

ENTSO-E Cost-Benefit analysis methodology for Electricity projects

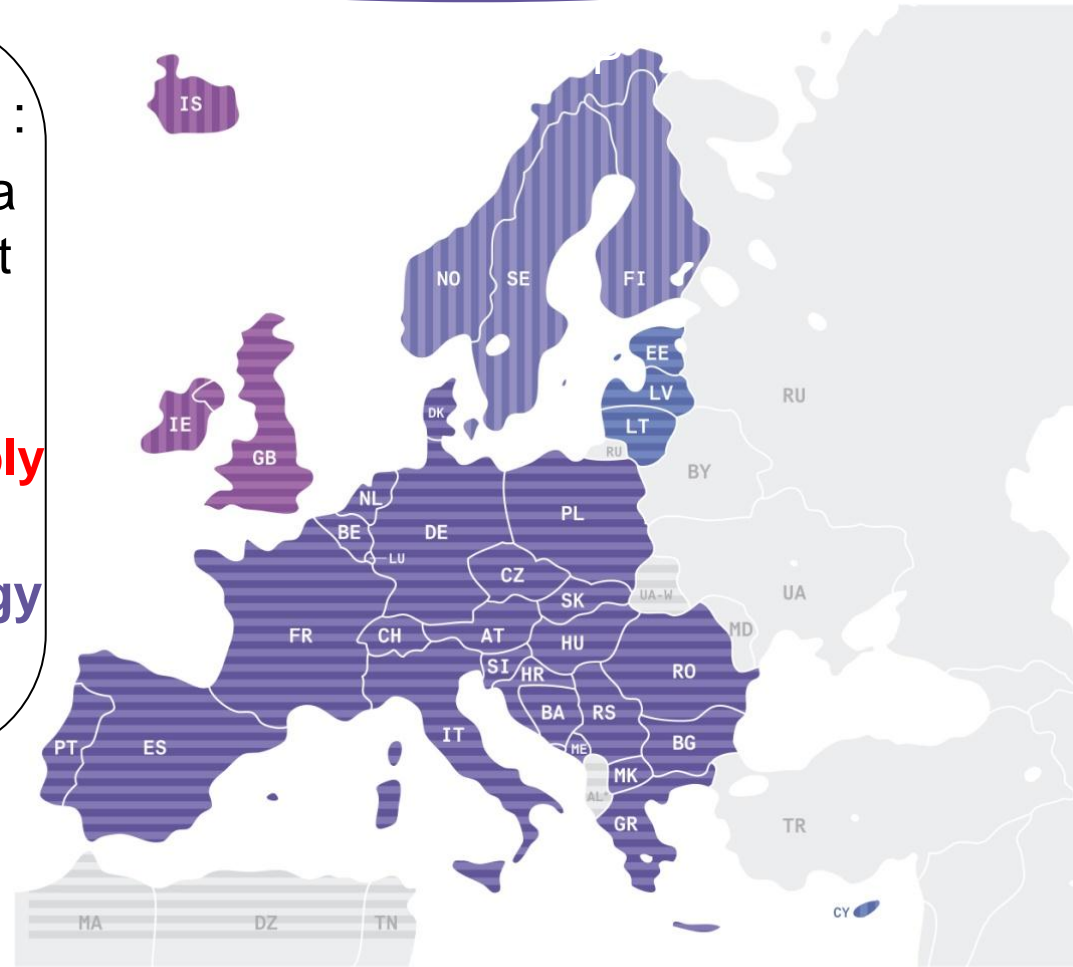
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ENTSO-E Network Development

ENTSO-E RG CCE stakeholder external workshop
26 March 2014, Bratislava, Slovakia

European power system

Objectives of EU power networks :

- ensuring the development of a single European grid to permit the **20-20-20 objectives**
- guaranteeing **security of supply**
- completing the **internal energy market**





Regulation 347/2013 mandates ENTSO-E to:

- Deliver a methodology for a **harmonised energy system-wide cost-benefit analysis at Union level** for projects of common interest, including on network and market modelling
- Make ENTSO-E **TYNDP sole basis** for selection of electricity projects of common interest (PCI)
- Deliver a consistent and interlinked **electricity and gas market input assumptions**, jointly with ENTSO-G, including both electricity and gas transmission infrastructures covering the energy infrastructure priority corridors

Mandatory from TYNDP 2016

Objectives of system wide CBA methodology

Giving Transparency on TYNDP projects assessment

- Harmonized EU energy system-wide CBA
- Demonstrate overall costs and benefits from a Pan-European system perspective



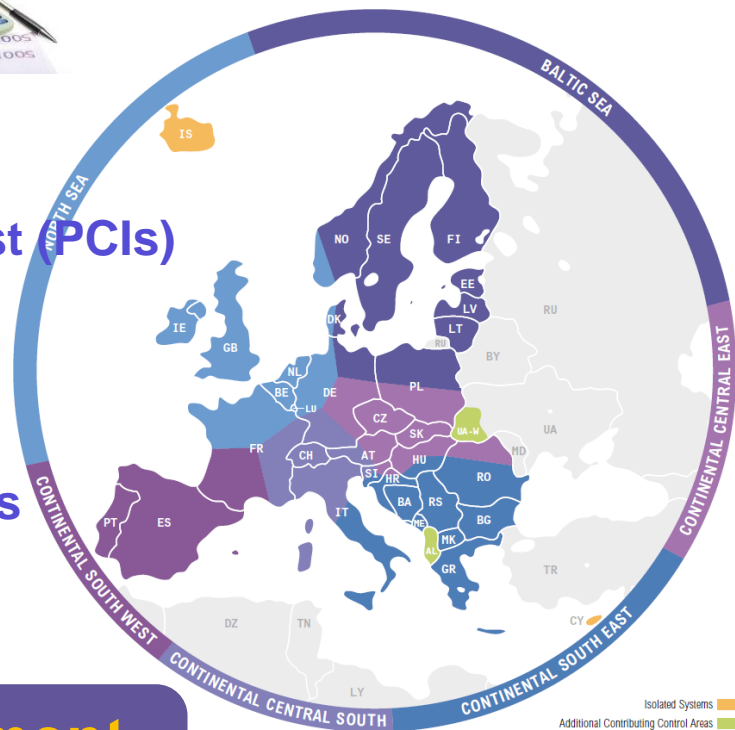
Supporting Selection Projects of common interest (PCIs)

- PCI Selection process will take into account ENTSO-E CBA results in TYNDP



CBA as possible input to decision-making process

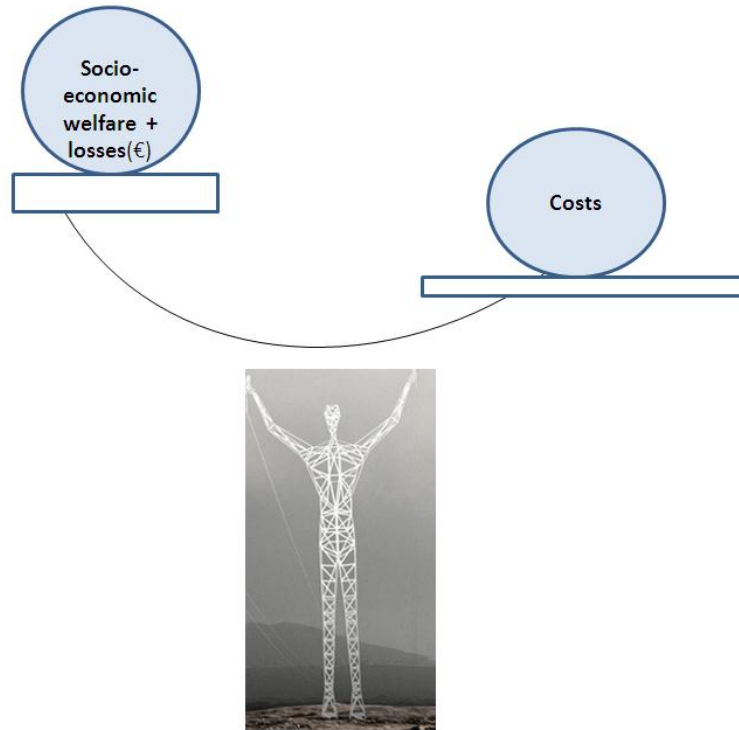
- CBA results as one of possible input for Cross Border Cost Allocation (CBCA)



