TYNDP

Planned infrastructure in Central and Eastern Europe

Olivier Lebois,

System Development Business Area Manager

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ENTSOG approach to infrastructure projects

TYNDP as defined under the 3rd Energy Package

> Published every other year

> Supply adequacy outlook

> Identificaiton of infrastructure gap and associated remedies

> Identification of barriers to remedies

> Consistency of European, regional and national investment plans

Project promoters are put at the core of the process

> ENTSOG does not select the projects to be included in the analysis

> A public call based on a single questionnaire in order to:

- Ensure fair treatment of all promoters
  - Transmission – UGS – LNG terminal
  - Regulated – non-regulated
- Get all data necessary to the assessment

Infrastructure assessment within TYNDP 2013

The concept of infrastructure-related market integration

> Market integration is an enabler for the completion of the pillars of the EU Energy Policy:

- Competition
- Security of Supply
- Sustainability

The efficient use of infrastructures under a given supply and demand scenario depends on the implementation of business rules (e.g. network codes) and market behaviour

Use of modelling as part of a scenario-based approach

> ENTSOG has developed a modelling tool representing the European gas market structured along balancing zones

> Different scenarios represent the uncertainty related to the development of infrastructures and supply
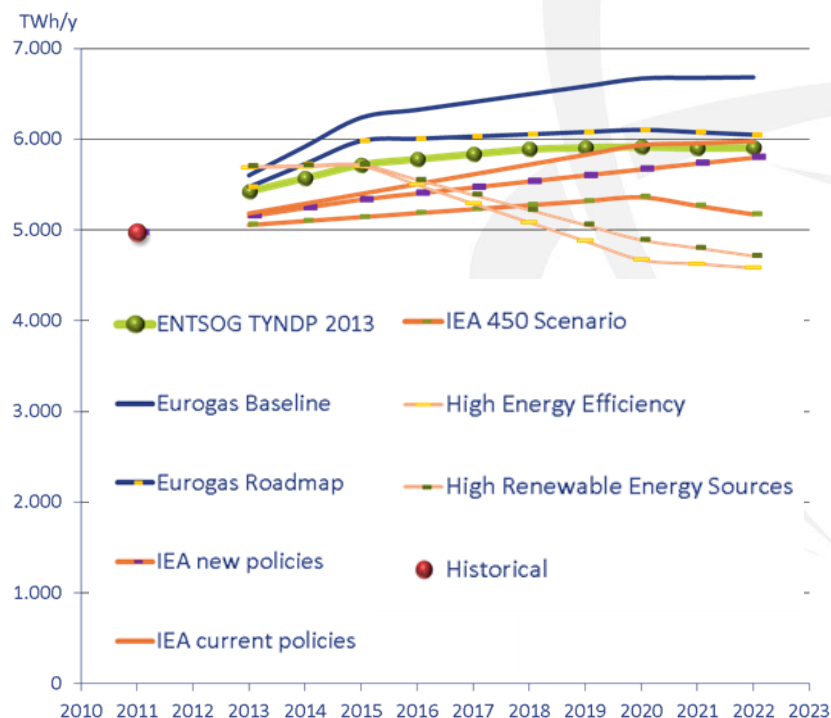
> The assessment is translated into a list of indicators

CEE region in TYNDP 2013-2022
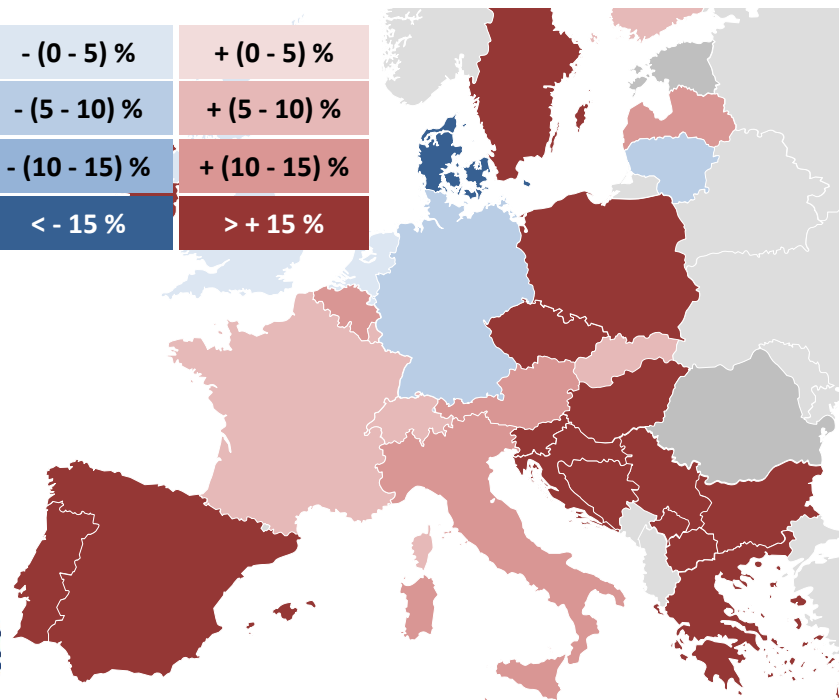
Demand scenario – TSO best estimate

A slow European aggregated growth

> 9% on the 10-year time horizon but with significant discrepancies by sectors and regions:

- Power generation (+33%) vs. Dom&Com&Ind (+1%)
- CEE region vs. decrease in UK, NL, DK & DE

> TSO best estimate is within the range of scenarios but will be very sensible to the evolution of the role of gas especially in power generation
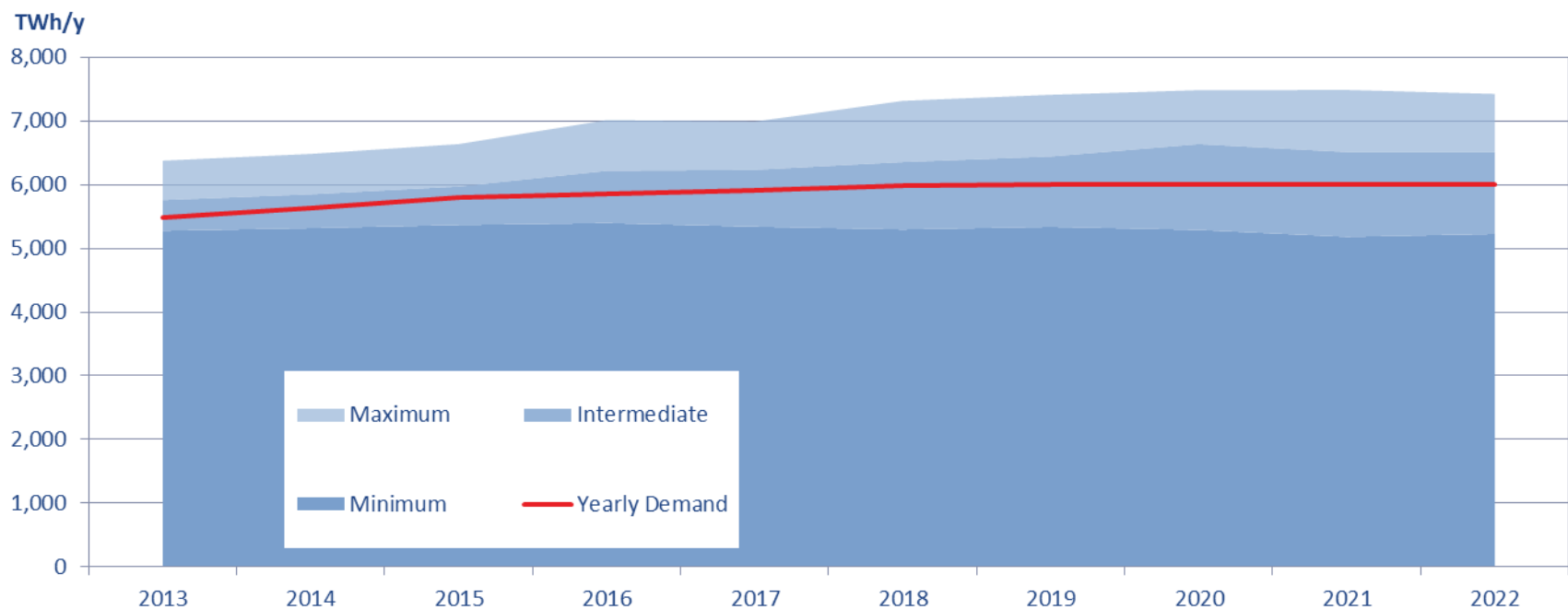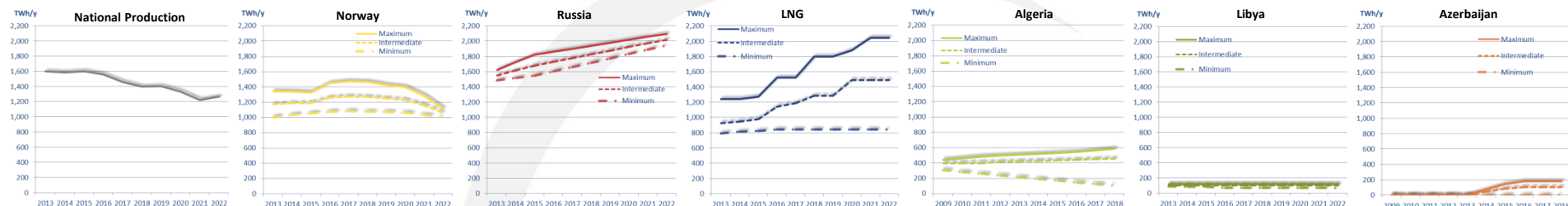

TWh/y

ENTSOG TYNDP 2013	IEA 450 Scenario
Eurogas Baseline	High Energy Efficiency
Eurogas Roadmap	High Renewable Energy Sources
IEA new policies	Historical
IEA current policies	

