

Guidelines to Cost-Benefit Analysis of Grid Development projects

CBA Workshop, 19. November 2012

Cost Benefit methodology: today's discussion structure

Brussels, 19 November 2012
10:30h – 17:00

ENTSO-E premises, Avenue de Cortenbergh 100
1000 Brussels

AGENDA

10:00	Registration – Coffee	
10:30	Welcome	Gerald Kaendler <i>Convener Working Group European Planning Standards & Connection Codes</i>
10:40	Draft Energy Infrastructure Package and the Cost Benefit Analysis	Kitti Nyitrai <i>European Commission – DG Energy</i>
11:10	ENTSO-E activities on Cost Benefit Analysis: from the TYNDP to 2050 perspective	Dimitrios Chaniotis <i>Manager System Development</i>
11:30	ENTSO-E Cost Benefit Analysis Methodology	Gro de Saint Martin <i>Convener Drafting Team Planning Standards</i>
12:10	Round table	Panel
12:30	General discussion	All
13:00	Lunch	
14:30	Interactive session on specific topics (sub-groups discussion): <ul style="list-style-type: none"> - Socio-economic welfare, RES & CO2 - Externalities (Value of lost load, environmental impact) - Grid transfer capability calculation and clustering - Building of scenarios & planning cases 	Drafting Team Planning Standards Members
16:00	Coffee break (compilation of the discussions results)	
16:15	Presentation of the sub-group discussion results	The Sub-Group moderators
16:45	Conclusions of the workshop, next steps	Jean Verseille <i>Chairman System Development Committee</i>
17:00	End of Workshop	

Outline

- **Goals of CBA**
- **Benefit framework**
- **Project definition**
- **Handling of uncertainties**
- **How to ensure that benefits outweigh costs?**



EU objectives of CBA methodology

Transparency



- Harmonised energy system-wide CBA
- Demonstrate overall costs and benefits from a European perspective



TYNDP projects

Candidate PCIs

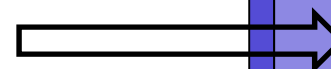
Selection of projects of common interest

- Selection process takes into account CBA results



Cross border cost allocation

- CBA results possible input (beneficiary pays principle)



*Upon
request
(Council
amendment)*

Why use pan-European CBA methodology ?

✓ **Address major changes and challenges** in the electricity sector (climate change, RES, market integration, SoS...)

- Common benefit framework reflecting today's challenges
- Highlight projects which have a particular value in achieving certain targets, such as RES integration or completing the Internal Market
- Identify robust projects, taking into account uncertainties linked to future system evolution
- Common scenarios and joint grid planning

✓ **Enhance dialogue with stakeholders**

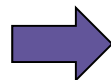
- Huge investment needs
- Need for social acceptance



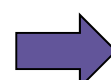
General approach to Cost Benefit Analysis



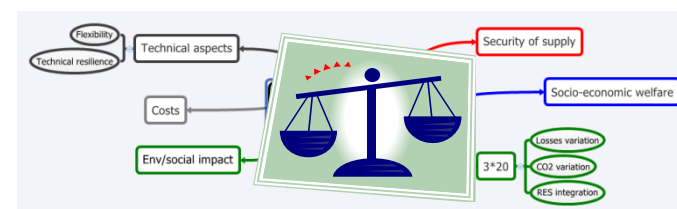
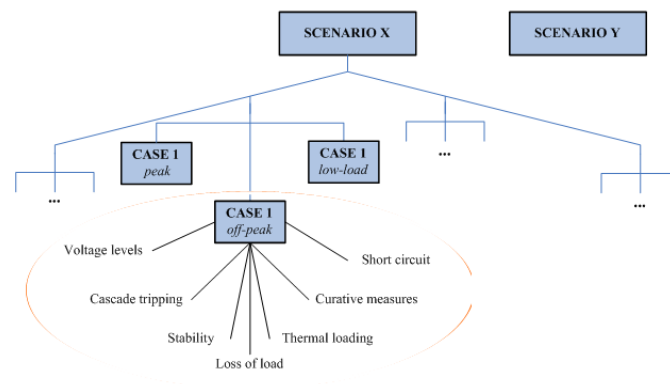
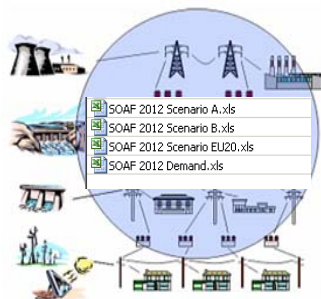
**Requirements for
scenario building
and analysis**



**Requirements for
analysis of planning
cases**

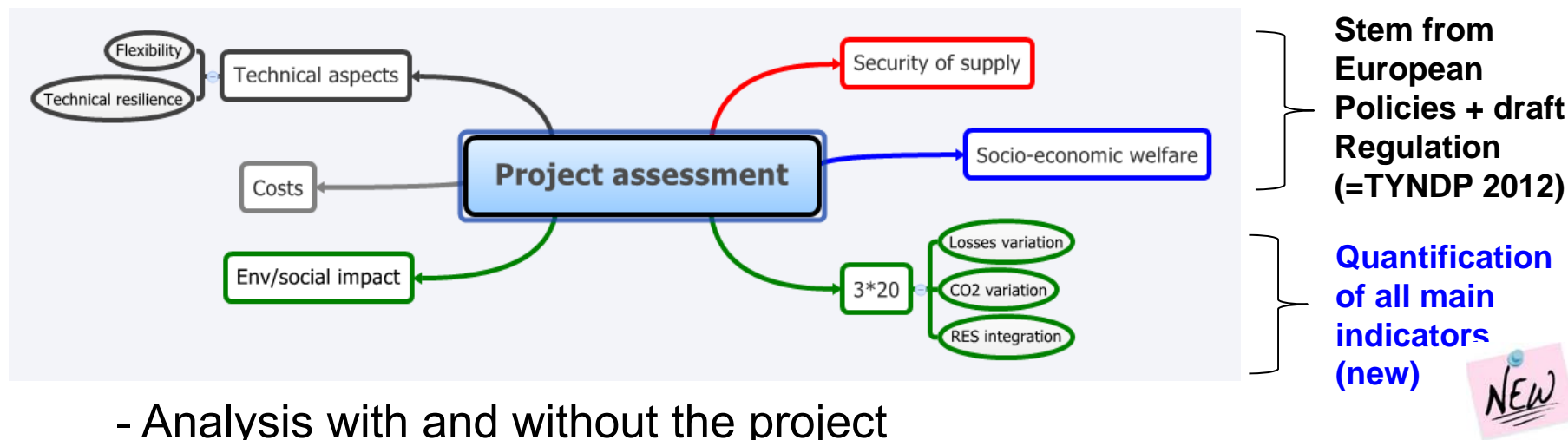


**Requirements for
analysis of costs
and benefits of
transmission
projects**



Benefit framework

✓ Benefit framework

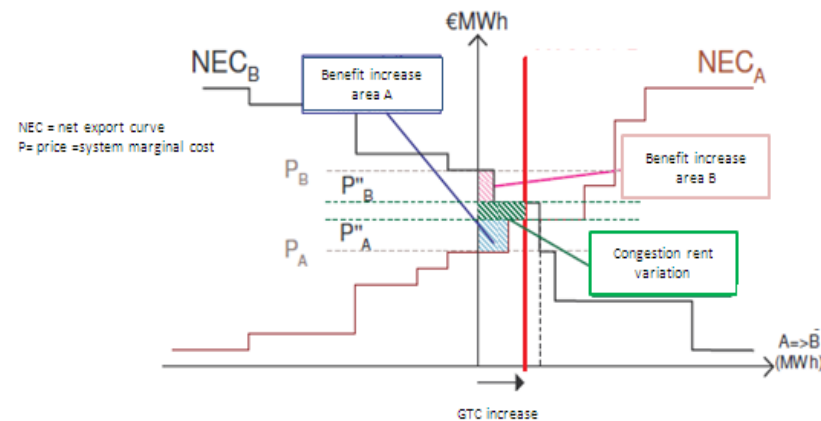
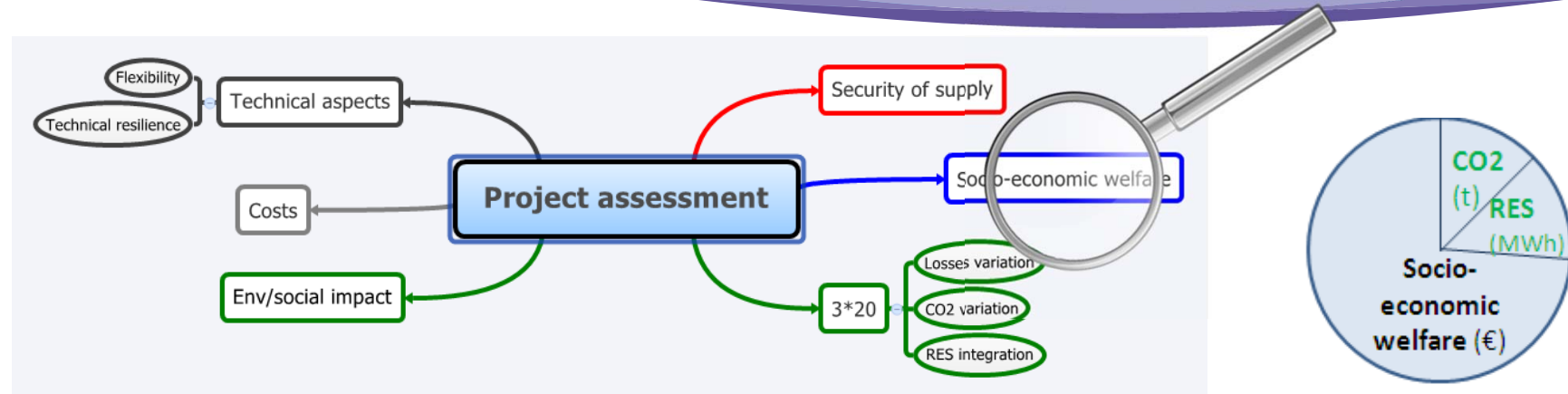


✓ Geographical framework

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

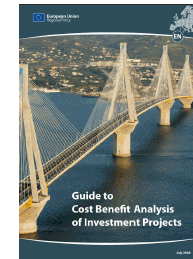