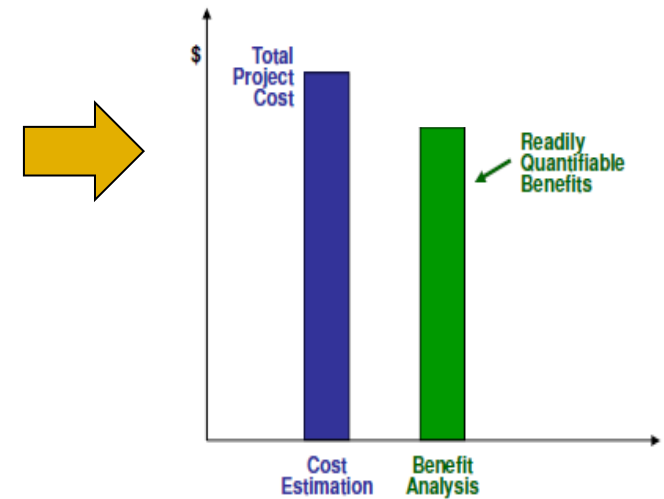
Tool to assess all Pan-EU development projects

General approach to CBA: get the balance right

Project Assessment

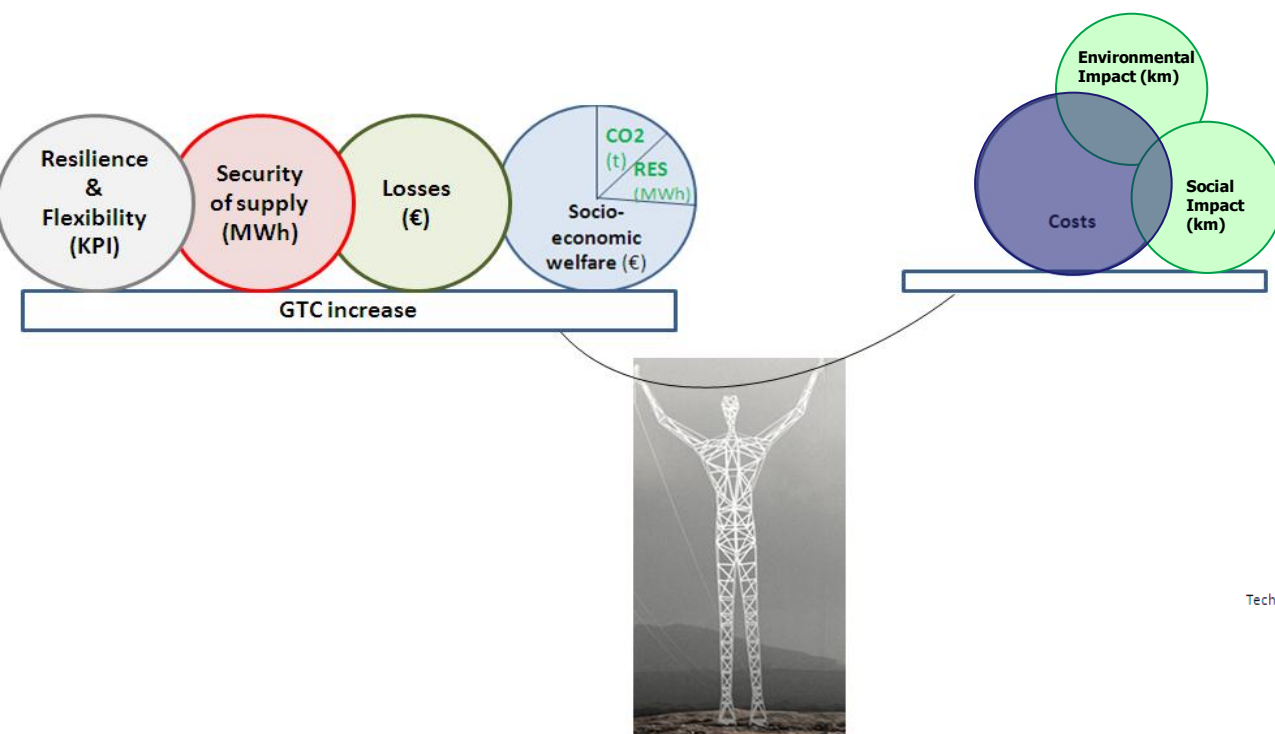


Balancing exercise



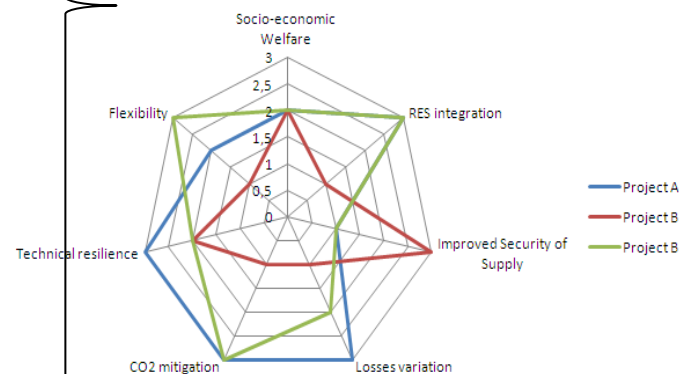
Steps towards benefits outweighing costs?

Benefits/Costs Computation



Results Presentation

Criteria	Grid Transfer Capability Increase	Socio-economic Welfare	RES integration	Improved Security of Supply	Losses variation	CO2 mitigation	Technical resilience	Flexibility	Social and environmental Impact	Project costs
	MW	ME/year	MWh/year	MWh/year	ME	Mt				ME
Project A	1000	90-150	500-550			0.5-0.6	+++	++		650-700
Project B	500	30-50		3000	20-30		++			25
