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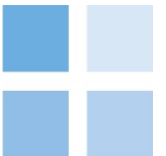
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# Monitoring and evaluation of the impact of the gas network codes and guidelines on the internal market

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Presentation to ACER – GRI Coordination Group

October 2015





- 1** Scope and objectives of the study
- 2** Analytical framework
- 3** Network code desired effects
- 4** Proposed network code indicators
- 5** Proposed high-level policy goal indicators

# Scope and objectives of the study



Main objective: develop two sets of indicators to measure: (1) the impact of network codes on internal gas market; and (2) achievement of high-level policy goals established by the Third Package.

- **Network codes and guidelines considered:**

- **Congestion management procedures** guideline (CMP GL)—applicable since October 2013;
- **Capacity allocation mechanisms** (NC CAM)—applicable from November 2015;
- **Balancing network code** (NC BAL)—applicable from October 2015;
- **Harmonised transmission tariff structures** (NC TAR)—currently being developed;
- **Incremental capacity amendment** (INC)—currently being developed;
- Other existing/planned network codes (e.g., interoperability and data exchange network code, adopted in April 2015) were outside scope.

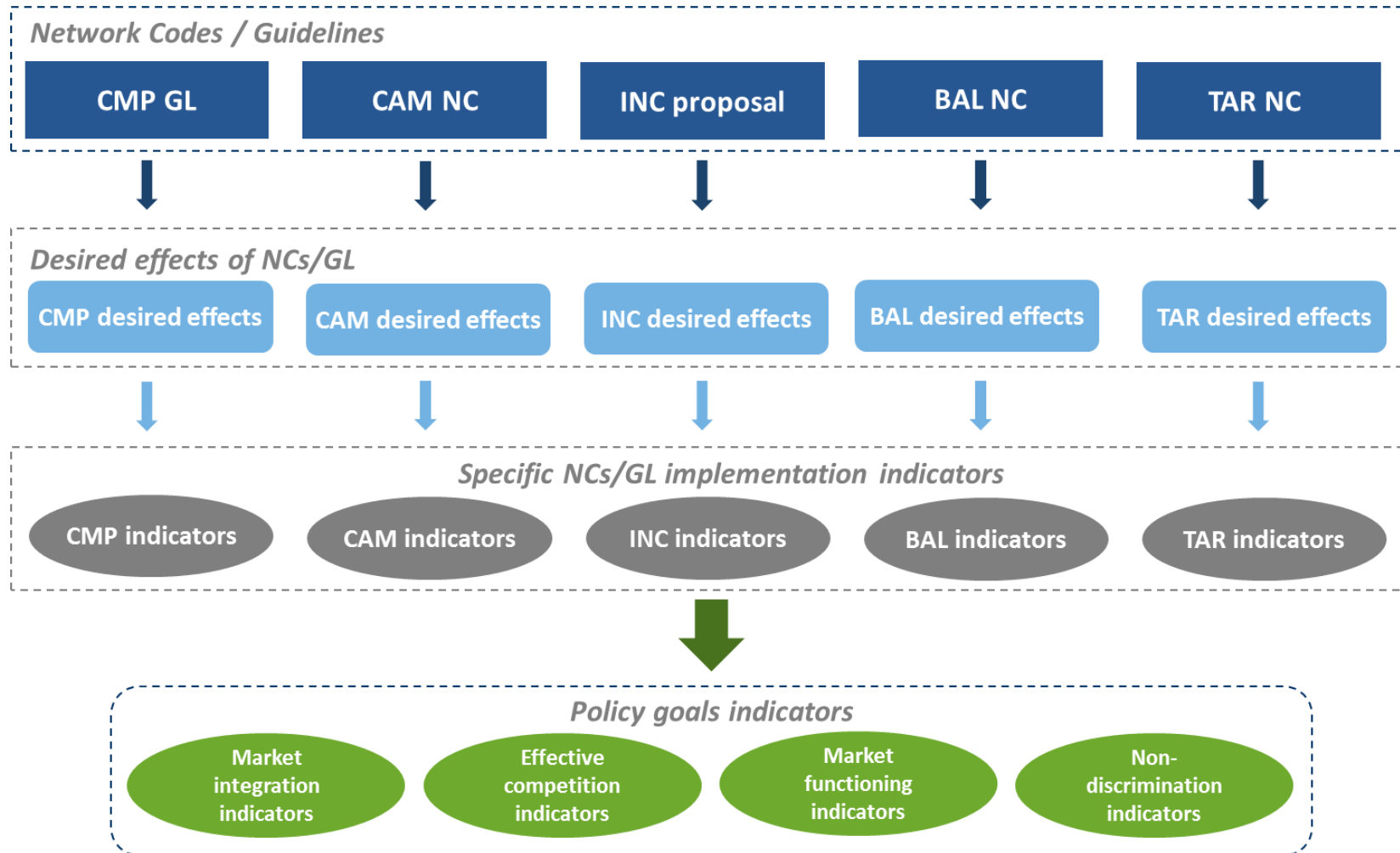
- **High-level policy goals from the Third Package (Regulation (EC) No 715/2009)**

