

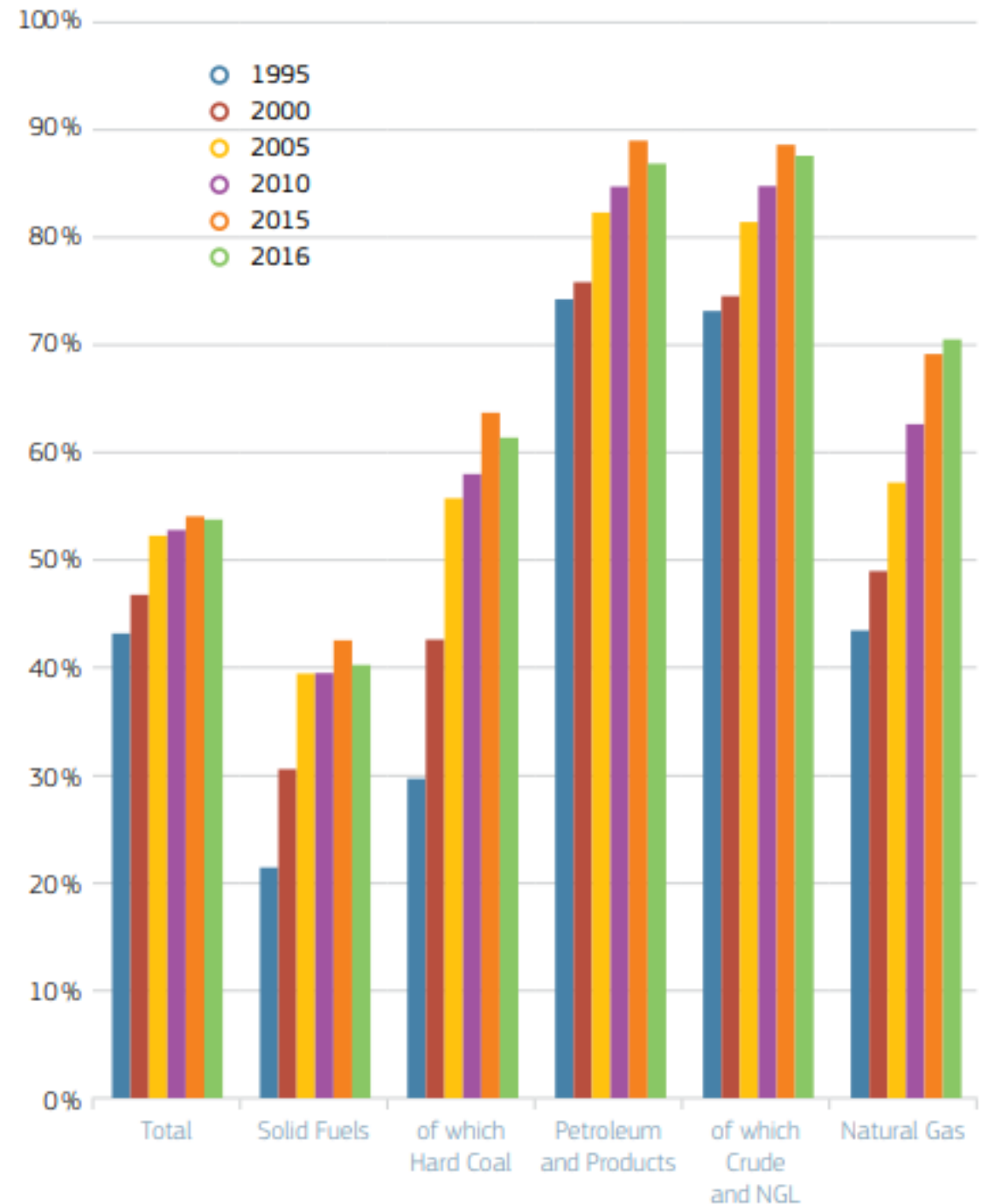
External dimension of the EEP

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EU28 import dependence

External dimension should:

- Secure stable and reliable supplies of energy at affordable prices.
- Improve relationship between consuming countries, producers and transit countries.
- Strengthen the negotiating position of the EU by 'speaking with one voice'.



Security situation in general

- Import dependency fluctuates between 52% and 55% between 2005 -2014.
- In 22 MS, net import dependency decreased in this period due to the RES (Austria, Estonia, Ireland, Italy, Latvia, Portugal, Spain) and decreasing consumption.
- In some others increase due to the decreasing domestic production (Denmark, Poland, UK) or closure of nuclear plants (Lithuania).

= While import dependency on fossil fuels has been increasing, their share within the energy mix is gradually decreasing.

Coal security and supplies

- Main source for electricity. Environmental problems (CCS), problems with state aid.

Hard coal

- Net import dependency for hard coal 55.7% in 2005 and rose to 67.9% by 2014.
- During this period indigenous production fell by nearly 40%.
- Net import stable, but accounts for a growing proportion of consumption.
- The Czech Republic the only net exporter in the EU.
- In 2014, even Poland, the EU largest coal producer, became a marginal net importer.

