Guidelines to Cost-Benefit Analysis of Grid Development projects

Status point on possible evolutions

15 October 2015

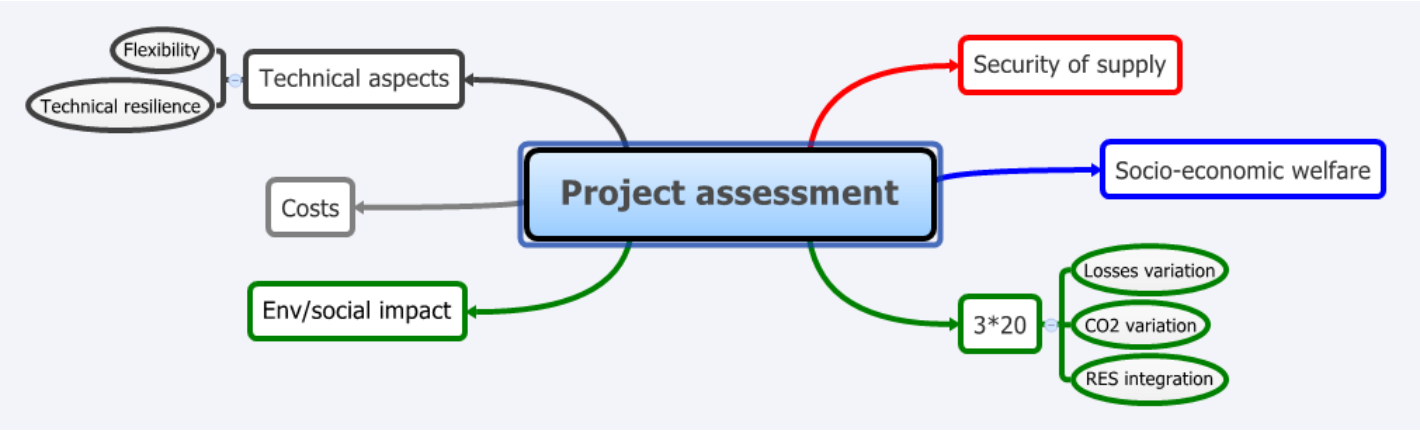
Network Development Stakeholder Group

entsoe

Reliable Sustainable Connected

CBA Methodology

✓Benefit framework



Stem from European Policies + draft Regulation (=TYNDP 2012)

Quantification of all main indicators (new)

Recommended Analysis with and without the project : TOOT methodology
(Take Out One at a Time : corresponds to a marginal value of each project with respect to the whole TYNDP projects portfolio)

The objective is still, and even more after the 2nd PCI selection process, to have a multicriteria CBA method and not to reduce a project assessment to a supposely perfect figure.

CBA: The issues currently discussed

Security of supply

Technical indicators

- GTC
- Clustering
- Losses
- TOOT/PINT

SEW

Qualitative benefits indicators

- « Resilience - robustness – flexibility »
- Indicateurs environnementaux

Storage projects assessment

Work is in progress – Still internal discussions

➔ Today is a transparency exercise

Project Clustering

TYNDP2014 showed poor understanding

The benefits by clusters have been disagregated in the PCI selection process

Our objective is to find a balance between the two risks :

- having clusters of very diverse projects
- Separate projects which make sense only together

➔ Change some very normative rules (5-year rule)

➔ Require more explanations from project promoters

➔ And publish them !

GTC calculations

Clarify a few technical aspects :

- **Way of computation (generation shift…)**
- **Impact of a project on different borders…**

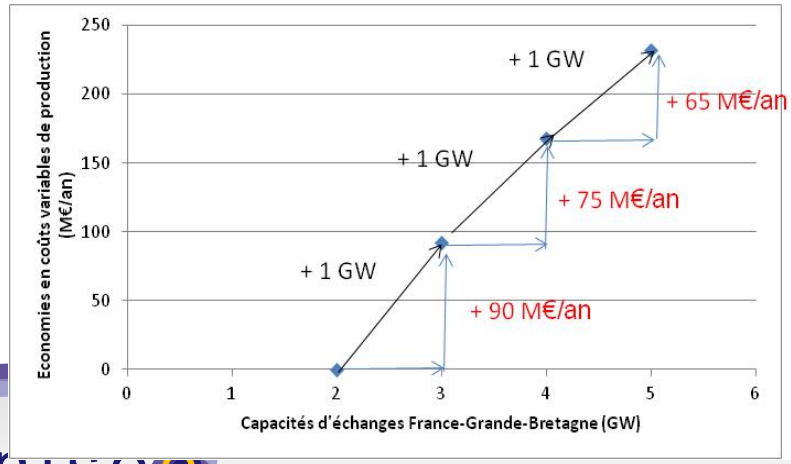
“TOOT-PINT” : what is the reference network

CBA proposes TOOT approach, to ensure that all projects have to be built. With exception in case of (too many) cometing projects.

