# Cost-Benefit Analysis

## The adapted methodology

**ENTSOG System Development**

**9th TYNDP/CBA WS – Vienna – 26 June 2014**

# The adaptation process

# Content of the adapted methodology

## *Framework of methodology development*

> **Objectives:** supporting PCI selection, CBCA and Investment request

> **Specificities:** system-wide and comparable assessment of each project

> **Constraints:** use of public data and confidentiality of commercially sensitive data

## *Integrated Energy-System Wide CBA*

> A TYNDP-step applied by ENTSOG as part of TYNDP:
  - Feedback loop on the cumulative impact of latest PCI selection
  - Basic assessment supporting the individual assessment of each project

> A PS-step applied by promoters on their own project (part of it delegated to ENTSOG)

## *Modelling approach*

> Linear programming apply to European balancing zones

> Minimization of the objective function being the gas, coal and CO2 bill for Europe

> Breakdown of monetized benefit per country as an output

# Feedback received during the adaptation process

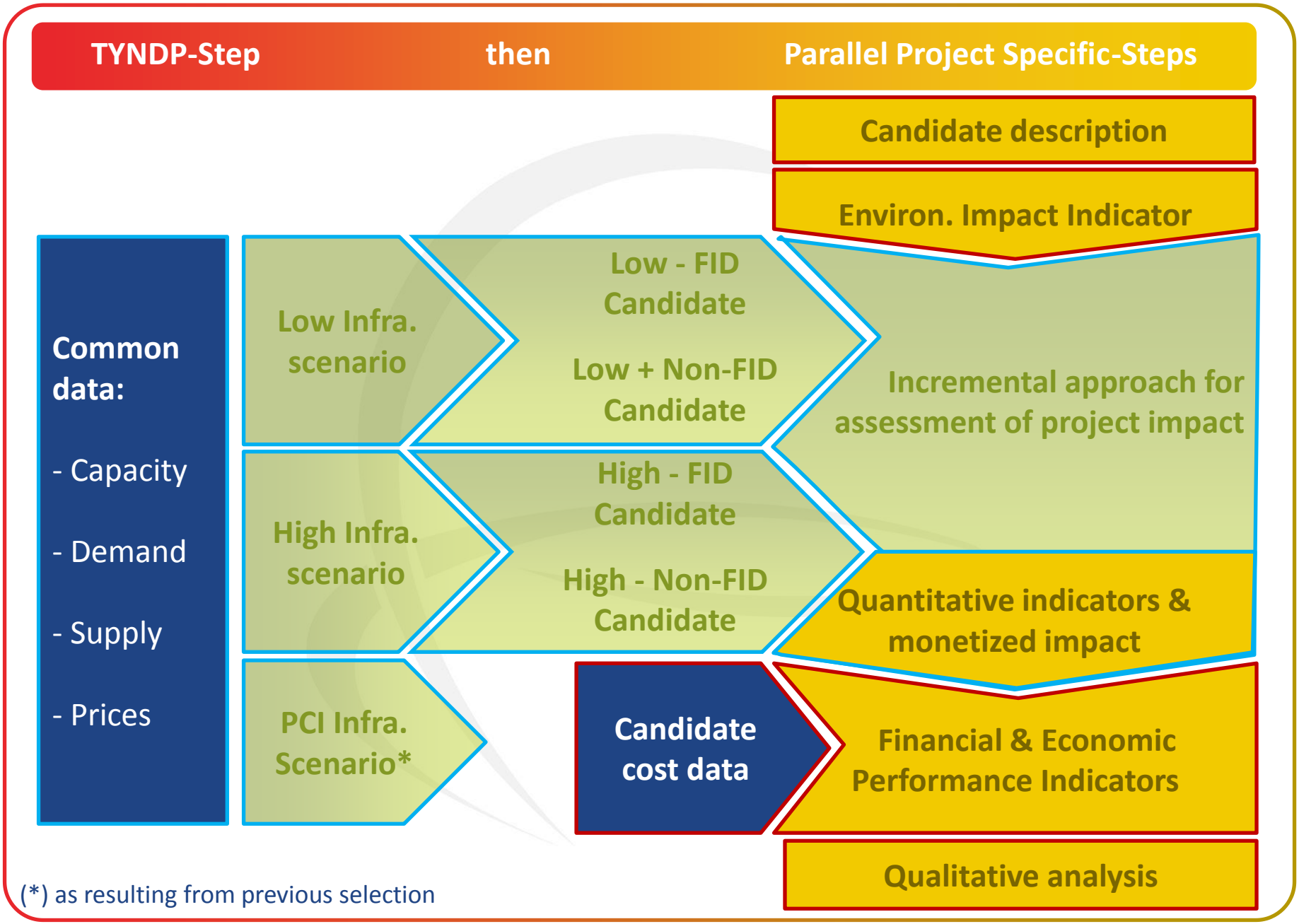
## *Extensive consultation with stakeholders*