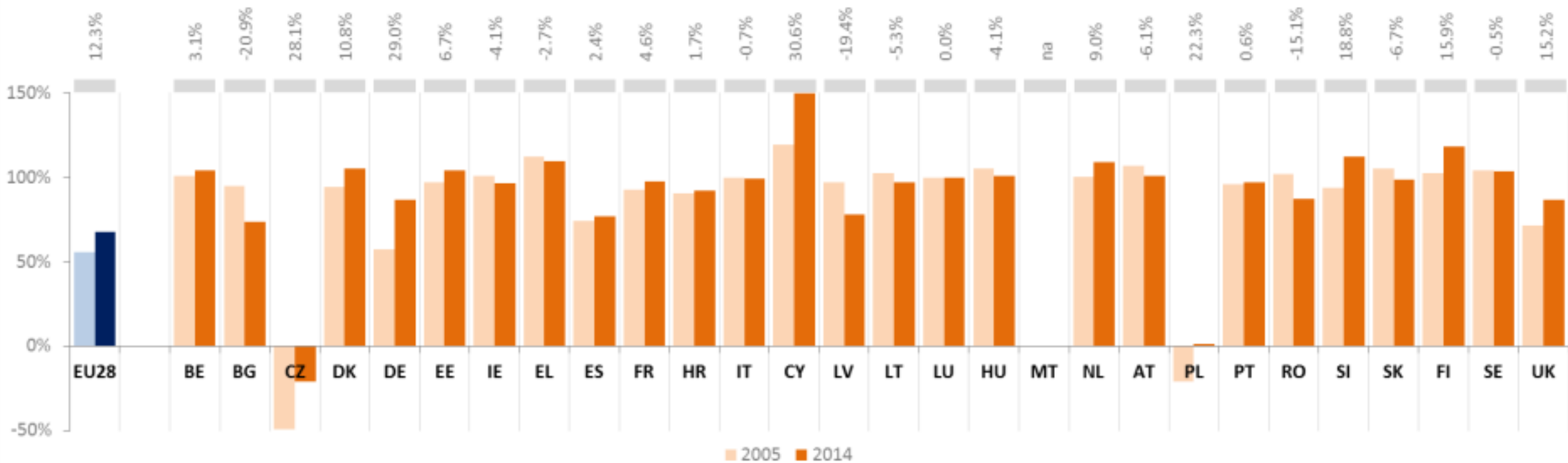
Brown coal

- Not traded internationally, imports to EU negligible. Indigenous production.

= not a security issue.

SoS1 - A3: net import dependency - Hard Coal

absolute change 2005-2014 [pp]

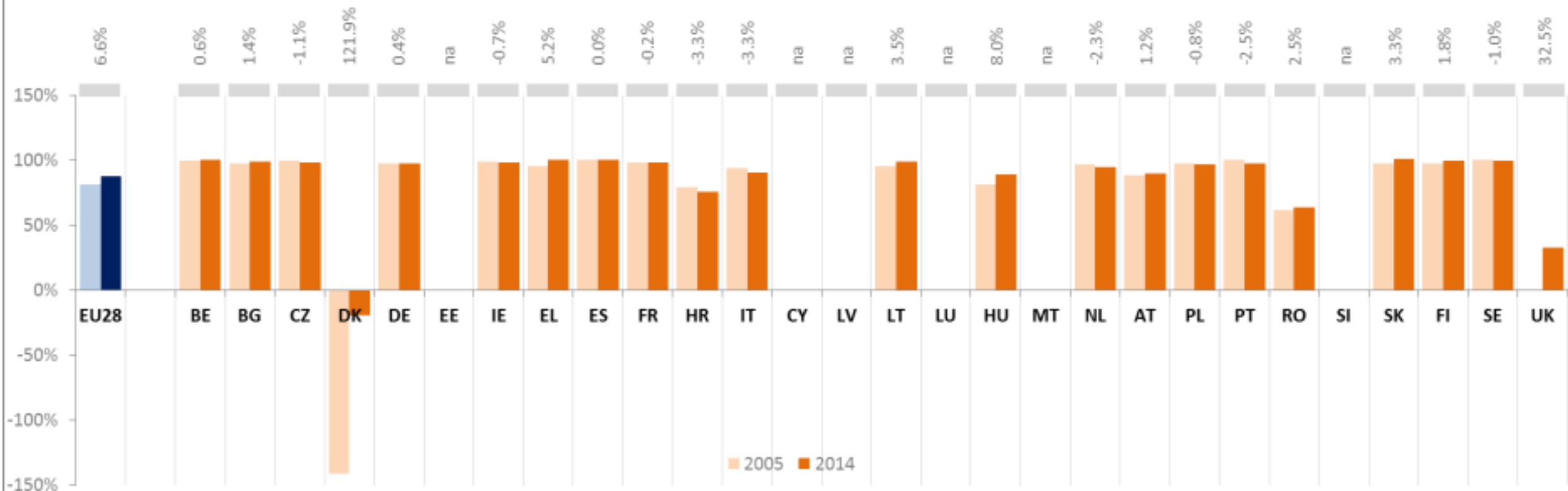


Oil security and supplies

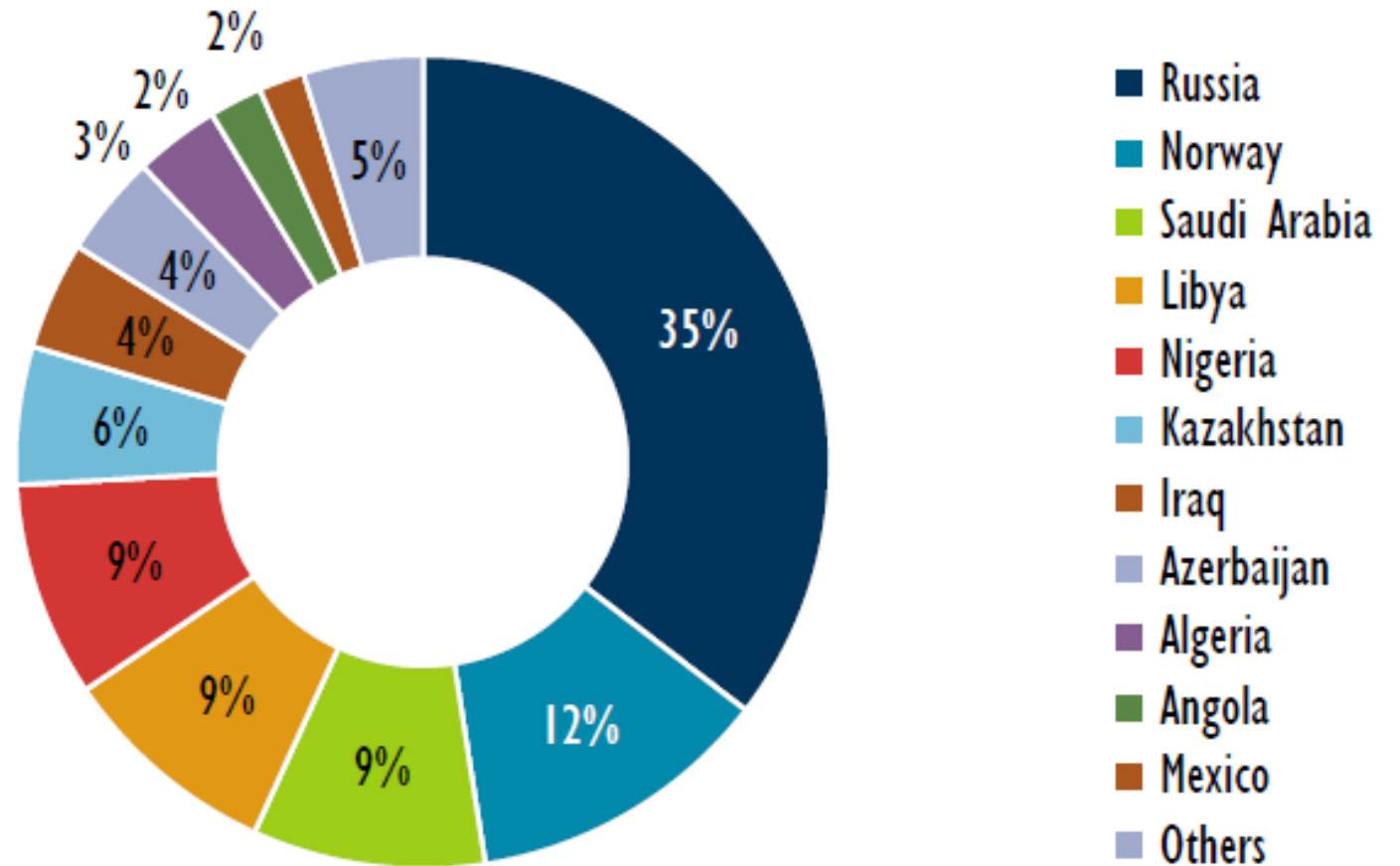
- Dependency increased from 81.3% in 2005 to 87.9% in 2014. In this period indigenous production fell by almost a half.
- Due to the falling consumption decreasing, imports are still covering a growing proportion of demand.
- Difficult to replace (transportation, petrochemistry)
- = **oil considered as a (limited) security** (dependency on exporting countries) **problem.**
- Also problem of competitiveness – European refineries face substantial restructuring (low margins and low utilisation rates) - decreasing regional demand and increased competition from Middle East, Asia, USA (EU imports diesel and jet fuels, exports gasoline)
 - 15 of them closed between 2008-2014 – 8% decrease in processing capacity of the EU.

SoS1 - A2: net import dependency - Crude oil and NGL

absolute change 2005-2014 [pp]



Imports of crude oil to the EU by country of origin, 2012



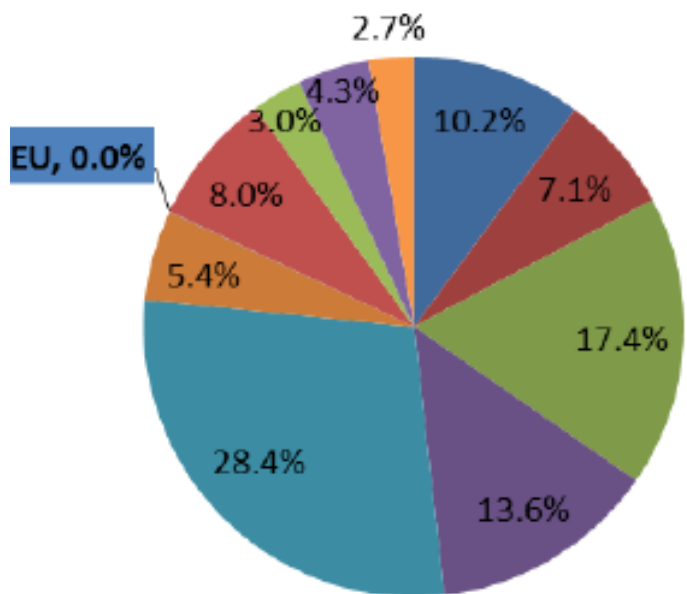
Source: Eurostat, May 2014

Nuclear security and supplies

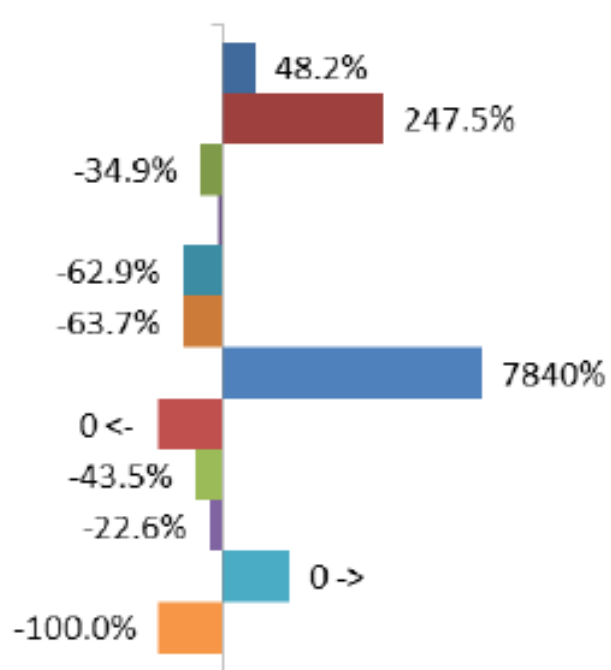
- In 2015 128 reactors in 14 states. In France, Hungary and Slovakia nuclear provide more than 50% of electricity.
- In 2015, 90% of the natural uranium came from outside of the EU. 39% from Russia.
- Nuclear energy **not considered a security problem:**
 - Diversification of supplies.
 - Mining (1/2 half of the production from Canada, Australia, Niger, Kazakhstan, Russia, Namibia) and yellow cake production.
 - Enrichment (to raise the proportion of the uranium-235 isotope). Countries with nuclear-bomb technology.
 - Fabrication.
 - High energy content of fuel – Temelin (2x1055MW) – about 4m²/y.
- Megatons to Megawatts.

Purchases of Natural Uranium by EU utilities by origin, 1992-2014 (tU)

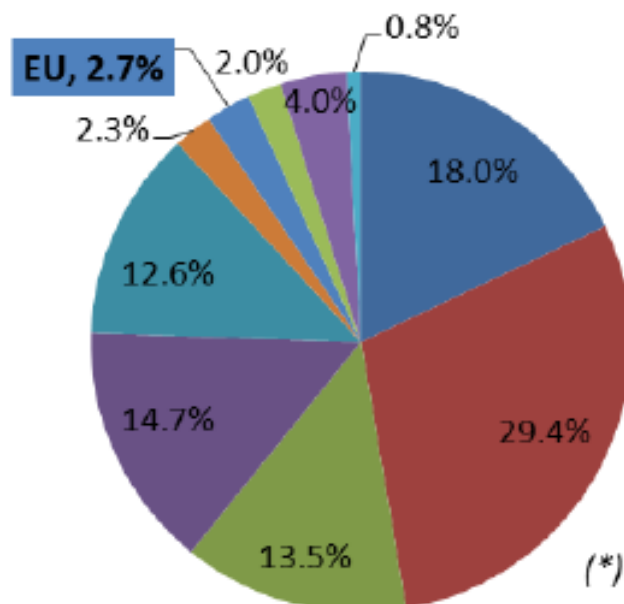
2005



change 2005-2014



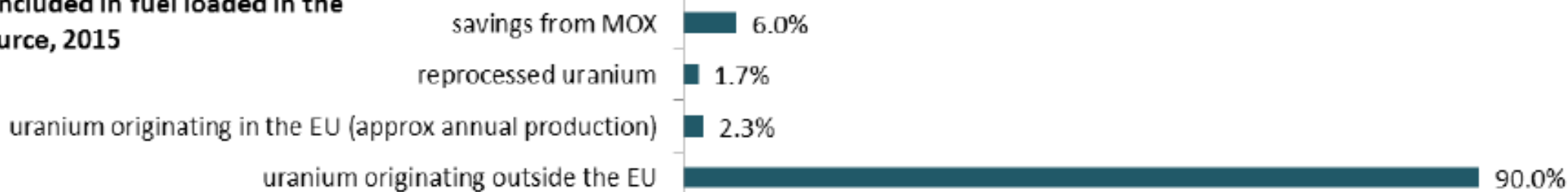
2014



- Russia
- Other CIS
- Australia
- Niger + Gabon (*)
- Canada
- South Africa + Namibia
- EU
- Heu feed (**)
- Other + undetermined
- USA
- Malawi
- Re-enriched tails

(*): Gabon has ceased uranium production since 1999
 (**): HEU=highly enriched uranium

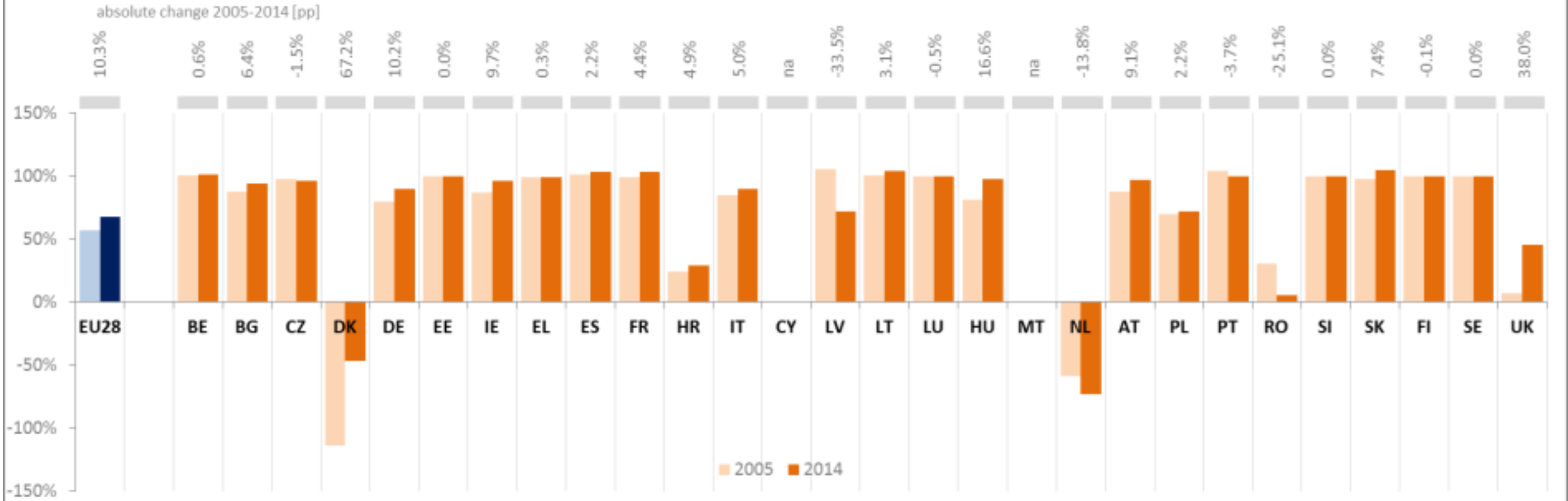
natural uranium included in fuel loaded in the EU reactors by source, 2015



