ENTSOG TYNDP 2013-2022

Assessment of the European gas system

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The European gas spider web

Emden fork
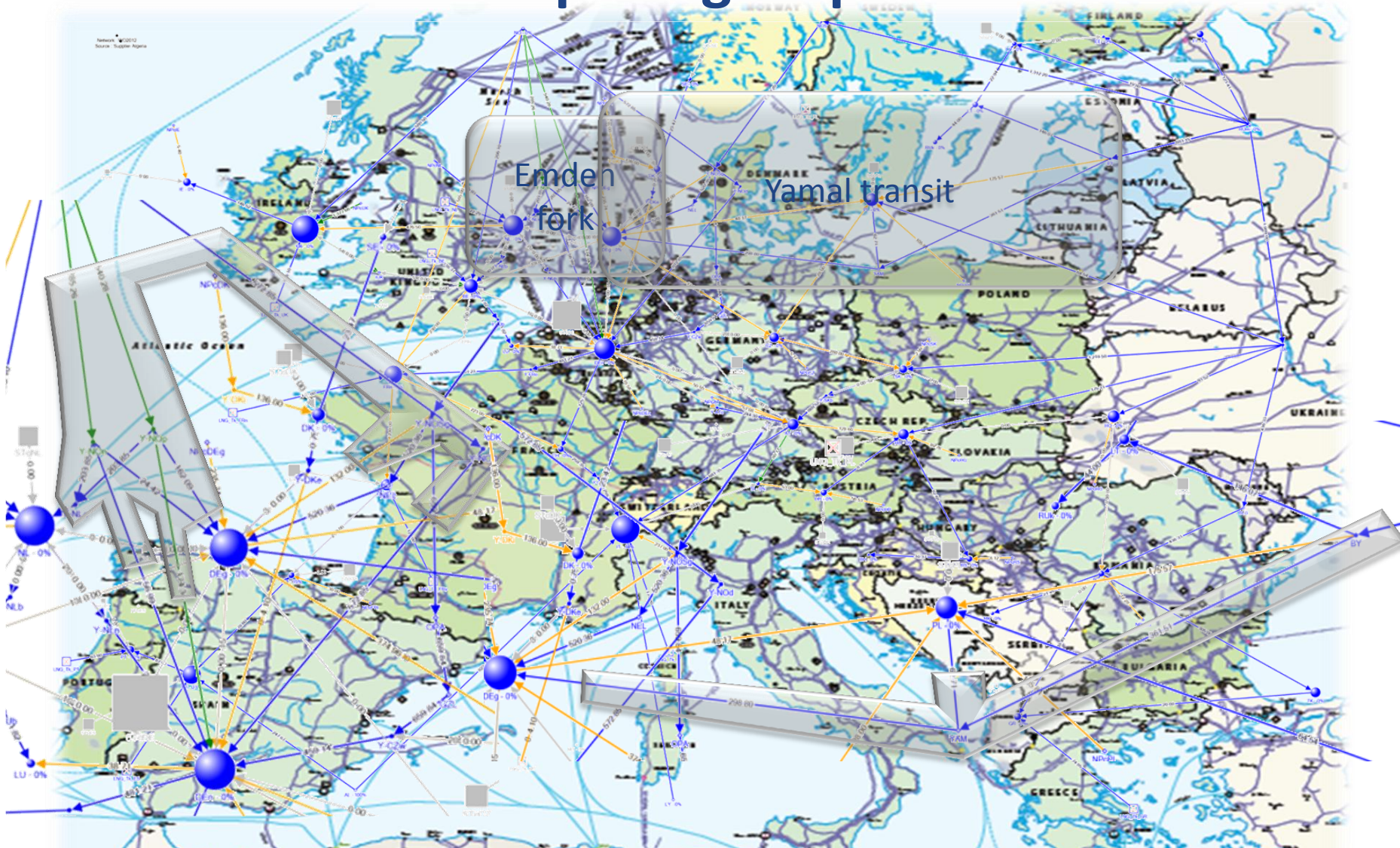
Yamal transit

Enhanced topology better consider complex situation as forks (e.g. Emden) and transit system (e.g. Yamal pipeline)

Security of Supply cases

Reference cases

> High Daily Demand conditions under a single day and a 2-week period

> For the single day, Design Case and Simultaneous Case have shown very similar results then modeling will focus on the Design Case