Demand evolution 2013-2022

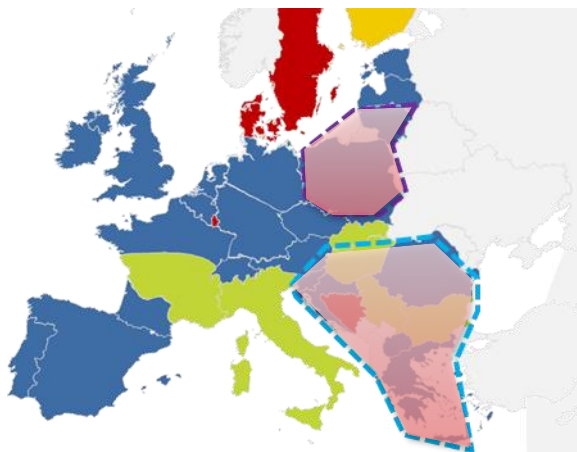| - (0 - 5) %	+ (0 - 5) %
- (5 - 10) %	+ (5 - 10) %
- (10 - 15) %	+ (10 - 15) %
< - 15 %	> + 15 %

Supply Adequacy Outlook

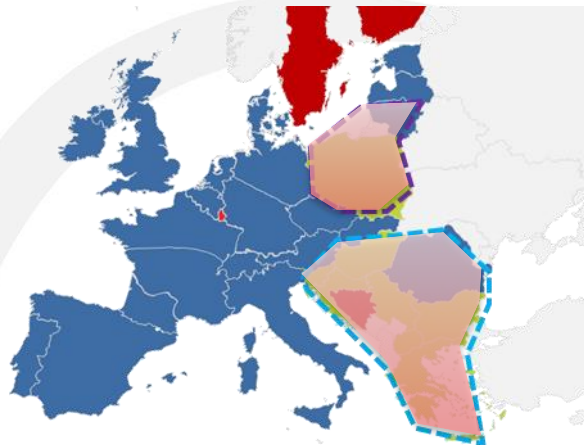## *3 scenarios per source to capture supply uncertainty*

If supply seems to reach Europe on the next 10 years, does it reach every consumer (network assessment) and will it fly away from Europe because of negative gas demand perspective?

Infrastructure resilience under peak conditions

2013

2017 FID

2022 FID
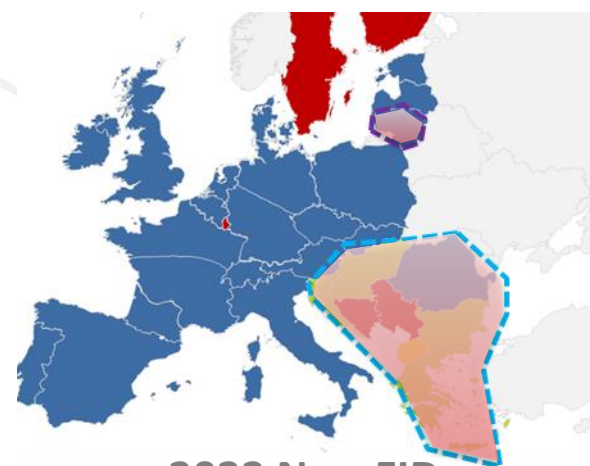
2017 Non-FID
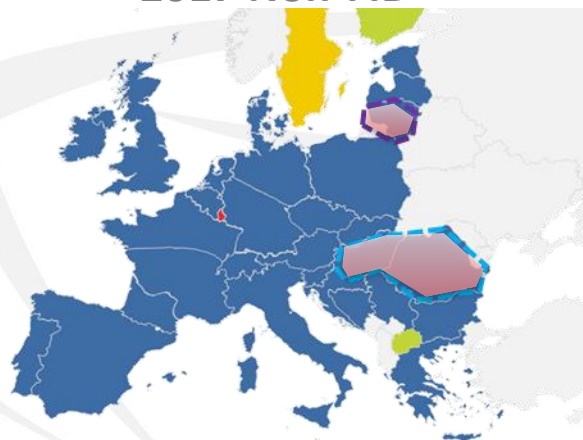
2022 Non-FID

Remaining Flexibility under Reference Case – Design situation

< 1%	1 - 5%	5 - 20%	> 20%

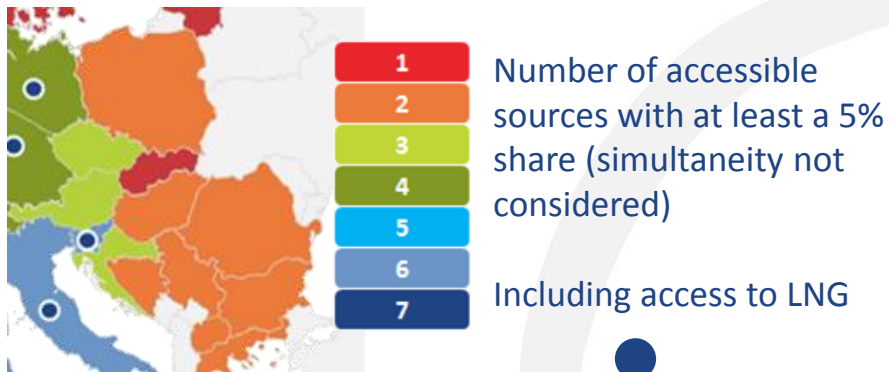**Areas lacking of Remaining Flexibility**