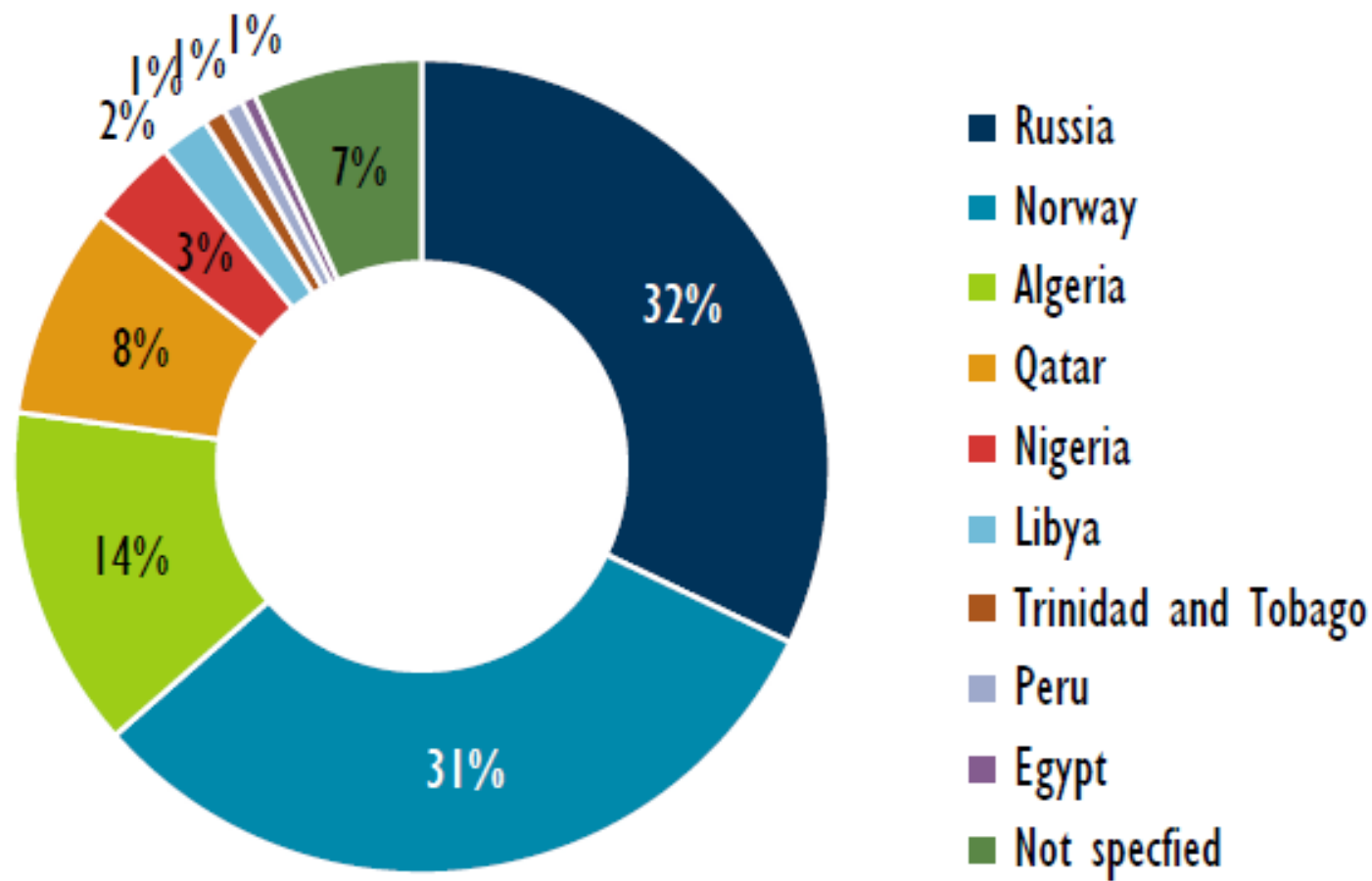
Gas security and supplies

- Only two remaining exporters – Denmark, the Netherlands. (+ Norway).
- Net import dependency for gas exceeds 90% in 16 MS, about half of which are fully reliant on imports (100% net import dependency).
- Two producing countries (the Netherlands, Romania) recorded significant improvement – their output decreased, but it was offset by a bigger decrease in consumption.
- Dependence on fixed pipelines – low flexibility.
- Ensuring security of gas supply and limiting import dependency a priority = **a high security concerns.**
- A growing competition due to LNG, higher exposure to price differentials between Asia, North America and the EU.

SoS1 - A1: net import dependency - Natural Gas



Gas imports to the European Union, 2012



Source: Eurostat, 2014.

EU approach to external supplies

- Market (legalistic) approach of the EU vs. geopolitical approach of supplying countries.
- Limited supranationalisation – energy security as an issue of high politics. Issues outside of the reach of the EU. Weak position of the EC.
- Not clearly defined area – only vague and rather supportive powers of the European Commission.
- Increasing importance due to the disintegration of Soviet Union, accession of new MS, Russia-Ukraine disputes, depletion of domestic sources... .

Powers and tools of the EC

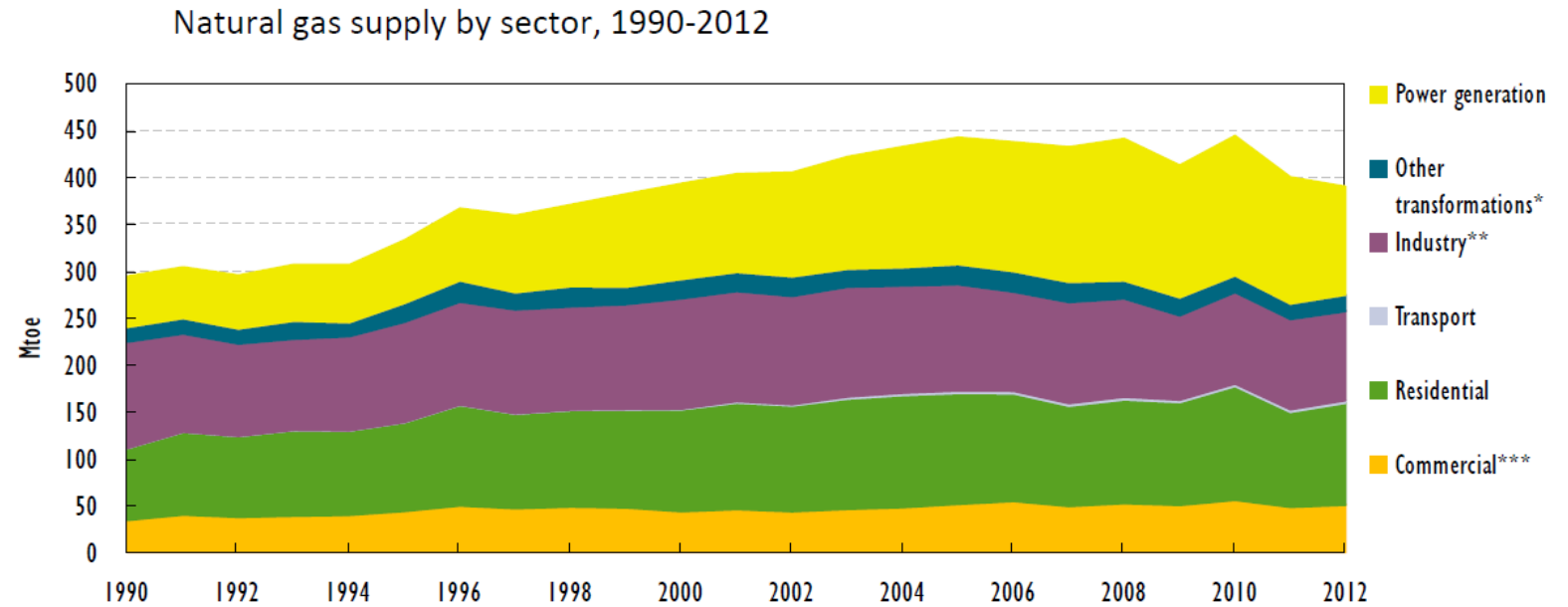
1) Management of external relations and dependency

