



SECURE

Potential Threats for EU Gas Security

Agenda

- Overall EU gas supply situation
- SoS from an “**external**” point of view – Long term supply
- Coordination of gas markets – SoS from an **internal** point of view
- **Internal/external** coordination and integration
- Presentation is based on the work done thus far in the gas work package and includes input from all the partners

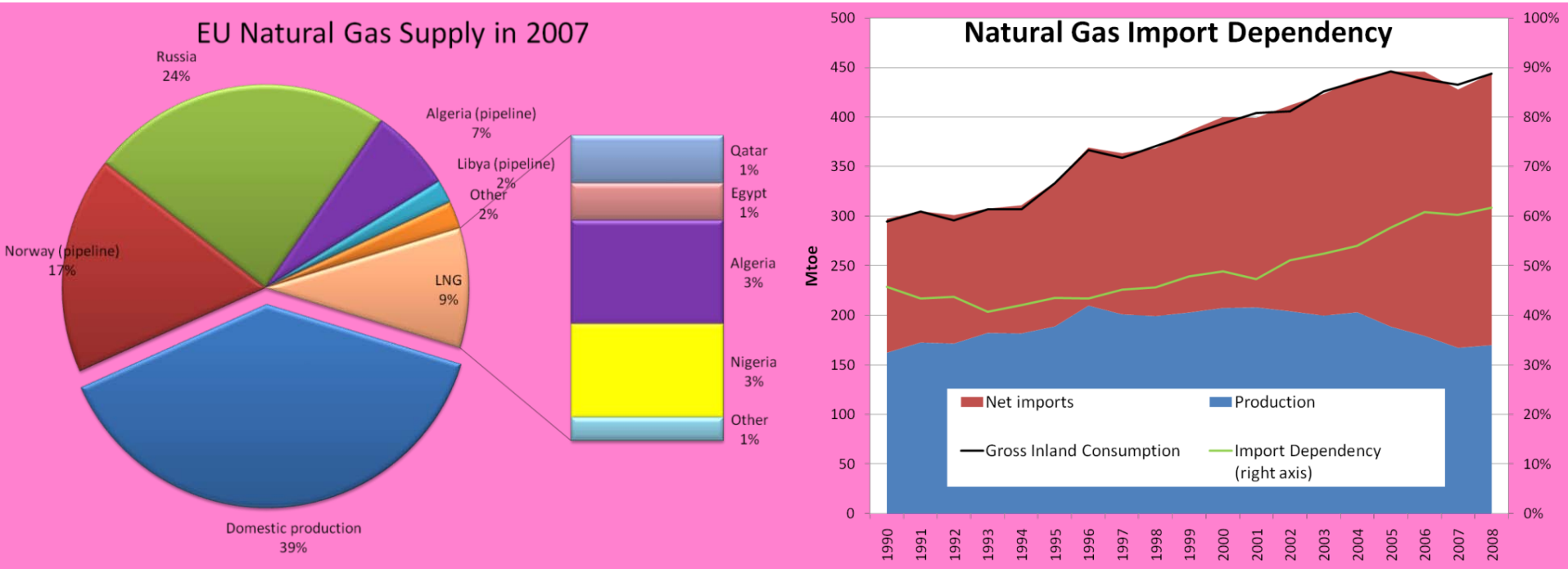


Natural gas security of supply – Overall EU gas supply situation

Dependence, Risks and Mitigation

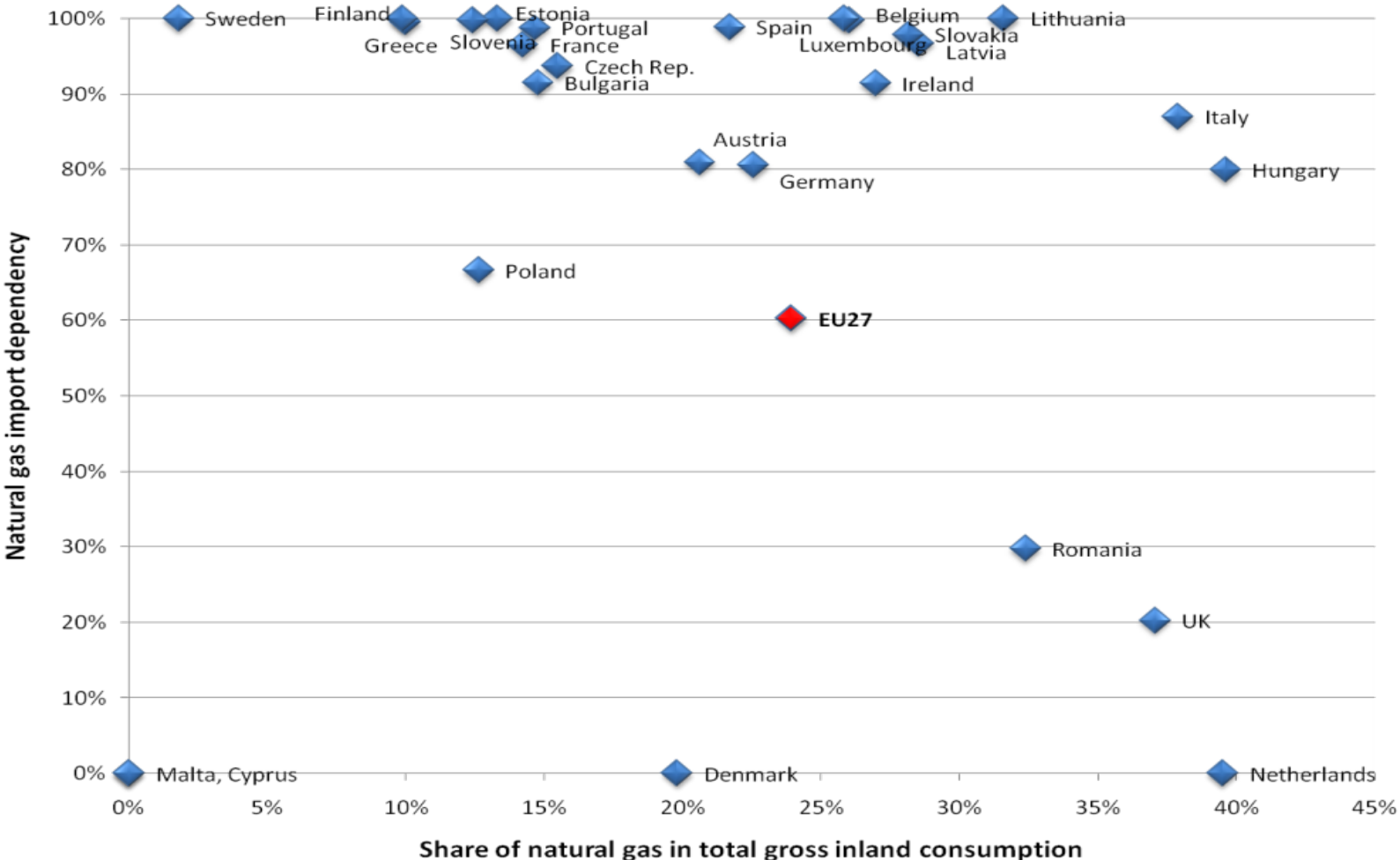
2009 gas crisis lessons

EU gas import requirement



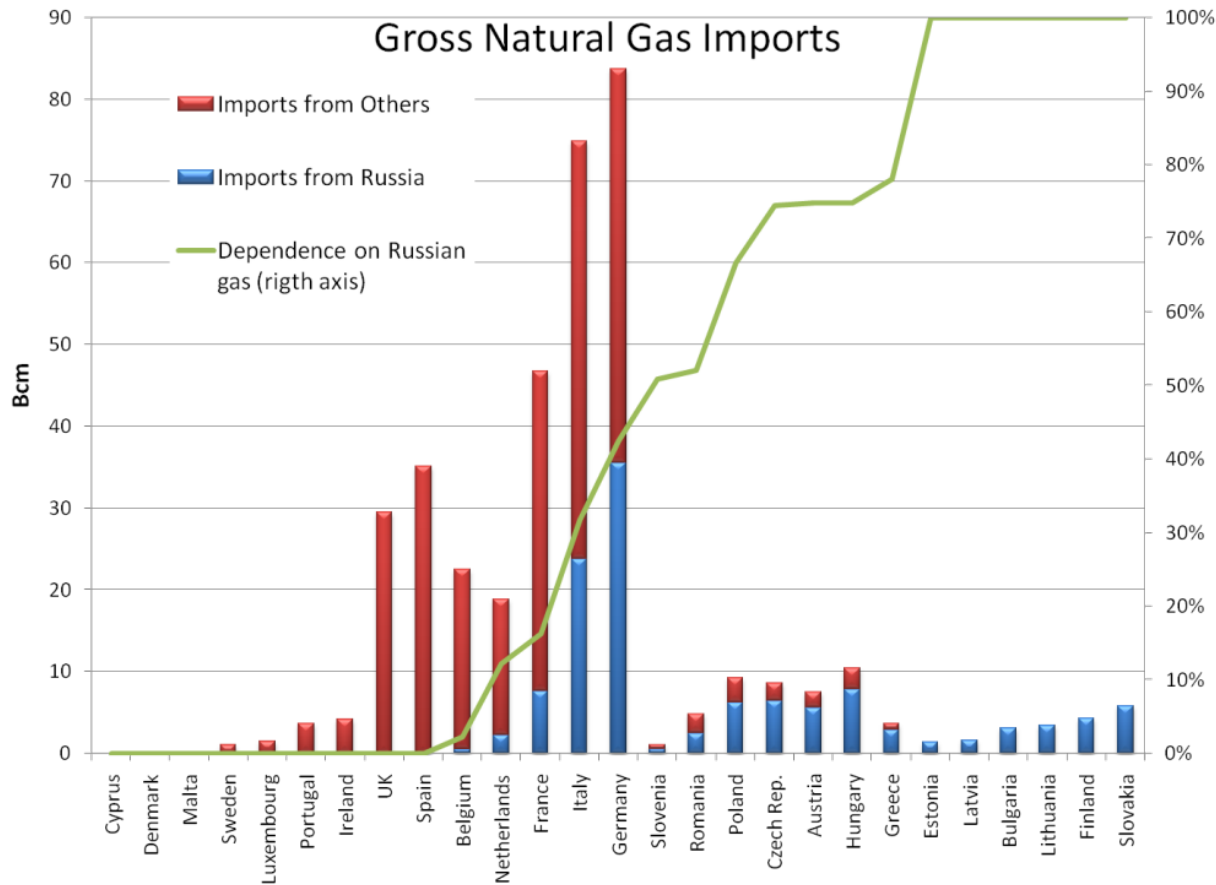
- EU imports more than 60% of its gas needs
 - Germany and Italy represent 40% of total EU gas imports
- Russia, Norway and Algeria account for 50% of EU gas supply in 2007

Natural gas dependency by country



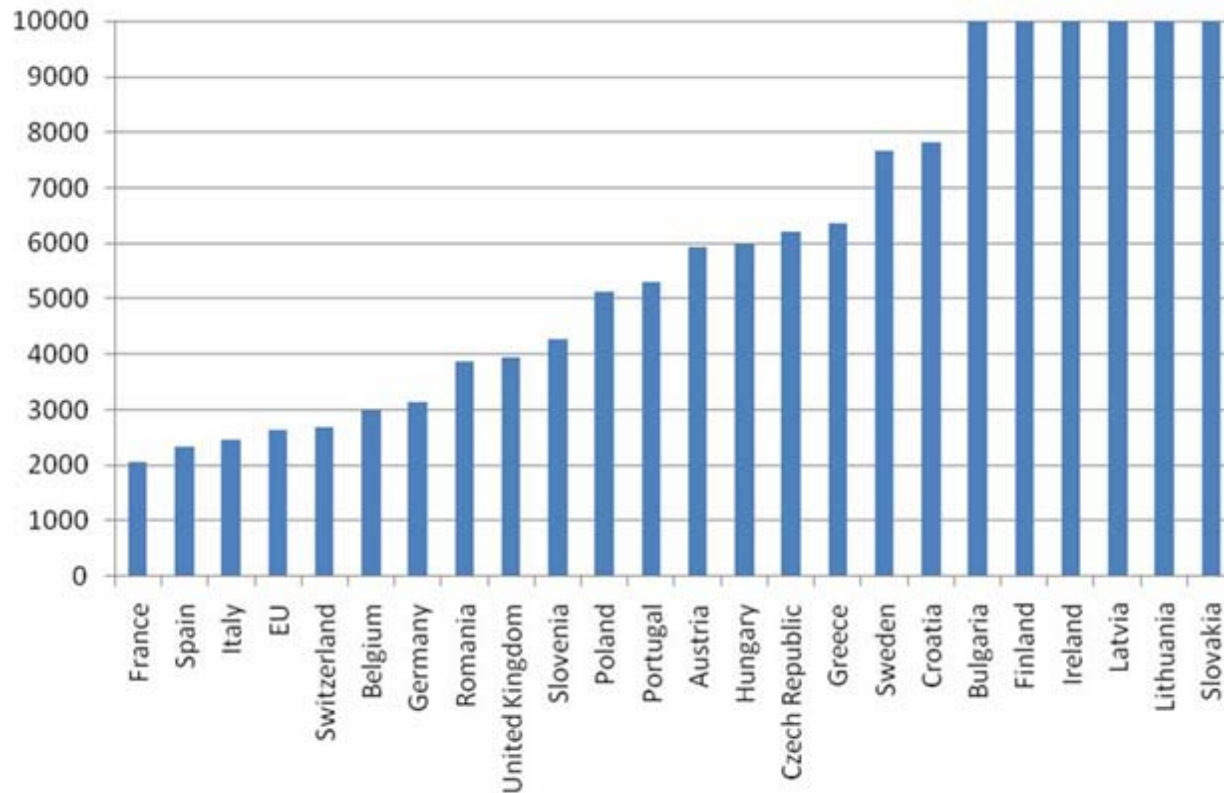