Under disruption of Belarus transit

Under disruption of Ukraine transit

The CEE Region will remain under the threat of demand disruption without new FID decisions

entso**g**

7

Evolution of the yearly supply mix in the CEE Region

2013

2013

Number of accessible sources with at least a 5% share (simultaneity not considered)

Including access to LNG

1	
2	
3	
4	
5	
6	
7	

Minimum share of Russian supply

< 20%
20-40%
40-60%
>60%

Direct access to LNG terminal
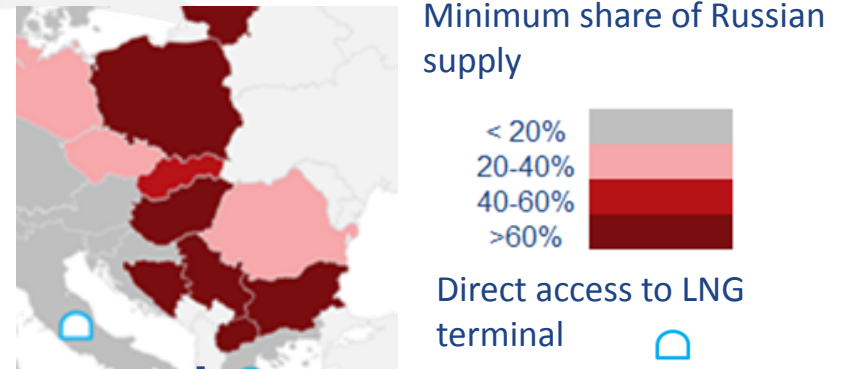
2017 FID   **2022 FID**

2017 FID   **2022 FID**

The need for new projects (both FID and non-FID) in the CEE region in order to lower dependence on Russian supply and increase source diversification

2nd Edition of the CEE GRIP

other GRIPs are: North-West, BEMIP, South-North Corridor, Southern Corridor and South

CEE GRIP 2014-2023 – composition of the region
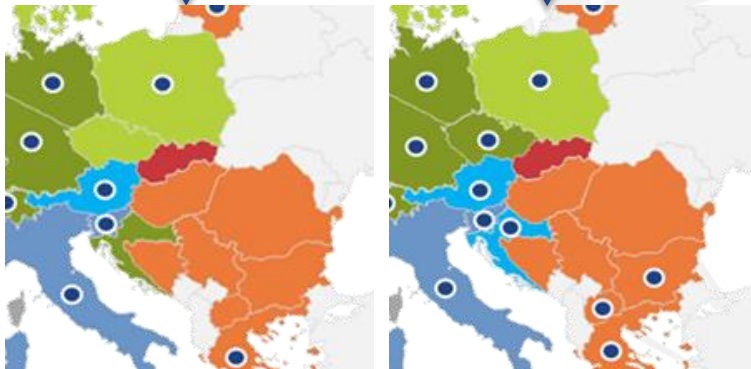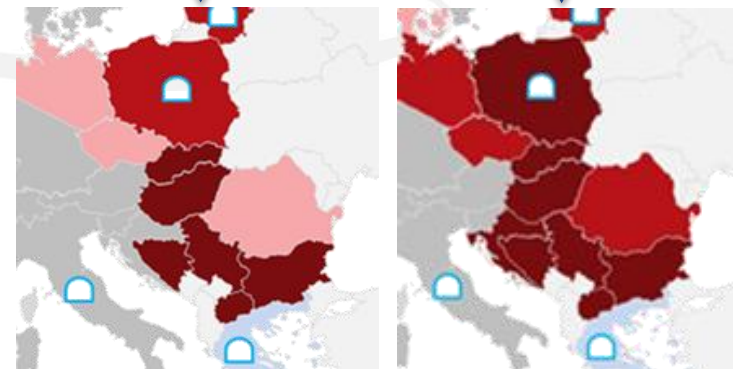
Countries and TSOs involved:

Austria	BOG GmbH
	TAG GmbH
	GAS CONNECT AUSTRIA GmbH
Bulgaria	Bulgartransgaz EAD
Croatia	Plinacro d.o.o.
Czech Republic	NET4GAS, s.r.o.
Germany	GRTgaz Deutschland GmbH
	ONTRAS – VNG Gastransport GmbH
	Open Grid Europe GmbH
	GASCADE Gastransport GmbH
	terranets bw GmbH
Hungary	FGSZ Ltd.
Poland	GAZ-SYSEM S.A.
Romania	Transgaz SA.
Slovenia	PLINOVODI d.o.o.
Slovakia	eustream, a.s.