Considered events

> Disruption of Norwegian supply to France (Franpipe) or UK (Langeled)

> Disruption of Algerian supply to Spain (GME) or IT (Transmed)

> Complete disruption of Libyan supply to Italy

> Complete disruption of transit through Ukraine or Belarus

> Minimization of LNG send-out as the LNG market is now global and make difficult to define a significant disruption at European level

> New approach helps to picture how Europe could be impacted by a major move of global LNG to another region

2-Week Case

Captures the impact of longer event on supply deliverability

> Supply and demand are considered as flat over the period in order to limit simulation to the last day as the demand profile would not influence the volume of supply

> Statistically demand and imports will be slightly lower than on a single day of the same occurrence

> LNG terminal send-out are set at their maximum sustainable send-out according the below formula per country (based on information provided by GLE):

$$\underbrace{\frac{Annual\ import\ under\ Reference\ Case}{365}}_{\text{Ships unloading with seasonal swing}} \times 110\% + \underbrace{\frac{(Initial\ tank\ level\ -\ Min\ tank\ level)}{14}}_{\text{Tank management}}$$

> UGS are used to balance demand

Initial stock level

> An output of the model is the minimum use of UGS on the last day

> Initial minimum stock level may be derived ex-post by adding the withdrawn gas on the 13 previous days

Market Integration approach

Role of infrastructures

> Level of market integration is not directly assessed as depending first on business rules and market player behavior

> Results from simulations will rather show how new infrastructure projects would support better:

- source and route diversification
- better ability to minimize/maximize some supply

> These elements are seen as infrastructure pillar of market integration
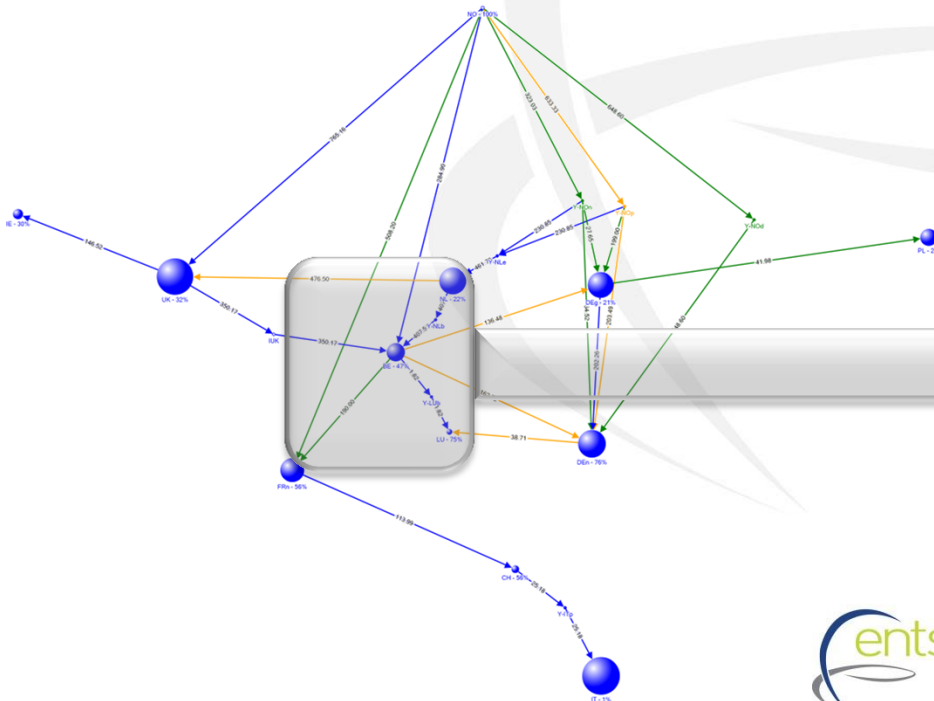
Expected results