- Support of diversification.
 - **Diversification of fuels.**
 - Diversification of suppliers.
 - Diversification of transit routes.
- Strategic reserves of oil and gas.
- Export of energy acquis communautaire via network of bilateral, multilateral and global treaties covering (to some extent) energy issues.

2) Improvement of the EU's internal resilience using Internal energy market mechanisms.

Replacement of the natural gas

- In power generation could be replaced by RES (?) or coal (?) or nuclear (?).
- In heat by coal (?) or biomass, energy efficiency.
- Indigenous production? (still some reserves in the North Sea) + unconventional sources (shale gas).



Notes: TPES by consuming sector.

* Other transformations includes refining and energy-own use.

Unconventional gas

- Abundant reserves – in the Netherlands, UK, Denmark, Romania, Poland, France, Germany, Bulgaria, Sweden, Spain.
- Reserves up to 16 trillion m³.
- Environmental concerns.
 - Gas itself is clean, but the exploration could be a problem.
 - Consumption of water – 280 000hl/one dril. 0,5 – 2 % of this water consists of drilling chemicals.
 - 2-4 ha/one drilling pad (up to 30 drills) 3-6km between pads.
 - Trafic – one dril = 700-2000 trucks (one every 4 min. during construction).
 - Earthquakes (seismic activity).
- Not produced commercially in the EU – banned (France, Bulgaria) or tested only (Poland, United Kingdom)