Project C	800	225-30	3000-3500		10-20	1-1.5	++	+++		150



Comprehensive information for stakeholders and decision-makers

Project Assessment methodology



TOOT – Take Out One at a Time:

- Project assessment in most plausible future
- Conservative approach
- Reference network: «all-projects-in» considering needs on each border

Clustering: basic rules

- Project assessment in most plausible future
- Conservative approach



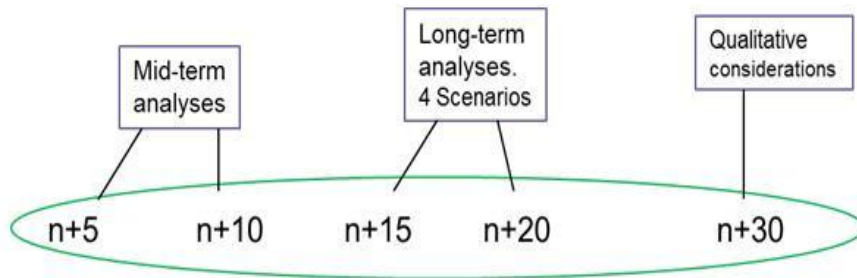
Maybe some needs for adaptations:

- In case of non-mature projects
- Accordance to Scenarios

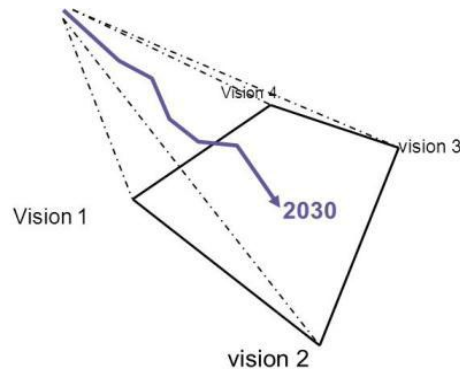
Equal treatment assured for both TSOs and third Party Projects

How to address uncertainties: scenarios & time horizons

Time horizons



Scenarios



TYNDP 2014:

4 Scenarios for one time horizon

TYNDP 2016:

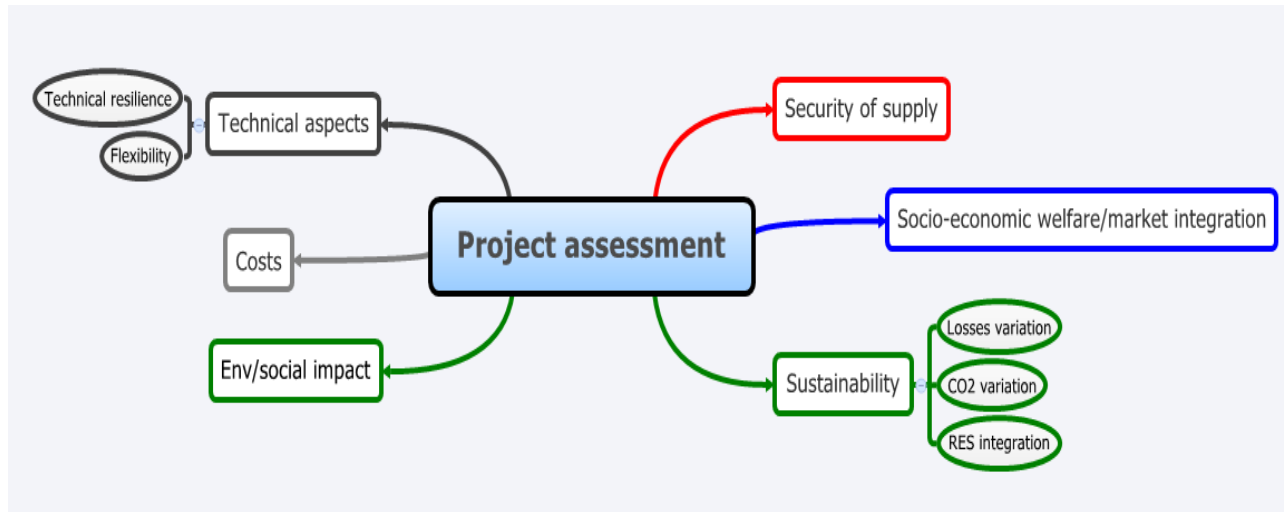
Scenarios and at least two time horizons

Sensitivity analysis
- Range of values

CBA quality depends mainly on quality of input assumptions !