- effective competition;
- efficient market functioning
- market integration; and
- non-discrimination;

# Analytical framework



Used to identify indicators suitable for measuring impacts/outcomes

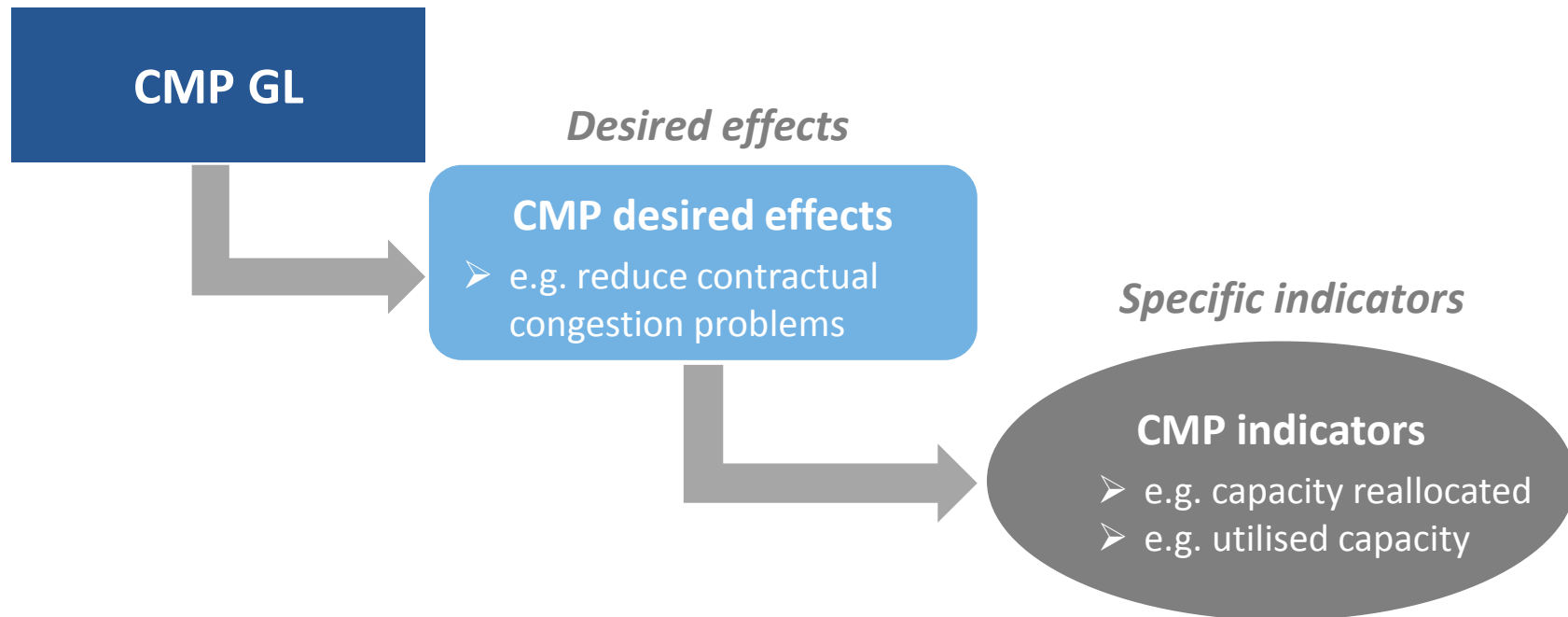


# Reasoning steps for network code indicators



Establishing a link between network code desired effects and quantifiable indicators