- 6 Stakeholder Joint Working Sessions on TYNDP/CBA focusing on:
  - Structure of the methodology and modelling approach
  - Supply and demand scenarios
  - Infrastructure projects (questionnaire and way they are processed)
  - Case-study
- Overall support to the November version with mostly question for clarification and case-study
- No active feedback received on supply and cost input data proposed by ENTSOG

## *Formal opinion from ACER (15 Feb.) and Commission (upcoming)*

| ACER Opinion | | Expected COM Opinion |
|---|---|---|
| Consideration of project cost by ENTSOG | | ENTSOG involvement in PS-CBA |
| TYNDP built on PS-CBA | | Sustainability assessment |
| SDR of 4% like for electricity | | Coverage of EEA |
| | | More integrated methodology |

# The resulting methodology


TYNDP-Step
then
Parallel Project Specific-Steps
Candidate description
Environ. Impact Indicator
Common data:
- Capacity
- Demand
- Supply
- Prices
Low Infra. scenario
High Infra. scenario
PCI Infra. Scenario*
Low - FID Candidate
Low + Non-FID Candidate
High - FID Candidate
High - Non-FID Candidate
Candidate cost data
Incremental approach for assessment of project impact
Quantitative indicators & monetized impact
Financial & Economic Performance Indicators
Qualitative analysis
(*) as resulting from previous selection
Carry out by ENTSOG
Carry out by promoter
Input data
Process
Results

# Data included in the methodology

## *Demand data*

- 2 TSO-scenarios for Residential, commercial and industrial sectors
- Thermal gap to be covered by gas and coal-fired power generation (2 scenarios considering elements from ENTSO-E visions 1 & 3)

## *Supply data*

- 3 Potential Supply Scenarios per source (including National Production)
- Source maximum deliverability per scenario and climatic case

## *System-wide cost data*

- 2 Global Context scenarios defining consistent average prices for gas, coal and CO2
  - Grey: WEO 2013 Current Policies
  - Green: National Grid Green scenario of 2013
- 1 Social Discount Rate for whole Europe (4%)

# Depth of the Economic Analysis

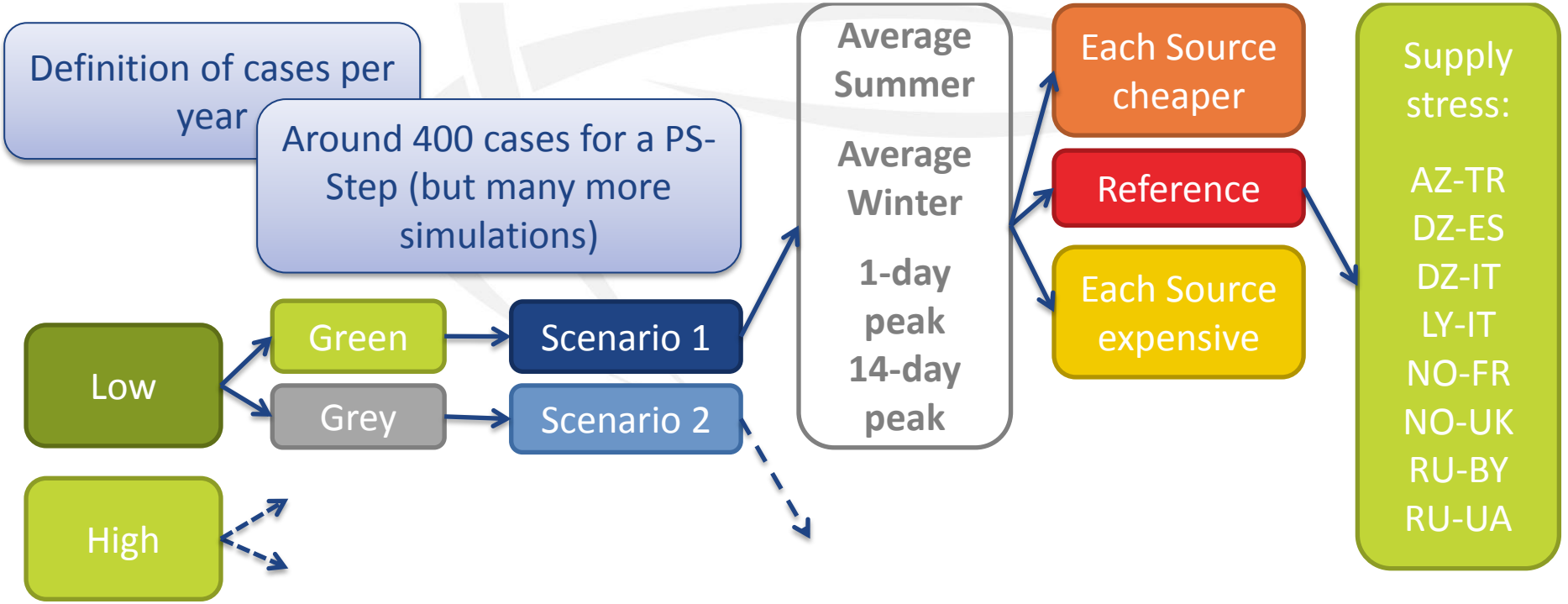
| Combined approach | Assessed aspects | Specific criteria | | | |
|---|---|---|---|---|---|
| | | SoS | Sust. | Comp. | Mkt. Int. |
| Capacity-based indicators | « N-1 » | X | | | |
| | Bi-directional | X | | | X |
| | Import Rte Diversification | X | | X | X |
| Modelling based indicators | Supply Source Diversification | X | | X | X |
| | Supply Source Dependence | X | | X | |
| | Remaining Flexibility | X | | | X |
| | Disrupted demand | X | | | |
| | Price convergence | | | X | X |
| Other indicator | Infrastructure Environmental Impact | | X | | |
| Monetization | Gas supply | | | X | X |
| | Coal for power generation | | X | | |
| | CO2 emission from power generation | | X | | |
| Qualitative analysis | Commenting and developing on project benefits | X | X | X | X |

# Width of the Economic Analysis

## *The different cases and scenarios*

- The magnitude of project benefits strongly depends on the situation under which it operates. It is therefore imperative to carry out the assessment under a wide range of possible situations
- The below scope represents a balance between data availability, the representativeness of considered situations and the necessity to assess all projects on the same basis

| Infra. Scenario | Global Context | Gas demand | Climatic cases | Price configuration | Disruptions |
|---|---|---|---|---|---|



# Qualitative part of the Economic Analysis

## *Comments on Indicators and Monetization*

- Project promoters will be invited to comment on:
  - the indicators and monetization results
  - its vision of the input data set as the scenario approach describes stereotype situations
- As the methodology uses a single price curve for all import routes coming from one source, for projects breaking the isolation promoters are invited to comment on possible price effect beyond what the methodology is able to capture