Benefits framework

Benefits framework



➔ Stem from
European Policies
+
Regulation 347/2013

➔ **Quantification
of all indicators**

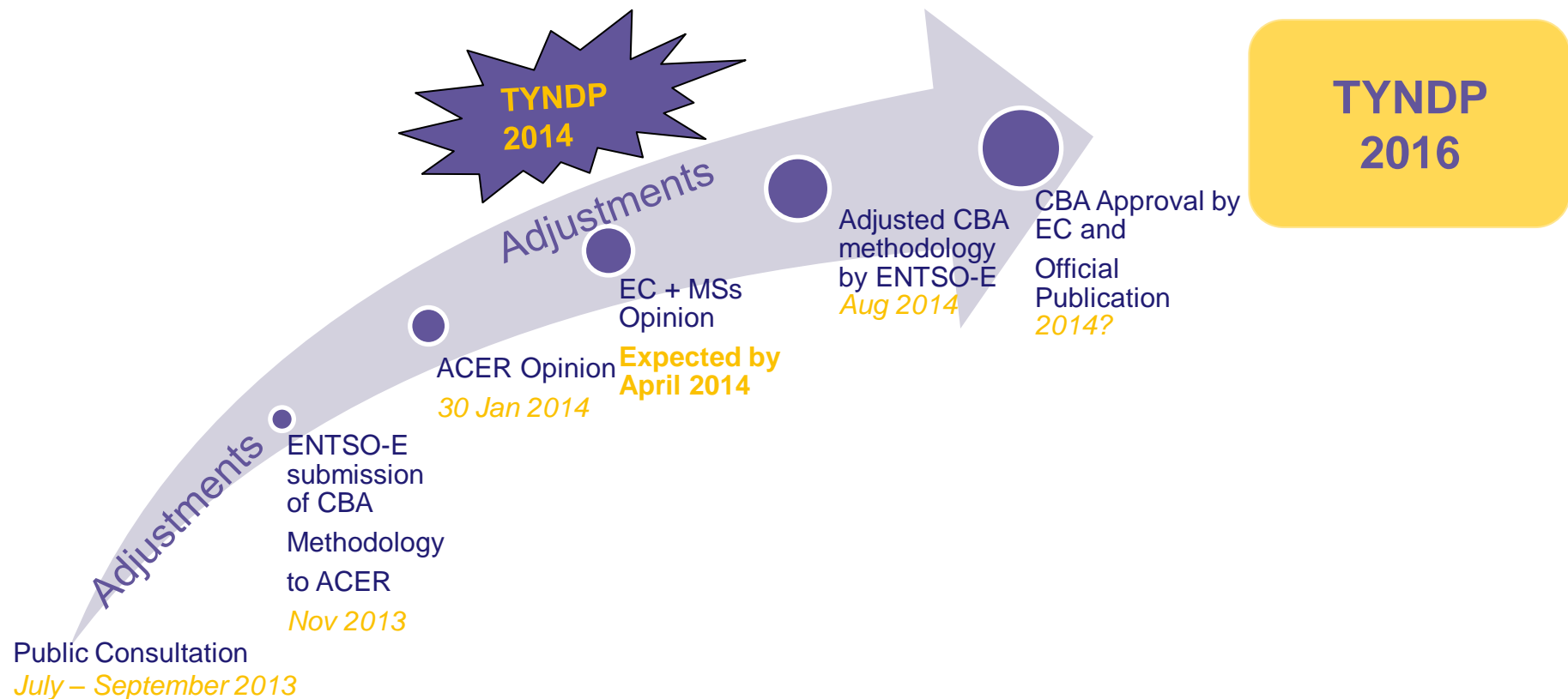


✓ Geographical framework

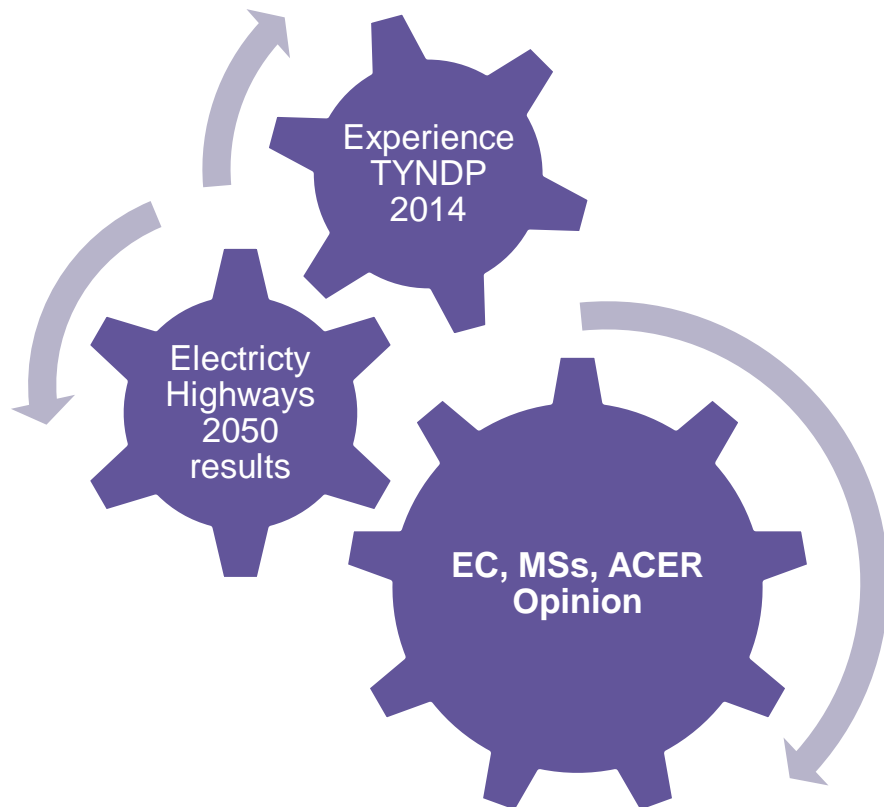
- Pan-European database
- Simulation ENTSO-E Regions + neighbours