- Most EU countries rely more than 90% on gas imports, however share of gas in energy mix vary a lot between countries

EU dependency on Russian Gas



- Russian gas' share in EU gas demand: 30% in 2007
- Most of the New Member States depend on only one import source, Russia
- Largest importers have less concentrated import sources

Herfindahl-Hirschman Index for EU Gas imports in 2007



- Six EU countries depict a maximum HHI value
 - Of these countries all but Ireland receive their gas completely from Russia
- However dependency does not always entail vulnerability (i.e. Finland)

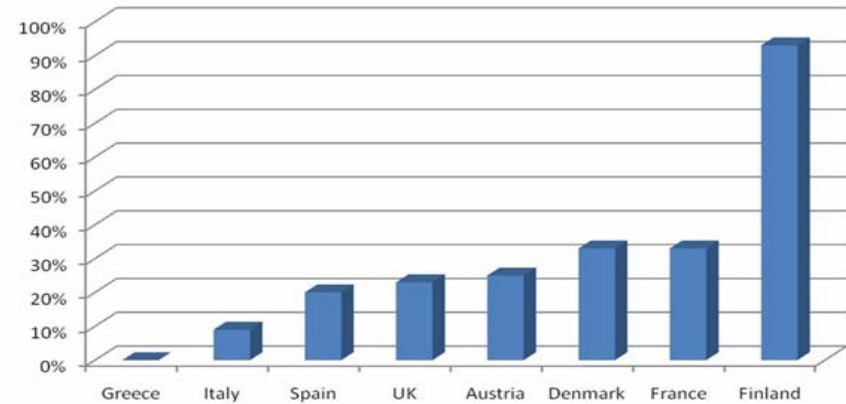
Risks to EU gas supply security

- Six main categories of potential risks to natural gas security can be distinguished:
 - Technical risks
 - (Geo)political risks
 - Regulatory risks
 - Economic and commercial risks
 - Environmental risks
 - Transit risks
- Internal dimension / external dimension
- Short term / long term
- Risk assessment vs. risk management