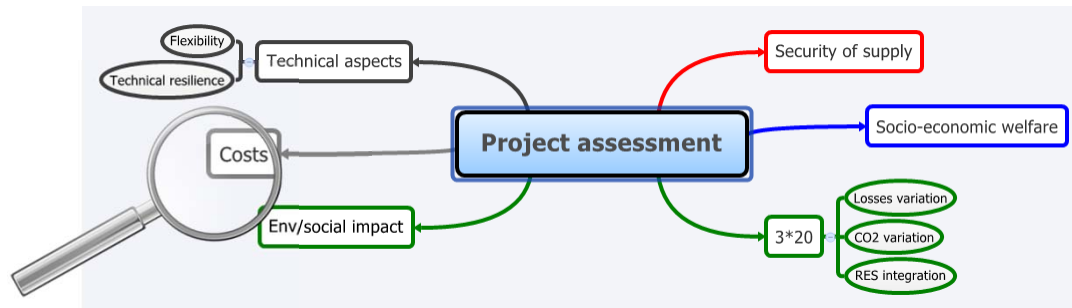


Benefit analysis: short glance on socio-economic welfare



Transmission improves optimization of generation portfolios across boundaries: Value for producers and consumers

Short glance on project definition and cost assessment



- What is a cross border project?

- Investment or set of investments
- CBA on interconnector only could in some cases give wrong results