*Network Codes / Guidelines*



# Reasoning steps for high-level policy goal indicators



Establishing a link between policy goals and quantifiable metrics

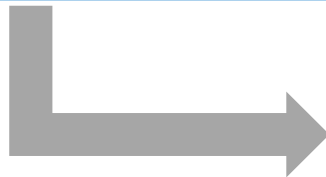
*Policy goal*

**Effective competition**



*Measurement approach*

- e.g. structural, behavioural, market performance
- e.g. ex-ante vs. ex-post



*Policy goal indicator*

**Indicators**

- e.g. HHI
- e.g. price-cost margins

# Desired effects of Network Codes and Guidelines



Problems/ issues	Desired effect/outcome	How it may advance high-level policy goals?
<b>Congestion management procedures (CMP Guideline)</b>		
<ul style="list-style-type: none"> <li>• Contractual congestion in the presence of unused technical capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Additional capacity offered</b> by TSOs through reoffering of already booked, but unused capacity (and purchased when there is demand for it);</li> <li>• <b>Coherent application of CMP procedures</b> either side of IPs;</li> <li>• <b>Unused firm technical capacity</b> due to contractual congestion is minimised;</li> <li>• Persistent <b>price differentials</b>, in excess of transportation and transaction costs, do not exist between entry-exit zones in the absence of physical congestion between them.</li> </ul>	<p><b>Efficient market functioning</b></p> <ul style="list-style-type: none"> <li>• Enhance overall market efficiency by better network utilisation;</li> </ul> <p><b>Effective competition</b></p> <ul style="list-style-type: none"> <li>• Increase liquidity in both capacity and commodity markets;</li> <li>• Support market entry by preventing long- and short-term capacity foreclosure;</li> </ul> <p><b>Market integration</b></p> <ul style="list-style-type: none"> <li>• Increase price convergence;</li> <li>• Connect markets and enable efficient flow of gas across entry-exit zone borders.</li> </ul>



# Desired effects of Network Codes and Guidelines



Problems/ issues	Desired effect/outcome	How it may advance high-level policy goals?
<b>Capacity allocation mechanisms (NC CAM)</b>		
<ul style="list-style-type: none"> <li>• Prevailing capacity allocation mechanisms often favour incumbents over new entrants;</li> <li>• Lack of alignment between national/TSO rules for capacity allocation;</li> <li>• Lack of transparency in capacity allocation mechanisms;</li> <li>• Lack of network access hampers competition.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Easier acquisition and use of IP capacity</b> (single purchase for bundle and single nomination, common platforms, etc.);</li> <li>• <b>Maximise technical capacity offered</b> through joint TSO capacity (re-) calculations;</li> <li>• <b>Elimination of unrealized cross-border trades due to mismatches in technical capacities</b> at an IP and due to different capacity allocation processes (e.g., timing, products, etc.);</li> <li>• <b>Increase liquidity at virtual hubs</b> by eliminating trading at flange;</li> <li>• Progression towards <b>maximum capacity to be sold as a bundled product</b>;</li> <li>• Enhanced <b>secondary trading of capacity</b> (through platforms);</li> <li>• Increasing <b>number of (new) shippers</b> purchasing capacity. Mismatches of bundled capacity may also occur due to differences in booking levels.</li> </ul>	<p><b>Efficient market functioning</b></p> <ul style="list-style-type: none"> <li>• More efficient network use by offering maximum technical capacity;</li> <li>• More efficient network use by allocating scarce capacity efficiently, using auctions (i.e., based on shippers' willingness-to-pay);</li> <li>• Reduce complexity and transaction costs involved in cross-border transport and trade.</li> </ul> <p><b>Effective competition</b></p> <ul style="list-style-type: none"> <li>• Increase and concentrate liquidity and competition at hubs).</li> </ul> <p><b>Market integration</b></p> <ul style="list-style-type: none"> <li>• Increase price convergence (if CAM results, at least on a short-term basis, in more capacity, and/or increased competition);</li> <li>• Connect hubs and enable efficient flow of gas across entry-exit zone borders.</li> </ul> <p><b>Non-discrimination</b></p> <ul style="list-style-type: none"> <li>• Create a level playing field for all shippers by making capacity allocation mechanisms more transparent, standardised and non-discriminatory by design.</li> </ul>