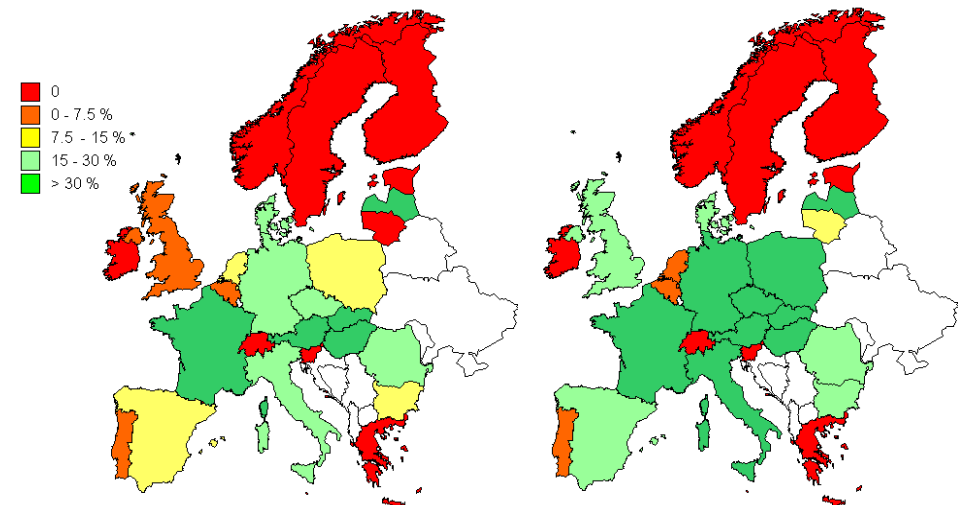
Options for mitigating gas supply disruptions

- Flexibility of Supply (not really possible)
- Flexibility of Demand
 - Interruptible customers
 - Fuel switch
 - National emergency measures
- Flexibility of Infrastructure
 - Gas storage (not enough)
 - Diversification of:
 - Supply sources
 - Routes (pipeline, LNG)
 - Internal EU gas networks (not sufficient)
- Dialogue and Cooperation

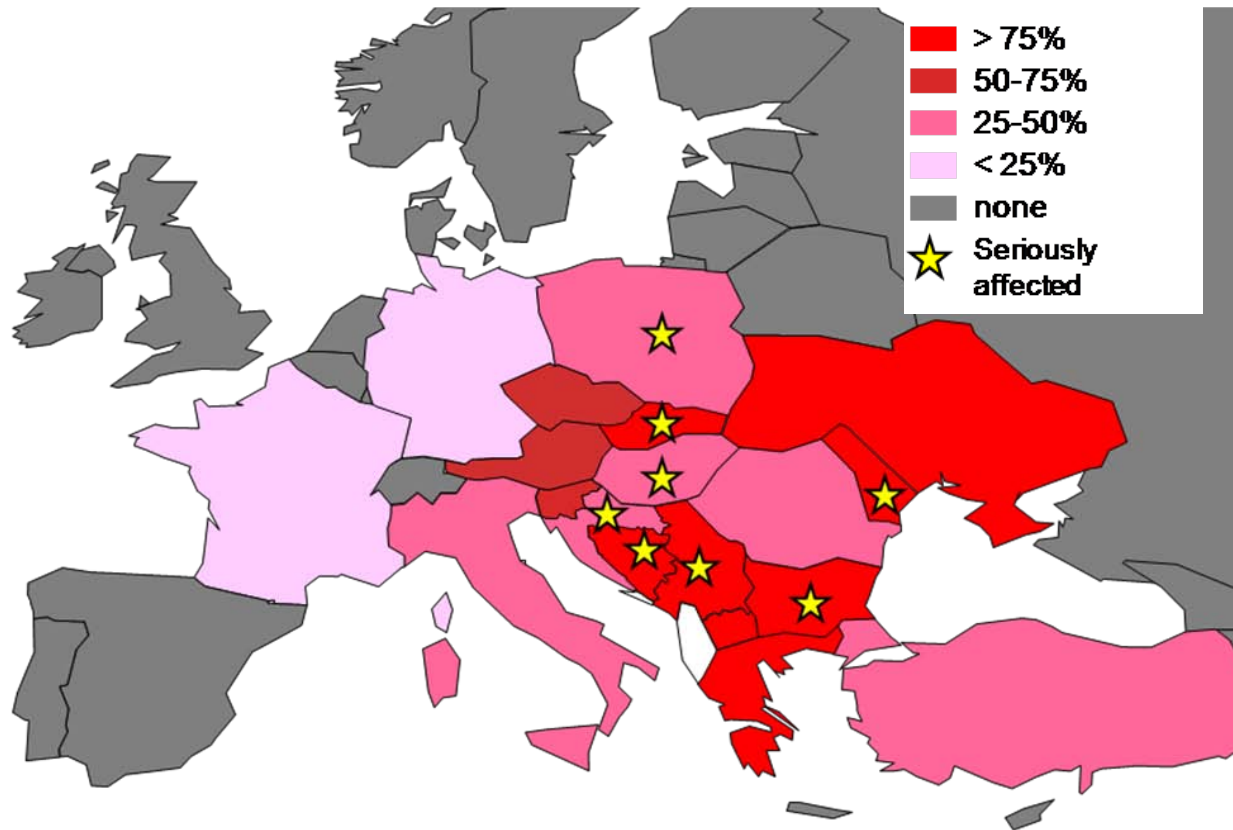
Level of Interruptible Gas Sales in Europe – CEER/Vitaly Protasov (2009)



Gas storage share of consumption in 2008 (left) / incl. all planned investments (right) – GIE, Ramboll and 2008 BP Statistical Review



The 2009 gas crisis



- Russian gas exports to 16 EU member states was drastically reduced on 6 January and cut completely from 7 till 20 January
- On 22 January gas flows to all European countries returned to normal levels

Lessons from the crisis and implications

- Severe impact on Eastern Europe
- Not sufficient storage capacity (not where needed)
- Lack of interconnection
- Countries with national emergency plans did better
- Needed more transparency
- Lack of contract flexibility and market competition
- Energy emergency regulation mostly outdated
- Fuel switch effective but reserves not sufficient
- Flow reversal successful but not possible everywhere
- Comeback of nuclear?
- Regional coordination of network access
- Strategic reserves?
- Solidarity
- Key role of private companies in mitigating the impact of the crisis