Central Eastern Europe GRIP — MAIN REPORT

The CEE GRIP region covers 10 countries, with the involvement of 16 TSOs

CEE GRIP 2014-2023 – main facts

The report builds on

> Conclusions of the 1st edition of the CEE GRIP

> Stakeholder feedback

> Methodology applied in TYNDP 2013-2022

Objectives of CEE GRIP

> Better connection of regional markets

> Increase of SoS in the region

> Identification of potential additional capacity (investment) needs

Scope of CEE GRIP

> Supply & Demand analysis

> Network modelling

> N-1 analysis

> Identification of investment barriers in the region

Published on 19 may 2014, CEE GRIP is the most up-to-date source of data on the network development in the CEE region

Investment in the CEE Region

Legend:
- Transmission Projects – FID
- Transmission Projects – non-FID
- LNG Projects – FID
- LNG Projects – non-FID
- UGS Projects – FID
- UGS Projects – non-FID
- Power to gas projects – non-FID

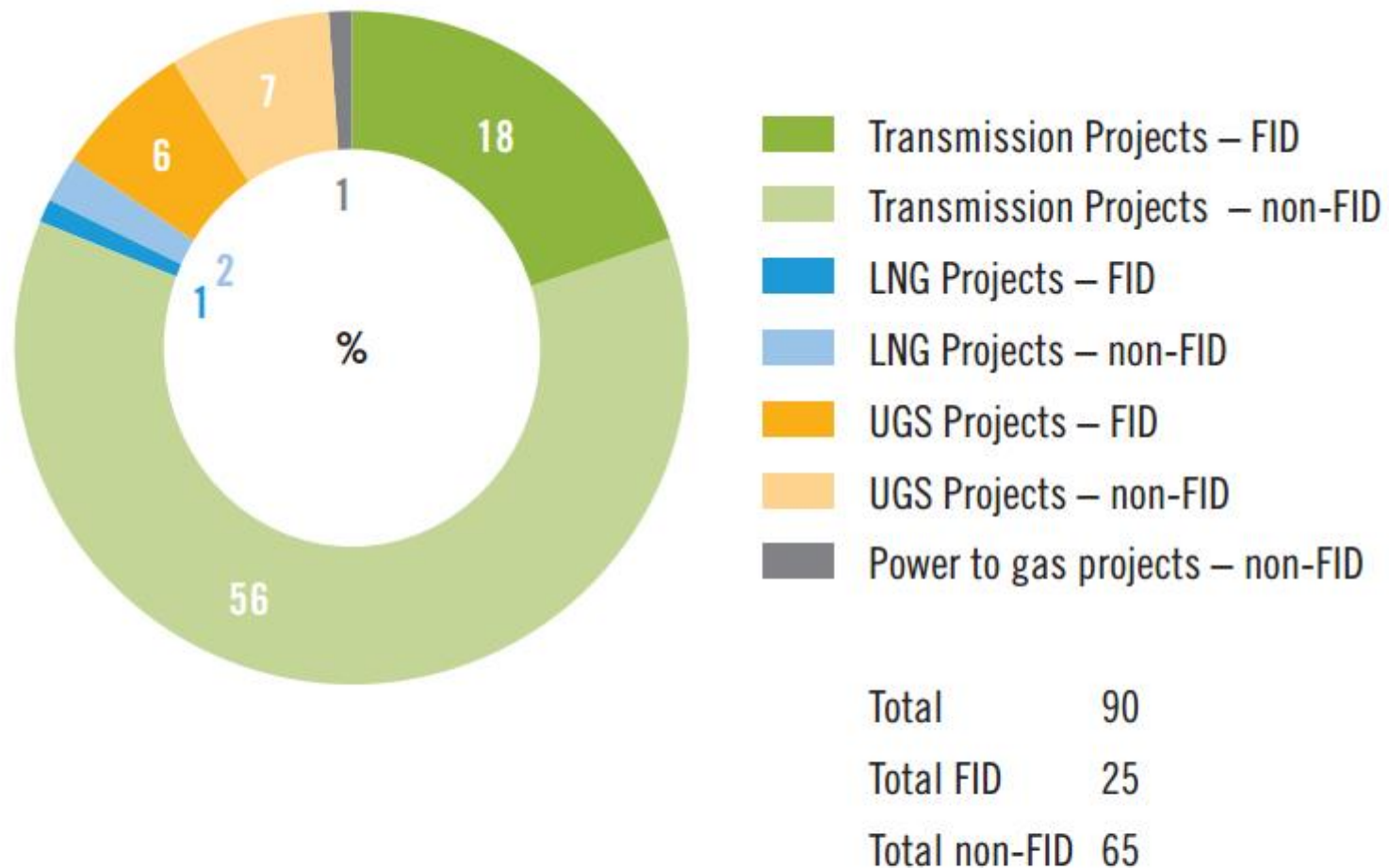|	
Total	90
Total FID	25
Total non-FID	65