# Desired effects of Network Codes and Guidelines



Problems/ issues	Desired effect/outcome	How it may advance high-level policy goals?
<b>Incremental capacity (INC amendment)</b>		
<ul style="list-style-type: none"> <li>• Lack of a transparent, economic, efficient and non-discriminatory, process of capacity demand assessment;</li> <li>• Lack of a transparent, efficient and non-discriminatory, market-based system (and process) of capacity allocation for incremental or new gas transmission capacity;</li> <li>• Lack of consistent and transparent approach for assessing investment efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Capacity demands for incremental and new capacity</b> are satisfied in a market-based manner (i.e., based on binding user commitments, using CAM auctions as the default model, and in limited cases in alternative CAMs);</li> <li>• <b>Incremental/ new capacity projects are efficient and financially viable;</b></li> <li>• <b>Economic test</b> applied to proposed projects is an accurate reflection of the share of expected benefits between users triggering the investment and other network users generally.</li> </ul>	<p><b>Efficient market functioning</b></p> <ul style="list-style-type: none"> <li>• Expand the EU-wide gas transmission network in an efficient (cost-effective) manner while meeting the network users' needs.</li> </ul> <p><b>Effective competition</b></p> <ul style="list-style-type: none"> <li>• Increase liquidity and competition at hubs.</li> </ul> <p><b>Market integration</b></p> <ul style="list-style-type: none"> <li>• Increase price convergence;</li> <li>• Increase physical interconnection and security supply (e.g. through firm backhaul).</li> </ul> <p><b>Non-discrimination</b></p> <ul style="list-style-type: none"> <li>• Create a level playing field for all shippers by making capacity allocation mechanisms more transparent and non-discriminatory by design.</li> </ul>

# Desired effects of Network Codes and Guidelines



Problems/ issues	Desired effect/outcome	How it may advance high-level policy goals?
<b>Balancing network code (NC BAL)</b>		
<ul style="list-style-type: none"> <li>• Market fragmentation and lack of competitiveness: due to differences in balancing regimes;</li> <li>• Non-market based balancing: most balancing is performed by TSOs;</li> <li>• Lack of transparency: balancing regimes and charges are often not transparent;</li> <li>• Significant barriers to entry: insufficient information about balancing positions; new entrants, in the absence of liquid balancing markets, tend to have more difficulty balancing their portfolios than incumbents;</li> <li>• Imbalance charges may be excessively high and not cost-reflective, creating a barrier to market entry.</li> </ul>	<ul style="list-style-type: none"> <li>• Transparent, well-functioning, <b>short-term flexibility market</b>;</li> <li>• <b>TSO plays an enabling role</b> by: (1) establishing/ supporting a trading platform; (2) supporting maximum opportunities for renomination; (3) providing sufficient information (e.g. demand, cash-out evolution, system status);</li> <li>• <b>Minimal long-term contracting</b> for flexibility;</li> <li>• <b>Small volumes / low frequency of TSO balancing actions</b> (only residual balancing);</li> <li>• <b>Transparent balancing mechanisms</b>: follow merit order; transparent decisions whether to buy/sell gas; determination of required volumes;</li> <li>• <b>Shippers to perform primary balancing role</b> (supported by the TSO as an enabler);</li> <li>• <b>Increased liquidity and competitiveness</b>;</li> <li>• <b>Barriers to entry and cross-border trade are eliminated.</b></li> </ul>	<p><b>Efficient market functioning</b></p> <ul style="list-style-type: none"> <li>• Transparent markets/ mechanisms can reduce balancing needs and the overall cost of balancing.</li> </ul> <p><b>Effective competition</b></p> <ul style="list-style-type: none"> <li>• Reduced barriers to entry;</li> <li>• Improved cross-border trade and competition.</li> </ul> <p><b>Market integration</b></p> <ul style="list-style-type: none"> <li>• Harmonised balancing rules and nomination timing and procedures promote cross-border trade.</li> </ul> <p><b>Non-discrimination</b></p> <ul style="list-style-type: none"> <li>• Transparency in balancing mechanisms and markets supports equal treatment.</li> </ul>

# Desired effects of Network Codes and Guidelines



Problems/ issues	Desired effect/outcome	How it may advance high-level policy goals?
<b>Tariffs (NC TAR)</b>		
<ul style="list-style-type: none"> <li>• Unjustified differences in tariff methodologies may result in tariff levels which distort cross-border trade and competition;</li> <li>• Lack of transparency in tariff methodologies and their application;</li> <li>• Transmission tariffs are not cost-reflective;</li> <li>• Transmission tariffs are unstable and unpredictable;</li> <li>• Long- and short-term capacity prices are inappropriately determined in relation to each other;</li> <li>• Inconsistent interruptible capacity pricing: e.g., wide variation in the discounts applied.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Transparent tariff methodologies</b> are implemented, with minimal cross-subsidy between users, and are reasonably cost-reflective;</li> <li>• Shippers can reasonably <b>predict and replicate transmission charges</b> using publicly available data;</li> <li>• TSOs are able to <b>recover allowed revenues</b> without significant and/or persistent under- and over-recovery and without large and frequent tariff adjustments;</li> <li>• Tariffs should give <b>appropriate investment signals</b>;</li> <li>• <b>Harmonised, transparent, cost-reflective and non-discriminatory entry/exit tariffs</b> promote cross-border trade.</li> </ul>	<p><b>Efficient market functioning</b></p> <ul style="list-style-type: none"> <li>• Increased transparency and predictability decreases market participants' risk and associated costs;</li> <li>• Cost-reflective tariffs promote more efficient network utilisation and expansion.</li> </ul> <p><b>Effective competition</b></p> <ul style="list-style-type: none"> <li>• Harmonised tariff methodologies should reduce discriminatory or non-cost reflective tariffs which may promote cross-border competition.</li> </ul> <p><b>Market integration</b></p> <ul style="list-style-type: none"> <li>• Harmonised tariff methodologies should reduce discriminatory or non-cost reflective tariffs which may promote cross-border trade.</li> </ul> <p><b>Non-discrimination</b></p> <ul style="list-style-type: none"> <li>• Transparency and minimal cross-subsidies eliminate/reduce discrimination between users.</li> </ul>



# Identifying potential indicators

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An initial long list of potential indicators was identified for each desired effect of network codes/guidelines and each policy goal

- **Based on the analysis of objectives and desired effects of each Network Code/Guidelines a long list of potential indicators to measure the desired effects and outcomes of each network code/guidelines was identified**
- **Similarly a range of potential indicators were identified to measure the achievement of higher level policy goals**
- **These potential indicators were qualitatively assessed to create a shortlist of indicators to be included in the recommended methodology**
- **Main criteria for selecting recommended indicators:**
  - Balance between each proposed indicator's strengths and weaknesses
  - Relevance to high-level policy goals and network codes/guidelines
  - The proposed indicators are both necessary and sufficient for impact monitoring
  - Data availability and accessibility
  - Feasibility and practical usability

# Selecting recommended indicators



A total of 45 indicators were selected, including 23 network code/guidelines indicators and 22 market monitoring indicators

- **Proposed indicators are not standalone measures of network code/guidelines impacts or market performance**—they should not be used in isolation to draw conclusions regarding market impacts of network codes/guidelines
- **In particular, the linkages between between network code and high-level policy goal indicators are not one-to-one:**
  - High-level policy goal indicators measure the market impact of multiple network codes; and
  - The market impact of single network code is difficult to quantify
- **Indicators are meant to be used by ACER in the annual MMR and measure the economic impact of NCs/GLs - implementation and compliance monitoring will be addressed by ACER in separate reports**
  - Some indicators have therefore been excluded from the list of recommended indicators as they were judged to be more useful to compliance and implementation monitoring

# Proposed network code indicators (CMP, CAM)



Ref. ID	Indicator	Unit	Data source(s)
<b>Congestion management procedures (CMP Guideline)</b>			
CMP.1	Additional capacity volumes made available through each CMP	kWh/d or kWh/h	ENTSOG TP
CMP.2	Utilisation of contracted capacity at IPs per shipper	% flows/booked capacity	REMIT
CMP.3	Aggregate utilisation of contracted capacity at IPs (flows/booked capacity)	% flows/booked capacity	ENTSOG TP
<b>Capacity allocation mechanisms (NC CAM)</b>			
CAM.1	Year-on-year change in average-day and peak-period technical capacity at IPs	kWh/d or kWh/h	ENTSOG TP
CAM.2	Bundled capacity release	MWh	REMIT
CAM.3	Share of total capacity sold as bundled on capacity booking platforms	% of all IP capacity sold	REMIT
CAM.4	Secondary market-traded bundled capacity and unbundled capacity	% of bundled capacity sold	REMIT
CAM.5	Contractual capacity utilisation at IPs (booked/technical capacity)	% of technical capacity	ENTSOG TP
CAM.6	Physical capacity utilisation at IPs (flows/technical capacity)	% of technical capacity	ENTSOG TP