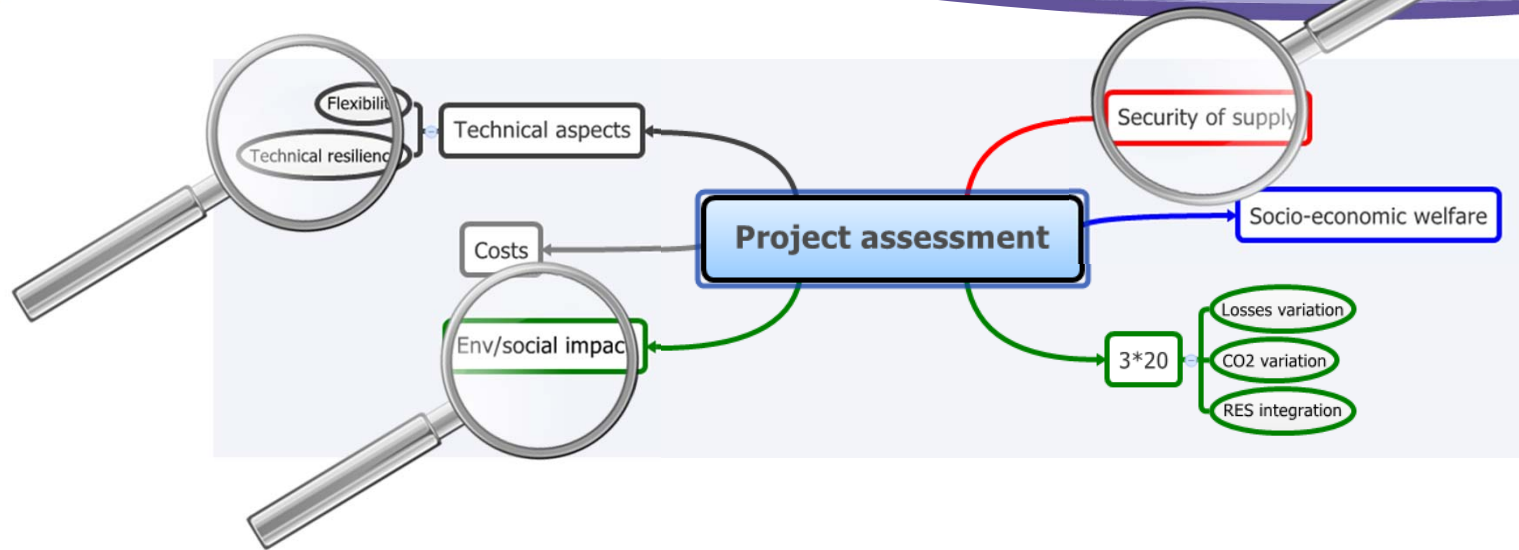
-ENTSO-E's clustering rule :

- Clustering allowed if $\Delta GTC_2 \geq 0.2 \Delta GTC_1$

Costs:

- “Pure” investment costs (material, works, studies...)
- Environmental costs (procedures, compensations, dismantling costs...)
- Operational costs, cost of replacements (if any)

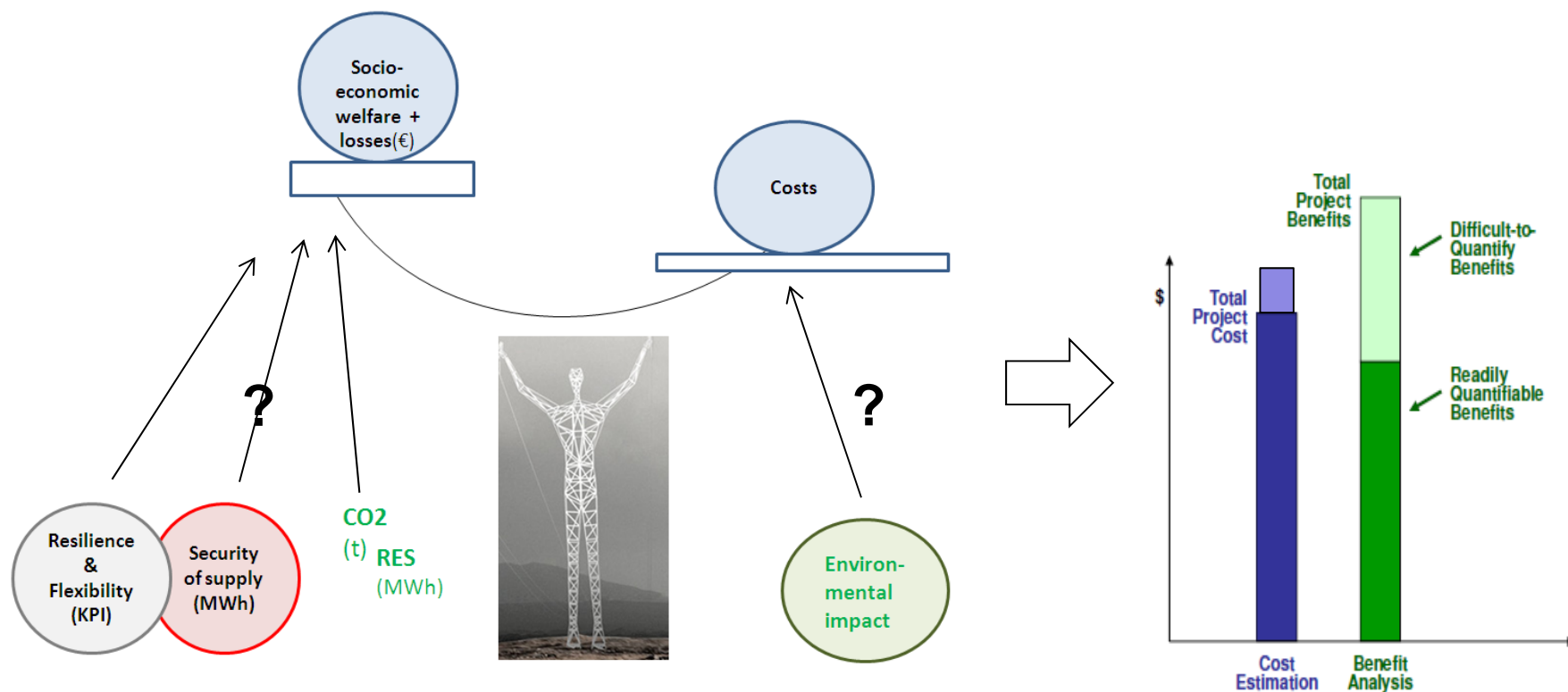
Benefit analysis: short glance on externalities