## *Further project benefits*

- Project promoters will have the opportunity to complement the analysis through the description of additional benefits of their projects:
  - Bunkering facility associated to a LNG terminal
  - Bringing gas in an area to connected
  - …
- Such statement will have to be justified by promoters

# Guidance

# Guidance on the interpretation of CBA results - 1

## *Selecting projects in an uncertain environment*

- Most of the project will show  benefits which highly depends on external parameters (level of demand, relative price of supplies…)
- As it is not possible to forecast the evolution of each parameter, the methodology does not provide a single ranking but capture the impact of projects changing the value of each parameter one by one

## *Selection of relevant price configuration*

- Monetization of project benefits is done under 13 different price configurations
- Some of them are not relevant for a corridor (e.g. Algerian pipe gas in the Baltic will remain minimal) and will just dilute the results
- The TYNDP-Step will indicate which price configurations are relevant for each corridor.

# Guidance on the interpretation of CBA results - 2

## *Aggregation of Economic Performance Indicators (EPIs)*

> If it is mathematically possible to aggregate the EPIs, this should be done based on the understanding of each individual results and by deciding at corridor level of the weight of each situation

## *Indicators vs. monetization*

> The impact of projects on the 4 specific criteria (Market integration, SoS, Sustainability and Competition) is measured through both indicators and saved costs

> As different perspectives of the same aspects they should not be added but used to understand the different facets of project benefits

- For example security of supply depends on the diversification and availability of both routes and sources

# Guidance on the interpretation of CBA results - 3

## *Project interaction*

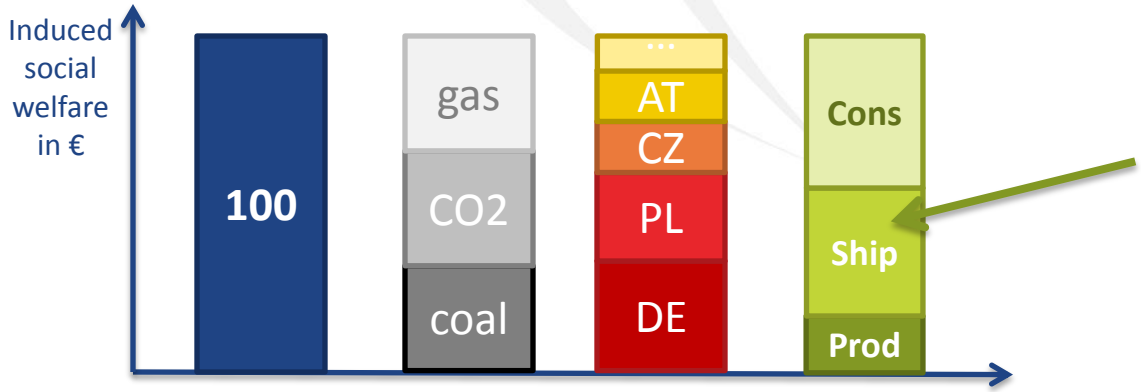
> The impact of a project is often dependent on the development of other infrastructures especially in the same region

> The comparison of project impact under the Low and High Infrastructure Scenarios will give a picture of the existence of competition or synergies:

| | Low Infra Sce. | High Infra Sce. | |
|---|---|---|---|
| Project A | + | +++ | Synergy with other projects |
| Project B | +++ | + | Competition with other projects |

## *Monetization of social welfare vs. shippers' commitments*

> The evaluation of the increase of social welfare induced by a project may be split along different clusters:




The CBA can contribute to the definition of market test threshold but shippers' commitments cannot be just added to the calculated social welfare without the risk of double counting