> Ability of European gas system to face very different supply mixes

> Ability of a given country to access 5% or 20% of each supply source
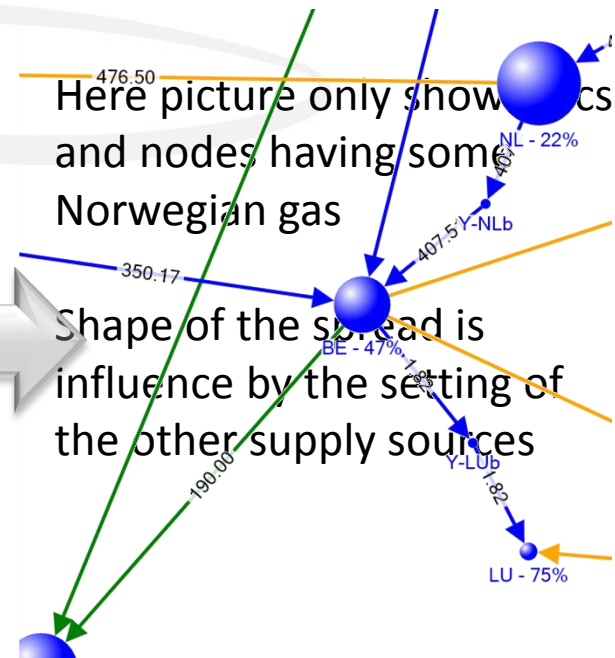
Market Integration cases - Reference

Reference Case

> Assessment carried out on an average day with UGS kept neutral

> Imports are based on historical shares but limited to the Intermediate potential supply scenario when increased up to 2022

> For every flow pattern, modeling tool identified supply shares in each Entry/Exit zone

Tracking of Norwegian gas

Focus on Belgium

Here picture only shows arcs and nodes having some Norwegian gas

Shape of the spread is influence by the setting of the other supply sources
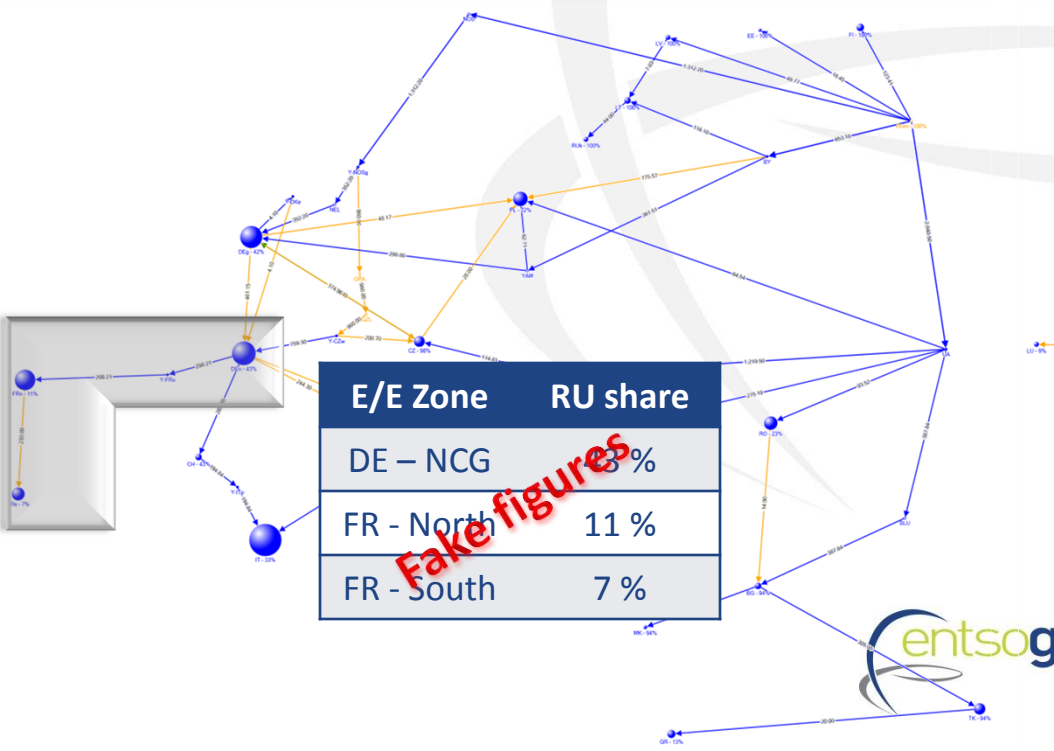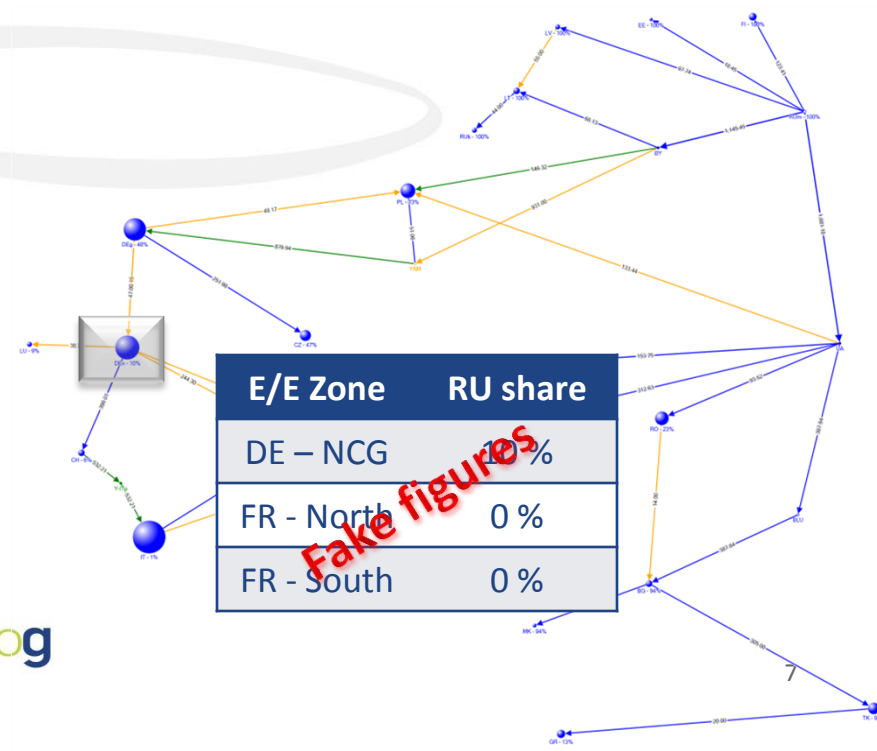
Market Integration cases - Minimization

Supply source mix

> Minimization: each import source is reduced as low as possible in order to identify potential limiting factor (infrastructure or alternative supplies)

> Alternative sources are limited by their respective Maximum potential scenarios

> For 2013, the narrow range between potential supply scenarios limit the ability of one source to be largely reduced because the other ones cannot catch up all the gas

Russian gas flows in Ref. Case

E/E Zone	RU share
DE – NCG	25 %
FR - North	11 %
FR - South	7 %

Fake figures

After minimization

E/E Zone	RU share
DE – NCG	10 %
FR - North	0 %
FR - South	0 %

*Fake figures*

Market Integration cases – Even Maximization

Supply source mix

> Even maximization: each import source is increased up to the Maximum potential export scenario in order to identify potential limiting factor (infrastructure or alternative supplies going below Minimum potential supply scenario)

> Alternative sources are limited by their respective Minimum potential scenarios and import routes are kept close to their reference level in order have the gas consumed close from the importing countries

> For 2013, the narrow range between potential supply scenarios limit the ability of one source to be largely increased

Maximized Russian gas flows

	Total Russian gas imports
Reference Case	4,198 GWh/d
RU Even Maximization	4,412 GWh/d
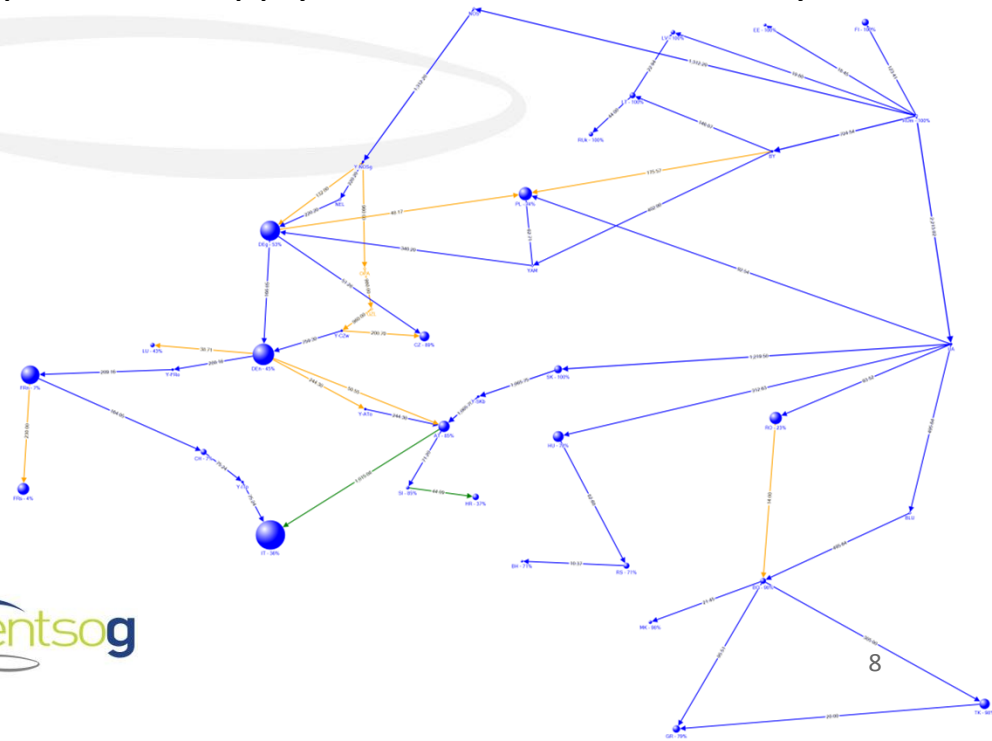
# Market Integration cases – Targeted Maximization

Supply source mix

> Targeted maximization: each import source is increased in order to reach a 5% or 20% supply share in a maximum number of countries alternatively

> Same limit for the alternative sources but with more flexibility in the import routes to enable flow patterns to target particular direction

> These simulations will be the ones used to define the accessibility of sources

Russian gas flows targeting Iberian Peninsula

E/E Zone	RU share
FR-North	26%
FR-South	19%
FR-TIGF	9%
ES	1%
PT	1%

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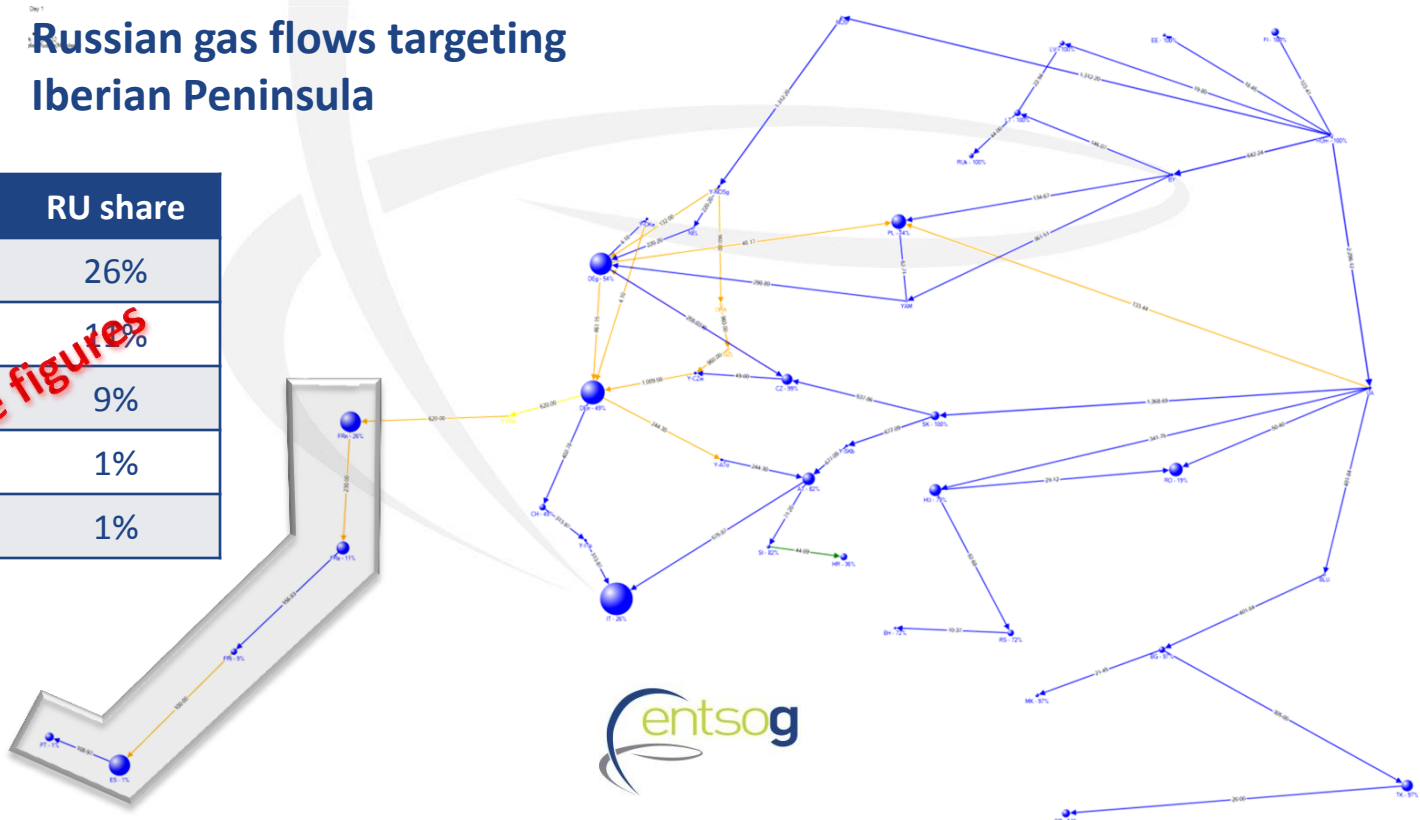
Where are we in the process?

2013 is the crucial year

> Whatever attention has been paid to define TYNDP 2013-2022 concept, approach has to be fine-tuned to fit with data and tool capability

> First year provides the baseline on top of which every project will be added to build 2017 and 2022 FID and non-FID clusters

> All simulations have been achieved for 2013 by the dedicated NeMo Kernel Group

> Results are now under TSO review to check that flow patterns fit with their network capability (their likelihood is not considered)

2017 and 2022, impact of new projects

> The number and diversity of infrastructure projects submitted to ENTSOG make challenging the construction of the infrastructure scenarios

> The new supply approach is dependent of the development of infrastructures, then specific scenarios have to be build for FID and non-FID clusters

> Simulation should be much easier as only variation of the 2013 ones

> Remedy identification will start by comparing FID and non-FID results

Thank You for Your Attention

Olivier Lebois
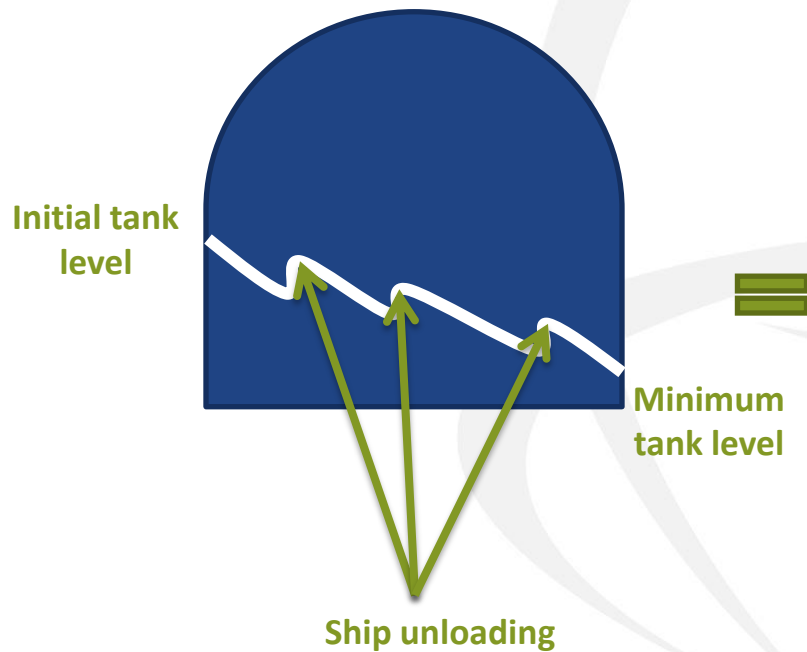ENTSOG Senior Adviser, System Development

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Modeling of LNG terminal in picture

Actual tank behavior

Tank maximum use without ships unloading

Initial tank level

Initial tank level

Minimum tank level*

Minimum tank level

(*): lower level maybe use in case of emergency

Ship unloading

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Linear ship unloading

GWh/d

120
100
80
60
40
20
0

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