Concluding remarks

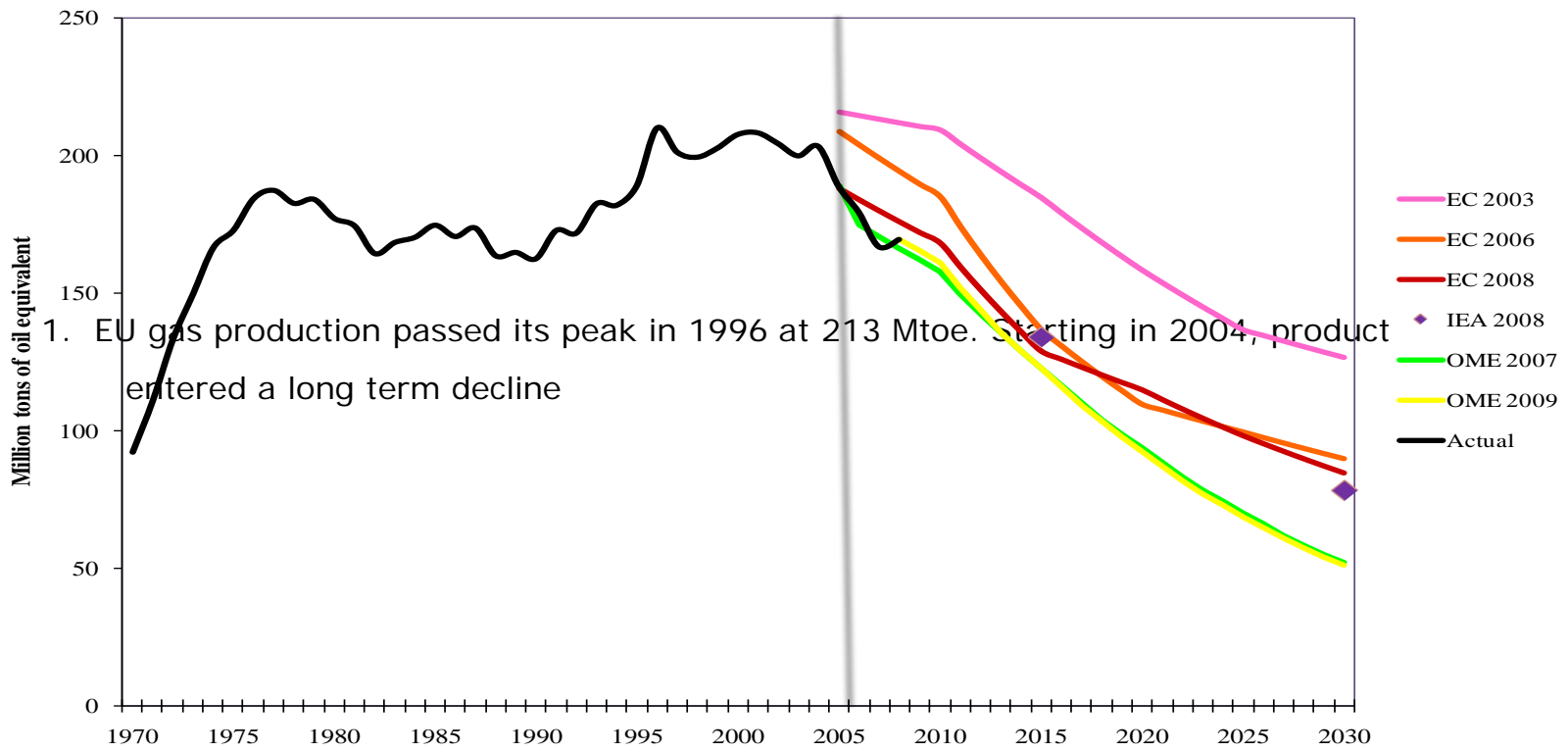
- European gas security faces serious challenges due to decreasing domestic production in parallel to increasing demand
- Natural gas security is not only a question of external dimension such as diversification of supply and sources and routes. Demand side and internal factors are at least as important
- There is no single response to supply disruption. Instead the solution is in the implementation of a set of forward looking policies and measures
- The 2009 gas crisis emphasized EU gas vulnerability and sensitivity to changes in gas supply
- Role of long term energy modeling in long term gas supply security must not be disregarded

Natural gas security of supply – SoS from an “external” point of view – Long term supply

Gas import requirement, uncertainties, import requirement, long term resources

Uncertainties about future gas import needs

EU gas production passed its peak in 1996 at 213 Mtoe. Starting in 2004, production has entered a long term decline