# Proposed network code indicators (INC, BAL)



Ref. ID	Indicator	Unit	Data source(s)
<b>Incremental capacity (INC amendment)</b>			
INC.1	Incremental and new capacity offered through alternative mechanisms/auctions	MWh	NRAs/TSOs
INC.2	Proportion of proposed incremental/new capacity projects that pass/fail the economic test	% of all proposed projects	NRAs/TSOs
INC.3	Range of f-factor values used in the calculation of the economic test	number(s) chosen by NRA(s)	NRAs/TSOs
<b>Balancing network code (NC BAL)</b>			
BAL.1	TSO balancing through short-term standardised products vs. balancing services contracts	% of total TSO balancing volume	REMIT/TSOs
BAL.2	TSO share of total balancing	% of total balancing requirement	REMIT/TSOs
BAL.3	Physical linepack day-on-day changes	mcm	NRAs/TSOs
BAL.4	Balancing net neutrality analysis	€/MWh	REMIT/TSOs/NRAs



# Proposed network code indicators (TAR)



Ref. ID	Indicator	Unit	Data source(s)
<b>Tariffs (NC TAR)</b>			
TAR.1	Stakeholder assessment of robustness of decision making and overall process associated with establishment of tariff methodology	multipoint scale	Survey of EU trade associations
TAR.2	Assessment of availability of all models and data to enable replication of actual tariffs	multipoint scale	Survey of NRAs/ EU trade associations
TAR.3	Stakeholder assessment of information availability to enable tariff predictions	multipoint scale	Survey of NRAs/stakeholders
TAR.4	Pass/fail compliance with cost allocation test	binary (pass/fail)	NRAs
TAR.5	Revenue Reconciliation parameters and outcomes	€, time, and frequency (years)	TSOs
TAR.6	Multipliers applied by each TSO	number(s) chosen by NRA(s)	PRISMA/TSOs/NRAs
TAR.7	Change in tariff levels at IPs	annual % change	ENTSOG TP

# Proposed high-level policy goal indicators (CO)



Ref. ID	Indicator	Unit	Data source(s)
<b>High-level policy goal of effective competition</b>			
CO.1	Herfindahl–Hirschman Index (HHI)	number between 0 and 10,000	REMIT
CO.2	Residual Supply Index (RSI)	share of total demand	REMIT
CO.3	Price-Cost Margin (PCM)	share of marginal cost	REMIT; for other sources see Chyong and Hobbs (2014)
CO.4	Gas demand	TWh	Eurostat/TSOs/IEA
CO.5	Participants	number	REMIT, exchanges
CO.6	Products traded	types	REMIT, exchanges
CO.7	Traded volumes	TWh	REMIT, exchanges
CO.8	Depth of market	index	ICIS Heren
CO.9	Churn rate	ratio	same as for CO.8 and CO.5
CO.10	Simulation model	various (see Annex A)	various (see Annex A)

# High-level policy goal indicators (MF, MI)



Ref. ID	Indicator	Unit	Data source(s)
<b>High-level policy goal of efficient market functioning</b>			
MF.1	Transaction costs	€	Survey
MF.2	Value of congestion at each IP	€/IP/year	ENTSOG TP; MI.1
MF.3	Potential net welfare gains from unused physical capacity	€	ENTSOG TP, MI.1
MF.4	Potential welfare loss from apparently inefficient flows at each IP	€	ENTSOG TP, MI.1
<b>High-level policy goal of market integration</b>			
MI.1	Price convergence	€/MWh	REMIT
MI.2	Price correlation	correlation coefficient	REMIT
MI.3	Price volatility correlation	correlation coefficient	REMIT
MI.4	Contract vs. spot gas prices	€/MWh	REMIT
MI.5	Oil-indexed vs. gas hub pricing	relative volumes	REMIT
MI.6	Number of supply sources	number of source countries	Eurostat Comext