Transmission has many (positive or negative) externalities: network effects, resilience (insurance value), impact on transaction costs, “first-mover” benefit, environmental impact....

ENTSO-E’s approach is to focus on the main externalities and to monetise only if there is a common reference value: [reliability of the assessment](#)

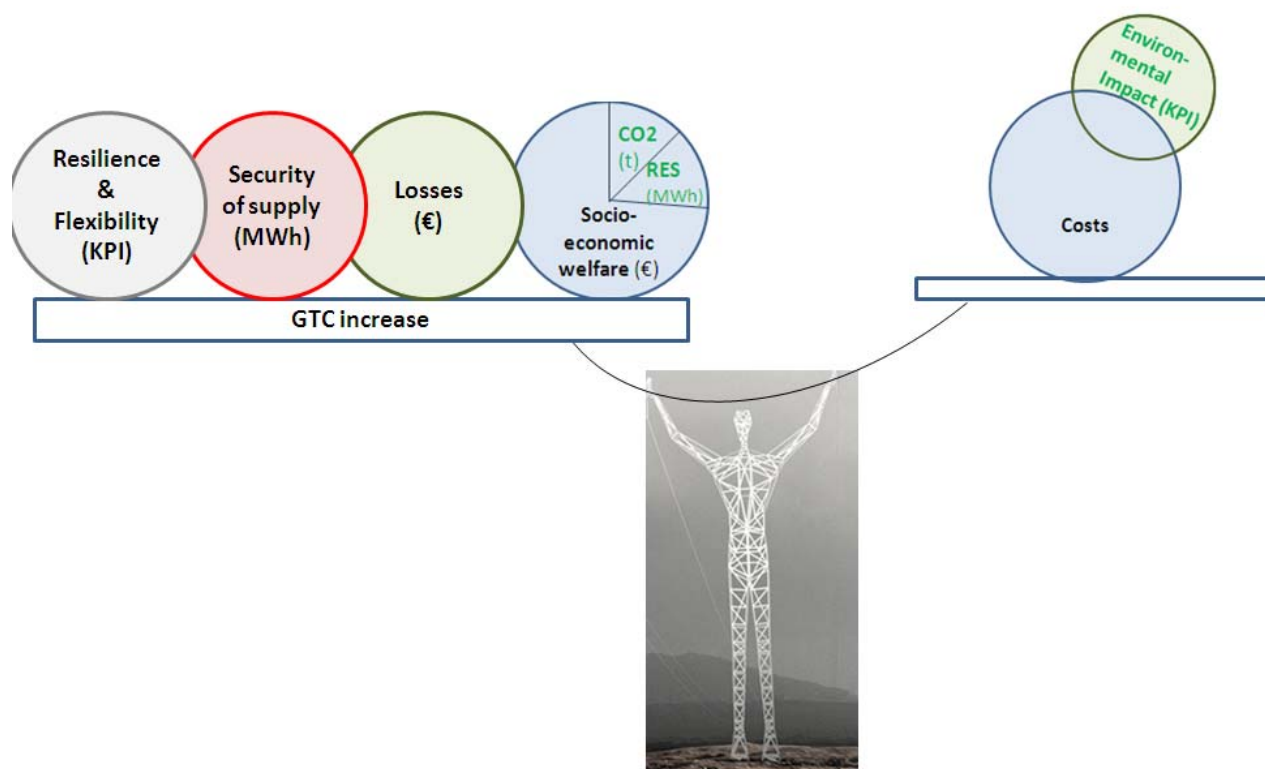
How to ensure that benefits outweigh costs: get the balance right



