TYNDP

Planned infrastructure in Central and Eastern Europe

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ENTSOG approach to infrastructure projects

TYNDP as defined under the 3rd Energy Package

> Published every other year
> Supply adequacy outlook
> Identification 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
    o Transmission – UGS – LNG terminal
    o 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

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**Demand evolution 2013-2022**

- (-5 - 10%)  
- (5 - 10%)  
- (10 - 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

Remaining Flexibility under Reference Case – Design situation

Areas lacking of Remaining Flexibility

Under disruption of Belarus transit

Under disruption of Ukraine transit

2017 FID

2022 FID

2017 Non-FID

2022 Non-FID

The CEE Region will remain under the threat of demand disruption without new FID decisions
Evolution of the yearly supply mix in the CEE Region

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.

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

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

- Transmission Projects – FID: 18
- Transmission Projects – non-FID: 7
- LNG Projects – FID: 6
- LNG Projects – non-FID: 1
- UGS Projects – FID: 1
- UGS Projects – non-FID: 2
- Power to gas projects – non-FID: 1

Total 90
Total FID 25
Total non-FID 65
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

System-Wide & General and Technical Project-Specific Data

Data processing to define: Supply curves and Infrastructure Scenarios

Low Infrastructure*  
High Infrastructure*  
PCI Infrastructure*

Modelling

Quantitative Analysis

Monetary analysis

TYNDP Report

System-Wide & General and Technical Project-Specific Data

Financial Project-Specific Data

Data processing

Low Infrastructure*  
High Infrastructure*

Modelling

Quantitative Analysis

Monetary analysis

Including Economic Performance Indicators and Sensitive

Description of the project

Financial Analysis

Qualitative Analysis

Use of TYNDP-Step results through the incremental approach
**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.
  - References defined as part of the methodology
  - 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
    - 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)
    - 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**

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

![Diagram showing the modelling approach](image-url)
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

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

<table>
<thead>
<tr>
<th>Assessed aspects</th>
<th>Addressed Specific Criteria</th>
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<tbody>
<tr>
<td><strong>Capacity-based indicators</strong></td>
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<tr>
<td>« N-1 »</td>
<td>X</td>
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<tr>
<td>Bi-directional</td>
<td>X</td>
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<td>Import Rte Diversification</td>
<td>X</td>
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<tr>
<td><strong>Modelling based indicators</strong></td>
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<tr>
<td>Supply Source Price Diversification</td>
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<td>Supply Source Price Dependence</td>
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<td>Cooperative Supply Source Dependence</td>
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<td>Uncooperative Supply Source Dependence</td>
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<td>Remaining Flexibility</td>
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<td>Disrupted demand</td>
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<td>Price convergence</td>
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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 CO2, support to RES intermittency, lifting isolation, bunkering...

Identification of the Area of Analysis

Environmental Impact indicator

<table>
<thead>
<tr>
<th>Section of the project</th>
<th>Stage of the project</th>
<th>Type of infrastructure</th>
<th>Surface of impact</th>
<th>Environmentally sensitive area</th>
<th>Mitigation measures</th>
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<tr>
<td>Section 1</td>
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Interaction between projects
Thank You for Your Attention

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