Figure 1: Number of investment projects in CEE GRIP 2014–2023 per type and implementation status

New TEN-E Regulation

from an overall assessment to a project-specific assessment

New TEN-E Reg.: Project-Specific assessment

ENTSOG cannot provide any judgement of value on projects

> ENTSOG work on identifying:
- Investment "gaps" related to the ability to meet demand
- Remedies among a list of projects provided by promoters
- The range of possible evolution of the infrastructure-related market integratoin

> TYNDP and similar reports contribute to inform decision-makers (market or institutions) about to commit into a project, it does not replace their decision nor their firm commitment

> ENTSOG has no ground (e.g. Knowledge on LT market needs, supply portfolio...) to select or rank projects

> Doing so, ENTSOG would destroy the trust of market and institutions

TYNDP methodology as a basis for project-specific assessment

> The application of TYNDP assessment using an incremental approach can identify the marginal impact of a project

> This is the basis of the CBA methodology drafted by ENTSOG but to be applied by project promoters themselves

The structure of the ESW-CBA
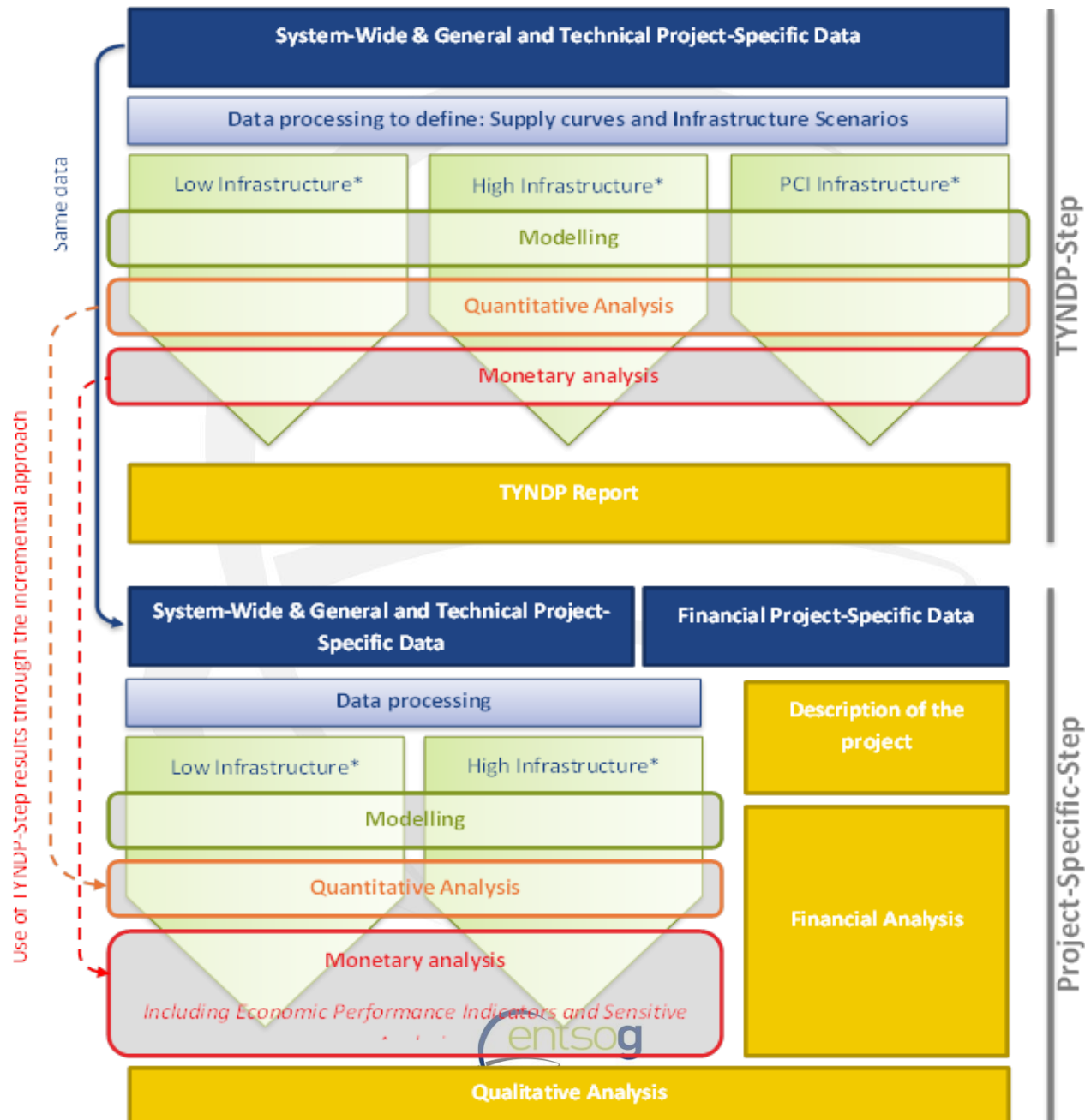
Input data

Time horizon

> 21 years starting from the year 'n' of analysis, this time 2015

> Input data are defined for the years n, n+5, n+10, n+15 and n+20
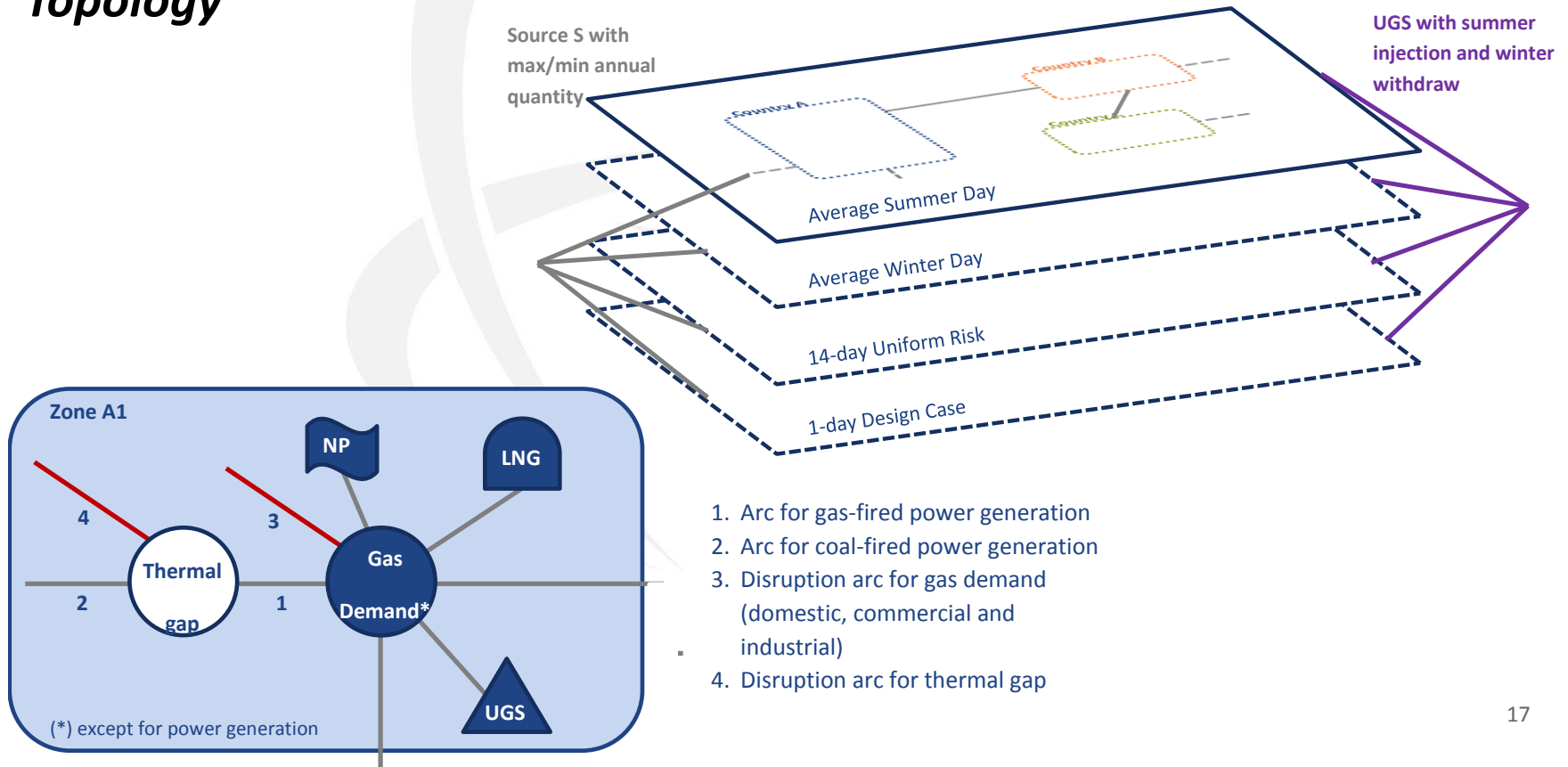
Categories of data

> System-wide data: related to existing infrastructures, gas demand and supply, power generation and coal.
  - o **References defined as part of the methodology**
  - o **Will be included in TYNDP**

> Project-specific data: related to each project as provided by its promoter and including:
  - General and technical data: as part of the call for infrastructure projects launched by ENTSOG ahead of each TYNDP report
    - o **Resulting from TYNDP Call for infrastructure projects**

  - Financial data: used by the promoter in the last stage of the PS-Step (including CAPEX, OPEX, Financial Discount Rate and Amortization period)
    - o **To be used by project promoters in the final stage of the Project-Specific data**