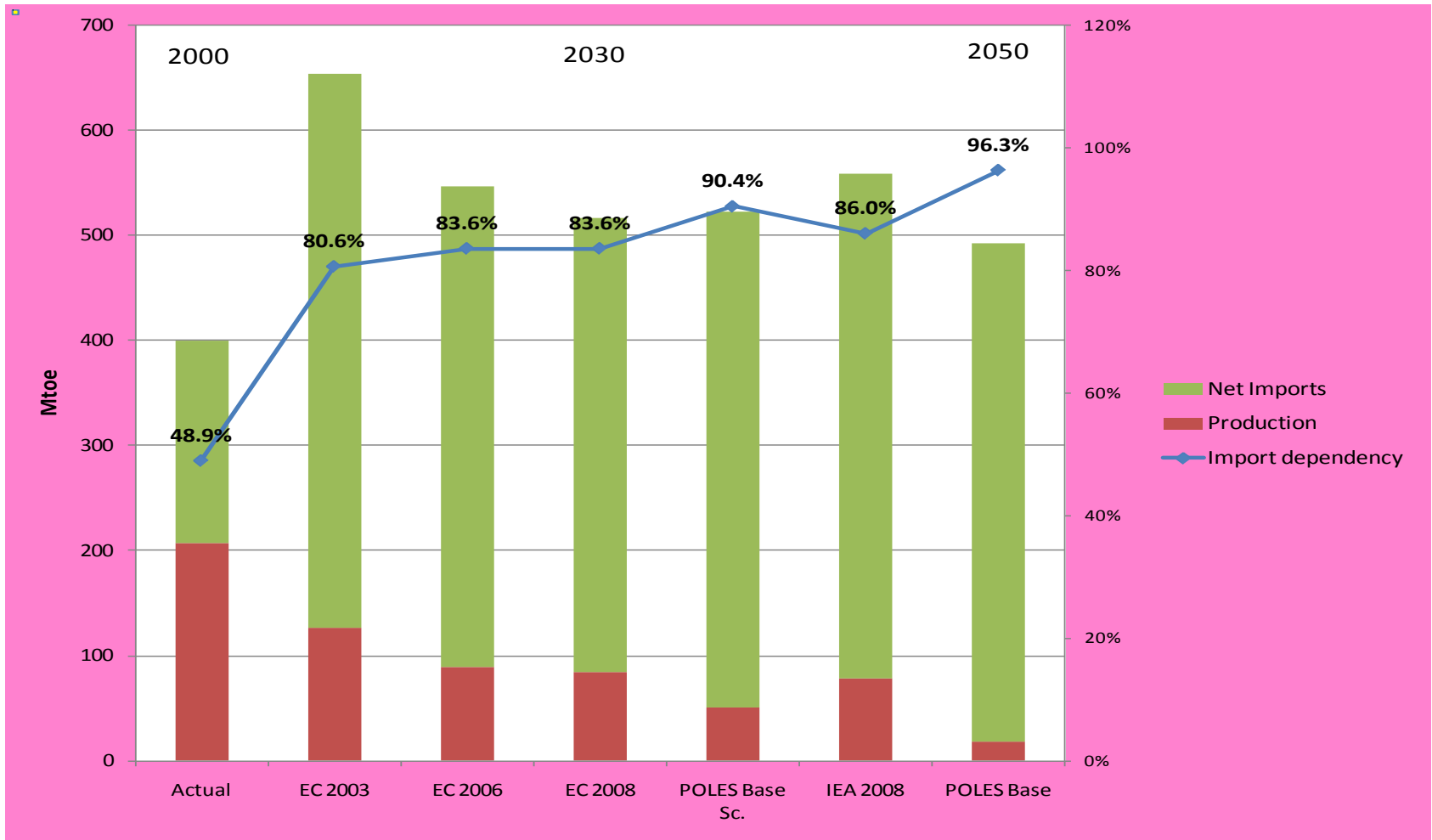


Uncertainties about future gas import needs

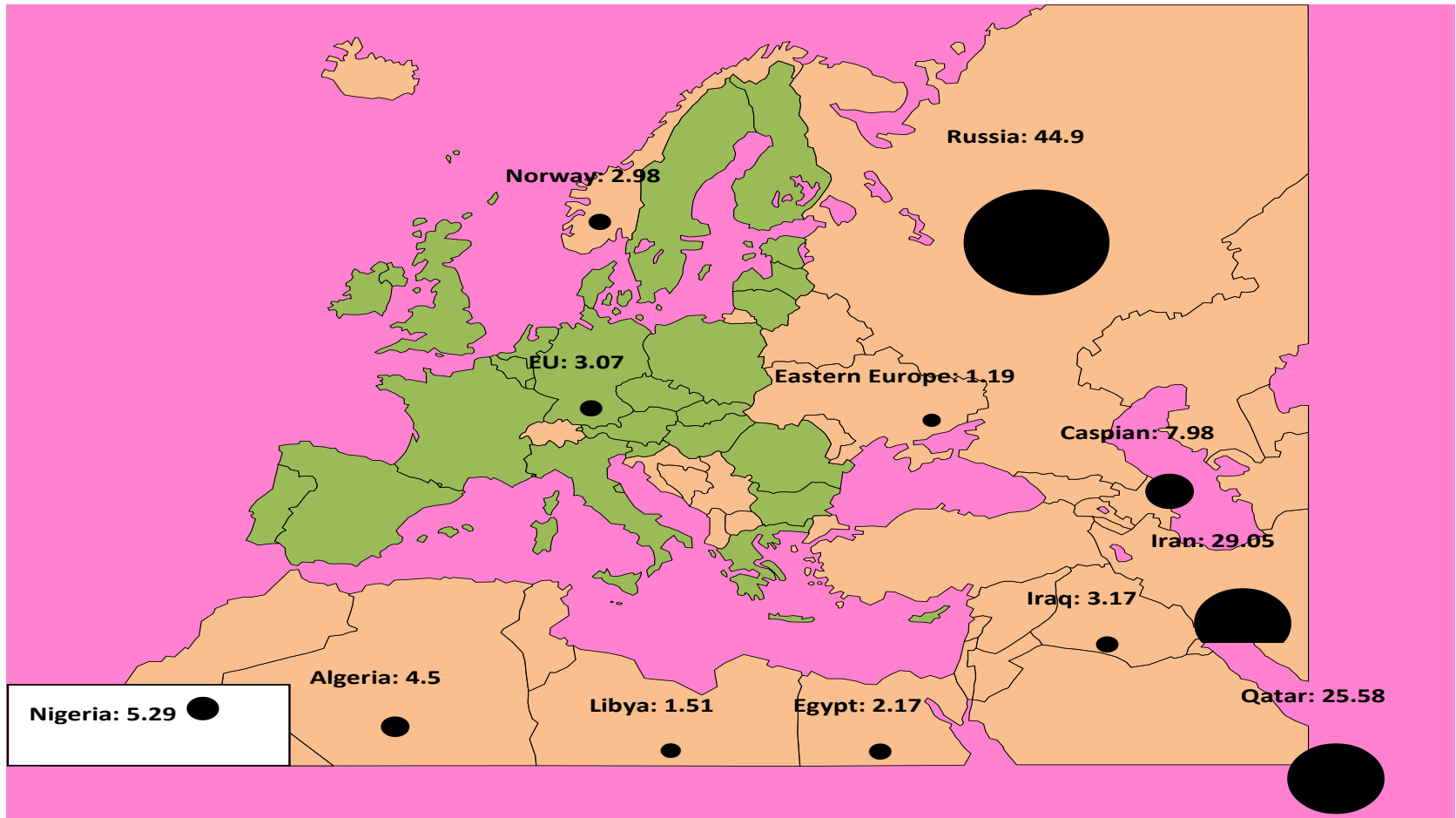
1. EU gas production passed its peak in 1996 at 213 Mtoe. Starting in 2004, production has entered a long term decline
2. Gas demand forecasts:
 - The EC and IEA forecasts over the past 5 years show downward revisions
Mainly due to the use of natural gas in power generation
3. Volatility of energy prices
4. Transit issues
5. EU's energy policy (20/20/20 targets)
6. Worldwide financial and economic turmoil

All these have profound implications on future import needs

EU natural gas demand and import dependency 2000 vs. 2030 and 2050



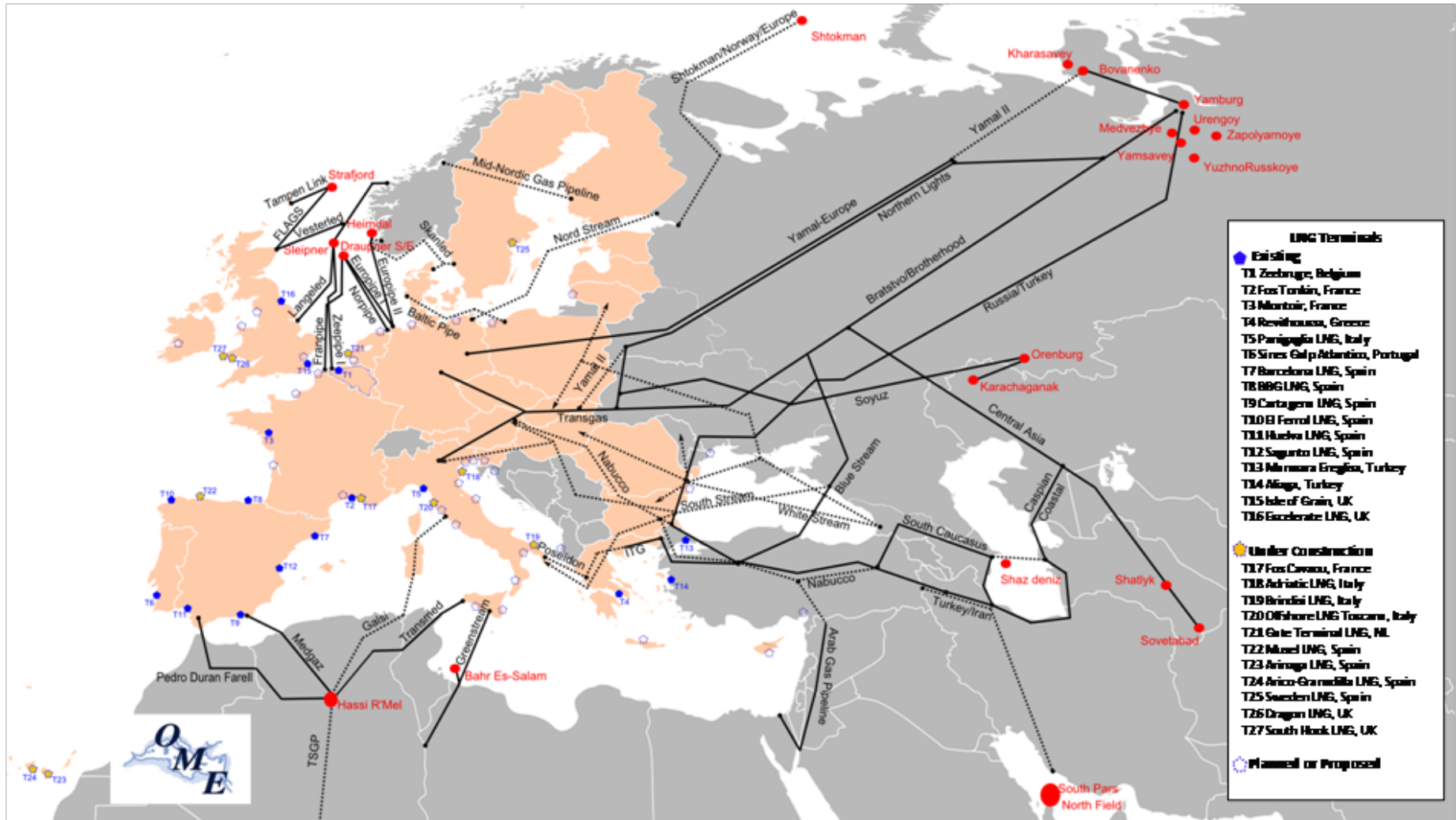
More than 80% of world gas resources are within reach of Europe



Concluding remarks on gas supply situation

- Today five countries export gas to EU Member States by pipeline.
- Combine technical capacity ~400 bcm/y at yearend 2009.
- If all pipeline projects materialize, total gas import capacity of the EU would increase 50% by 2020.
- At the of 2009, EU total LNG regasification capacity is about 150 bcm/y.
- Several other LNG import facilities will come on stream over the next decades, at least doubling the current capacity.
- This means: Current EU gas import capacity could double by 2030, compared to 550 bcm/yr at yearend 2009 . Well above the estimated import requirement of the EU.

