An Embargo of Russian Gas…
…and its Effects on Security of Supply in Europe

Harald Hecking

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Energiewirtschaftliches Institut der Universität zu Köln
Russian gas is essential to European gas supply...

Imports from Russia in % of total gas consumption in 2013

- 100%
- 75 - 100%
- 50 - 75%
- 25 - 50%
- < 25%
- None

... but assessing security of gas supply is more complex.

- Pipeline interconnections
- LNG supplies
- Gas storage
- Long-term supply contracts
- Time structure of supply and demand

Computer simulation of daily gas flows

TIGER
Main Assumptions

- **Embargo**
  - Starts on 1\textsuperscript{st} of November 2014
  - Simulation of different durations (1, 2, … months)

- **Gas demand**
  - Gas demand equal to 2013
  - Correction for outliers (e.g. March 2013)

- **Gas production**
  - Gas production capacity equal to 2013
  - Correction for lower Groningen field production
  - Norway can increase production by 5 bcm/a

- **Gas storages**
  - Storage level at 100% on 1\textsuperscript{st} of November 2014
  - Refilling level at 85% on 1\textsuperscript{st} of November 2015

- **LNG**
  - LNG imports by Europe in 2013 at ~50 bcm/a
  - 45 bcm/a of additional LNG available during crisis
How would European infrastructure compensate for missing gas from Russia?
How would Europe compensate the embargo of Russian gas? Storage, Pipeline flows and LNG Regasification, Nov-Apr (no embargo)
How would Europe compensate the embargo of Russian gas?

Storage, Pipeline flows and LNG Regasification, Nov-Apr (6-month embargo)
Which countries would suffer from supply shortfalls?
What is a supply shortfall?

Supply shortfall = Usual demand not served

Lower gas demand because of higher prices

Supply curtailment
Which countries would suffer from supply shortfalls?

Supply shortfall by country (% of annual demand)

- > 50%
- 25 - 50%
- 10 - 25%
- 5 - 10%
- < 5%
- full supply

Disruption: 3 Months
Nov - Jan
Which countries would suffer from supply shortfalls?

Supply shortfall by country (% of annual demand)

- > 50%
- 25 - 50%
- 10 - 25%
- 5 - 10%
- < 10%
- < 5%
- full supply

Disruption: 6 Months

Nov - Apr
Which countries would suffer from supply shortfalls?

Supply shortfall by country (% of annual demand)

- > 50%
- 25 - 50%
- 10 - 25%
- 5 - 10%
- < 10%
- < 5%
- Full supply

Disruption: 9 Months
Nov - Jul
Supply shortages in select European countries for different durations of an embargo
Two drivers are crucial for these results

- LNG imports by Europe have to increase by 45 bcm/a
- Storage refilling for winter 15/16 max. 85%
  (9 months embargo: max. 70%)
How would LNG imports help to overcome the supply crisis?
How much LNG could Europe purchase on the world market?

- 75% of global LNG volume (320 bcm) is sold in long-term contracts
- European importers have long-term contracts of ~ 85-95 bcm of LNG
- In 2013, Europe imported roughly 50 bcm of LNG
The more LNG the better… but LNG does not compensate missing Russian volumes entirely
What is the role of storages during an embargo?
The shorter the disruption…
…the more helpful is gas storage.
Lower refilling implies better supplies in winter 14/15… but at the cost of secure supplies in winter 15/16?
What would be the effects of a cold spell during the embargo?
What would be the effects of a cold spell in February?

Supply shortfalls during a six month embargo (% of weekly demand)

- > 50 %
- 25 - 50 %
- 10 - 25 %
- 5 - 10 %
- < 5 %
- full supply

First week of February (normal weather)
What would be the effects of a cold spell in February?

Supply shortfalls during a six month embargo and a cold spell

First week of February (cold spell)

- > 50%
- 25 - 50%
- 10 - 25%
- 5 - 10%
- < 5%
- full supply

What would be the effects of a cold spell in February?
Conclusion

• A disruption of Russian gas would be an extreme situation for the European gas infrastructure

• Reverse flows, extensive storage usage and increasing LNG imports could dampen the effects

• The duration of the embargo is crucial

• Gas storage is helpful to overcome shorter disruptions

• Increasing LNG imports is essential, but LNG prices may increase significantly

• However, some countries will be in trouble anyway
Thank You for Your Attention
Any Questions or Remarks?

Harald Hecking
Institute of Energy Economics at the University of Cologne (EWI)
Alte Wagenfabrik
Vogelsanger Str. 321a
50827 Cologne, Germany
Tel. +49 – 221 27729 0