarios

# Results 'Today' and 2020 (1)

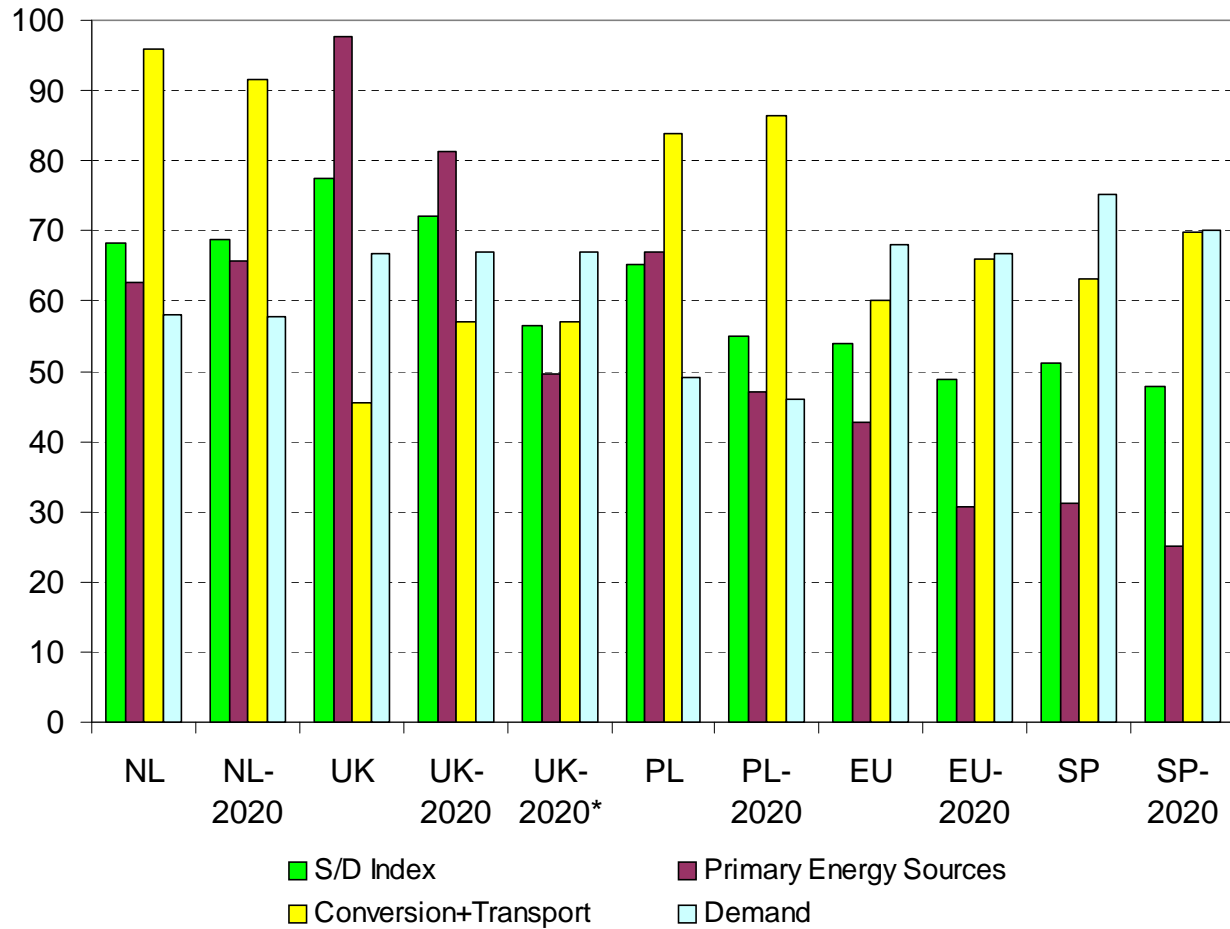
S/D Index



UK 2020 \*: 75% import dependencies

# Results 'Today' and 2020 (2)

(Sub-)Index





## Summary and Final Remarks

Thank you for your  
attention!

- The Security of Supply Standard:
  - Broad and standardised assessment of energy supply in EU and individual Member States
  - Procedure and two quantitative indicators
  - S/D Index provides a SoS indicator for energy scenarios
- Follow up:
  - Concept an preliminary results presented and discussed with the European Commission
  - Workshop with policy makers of several EU MS to gain practical experience
  - Examples of CC-Index
  - Formal presentation in Brussels early 2007

### Acknowledgement

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