Natural gas import infrastructure in the EU



LNG Terminals	
●	Existing
T1	Zeebrugge, Belgium
T2	Fos Tonkin, France
T3	Milnport, France
T4	Revithoussa, Greece
T5	Panigaglia LNG, Italy
T6	Sines Galp Atlantic, Portugal
T7	Barcelona LNG, Spain
T8	BBOG LNG, Spain
T9	Cartagena LNG, Spain
T10	Ferrol LNG, Spain
T11	Huelva LNG, Spain
T12	Sagunto LNG, Spain
T13	Marmara Ereğli, Turkey
T14	Aliaga, Turkey
T15	Isle of Grain, UK
T16	Escondido LNG, UK
●	Under Construction
T17	Fos Cavaux, France
T18	Adriatic LNG, Italy
T19	Brindisi LNG, Italy
T20	Offshore LNG Toscana, Italy
T21	Gate Terminal LNG, NL
T22	Mixed LNG, Spain
T23	Avinaga LNG, Spain
T24	Alicante-Granada LNG, Spain
T25	Sveasby LNG, Spain
T26	Dragon LNG, UK
T27	South Hook LNG, UK
○	Planned or Proposed

Concluding remarks

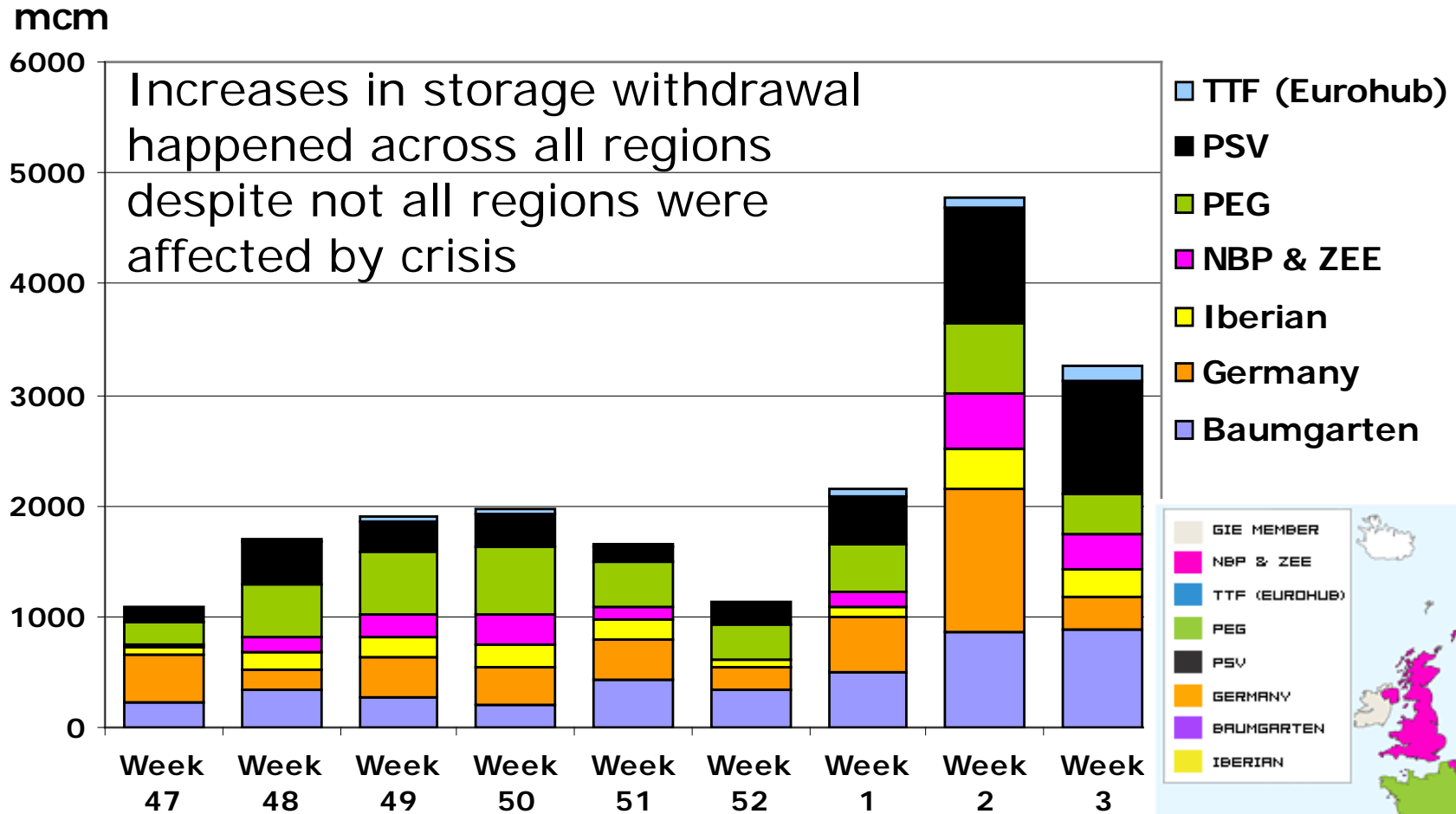
- There is enough gas around Europe to secure the EU gas supply to 2030.
 - Question relates to investment in upstream sector and infrastructure development in supplier countries to achieve the desired production.
- But what about after 2030?
 - Will the EU be prepared for a post gas peak in most of its current suppliers, and how?
- Gas security has to be addressed in a global perspective, and throughout the gas chain.
- Need promoting healthy relations between producers, consumers and transit countries AND between national and international companies.

Natural gas security of supply – EU internal market focus

Historical evidence of market mitigation of natural gas security of supply

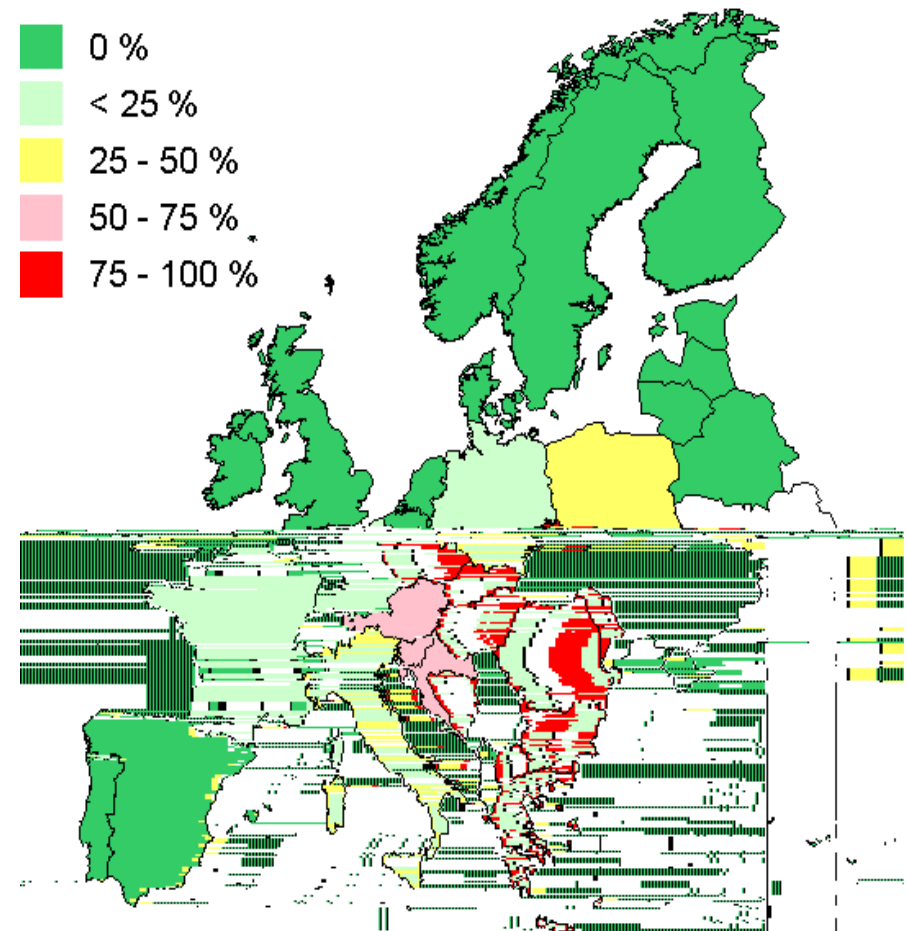
Gas market and SoS coordination and integration