Goal : Capture all main transmission benefits

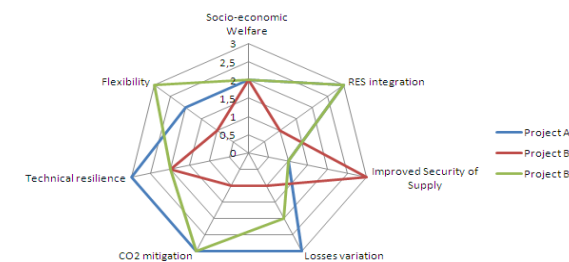
How to ensure that benefits outweigh costs ?

Computation



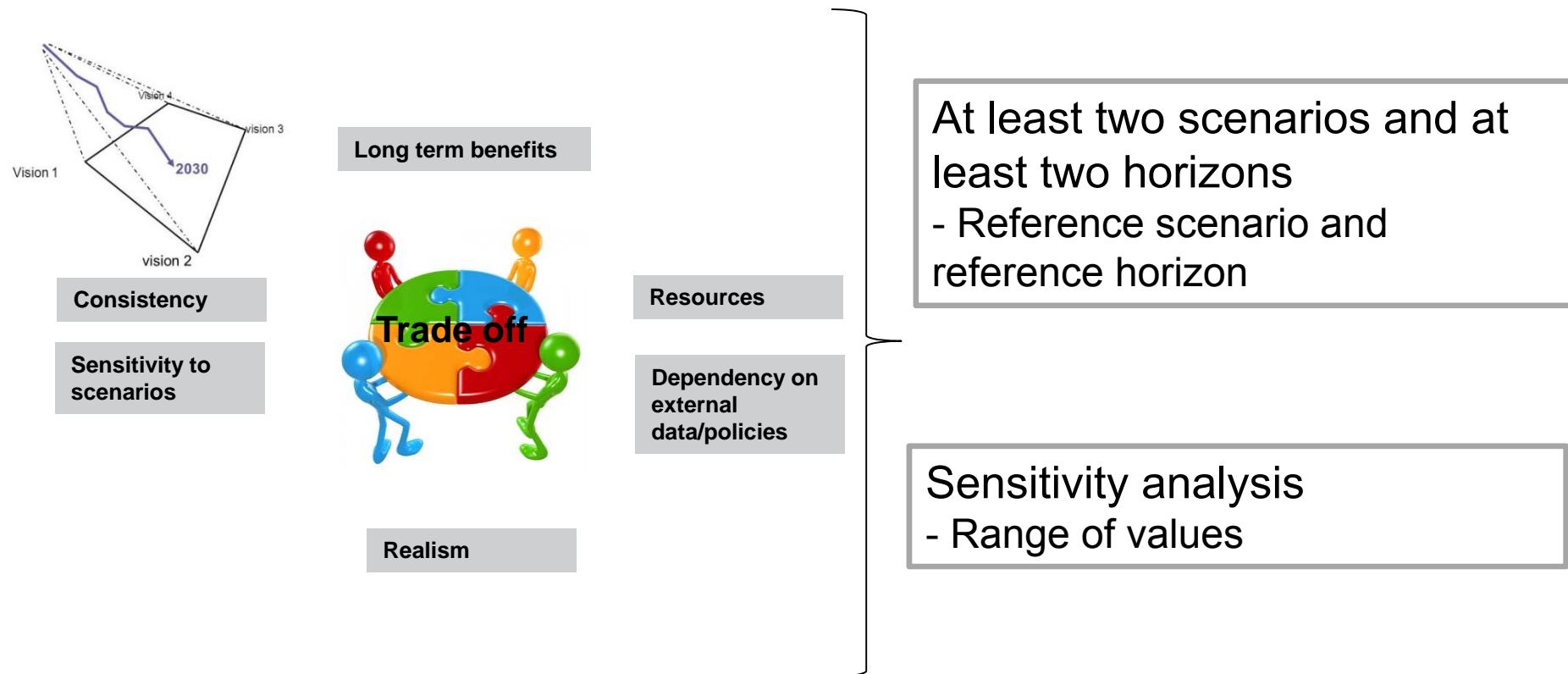
Presentation

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	M€/year	MWh/year	MWh/year	M€	Mt				M€
Project A	1000	90-150	500-550			0.3-0.6	+++	++		650-700
Project B	500	30-50		3000	20-30		++			25
Project C	800	225-30	3500		10-20	1-1.5	++	+++		150



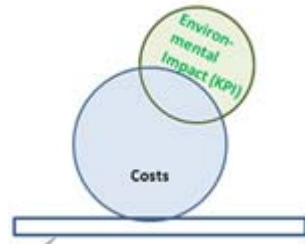
Goal : best possible information for stakeholders and decision-makers

How to address uncertainties: scenarios & time horizons



CBA quality depends on quality of input assumptions !

How to assess the environmental and social impact ?



Ideas welcome !

- **Internalised** (avoidance costs, compensation costs....)
- **Not internalised** : residual impact or uncertain impact
- Challenge : indicator for project at both conceptual and permitting stages

-Today's approach :



-GIS + expert view



Sub-indicators



Criteria	Project assessment									
	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	€/year	€/year	€/year	€/year	€/year	€/year	€/year	€/year	€/year
Project A	1000	150	500					++		850
Project B	500	30						++		250
Project C	800	225		10				++		750

CBA quality depends on capacity of including externalities

Conclusions/discussion

What do you think about ENTSO-E's combination of CBA and multi-criteria assessment?

Do you think the approach is likely to provide a good balance between consistency of results and necessary freedom for project promoters and regional groups?