Powers and tools of the EC

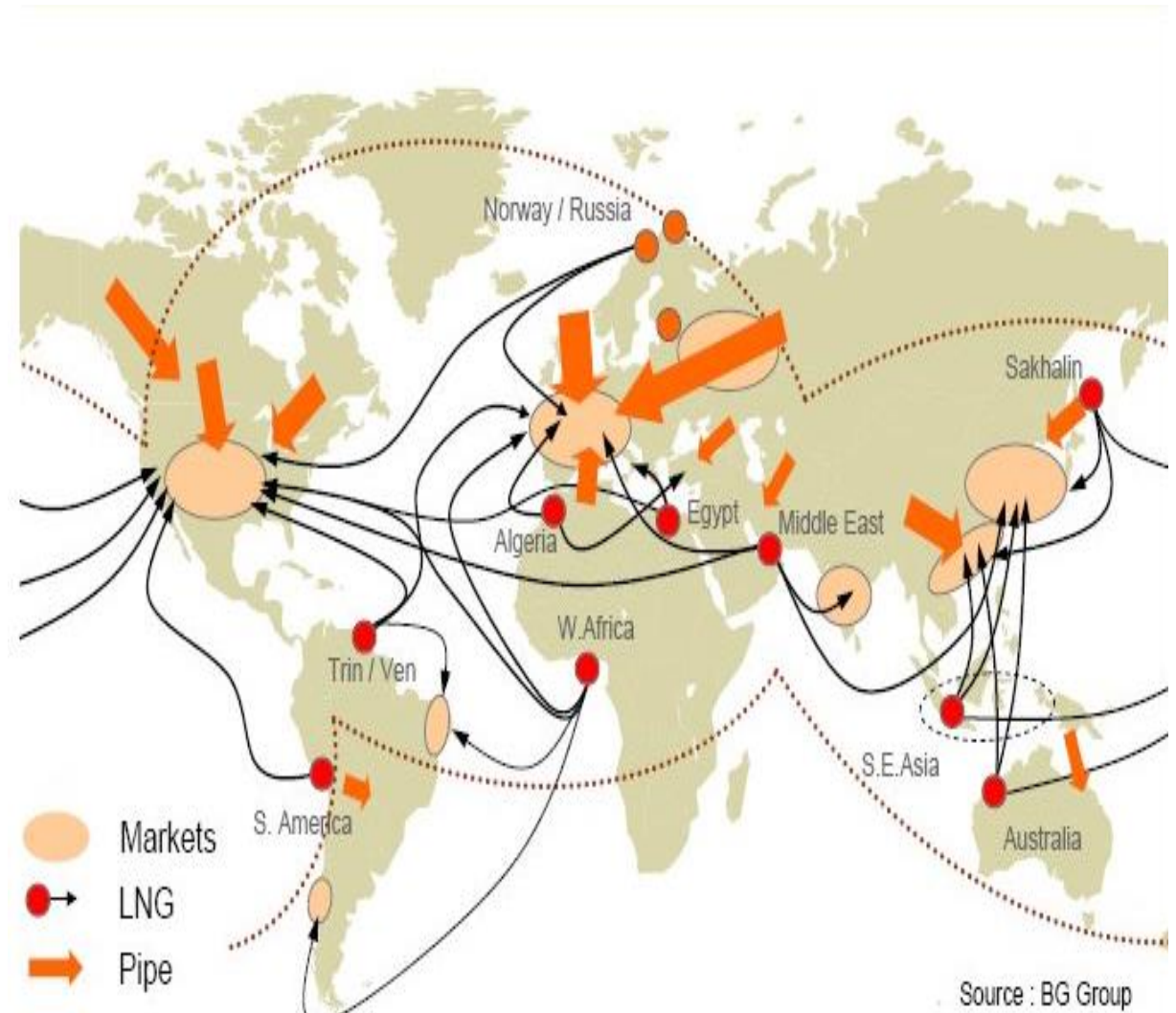
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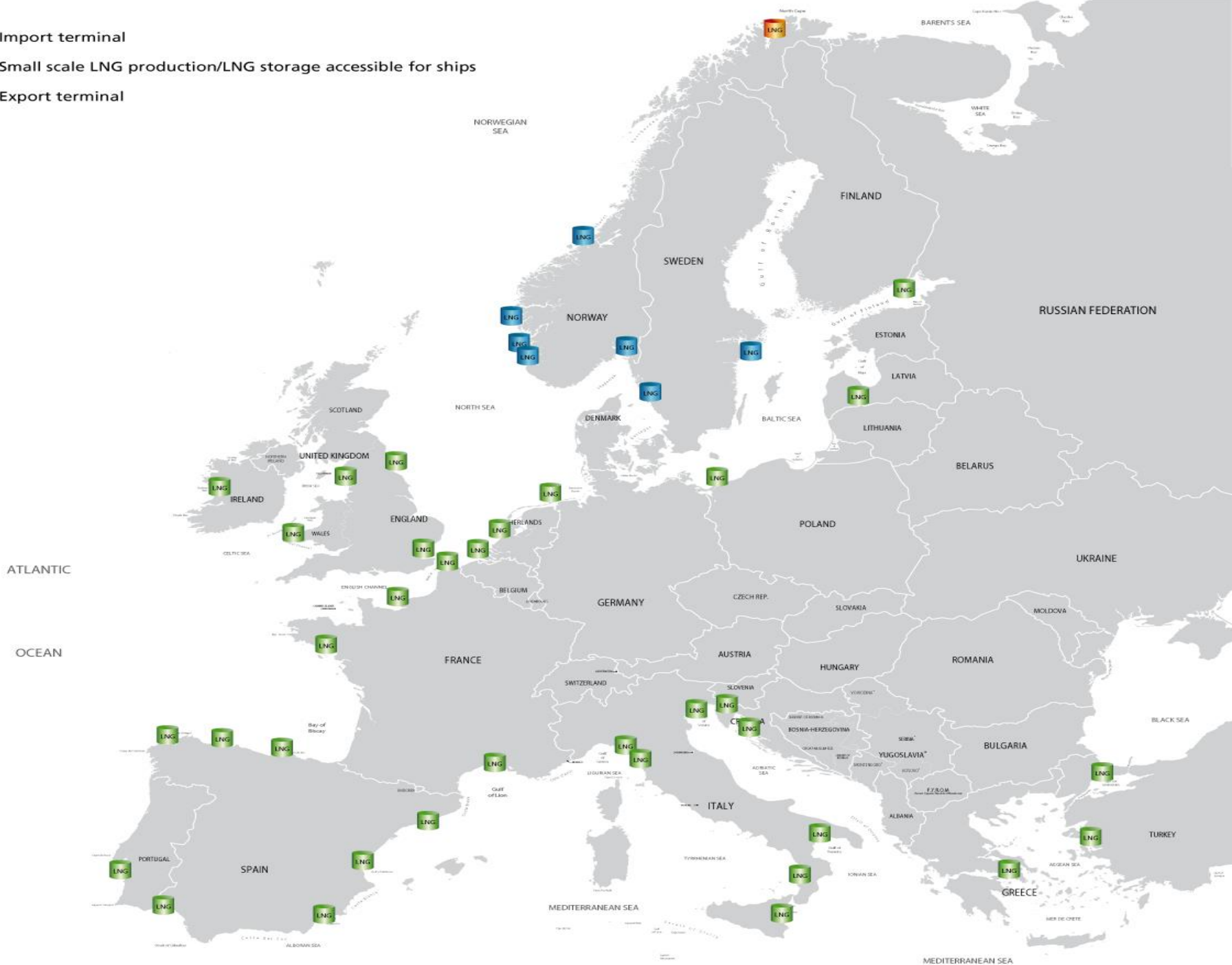
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Pipeline gas and LNG

- In 2017 LNG represented about 14% of EU supplies.
- From Qatar (41%), Nigeria (19%), Algeria (17%), Peru (7%), Norway (7%), the US (4%) and Trinidad and Tobago (3%).
- EU's LNG capacity sufficient to meet 43% of total demand.



-  Import terminal
-  Small scale LNG production/LNG storage accessible for ships
-  Export terminal



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Nabucco pipeline

- Preparation started in 2002.
- In 2003 EU provided support in the amount of 50% of estimated costs of the feasibility study.
- 2005 joint venture agreement.
- Preparation work collapsed in 2013, after the announcement of Azerbaijan to supply TAP instead.