# High-level policy goal indicators (ND)



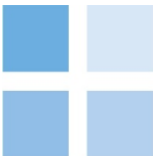
Ref. ID	Indicator	Unit	Data source(s)
High-level policy goal of non-discrimination			
ND.1	Quality of published data	multipoint scale	survey
ND.2	Barriers to entry	multipoint scale	survey

# Monitoring and evaluation of the impact of the gas network codes and guidelines on the internal market

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Presentation to ACER – Part II

October 2015





- 1 Proposed network code indicators**
- 2 Proposed high-level policy goal indicators**
- 3 Implementation workplan**

# Proposed network code indicators (CMP, CAM)



Ref. ID	Indicator	Unit	Data source(s)
<b>Congestion management procedures (CMP Guideline)</b>			
CMP.1	Additional capacity volumes made available through each CMP	kWh/d or kWh/h	ENTSOG TP
CMP.2	Utilisation of contracted capacity at IPs per shipper	% flows/booked capacity	REMIT
CMP.3	Aggregate utilisation of contracted capacity at IPs (flows/booked capacity)	% flows/booked capacity	ENTSOG TP
<b>Capacity allocation mechanisms (NC CAM)</b>			
CAM.1	Year-on-year change in average-day and peak-period technical capacity at IPs	kWh/d or kWh/h	ENTSOG TP
CAM.2	Bundled capacity release	MWh	REMIT
CAM.3	Share of total capacity sold as bundled on capacity booking platforms	% of all IP capacity sold	REMIT
CAM.4	Secondary market-traded bundled capacity and unbundled capacity	% of bundled capacity sold	REMIT
CAM.5	Contractual capacity utilisation at IPs (booked/technical capacity)	% of technical capacity	ENTSOG TP
CAM.6	Physical capacity utilisation at IPs (flows/technical capacity)	% of technical capacity	ENTSOG TP

# Proposed network code indicators (INC, BAL)



Ref. ID	Indicator	Unit	Data source(s)
<b>Incremental capacity (INC amendment)</b>			
INC.1	Incremental and new capacity offered through alternative mechanisms/auctions	MWh	NRAs/TSOs
INC.2	Proportion of proposed incremental/new capacity projects that pass/fail the economic test	% of all proposed projects	NRAs/TSOs
INC.3	Range of f-factor values used in the calculation of the economic test	number(s) chosen by NRA(s)	NRAs/TSOs
<b>Balancing network code (NC BAL)</b>			
BAL.1	TSO balancing through short-term standardised products vs. balancing services contracts	% of total TSO balancing volume	REMIT/TSOs
BAL.2	TSO share of total balancing	% of total balancing requirement	REMIT/TSOs
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TAR.5	Revenue Reconciliation parameters and outcomes	€, time, and frequency (years)	TSOs
TAR.6	Multipliers applied by each TSO	number(s) chosen by NRA(s)	PRISMA/TSOs/NRAs
TAR.7	Change in tariff levels at IPs	annual % change	ENTSOG TP

# Proposed high-level policy goal indicators (CO)



Ref. ID	Indicator	Unit	Data source(s)
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# High-level policy goal indicators (MF, MI)



Ref. ID	Indicator	Unit	Data source(s)
<b>High-level policy goal of efficient market functioning</b>			
MF.1	Transaction costs	€	Survey
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MF.3	Potential net welfare gains from unused physical capacity	€	ENTSOG TP, MI.1
MF.4	Potential welfare loss from apparently inefficient flows at each IP	€	ENTSOG TP, MI.1
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MI.1	Price convergence	€/MWh	REMIT
MI.2	Price correlation	correlation coefficient	REMIT
MI.3	Price volatility correlation	correlation coefficient	REMIT
MI.4	Contract vs. spot gas prices	€/MWh	REMIT
MI.5	Oil-indexed vs. gas hub pricing	relative volumes	REMIT
MI.6	Number of supply sources	number of source countries	Eurostat Comext