Do you agree with ENTSO-E's approach for clustering of investments?

Do you think ENTSO-E's approach to overall assessment provide enough information both for decision-makers and the public?

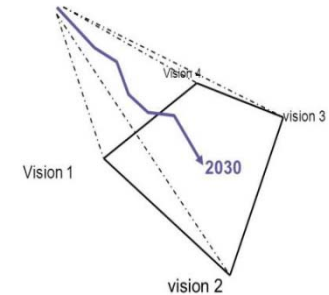
Annexes



General approach to CBA: main changes compared to the 2012 methodology

❖ **Scenarios & planning cases**

- ✓ Use of a wider span of scenarios and sensitivity analysis
- ✓ Specification of the nature, level of coherence and source of legitimacy of data and economic parameters
- ✓ Specification of area of analysis



❖ **Project identification**

- ✓ Rules on project clustering

❖ **Cost & benefit analysis**

- ✓ Higher consistence on calculation methodologies for each indicator (transparency)
- ✓ Quantification of each indicator in addition to colour code
- ✓ Monetization of additional indicators (losses)
- ✓ Guidance on discount rate
- ✓ Life cycle cost, residual value



Discount rate

Social discount rate (not financial)

“Guidance through upper and lower bounds

- ✓ Lower bound: max (economic growth of the Region, risk-free rate observed on financial markets)
- ✓ Higher bound: highest cost of debt observed in the countries financing the project

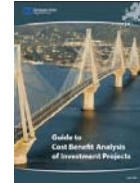
Value to be set by RG:

- ✓ A single discount rate must be used for homogeneous regions
- ✓ Two discount rates may be used for heterogeneous regions
- ✓ A single discount rate must be used for each project,