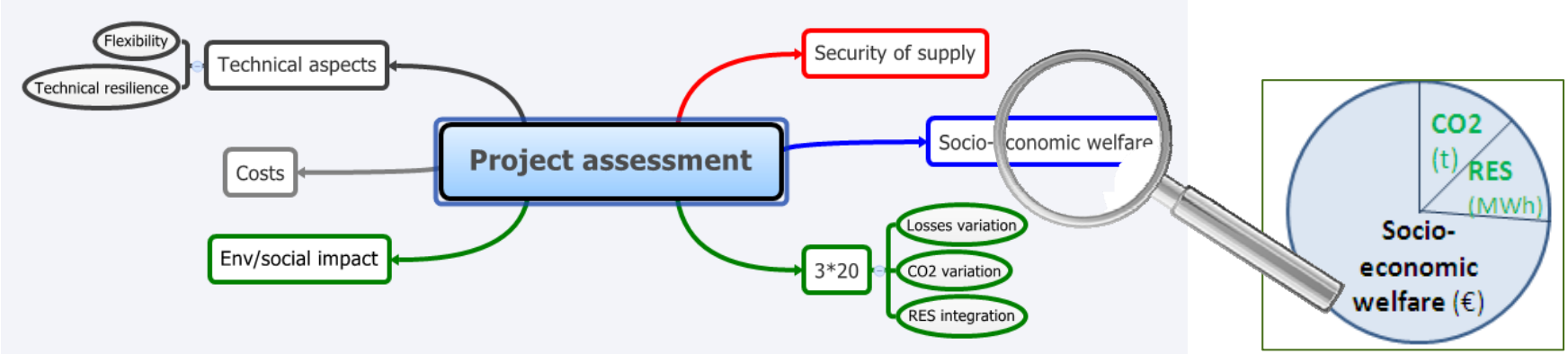
TYNDP 2014 showed a huge interest in defining Target Capacities

Hence the expectation is moving from assessing projects, to defining the target network infrastructure.

We could think of going as far as publishing some SEW/GW curves.



Current CBA : Socio-Economic Welfare



Transmission lines, as well as Storage, allow optimisation of use of existing generation portfolios

- ✓reduce generation costs,
- ✓reduce CO2 emissions
- ✓facilitate evacuation of RES

Market Studies measure the benefit of any storage project, under the assumption of perfect competitive market between energy sources, and economically optimal use of the storage facilities*

** In some countries, depending on particular regulatory framework, the owners of storage plants may not always be likely to capture the full value of storage devices (e.g. a TSO owner will not be able to capture any arbitrage value, or private owners may not be able to capture any system service value). In this respect, the socio-economic welfare measured in the CBA maximises the potential benefit of storage.*

Future CBA : SEW – completing the picture

Energy ✓

- Value of *actual* exchanges

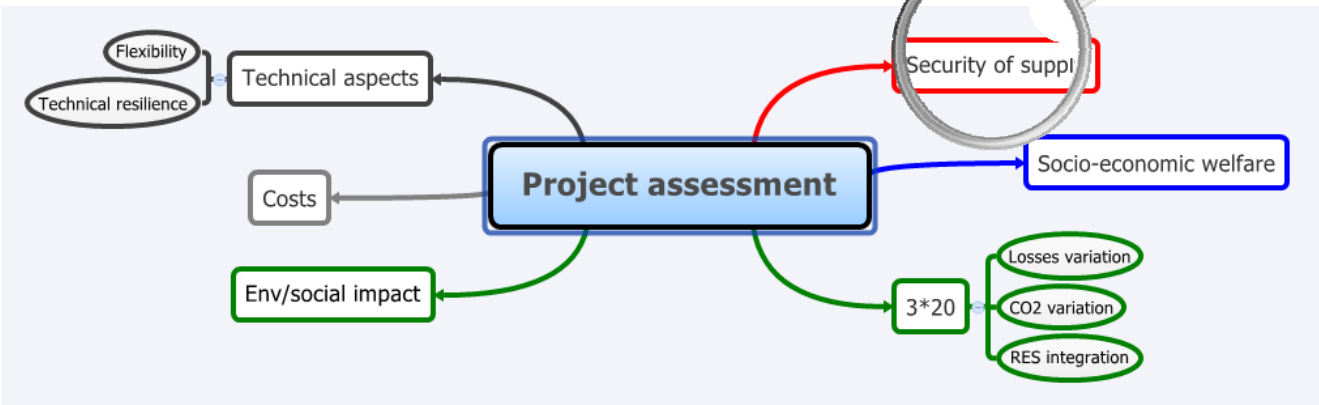
Capacity ✖

- Value of spared back-up generation means

Flexibility ