entsog

european network
of transmission system operators
for gas

Brussels, 13 February 2018

Supply cost assumptions

Image Courtesy of Thyssengas

Difference with TYNDP 2017

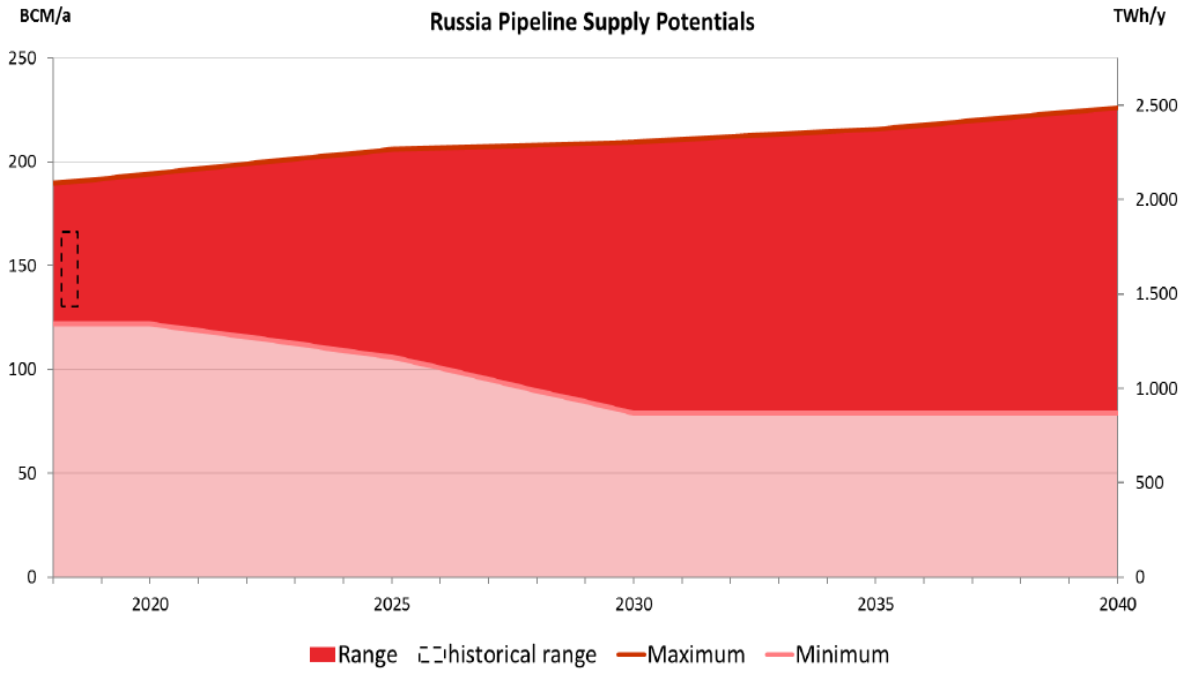
	TYNDP 2017	TYNDP 2018
Supply	Supply availability based on min/max supply potential	Same approach
	Balanced configuration + 12 additional min/max supply configuration (fixed price spread) + 1 RU import price spread configuration	Simplification through - **few meaningful** supply configurations - incl. min/max configurations - All configurations accounting for **LNG and pipe prices differentiation** Differentiated prices of Russian gas at Eastern Europe borders. More meaningful **price differentiation** among import sources • LNG basins + price differentiation at EU country level (Netback Asia) • Different prices for pipelines
	Observed different price of Russian gas price at Eastern Europe borders only in case of "Import Price Spread Configuration"	
	Same initial price for all import sources in all configurations (incl. "Balanced") • LNG treated as one source • No distinction among pipeline import prices	

Criticised by stakeholders

Supply approach and supply price assumptions: what do we need?

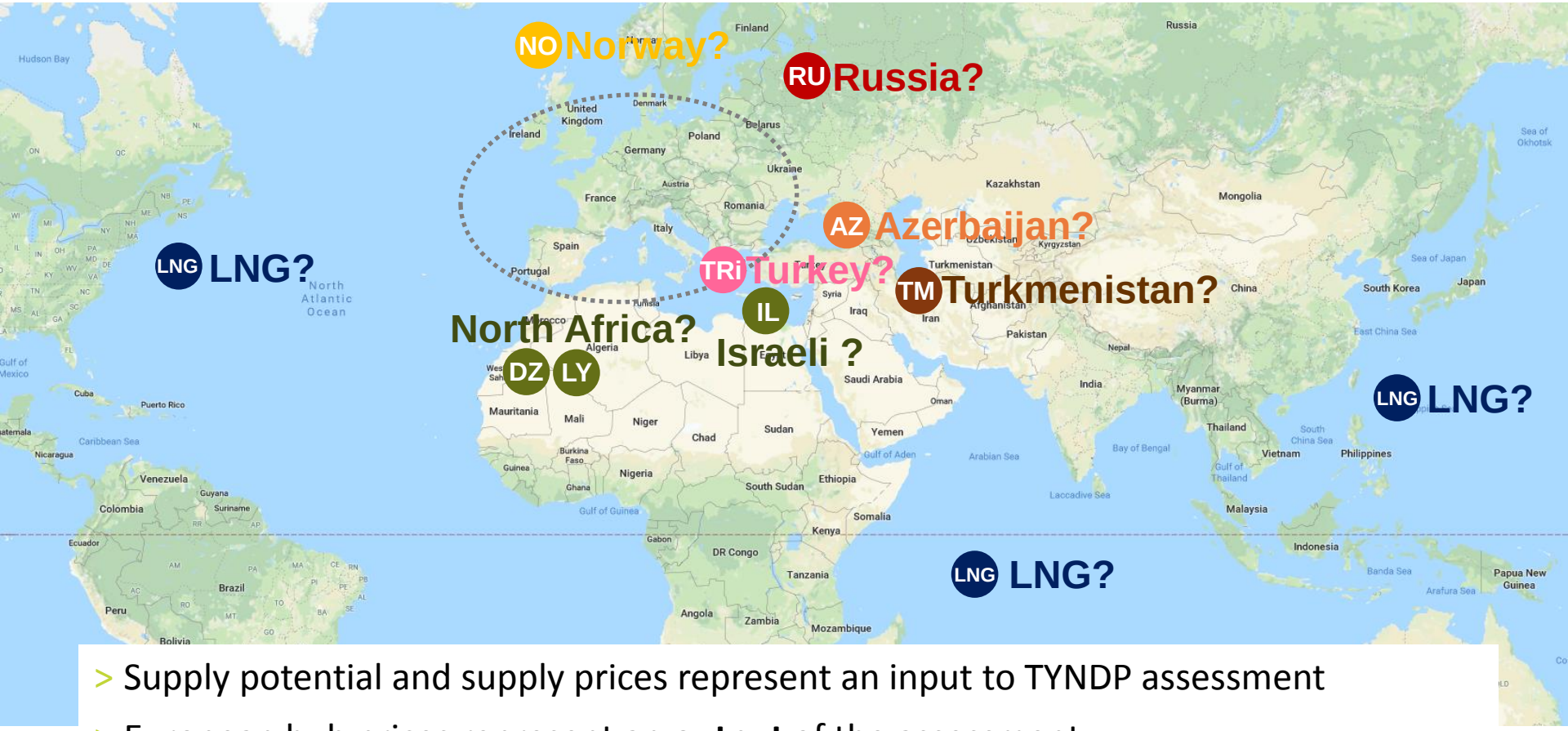
Supply potentials

- Supply potential volumes represents an input to the assessment defined in the ENTSOG Scenario Report
- Each supply source starting with a different "*reference price*"



Supply potential volumes (here)

Supply costs



> Supply potential and supply prices represent an input to TYNDP assessment

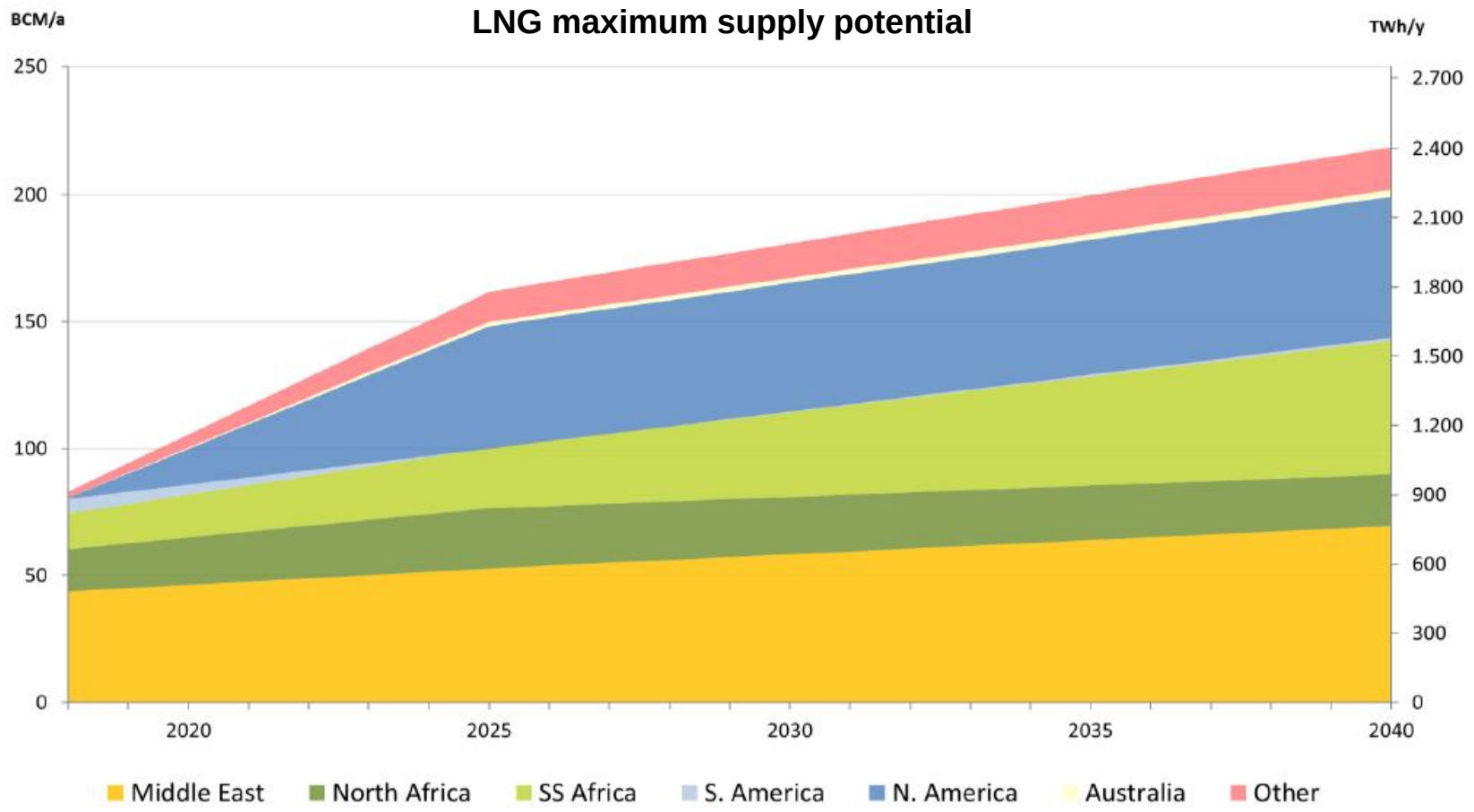
> European hub prices represent an **output** of the assessment

=> We need **Reference Import Price per each supply source**

LNG: basins and netback Asia approach

LNG basins

> LNG basins supply potential defined in TYNDP Scenario Report



Netback Asia approach

Main assumptions:

> LNG per basin as per TYNDP Scenario Report

> Asia as main driver of LNG demand and LNG price maker

> Japan price as starting point (source IEA WEO)

> LNG import price in EU per country according to Netback Asia approach

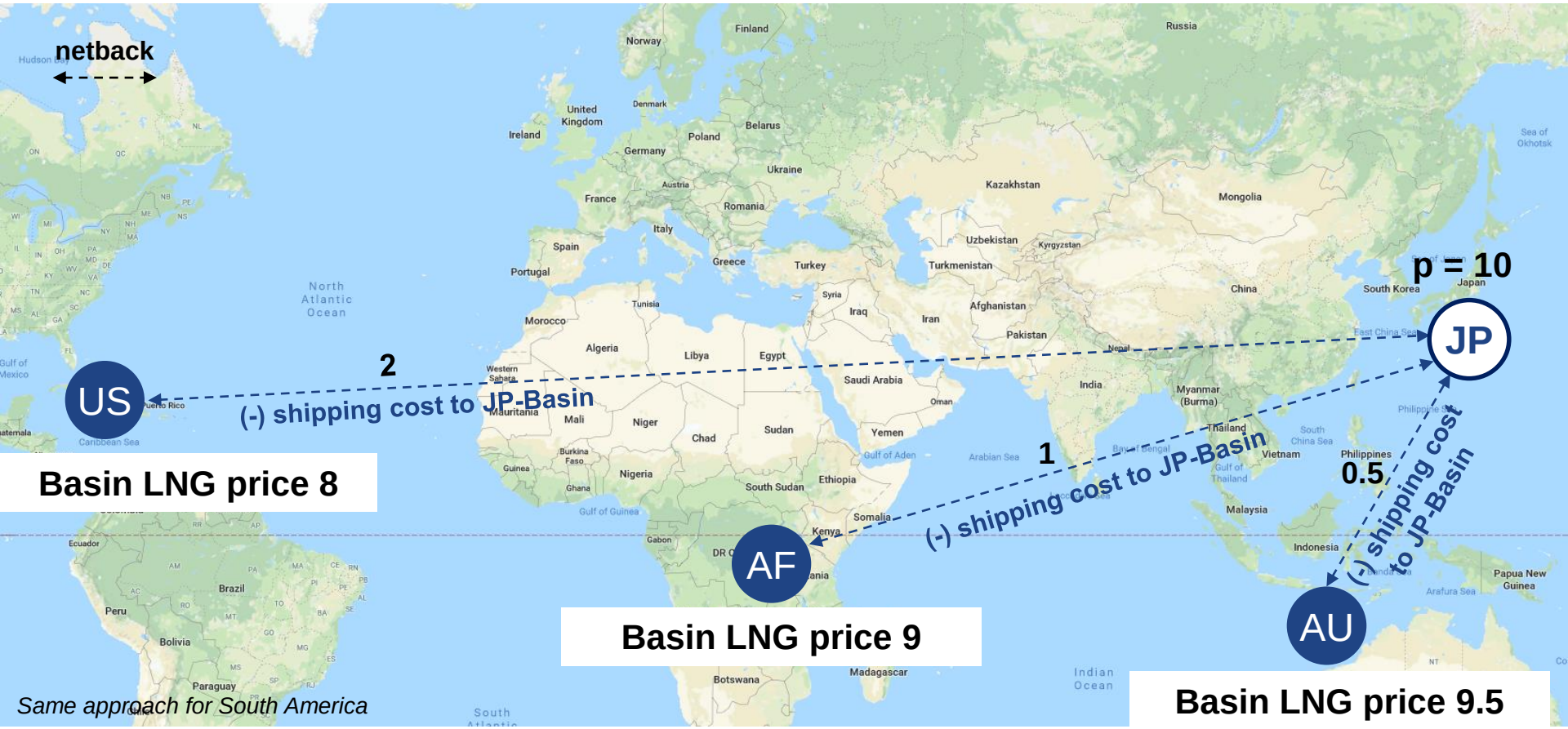
> Shipping costs as spread between basins prices and EU countries

> LNG from Qatar/North Africa (DZ)/Norway at a price that allows re-export to Asia

Japan reference price for netback

Japan price from IEA WEO 2017

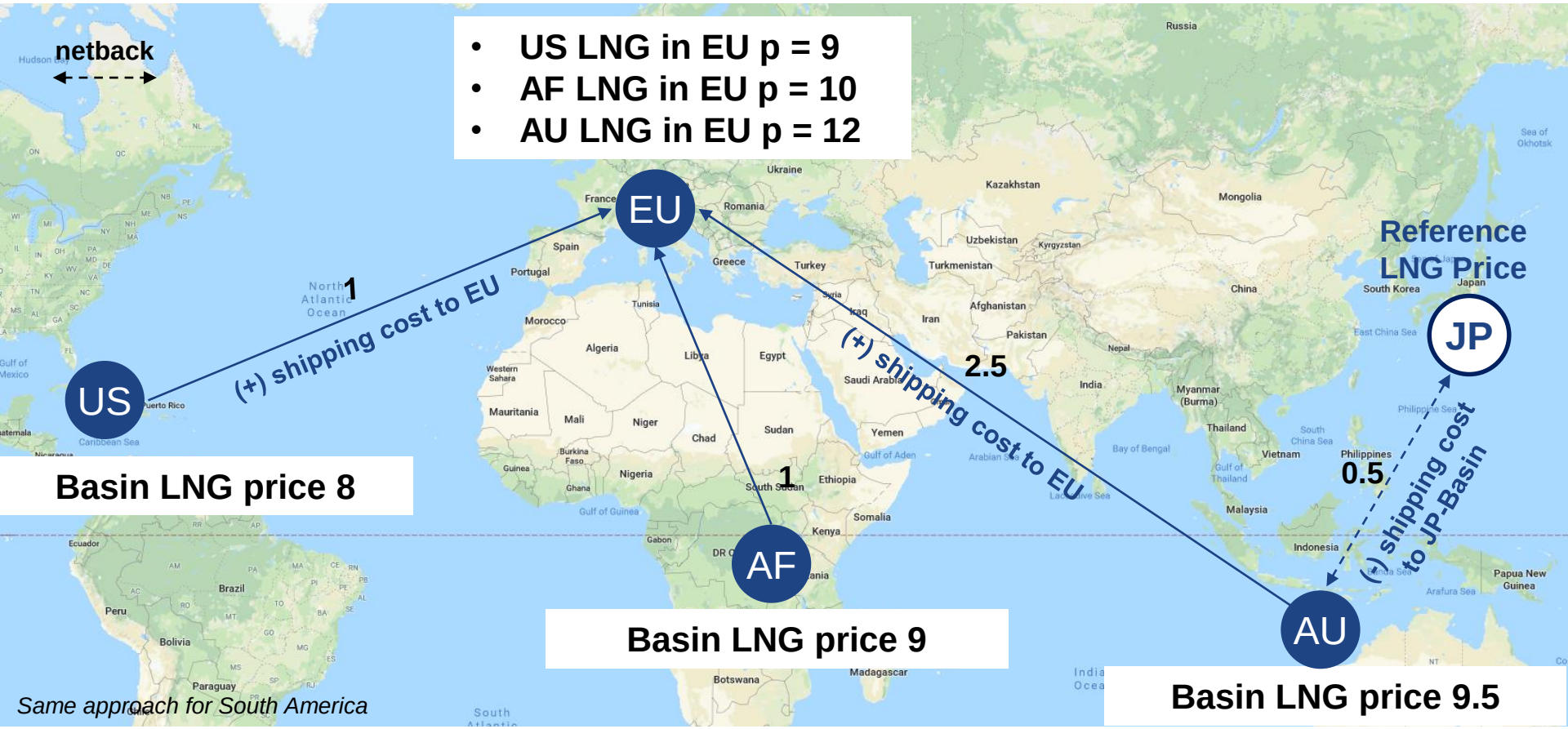
LNG basins price as for Netback Japan



Each LNG basin indifferent to send LNG to Japan or Europe

values do not represent actual figures

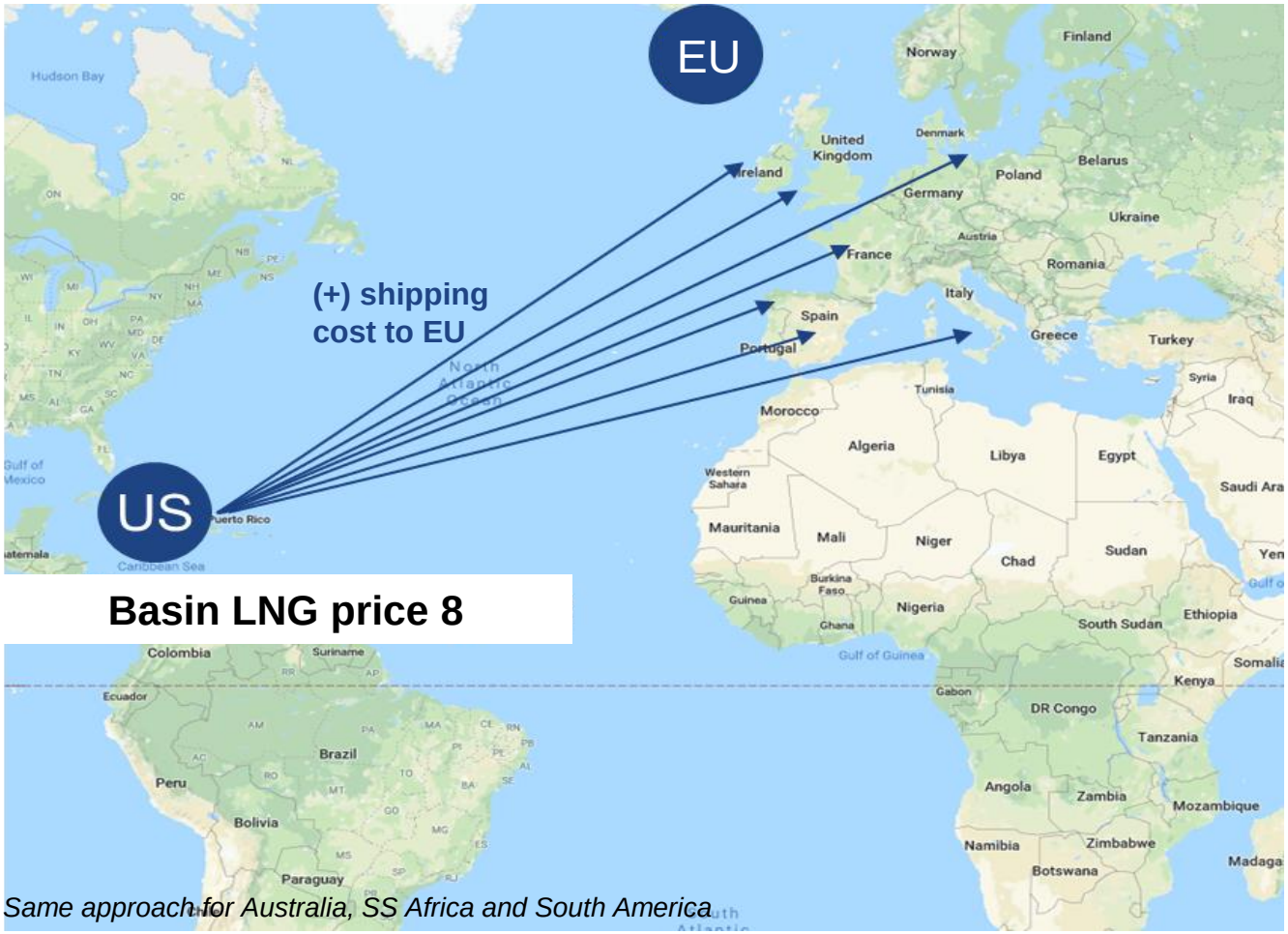
Price in EU based on shipping costs (1)



EU import LNG = LNG basin supply cost + shipping to EU

values do not represent actual figures

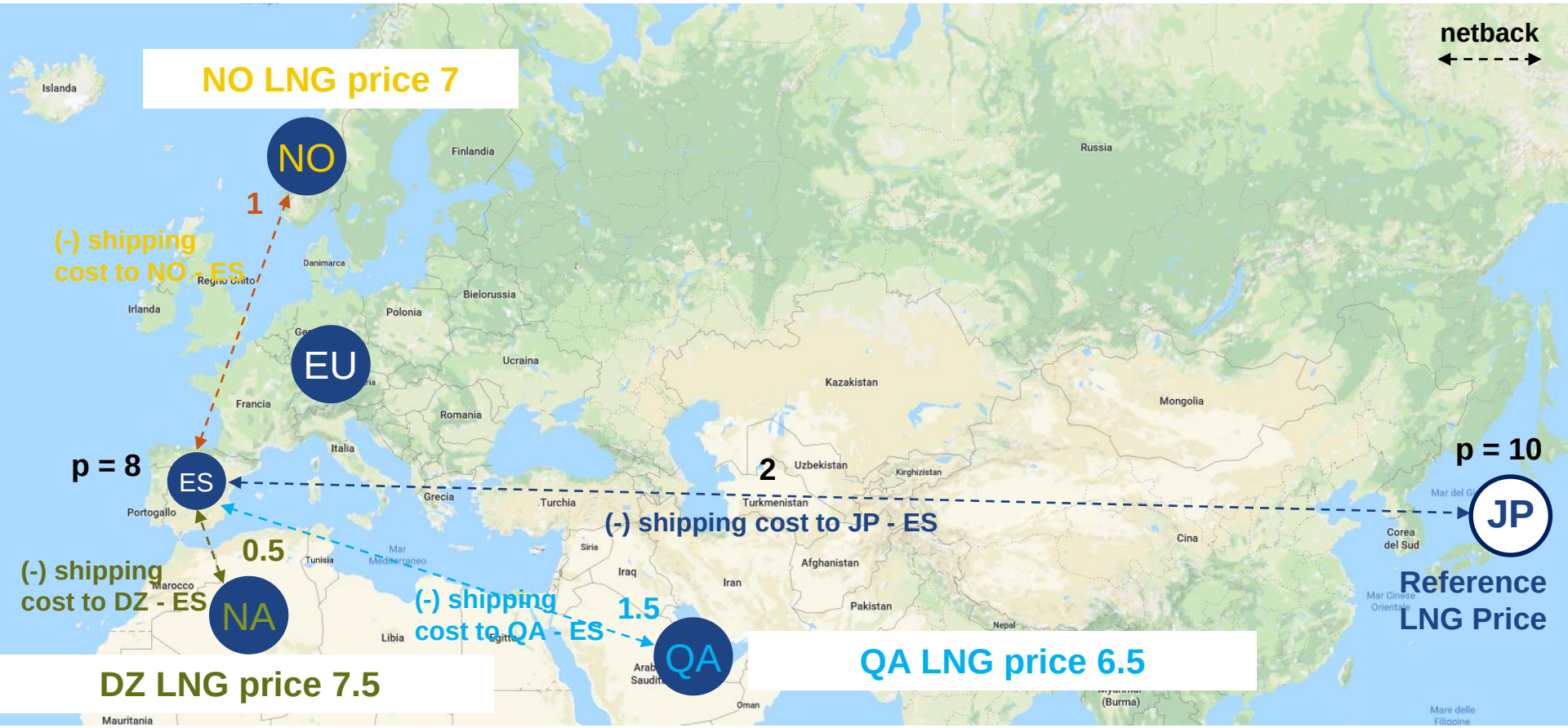
Price in EU based on shipping costs (2)



Price in EU differentiated per LNG basin and per delivery country

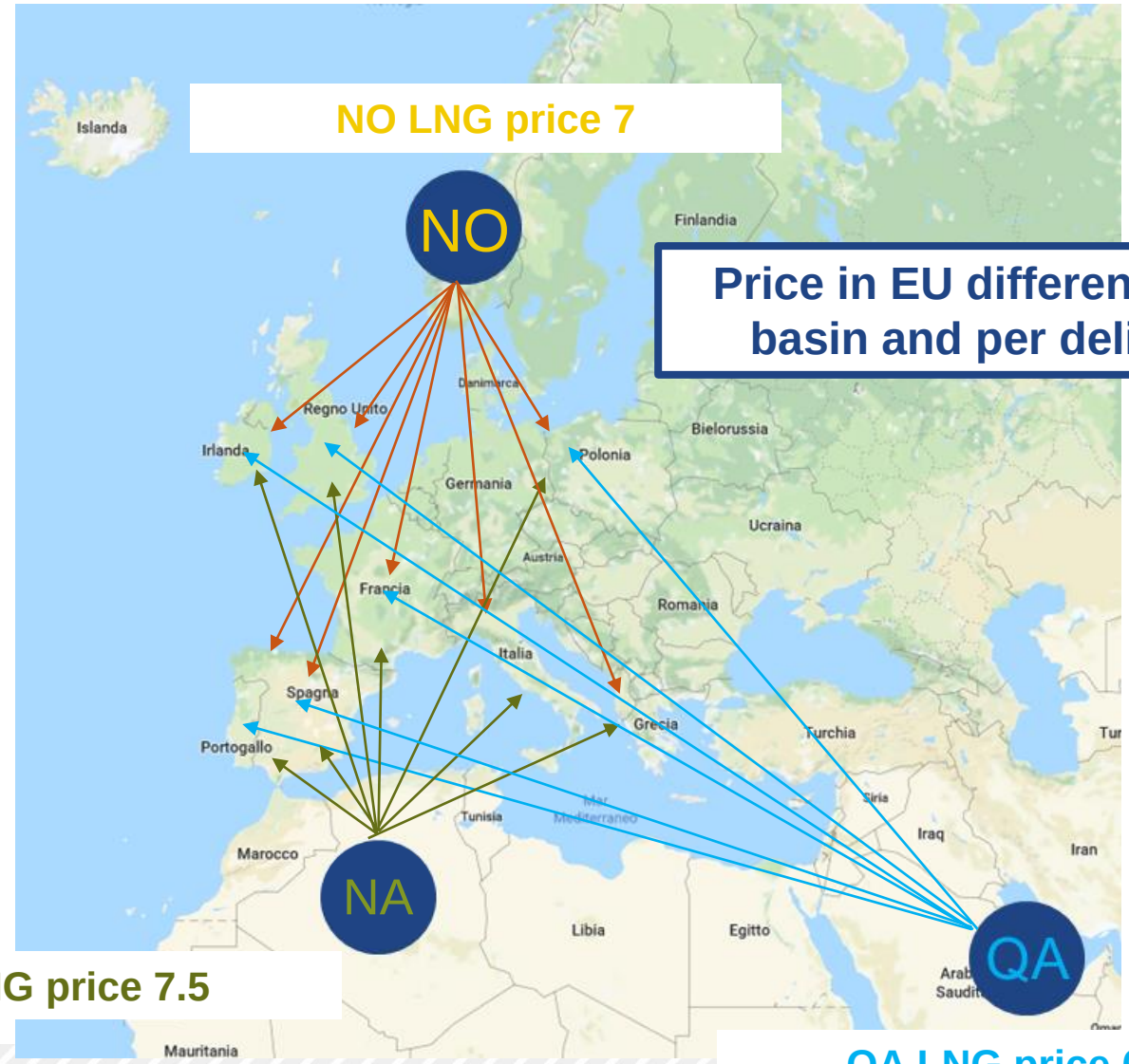
values do not represent actual figures

LNG re-export as netback Spain (1)



NO, NA and QA LNG prices still allowing re-export to Asia

LNG re-export as netback Spain (2)



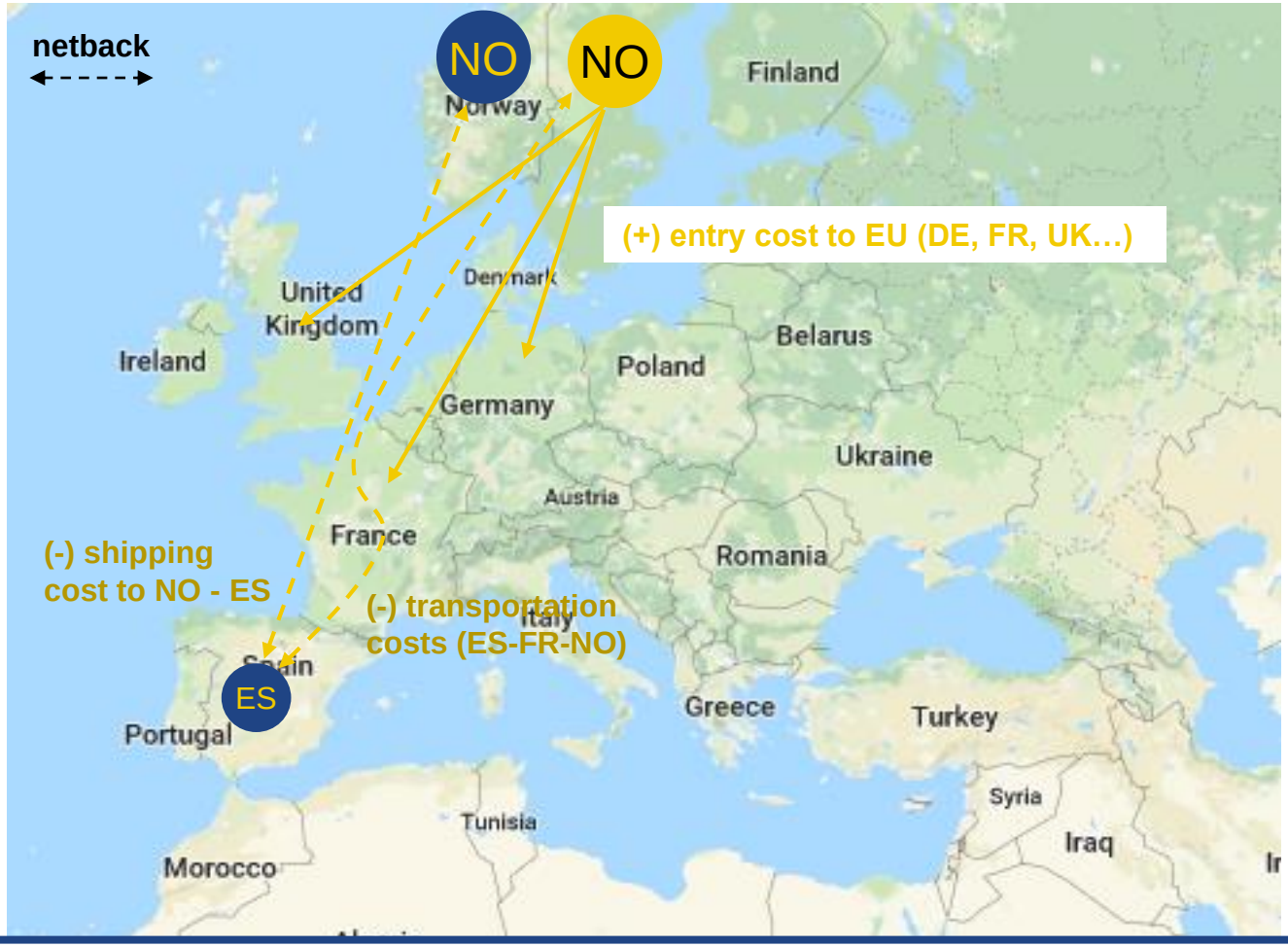
Price in EU differentiated per LNG basin and per delivery country

NA LNG price 7.5

QA LNG price 6.5

Supply via pipelines

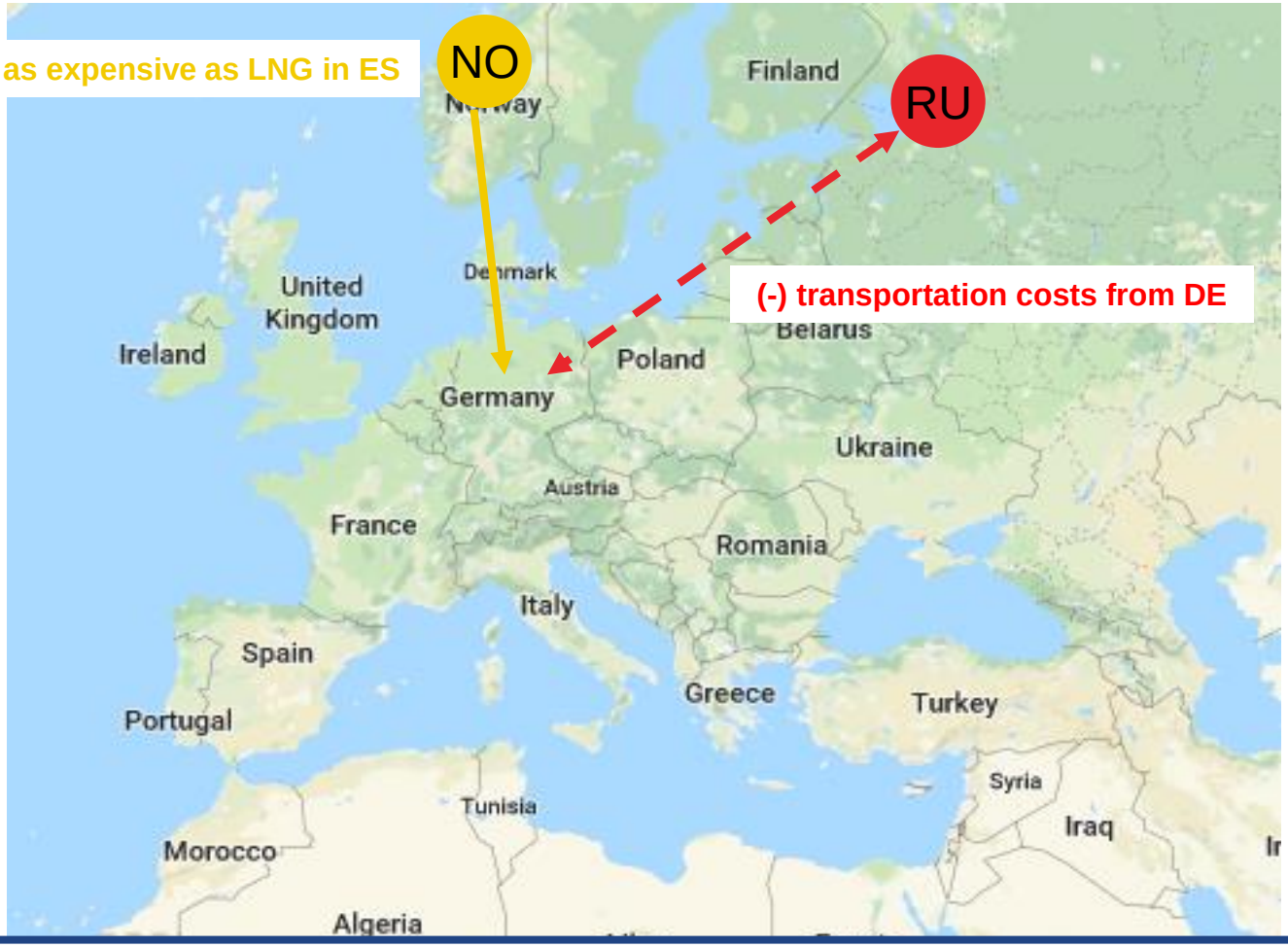
Norway pipe



NO pipe competing with NO LNG in Spain

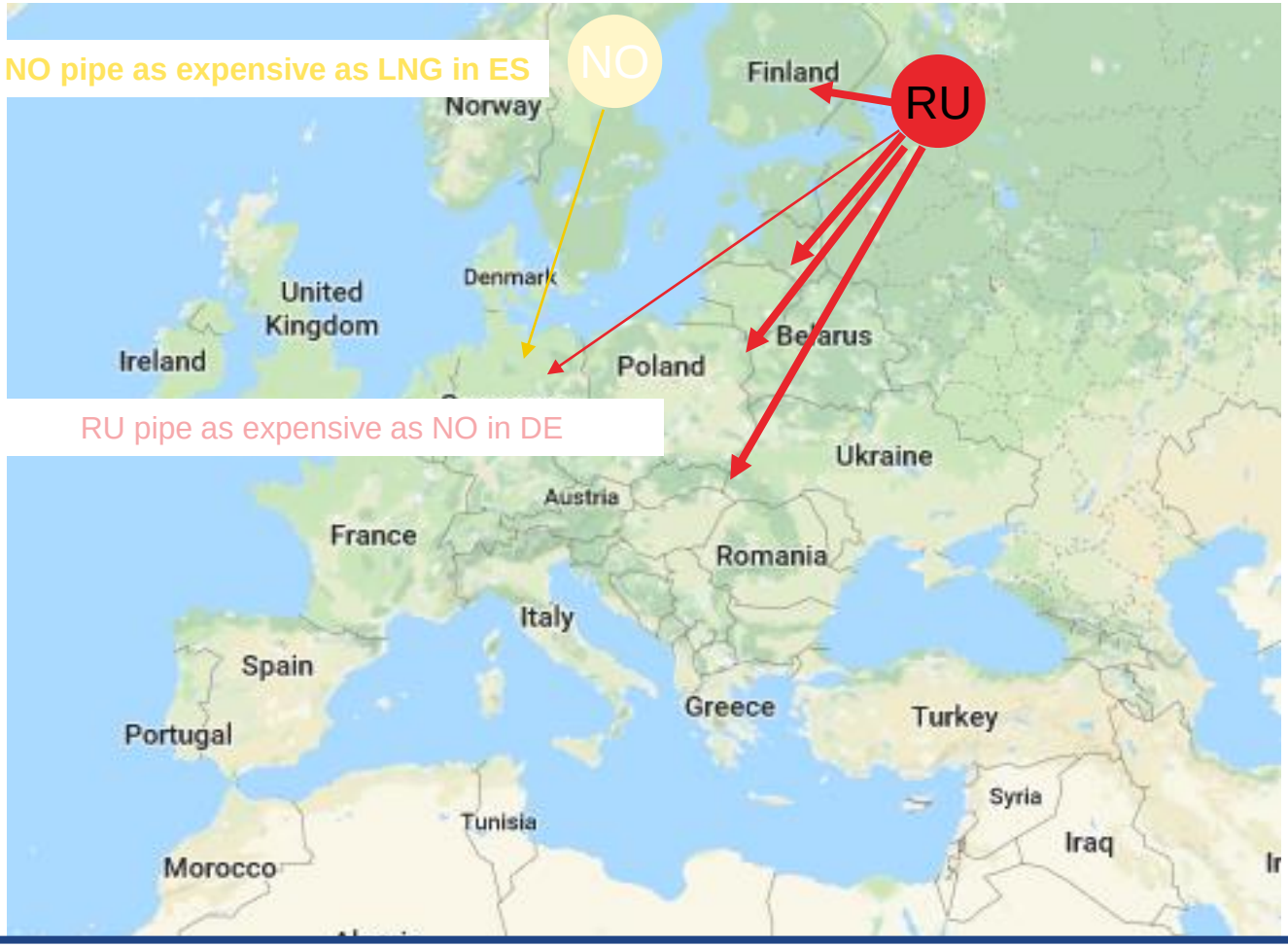
Russia pipe in NW Europe

NO pipe as expensive as LNG in ES



RU pipe competing with NO pipe in Germany

Russia pipe in East Europe



RU pipe price differentiated at each East border

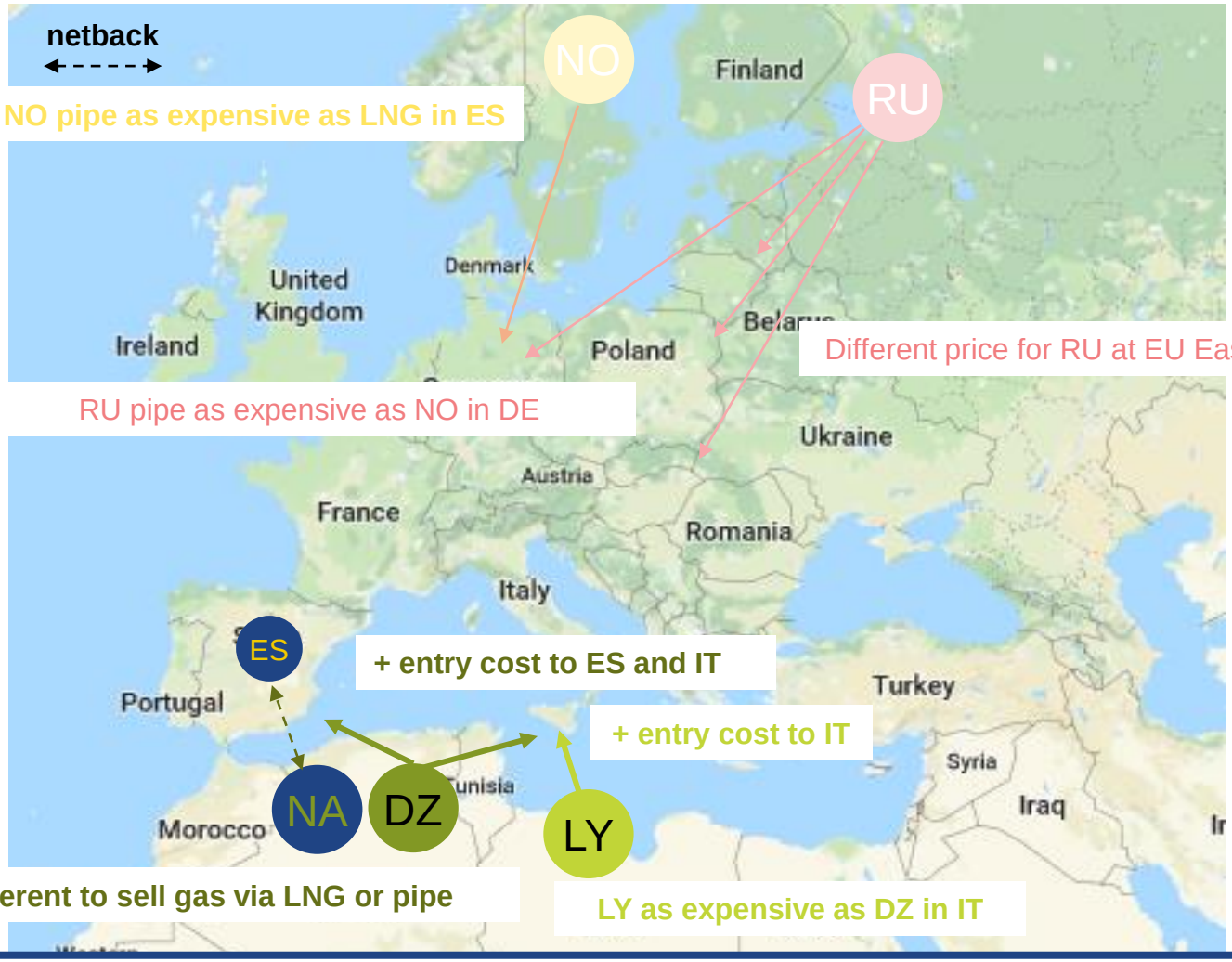
Russia price in East Europe

> EU East borders with RU "spread vs Germany" in all configurations based:
  - EC Quarterly Report
  - Additional assumptions in case of missing data

Country Code	Route To	From	Possible Price Spread on TYNDP18 (€/MWh)		
			Spread Last Qreport	Spread Ave Last 4 Q	Spread Max Last 4 Q
BG	Bulgaria	Romanian transit system	1.50	1.90	-0.90
CZ	Czech Republic	Czech transit system	0.10	0.10	-0.30
EE	Estonia	Russia	2.80	3.40	2.80
FI	Filand	Russia	1.10	1.60	1.20
GR	Greece	Bulgarian transit system	-0.30	0.40	-1.00
HU	Hungary	Ukraine	-1.10	1.60	0.60
LT	Lithuania	Belarus	0.40	1.00	0.20
LV	Latvia	Estonian transit system	0.10	1.00	0.70
MK	FYROM	Bulgarian transit system	1.50	1.90	-0.90
PL	Poland	Belaris, Yaml-Europe pipeline, Ukrai	0.40	1.00	0.20
RO	Romania	Ukraine	0.90	2.10	0.40
SK	Slovakia	Ukraine	-0.10	2.40	0.80

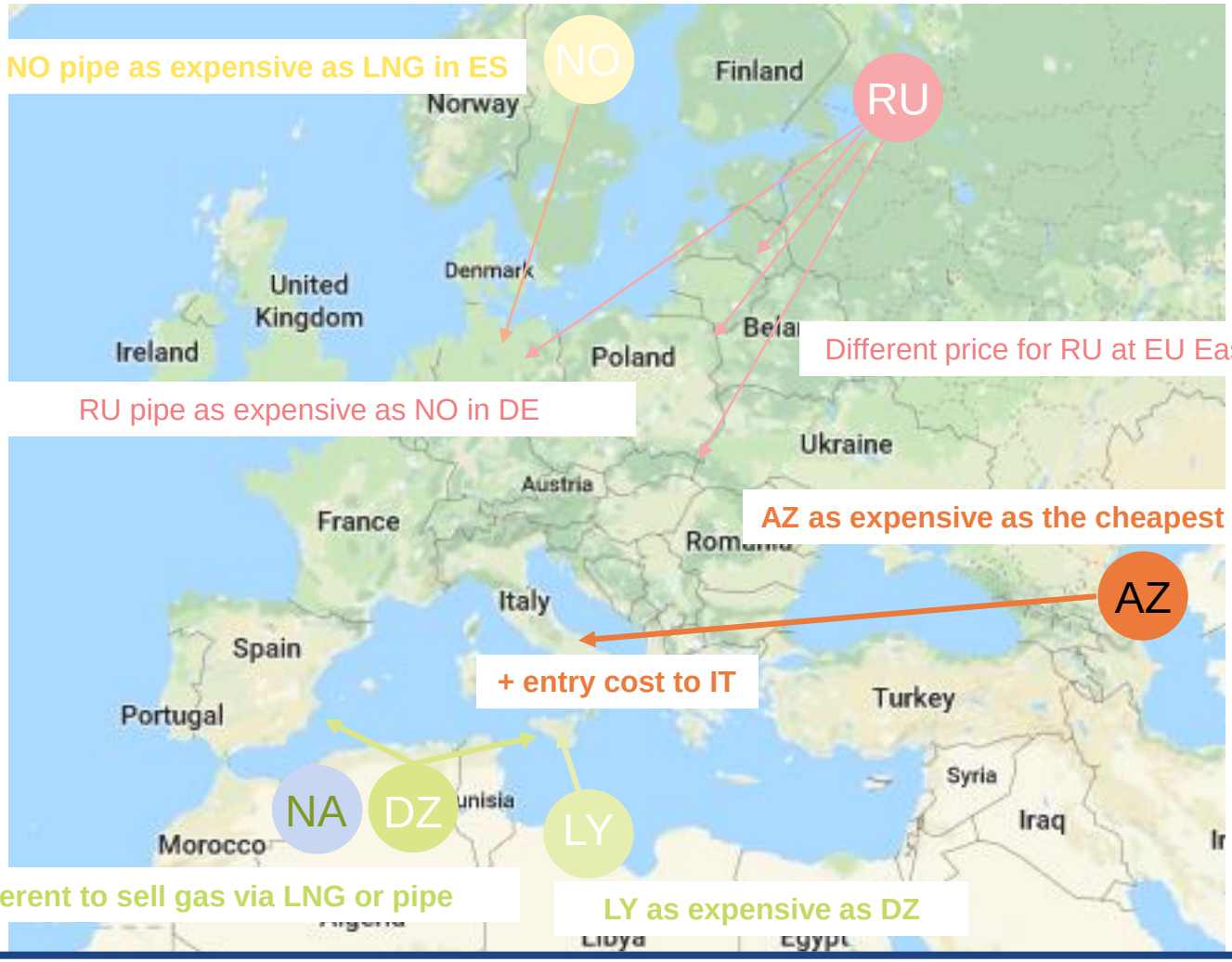
spread vs Germany price

Algeria and Libya pipe



Algeria indifferent to sell gas via LNG or pipe

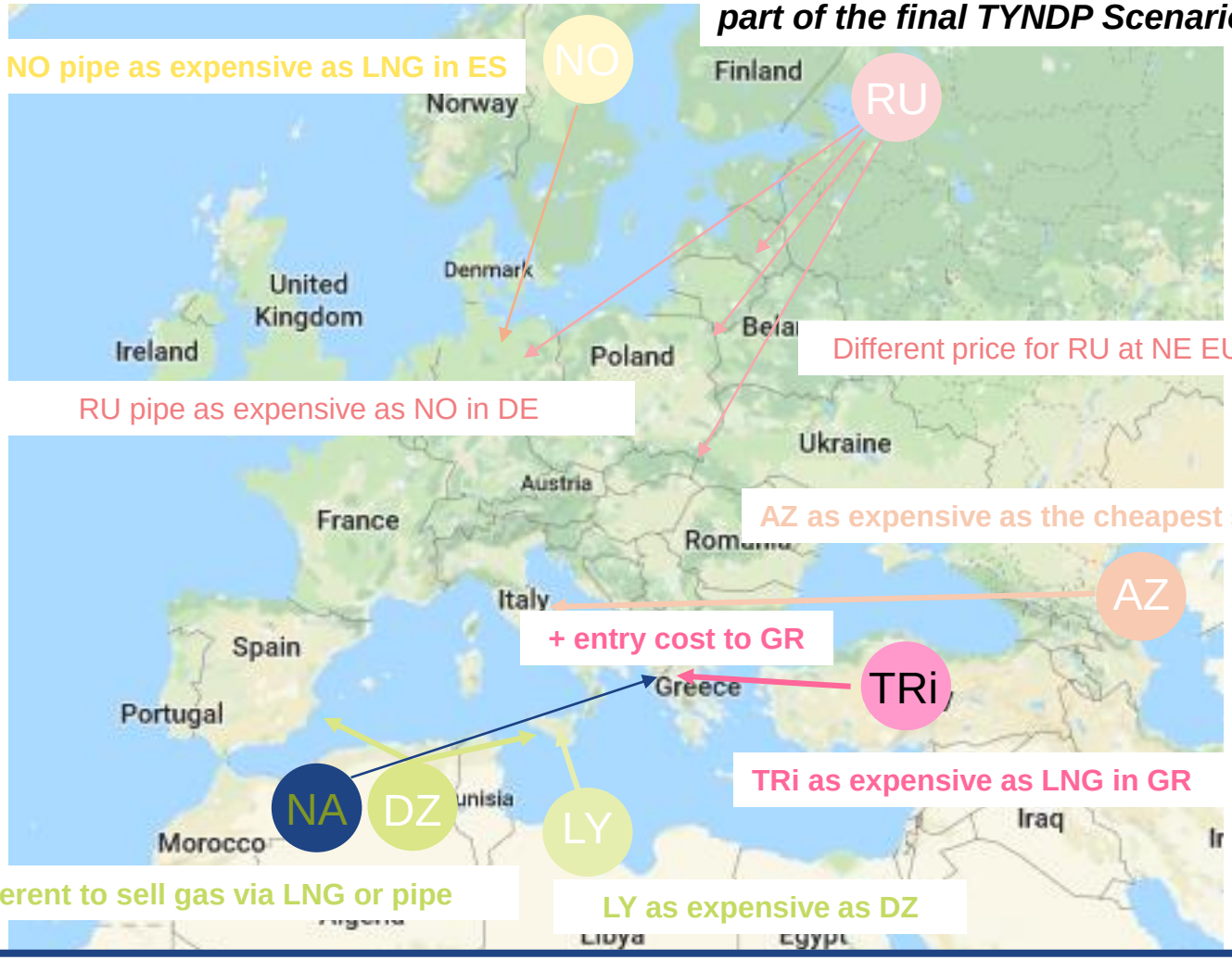
Azeri gas



Azeri gas competing with the cheapest source in IT

Turkey gas

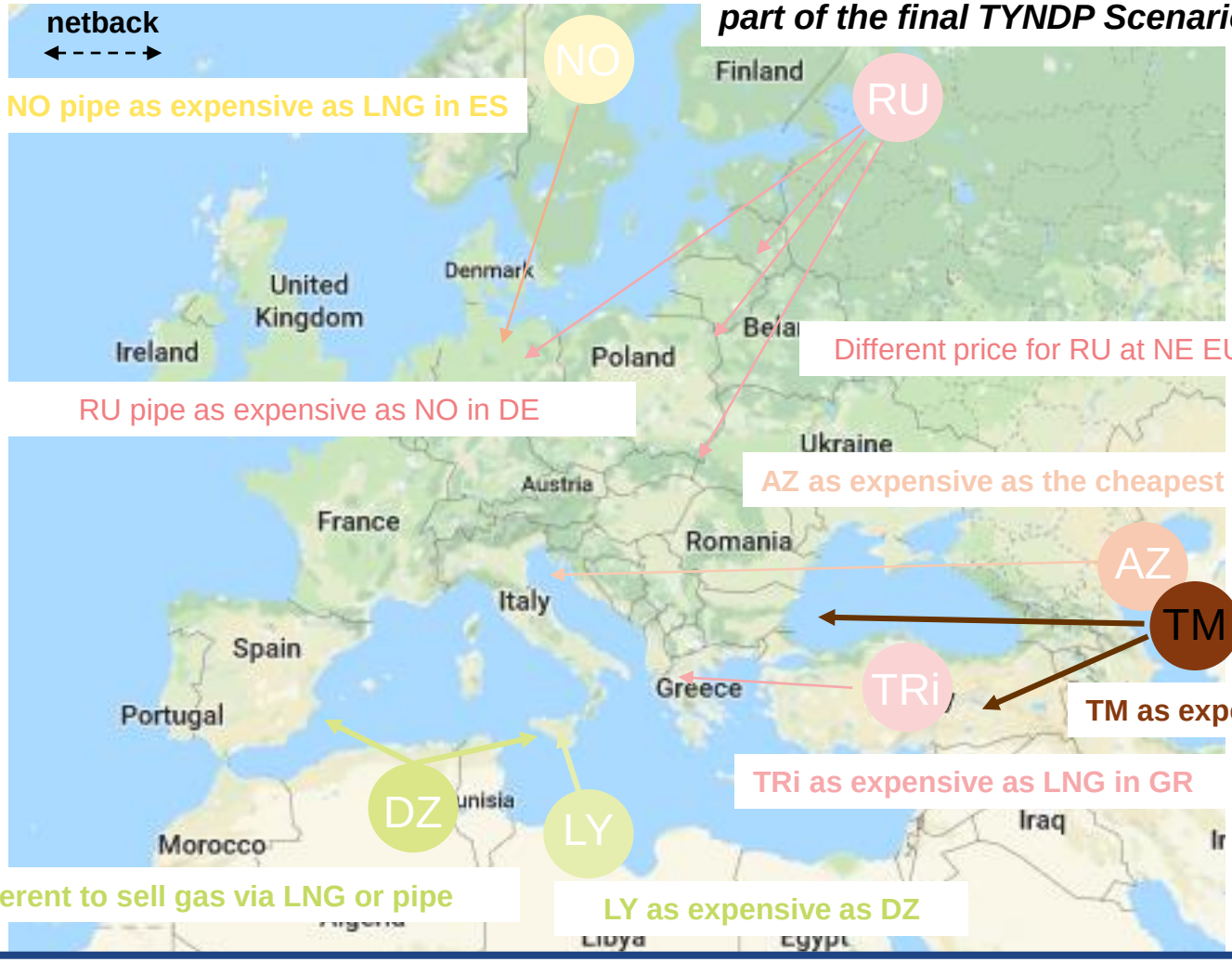
Turkey supply supply potential to be included as part of the final TYNDP Scenario Report



Turkey competing with LNG in Greece

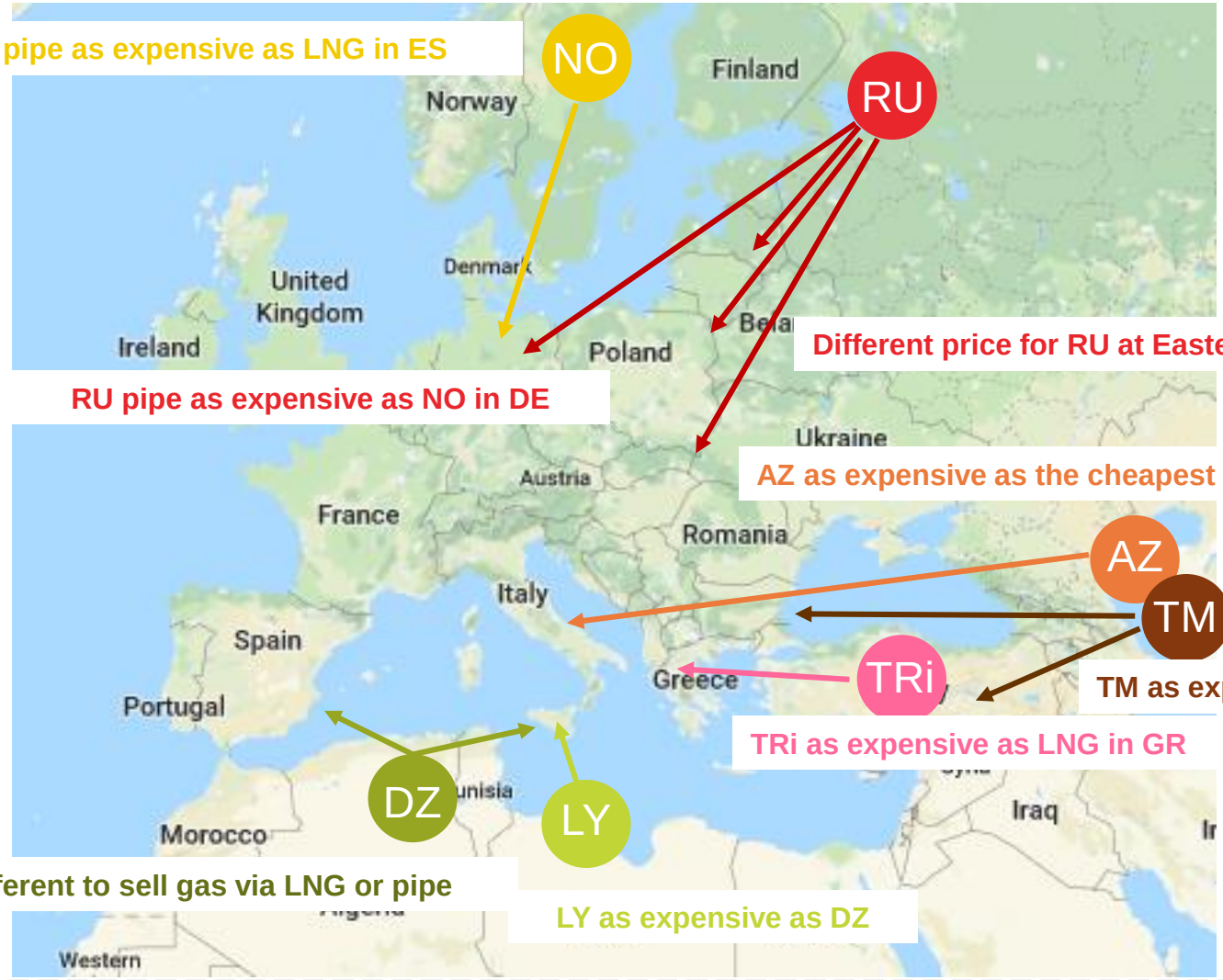
Turkmenistan pipe gas

Turkmenistan supply potential to be included as part of the final TYNDP Scenario Report

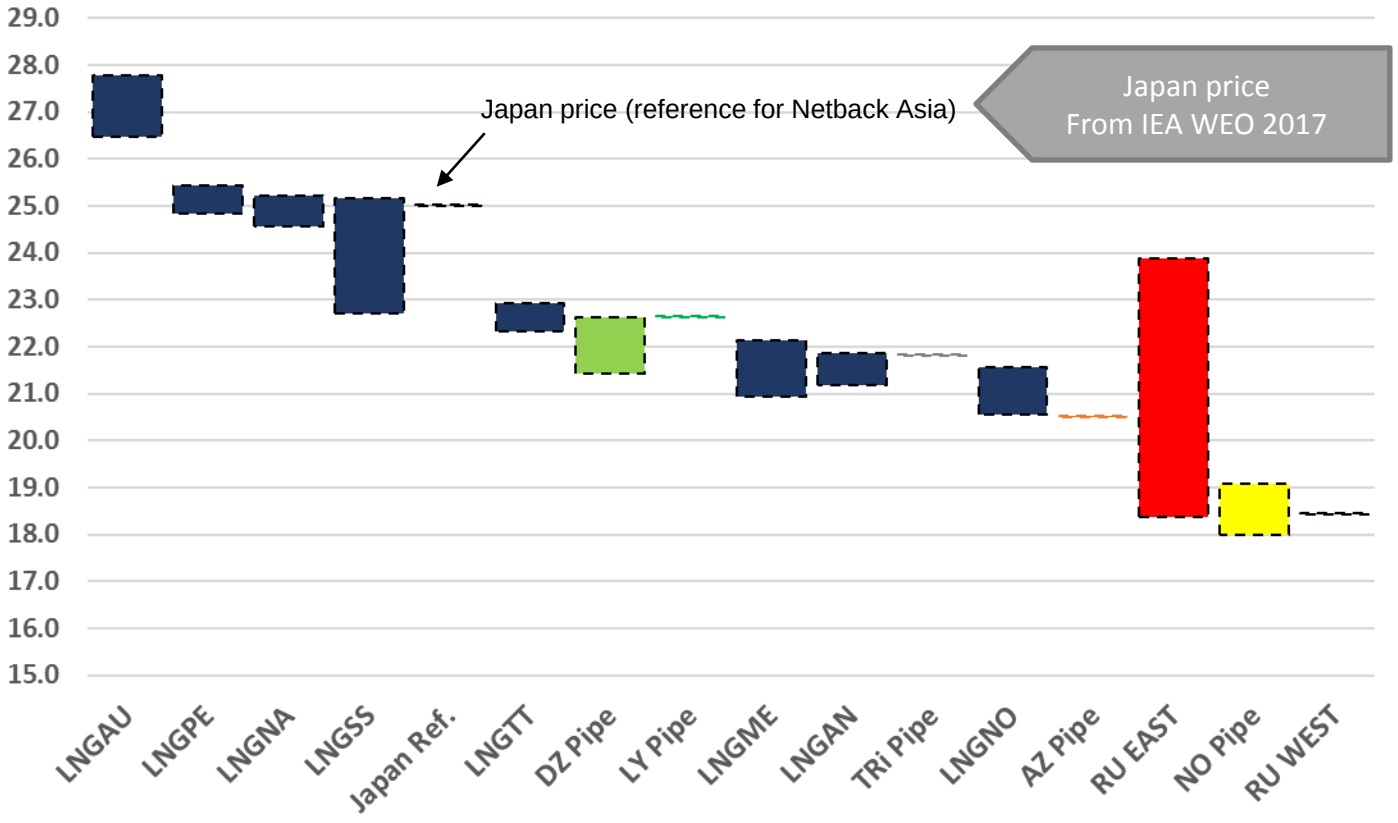


Turkmenistan gas priced as Azeri gas

Overall approach for pipe gas



Supply costs at EU borders



A more refined approach to reflect import price differentiation

reference price + shipping/transportation costs at EU borders

Consideration of meaningful supply configurations

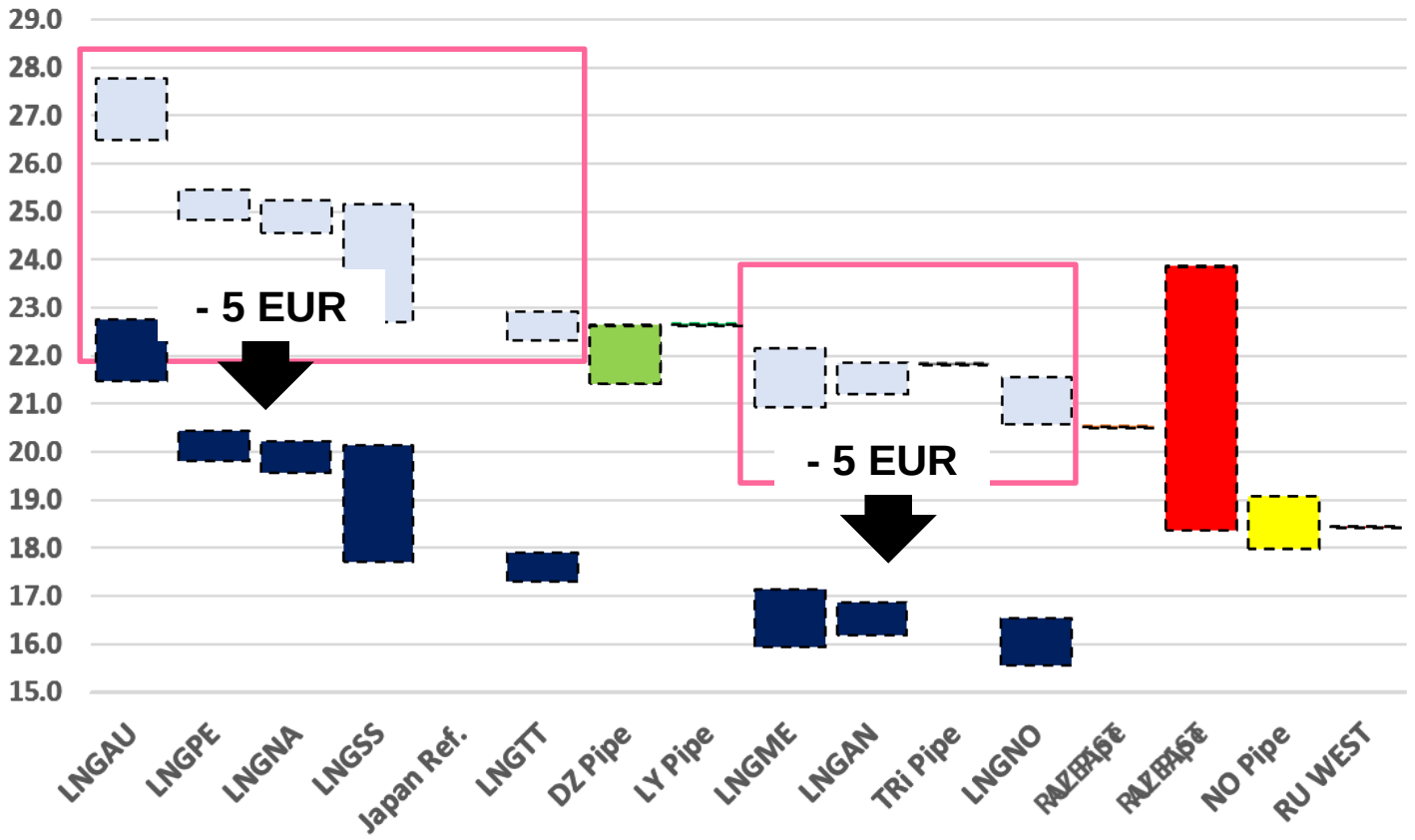
Handled through sensitivities on supply price allowing to minimise and maximise meaningful supply sources

> Focus on limited and significant configurations

- LNG minimisation / maximisation
- Russia minimisation / maximisation
- South gas maximisation

Sensitivities to cover all possible and meaningful supply price "situation"

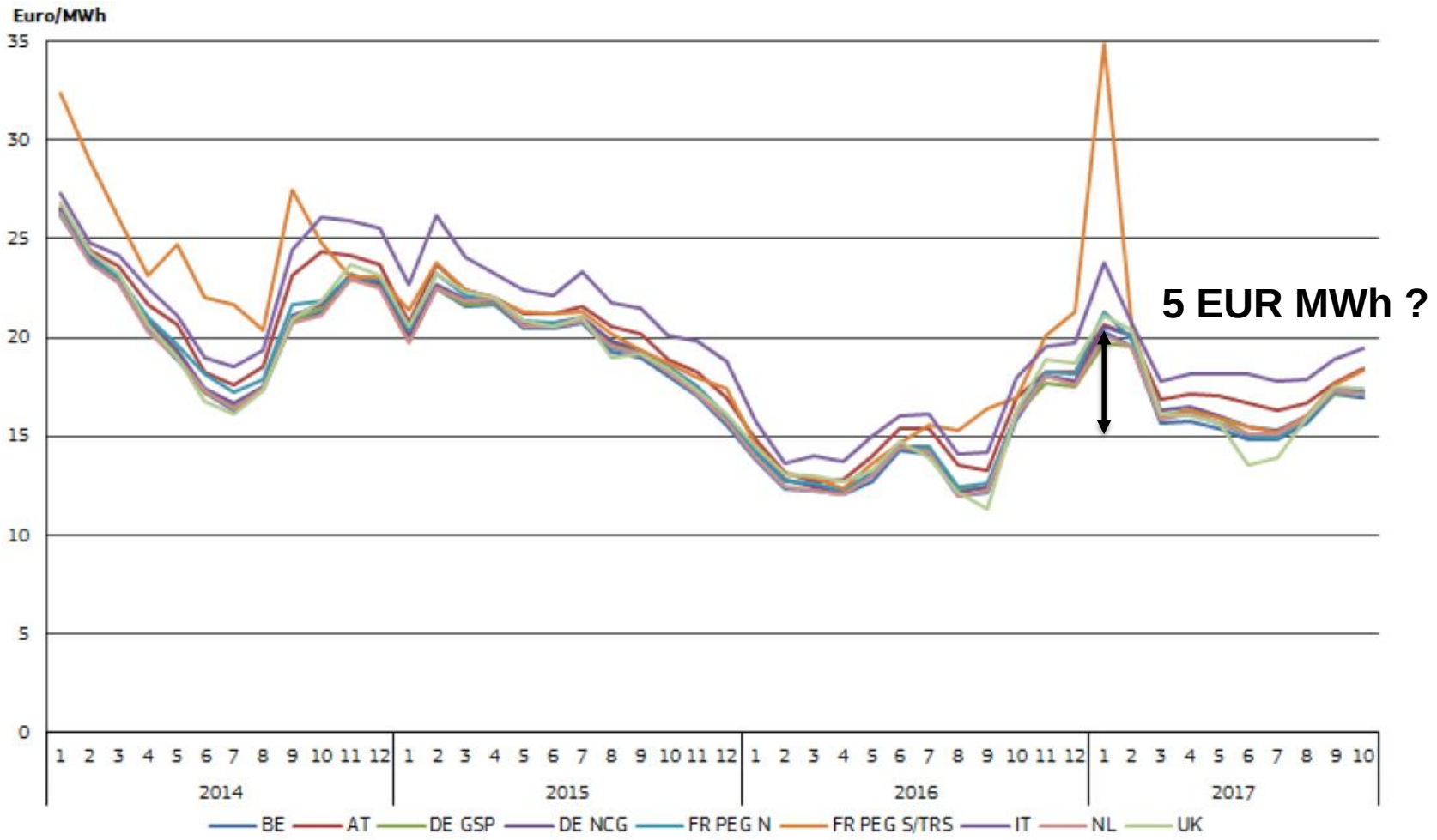
Supply in case of LNG maximisation



LNG cheaper than other sources in LNG maximisation

reference price + shipping/transportation costs at EU borders

Which spread?



Source: EC Quarterly Report (here)

Thank You for Your Attention

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