Period of calculation

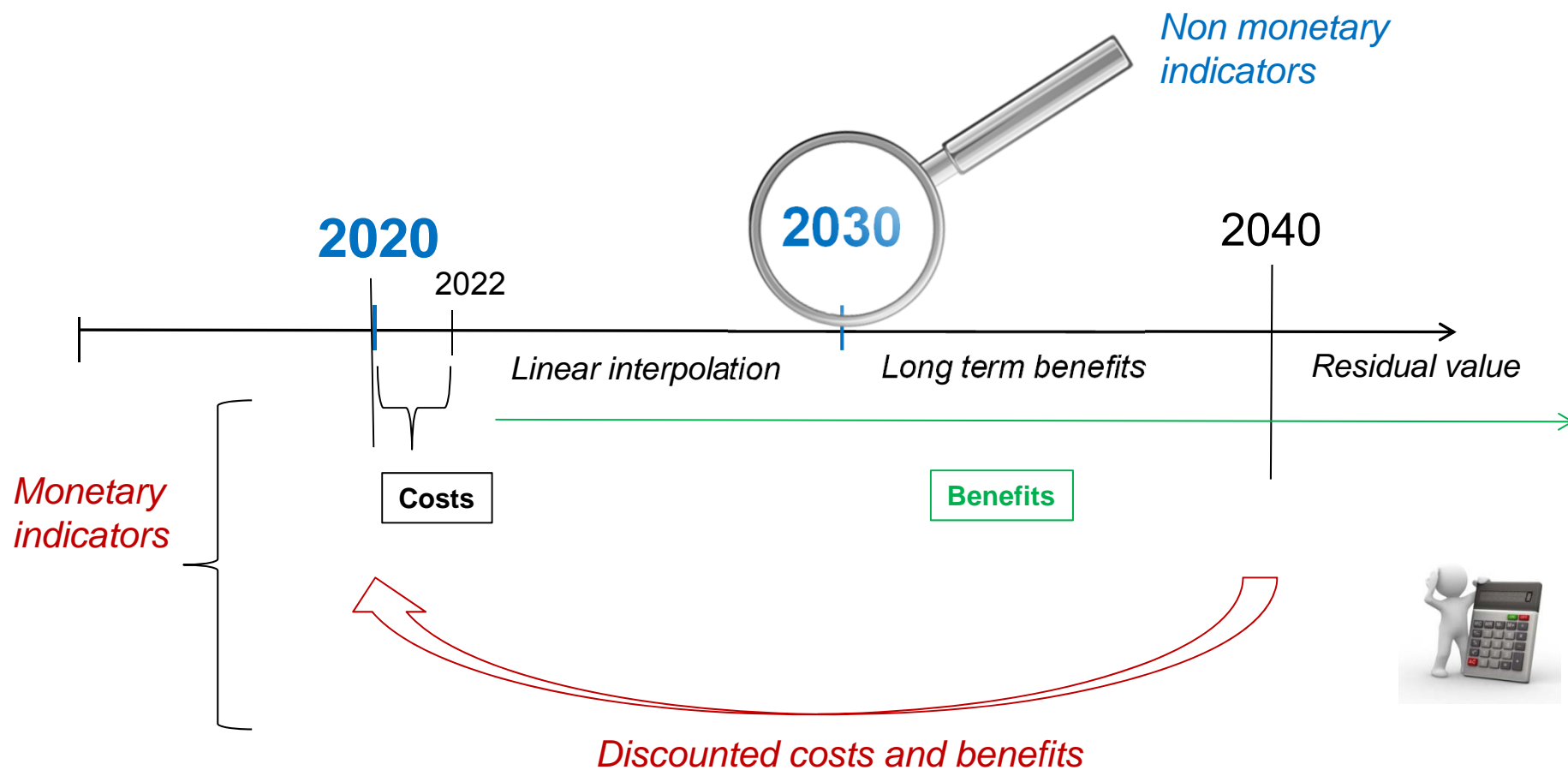
Shall cover at least 2 study horizons (mid term and long term)

Residual value to be taken into account



General approach to CBA: time considerations

Assessment under the reference scenario: expected values



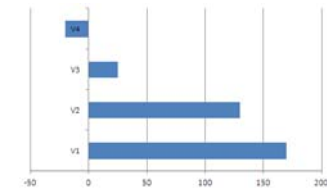
Sensitivity analysis

❖ Sensitivity scenarios

Projects are assessed in at least two macro-economic scenarios
(ranges of values are provided for all indicators)

❖ Sensitivity cases

Selected sensitivity analysis are carried out for the most influencing variables
(varying selected key assumptions whilst fixing all of the other assumptions)



❖ Specific flexibility indicator

The robustness of each project against variation of different scenarios or cases is assessed through the “Flexibility” indicator.

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