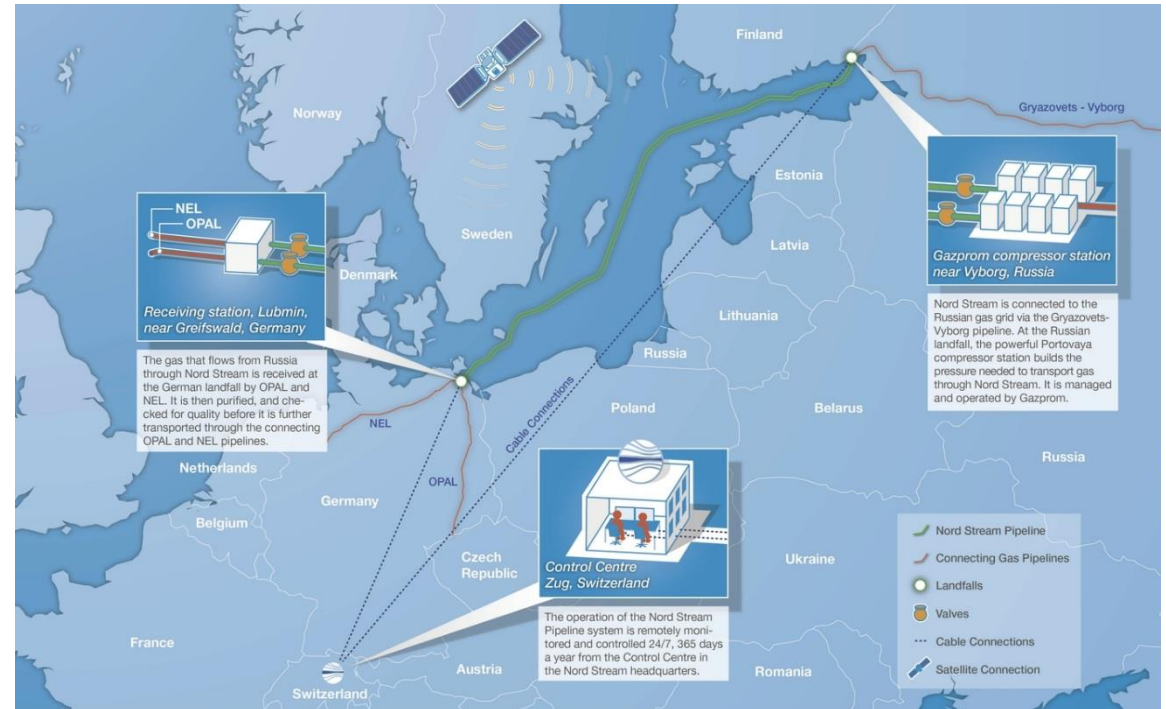
South Stream

- Announced in 2007 with 63 bcm/y capacity. Controlled by Gazprom Export.
- Legal issues related to the third package (unbundling, TPA).
- Cancelled in 2014, replaced by Turkish Stream.



Nord Stream

- Nord Stream (2 lines of 55 bcm/y) is not restricted by TPA but both OPAL (50 % of its 35 bcm/y) and NEL (35 % of its 20 bcm/y) are.
- Supported by the EU (just fraction of costs).



Powers and tools of the EC

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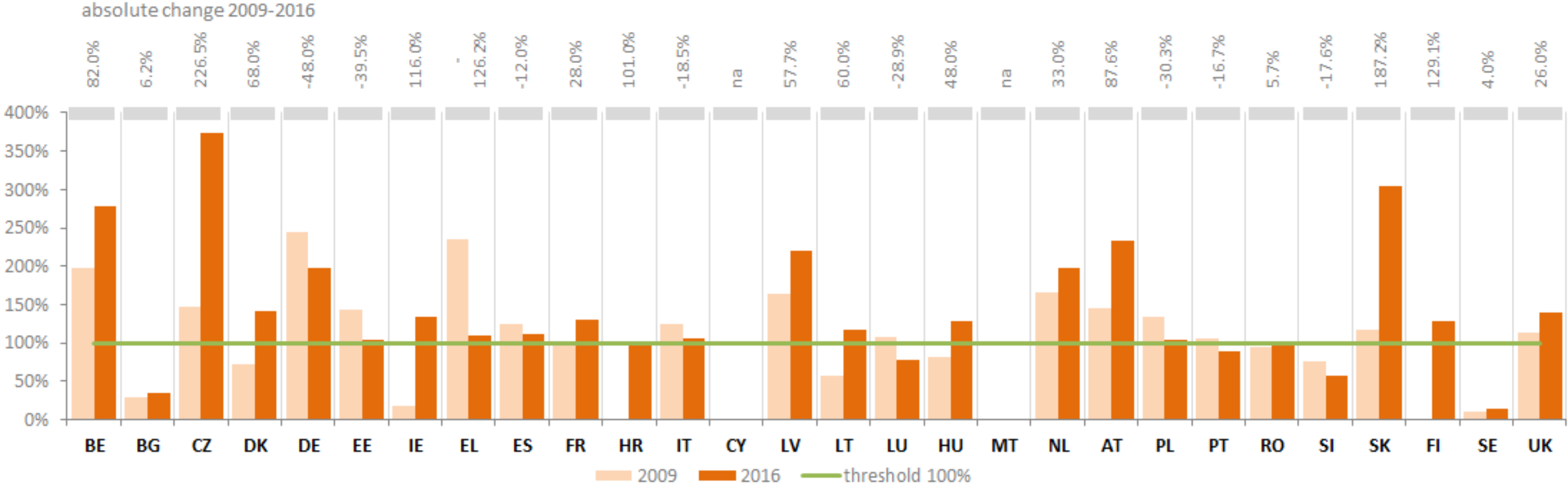
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Activities of the commission - reserves

- Strategic reserves of crude oil and petroleum products – Directive 2009/119/EC – MS are obliged to ensure a total level of oil stocks corresponding to the
 - 90 days of average daily net imports or
 - to the 61 days of average daily inland consumption, whichever of the two quantities is bigger.
- Regulation No 994/2010 concerning measures to safeguard security of gas supply.
 - Resolves the situation in case when the single largest gas infrastructure of country fails, which is the so called N-1 scenario.
 - In such case, the regulation obliges the MS to ensure the supply for protected customers (mostly households + hospitals...).
 - To be replaced by Regulation No 2017/1938

SoS3: N-1 rule for gas [%]



N-1 formula for gas infrastructure – it measures the ability of the gas infrastructure of a country to satisfy, in the event of a disruption of the single largest gas infrastructure, total gas demand during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years, expressed as a percentage of that demand.

Sources

- IEA (2014): Energy Policies of IEA Countries – The European Union.
- EC (2017): Second Report on the State of the Energy Union.