Finalization of ENTSO-E CBA Methodology

- A continuous dialogue with stakeholders
- ENTSO-E submitted its CBA Methodology to Member States, the Commission and ACER for their relevant opinion on 15 November 2013



Future improvements needed on CBA Methodology



Further options for CBA Improvements

- ✓ Definition of a single discounting rate factor at EU level
- ✓ Medium-term and Long-term Time horizons for Analysis
- ✓ Implementing a detailed CBA part for Storage projects
- ✓ Including terms and definitions in an homogeneous way
- ✓ CBCA Guidance on CBA support



Why use ENTSO-E CBA Methodology:

- ✓ Have harmonised energy system-wide cost-benefit analysis at Union level for TYNDP projects and PCIs
- ✓ Tool to assess all Pan-EU development projects
- ✓ Demonstrate overall costs and benefits from a Pan-European system perspective
- ✓ Transparency on projects assessment
- ✓ Enable decision-makers to evaluate all features of each development project
- ✓ Guarantee fair and equal treatment for TSOs and 3rd parties
- ✓
- ✓ **We are pleased to continue the list!!!!**

THANK YOU FOR YOUR ATTENTION!

Questions?

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Reliable Sustainable Connected

Benefit Indicators

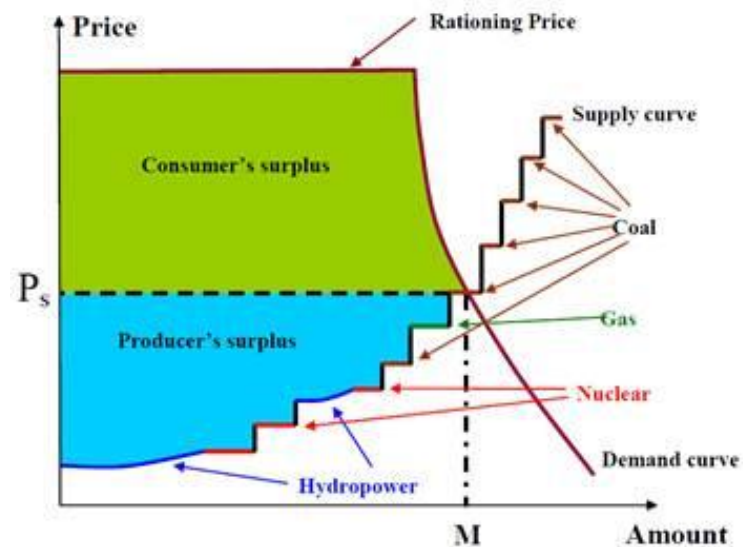
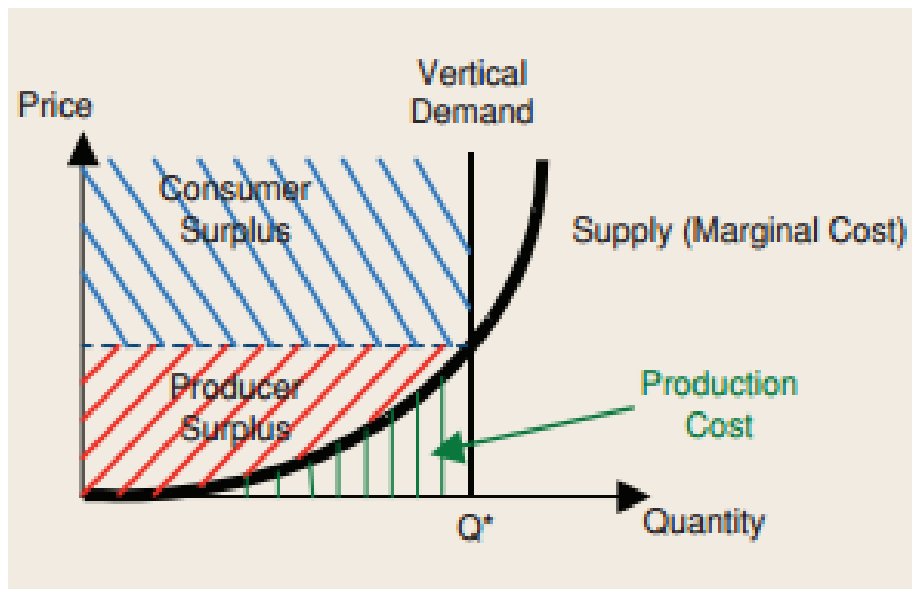


- B1. Security of supply** is the ability of a power system to provide an adequate and secure supply of electricity in normal conditions.
- B2. Social and economic benefit** on electricity markets is characterised by the ability of a power system to reduce congestions and thus provide an adequate grid transfer capability.
- B3. RES integration.** Support to RES integration is defined as the ability of the system to allow the connection of new RES plants and unlock existing “green” generation, while minimising curtailments.
- B4. Variation of losses** (energy efficiency) is the ability to minimise thermal losses in the power system.
- B5. CO2 emissions** is a result of B2 and B3 (unlock of carbon-free generation), as well as B4.
- B6. Technical resilience/system safety** is the ability of the system to withstand increasingly extreme system conditions (exceptional contingencies).
- B7. Flexibility** is the ability of the proposed reinforcement to serve in different possible future development paths or scenarios.

Thresholds : benefit indicators

- Socio economic benefit




- Light green : the project has an annual benefit < € 30 million
- Green: the project has an annual benefit between € 30 and € 100 million
- Dark green: the project has an annual benefit > or = to € 100 million






Thresholds : benefit indicators






- Socio economic benefit

-  Light green : the project has an annual benefit < € 30 million
-  Green: the project has an annual benefit between € 30 and € 100 million
-  Dark green: the project has an annual benefit > or = to € 100 million

- RES integration

-  White: the project has a neutral effect on the capability of integrating RES, i.e. allows less than 100 MW of direct RES connection or increases RES generation by less than 50 GWh
-  Light green: the project allows direct connection of RES production between 100 and 500 MW or permits an increase in RES generation between 50 GWh and 300 GWh
-  Dark green: the project allows direct connection of RES production greater than 500 MW or increases RES generation by more than 300 GWh

- Security of Supply

-  Light green: the project has no measurable impact on security of supply;
-  Green: the project increases the security of supply for an area of annual energy demand greater than 3 TWh by more than 0.001% of annual consumption⁴¹;
-  Dark green: the project increases the security of supply for an area of annual energy demand greater than 3 TWh by more than 0.01% of annual consumption⁴².

Thresholds : benefit indicators

- CO2 variations

Indicative colours are assigned as follows:



White: the project has no positive effect on CO2 emissions



Green: the total of projects reduces CO2 emissions by < 500 kt/year



Dark green: the total of projects reduces CO2 emissions by > 500 kt/year

- Variations in losses



Red: the project contributes to increase the volume of losses on the grid



White: the project may help decreasing losses in some situations and increasing them in others



Light green: the project the project contributes to decrease the volume of losses on the grid

- Technical resilience/system safety

- Robustness/flexibility

Indicative colours are assigned as follows:



White: the score of KPI's is 0



Green: the score of KPI's is < or = 3+



Dark green: the score of KPI's is > 3 +

Thresholds : impact indicators



- Investment costs



Light green: Higher than 1000 M€



Green: Between 300 M€ and 1000 M€



Dark green: lower than 300 M€

- Environmental and social impact



Light green: desk-top studies indicate that sensibility is low (no protected or dense urban area is affected, the visual impact is perceived as low).



Amber: desk-top studies indicate that sensibility is medium (protected or urban area may be affected in a limited way, visual impact is perceived as moderate).



Red: desk-top studies indicate that sensibility is high (visual impact is high, protected or urban area may be affected).