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2nd Technical Workshop: Gas Market Design and Natural Gas Transmission Grid Codes

Regulatory Investment Guide for Assessing Natural Gas Ten-Year Network Development Plans and Constituent Projects

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TYNDP system-wide assumptions

TYNDP specific projects' description and categorization

Specific projects appraisal

Specific projects financial analysis

Specific projects cost-benefit analysis

Sensitivity and risk analysis

Prioritization of projects

Regional projects approach



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TYNDP system-wide assumptions

Assessing reasonableness of TYNDP system-wide input data assumptions concerning:

- Gas demand scenarios (including gas volumes detailed by sector and key customers, peak demand and seasonal profiles)
- Gas supply scenarios (include assumptions for flexibility of supply within the seasons of the year and under high demand situations)
- Gas infrastructure “reference grid”
- Other assumptions, including technical capacities, alternative fuel prices, efficiency factors for gas and other fuels in electricity production, gas other fuels CO2 emissions, CO2 emission prices etc



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Review of TYNDP specific projects' definition and categorization

Ensuring that:

- Information included for specific projects in the TYNDP is adequate i.e.(clear project rationale, description, technical information, investment costs etc.)
- Each project is a self-sufficient unit of analysis - avoidance of under scaling or over scaling of projects

Ensuring that projects are assigned to one of the following categories, based on their characteristics:

- **Category 1:** Projects concerning system integrity and continuity of supply
- **Category 2:** Projects concerning system security of supply
- **Category 3:** Projects concerning system expansion

Projects in each category are appraised under a different process and are prioritized based on their category.



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Specific projects appraisal

- Compliance with legal/regulatory obligations
- Reasonableness of capex and opex estimates (use of international and/or national benchmarks)
- Supporting technical and environmental feasibility analysis (at least a pre-feasibility study).
- Existence of Option analysis - technical, economic, environmental aspects and risks of a project under a range of options to identify the most optimal solution



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Specific projects appraisal

- Differences in appraisal process according to project category:
 - For **Category 1 projects**, focus is on checking rationale and alleged compliance with legal/regulatory obligations, assessing cost reasonableness, and ensuring optimal cost/benefit ratio (options analysis performed by TSO). Full CBA requirement for larger projects.
 - For **Category 2 projects**, focus is on both financial and CBA analysis. Projects that are not financially viable but are nevertheless shown to be economically attractive under CBA could be considered for implementation. Nevertheless, in such cases, TSO should pursue possibilities to secure grants (PECI status, IPA funding etc) so as to mitigate increases in UoS tariff.
 - For **Category 3 projects**, focus is on financial analysis. Projects that are not financially viable should not proceed. CBA could be requested for more strategic projects, but even if these are shown to be economically attractive, they should be considered for implementation only if grants can be secured.



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Specific projects financial analysis

- Basic principles/concepts
 - Discounted Cash Flow method
 - Incremental Approach
 - Assessment of only “direct” costs and revenues from the project to the TSO
 - Discount rate (WACC)
 - Impact on use-of-system tariffs
 - Financial attractiveness – FIRR, FNPV
- Period of analysis
- Residual value
- Description of the techniques of cashflows discounting and the formulas for deriving FNPV and FIRR.
- Assessing impact of a project on the average use-of-system tariff.
- Discussion on the interpretation of financial analysis results of each project type
- Case studies



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Specific projects cost-benefit analysis

- **CBA basic principles/concepts**
 - Incremental approach to cost/benefit assessment
 - Social opportunity costs
 - Social discount rate (SDR)
 - Microeconomic approach to monetisation – shadow prices
 - Exclusion of indirect and wider effects from the analysis
- Description of **economic benefits** associated with gas infrastructure projects:
 - diversification of supply route or supply sources for gas
 - increase of capacity to accommodate increased gas demand
 - increase of security and reliability of supply
 - improved network efficiency



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Specific projects cost-benefit analysis

- Approach to **monetizing economic benefits**
- Use of (and sources for) **benchmarks/shadow prices** for calculation of economic benefits
- Economic attractiveness indicators - **ENPV, ERR** and **B/C** ratio
- **Interpretation of economic analysis results**
- **Case studies**



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Sensitivity and risk analysis

- Approach to and techniques for conducting **sensitivity analysis**, both for financial analysis and for CBA
- identification of **the ‘critical’ variables of the project** i.e. those variables whose variations have the largest impact on the project’s financial and/or economic performance (change on the FRR, FNPV)
- assessment of **risk levels** i.e. probability of adverse events to occur times severity of their impact on the project)
- Identification of potential **risk mitigation/prevention** measures
- Identification of **who is responsible for implementation of mitigation measures and their timing**



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Prioritization of projects

- **Prioritization of projects within each of 3 categories**
- **Multi-criteria analysis (MCA) approach to project prioritization** - comparison of projects against multiple appraisal indicators, with weights attached to each indicator, and subsequent scoring of projects
- **Criteria include CBA economic performance indicators and qualitative indicator(s) reflecting project preparedness/maturity**
- **Additional quantitative indicators can be included in MCA for Regional projects** e.g. for cross-border projects or national projects that impact cross border capacity and/or flows
- Such capacity based quantitative indicators include **Import Route Diversification (IRD) and N-1 indicator**



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Review of prioritization of projects by Category

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Regional Projects approach

The necessity for having a regional approach to complement and inform national-level methodologies

- The project's first goal is assisting regulators with drafting national-level methodologies
- **However, a CBA conducted with a national-level methodology only includes costs and benefits on one side of the border**, so there is value in considering a regional approach or methodology
- **A regional perspective encompasses “regional” projects** - i.e. those projects that are cross-border projects or national projects impacting cross-border capacity and/or flows
- For regional projects, it is necessary for a **joint CBA for the entire cross-border project** that takes into account infrastructure plans, costs and benefits on both sides of the border.



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Regional Projects approach

The dimensions of Regional approach

- A **joint CBA for regional projects is not so much involving a different CBA methodology**, but a different process to be followed by TSOs and regulators to reach a commonly agreed framework in regards to appraisal
- There is **value of TSOs and NRAs cooperating and working together** to develop projects of regional impact: ensuring a common approach by agreeing on design, cost & benefits assumptions
- The **USAID-supported USEA project** is working with countries in Southeast Europe and neighboring countries (e.g., Croatia, Ukraine, Bulgaria, Romania, etc.) on **network modelling at the national and regional level**. This could help indicate projects of regional importance, to be further assessed
- **Market flow modelling** could then support the assessment of the wider regional impact of projects on security of supply and welfare



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Regional Projects approach

The determinants of a regional approach

- At the next workshop, we will have to clarify key objectives and targets for a regional approach (i.e., what is most useful to the group), potential regional groupings, prerequisites and constraints