# High-level policy goal indicators (ND)



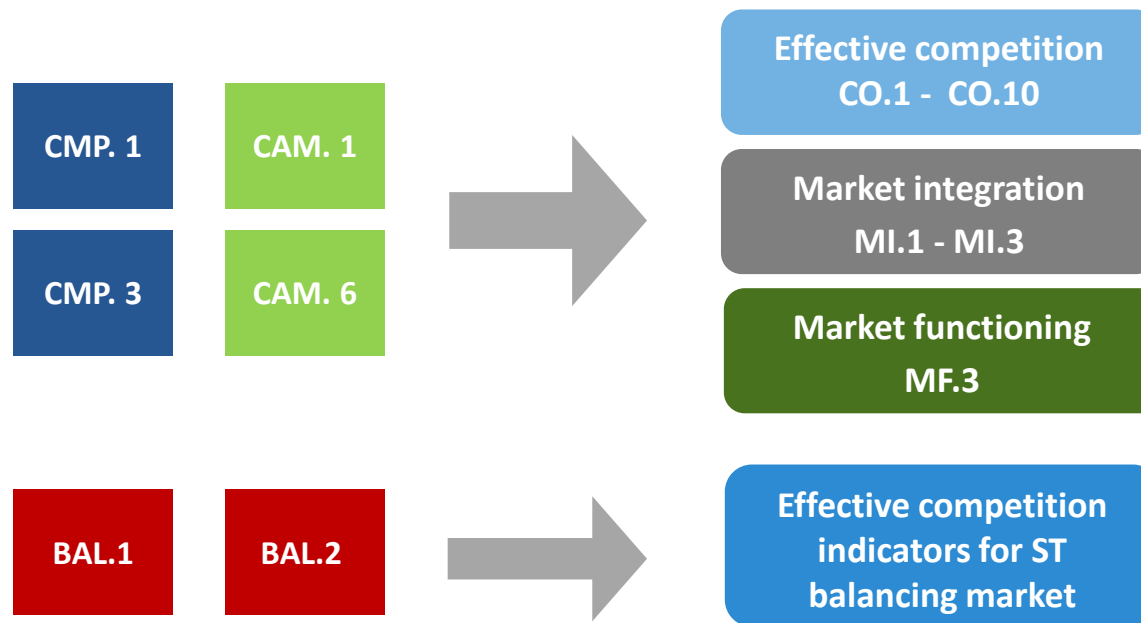
Ref. ID	Indicator	Unit	Data source(s)
High-level policy goal of non-discrimination			
ND.1	Quality of published data	multipoint scale	survey
ND.2	Barriers to entry	multipoint scale	survey

# Potential linkages and correlations between indicators



## Linkages between NC/GL indicators and higher policy goals indicators

- Many of the desired effects and thus the indicators proposed are closely linked.
- Theoretical correlations between NC/GL indicators and higher policy goal indicators exist but these will have to be tested empirically once the data becomes available
- Higher policy goals indicators measure the impact of multiple NCs so there are likely to be multiple and partial correlations between these





# Proposed implementation workplan



Initial implementation setup  
 First annual calculation run for MMR

2015	2016	2016	2016	2016	2017	2017	2017	2017	Beyond 2017
Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	

## Phase III

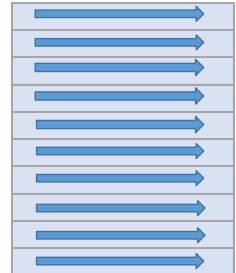
Calculation of all indicators listed in Phases I and II for the Annual MMR 2017



## Phase IV

### NCs/GLs

- TAR.1 Stakeholder assessment of robustness and overall process associated with establishment of tariff methodology
- TAR.2 Assessment of availability of all models and data to enable replication of actual tariffs
- TAR.3 Stakeholder assessment of information availability to enable tariff predictions
- TAR.4 Pass/fail compliance with cost allocation test
- TAR.5 Revenue Reconciliation parameters and outcomes
- TAR.6 Multipliers applied by each TSO
- INC.1 Incremental and new capacity offered through alternative mechanisms/auctions
- INC.2 Proportion of proposed incremental/new capacity projects that pass/fail the economic test
- INC.3 Range of f-factor values used in the calculation of the economic test



### High level policy goals

- CO.10 Simulation model



## **CAMBRIDGE ECONOMIC POLICY ASSOCIATES**

Queens House, 55-56 Lincoln's Inn Fields  
London WC2A 3LJ

Tel: 020 7269 0210

Fax: 020 7405 4699

[info@cepa.co.uk](mailto:info@cepa.co.uk)

[www.cepa.co.uk](http://www.cepa.co.uk)

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