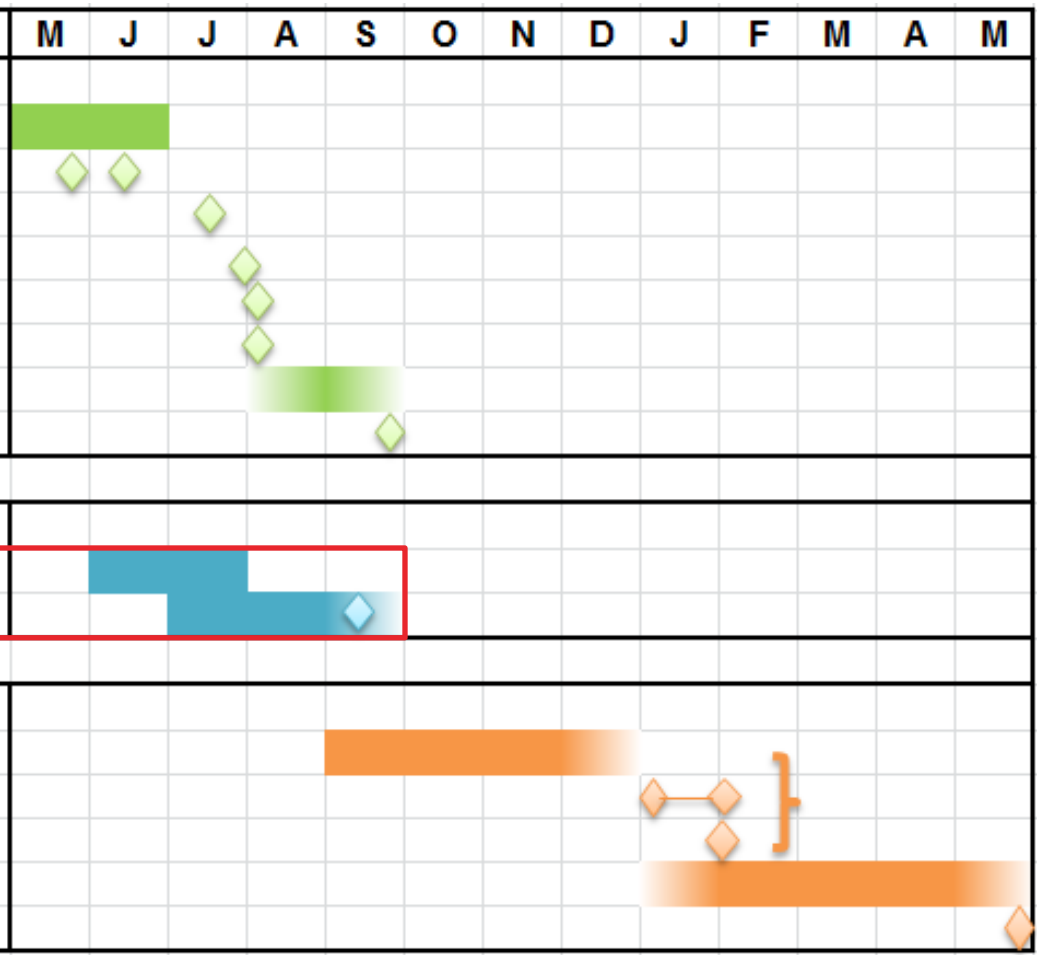
# Implementation processes

# Implementation time table

***The approval process of the CBA methodology and the deadline for the 2 PCI selection leave little time for the implementation of the CBA***

> Both for ENTSOG with the TYNDP-Step and Promoters for the PS-Step

| | Date |
|---|---|
| **CBA adaptation process** | |
| Drafting | |
| Update | BOA 28/05 & GAS 11/06 |
| Information-day for GAS | Mid-July |
| BOA Approval | 24/07 |
| GAS Approval | 25/07 - 01/08 |
| Submission to COM | 01/08 |
| Commission review | undefined |
| Publication | 2 weeks later |
| | |
| **Data collection** | |
| TSO data | closing on 31/07 |
| Infra. Projects | Closing on 12/09 |
| | |
| **CBA Implementation** | |
| TYNDP drafting (including INV WG acceptance) | |
| TYNDP Approval (BOA and GAS) | |
| TYNDP Publication | |
| Project Specific-Step | |
| End of 2nd PCI selection | |



# Thank You for Your Attention

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