The modelling approach

Evolution of the approach used since 2011

> Yearly optimization

> Use of fuel and CO2 cost

> Modelling of power generation

Topology

Source S with max/min annual quantity

UGS with summer injection and winter withdraw

Average Summer Day

Average Winter Day

14-day Uniform Risk

1-day Design Case

Zone A1

NP

LNG

4

3

Thermal gap

Gas Demand*

2

1

UGS

(*) except for power generation

1. Arc for gas-fired power generation
2. Arc for coal-fired power generation
3. Disruption arc for gas demand (domestic, commercial and industrial)
4. Disruption arc for thermal gap

Objective function and Social Welfare

Optimization of the European bill

> The tool defines the flow pattern minimizing the gas, coal and CO2 bill for Europe (different than national optimums)

> Specific calculation for project bringing gas into new areas (e.g. Malta)

> The cost of using infrastructures is not considered
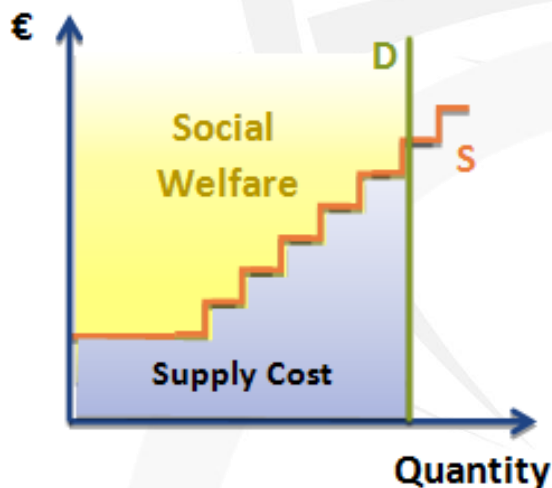
Calculation of social welfare

> At European level

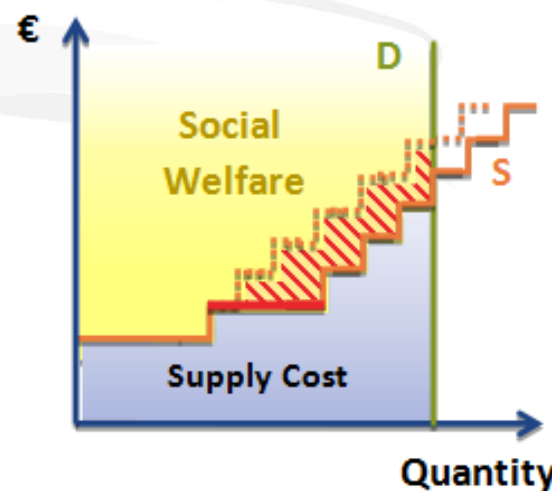Figure 9a - Social Welfare with inelastic demand before the project

Figure 9b - Social Welfare with inelastic demand after the project

> Split per country based the iterative process resulting in the construction of the supply curve per country

Indicators

	Assessed aspects	Addressed Specific Criteria			
		SoS	Sust.	Comp.	Mkt. Int.
Capacity-based indicators	« N-1 »	X			
	Bi-directional	X			X
	Import Rte Diversification	X		X	X
Modelling based indicators	Supply Source Price Diversification	X		X	X
	Supply Source Price Dependence	X		X	X
	Cooperative Supply Source Dependence	X		X	
	Uncooperative Supply Source Dependence	X		X	
	Remaining Flexibility	X			X
	Disrupted demand	X			
	Price convergence			X	X

Performance Indicators

Provide a synthetic view of project benefits

> For Promoters through the Financial Performance Indicators
- FPIs are calculated with the Financial Discount Rate defined by each promoter

> For EU Society (including Promoters) through the Economic Performance Indicators
- The analysis of project benefits should also consider the other indicators and the net Social Welfare per country
- The EPIs are calculated using a 4% Social Discount Rate
- The sensitivity of EPIs to CAPEX, OPEX and date of commissioning is also analysed

The indicators

> Net Present Value

> Internal Rate of Return

> Benefit/Cost Ratio

$$ENPV = \sum_{t=f}^{c+19} \frac{R_t - C_t}{(1+i)^{t-n}}$$

$$EB/C = \frac{\sum_{t=f}^{c+19} \frac{R_t}{(1+i)^{t-n}}}{\sum_{t=f}^{c+19} \frac{C_t}{(1+i)^{t-n}}}$$

Qualitative Analysis

Commenting on Quantitative and Monetary Analyses

Monetization of disruption

> Let open to promoters initiative as there is no common definition of Cost of Disruption, occurrence, type of disruption

Description of additional benefits

> For example: other emissions than CO_2, support to RES intermittency, lifting isolation, bunkering…

Identification of the Area of Analysis

Environmental Impact indicator

Section of the project	Stage of the project	Type of infrastructure	Surface of impact	Environmentally sensitive area	Mitigation measures
Section 1					
Section 2					

Interaction between projects

Thank You for Your Attention

Olivier Lebois
Business Area Manager, System Development

ENTSOG -- European Network of Transmission System Operators for Gas
Avenue de Cortenbergh 100, B-1000 Brussels

EML: olivier.Lebois@entsog.eu
WWW: www.entsog.eu