Evidence of coordination and integration - Weekly withdrawal from storages during Ukraine crisis



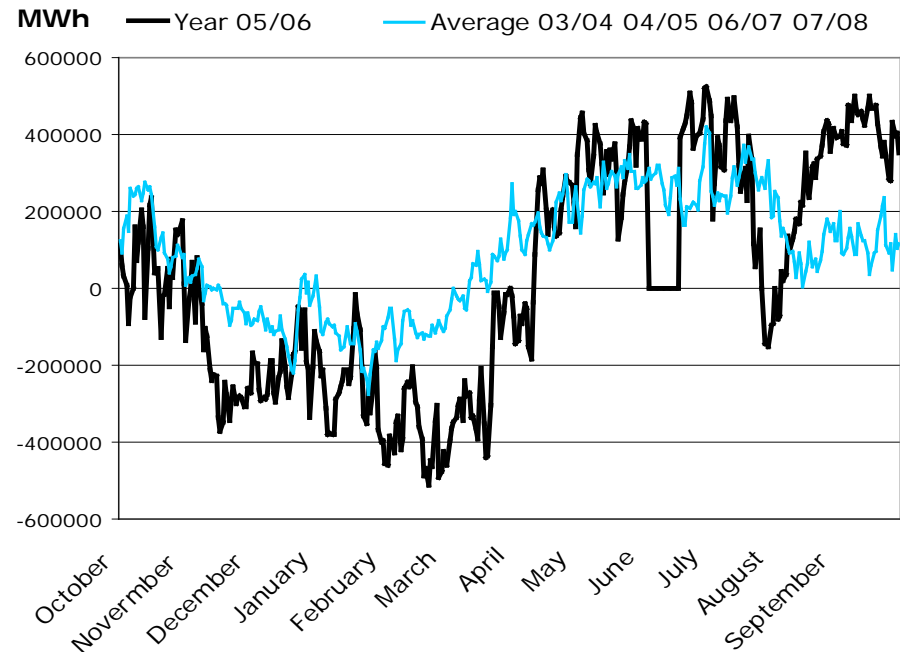
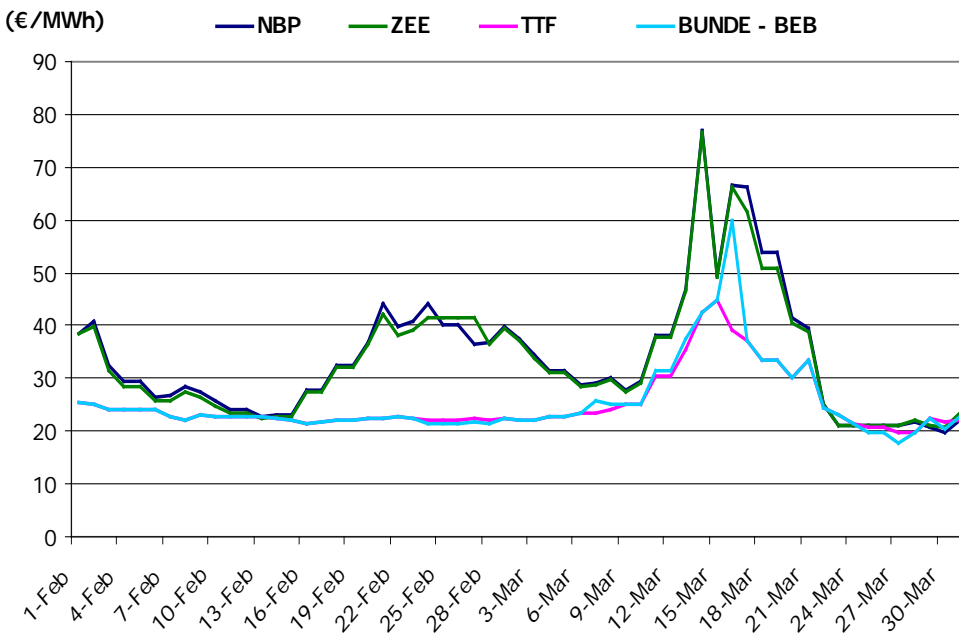
Ukrainian gas crisis followed financial crisis and warm fall/winter

- October - December 2008 was a relatively warm period heat degree days only at 0,94 compared to average of 1
- Consumption in October – December had been lower in Europe 13,4 BCM in EU 27 and 9,4 BCM in EU15

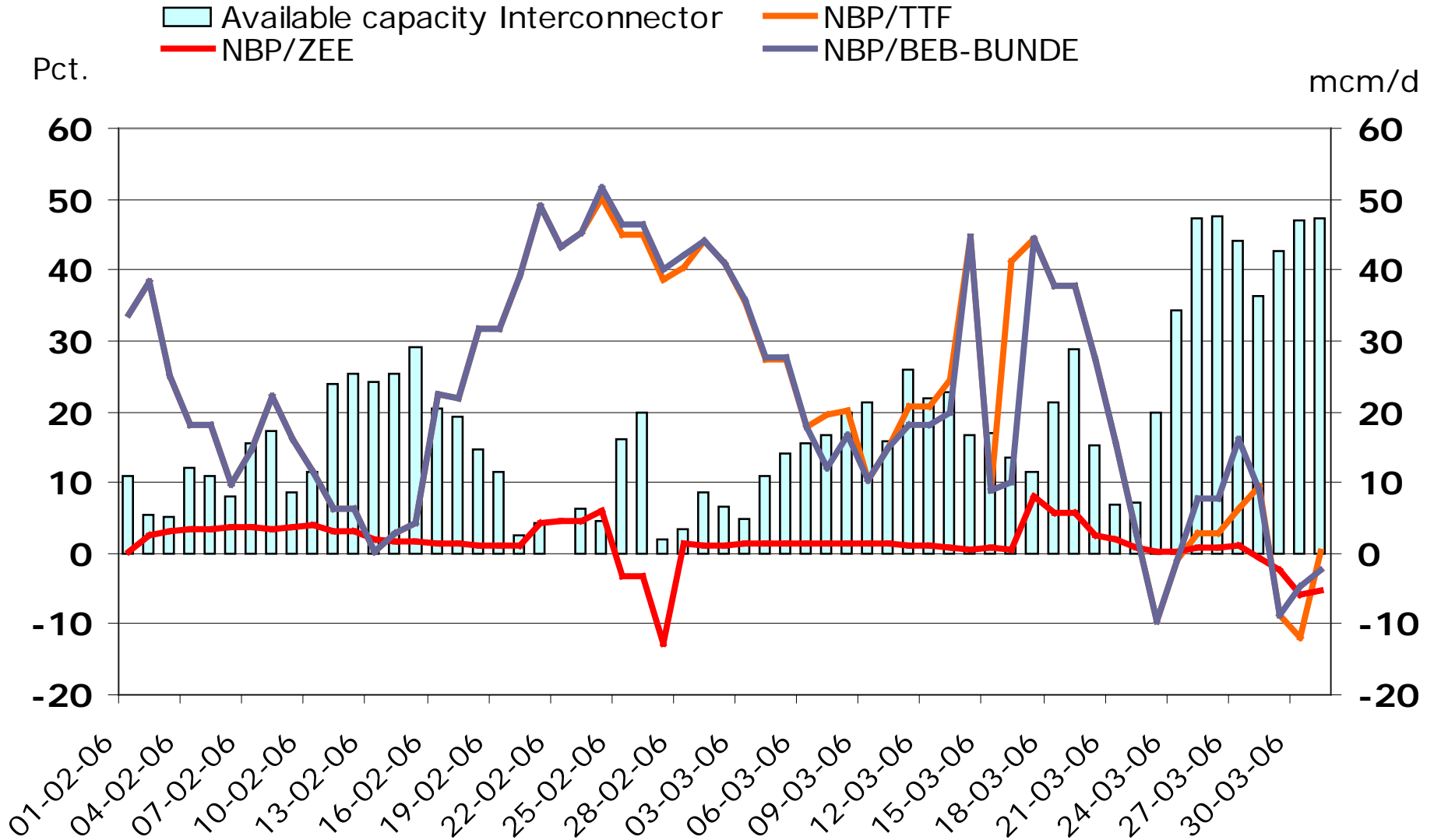


Rough fire

- Natural gas prices increased in UK
- Gas fired power generation switched away from gas
- Increased import flows towards UK



Market reaction Rough fire



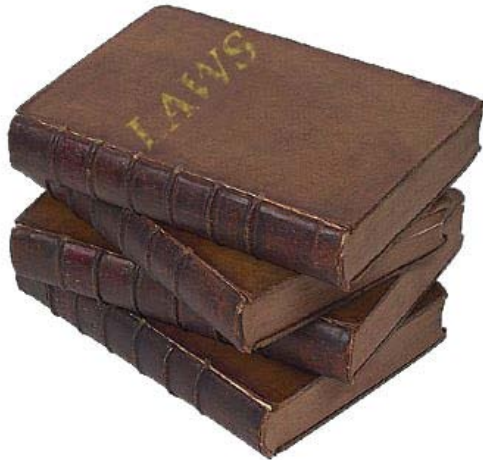
How are coordination issues within the EU regarding market and SoS handled?



Legislation

EU market directives

- 2009/73/EC
- 2003/55/EC
- 98/30/EC



RAMBOLL

SoS directives and regulations

- 2009 Proposal for a regulation concerning measures to safeguard security of gas supply
- 2004/67/EC

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Background for
2004/67/EC, Europa.eu

Market imperfections in relation to SoS

- Markets do not know the true costs and risks adhered to SoS
 - Do not know the total costs.
 - Some do not even know their own costs. (DK)
- Markets value future events lower than governments
 - Quicker depletion rates of resources.
 - Lower value of SoS measures.
- Markets require unbundling – SoS prefers vertical integration
- Some SoS tools are counterproductive for markets e.g.
 - Strategic storage

Investment decisions – markets?

- EU internal investment decisions
- Market can make more informed decisions
 - Rules about access, tariff, exemptions etc.
 - less uncertainty
- EU external investment decisions
 - More uncertainties
 - Overall EU policy
 - Coordination with producer investments
- EU play a more active role in third country infrastructure investments



Emergency supply – 2 approaches

UK

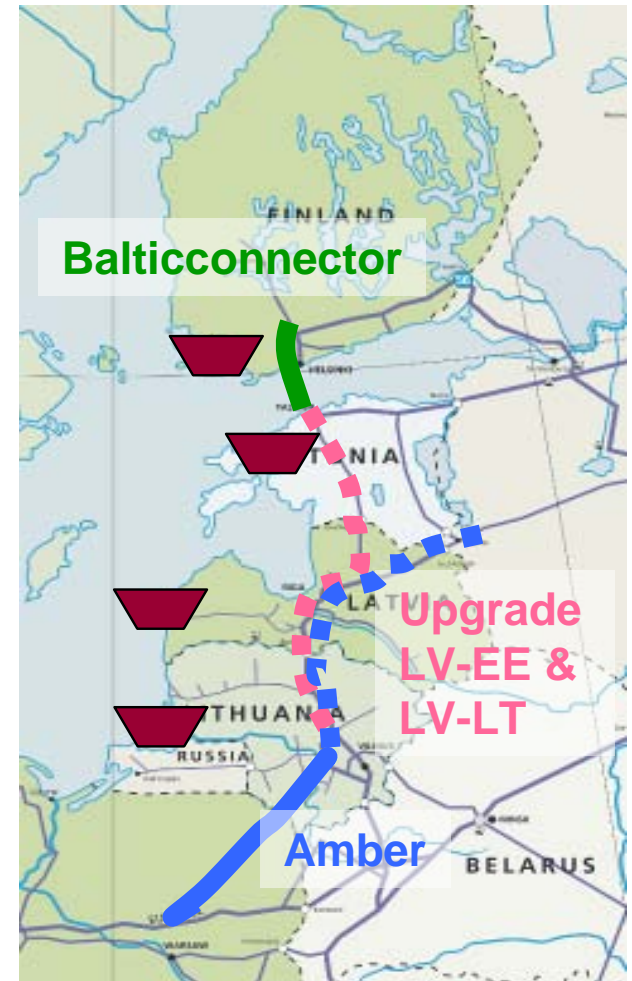
- Market based approach
- Market prices as signals for demand cuts and supply increases
- Fast depletion rate
- Interruptible contracts
- Price depended interruptible contracts
- Cash-out principle
- Fuel switching

Netherlands

- Peak supply
- Groningen production cap
- Small fields policy
- Slow depletion rate

Baltic countries market/SoS - conflicting interests or?

- Improving markets would also lead to improved SoS.
- However relatively expensive investments compared to market size and costs of Russian imports.
- Investments only to be financed by market considerations – not feasible.
- Investments financed by Market and SoS – feasible?
- Should rules about tariffs allow for financing of SoS? => Increased integration of market directive and SoS regulation?



The internal market and Ukraine/Russia challenge

- Does the internal market present any solutions in regards to the Ukrainian/Russian problem?
- Integration of Ukrainian network in internal gas market?
- Ukraine partnership on energy, adoption of the energy acquis, ECT.
- Point of gas delivery Ukraine border instead of EU border? (Strongly opposed by Russia)
- EU-Russia Early Warning Mechanism



Challenges for long term contracts?

- EU importers may be keen on a new Russian/Ukraine conflict.
 - Russian import prices are probably twice the price of available gas at international markets.
 - Advantage to loose binding restrictions of take or pay clauses.
- Still lacking reverse flow and diversification, thus replacing Russian gas is only an option for the Western gas markets.
- The last crisis pushed focus on reverse flow and thus also helped improve markets.
- Renegotiations of long term contracts, arbitrage issues – SoS issue?
- Short term gains could be induced at long terms costs due to e.g. increased uncertainty in the long term!

International coordination and cooperation

EU legislation and SoS in relation to:

- The role of international treaties
 - Energy Charter Treaty.
 - Treaty of the Energy Community, requirement to adhere to the market directive but not to the SoS directive or regulation
- The role of EU negotiations, bilateral agreements and a common approach to SoS e.g.:
 - Dialogue with Norway about future investments.
 - Dialogue with Russia and Ukraine in the tripartite forum.



The EU, internal market for gas and long term solutions

- Gas import routes – market decisions or political decisions
- EU negotiations and discussions with third parties?
 - Caucasus
 - Russia
 - Norway
 - Qatar
 - Iran
 - Saudi Arabia
 - United Arab Emirates
 - Nigeria
 - Etc.



Possible future actions

- Coordinate market and SoS on legislative levels, long and short term and with external relations
 - Set out clear policies and legislative framework for market provision of SoS
 - Think market development, liberalisation and SoS as one package? Fourth package
 - Use EU negotiations and politics for ensuring framework long term SoS – incorporate market when implementing e.g. investments
 - ENTSO and ACER involvement in SoS
- Natural gas in the EU as an integrated approach
- Reverse flow – enable markets to function optimally
 - Strengthening price signals, market hubs, trading etc.
- Ensure proper conditions for market provision of SoS but acknowledge the markets shortcomings in relation to SoS

Thank you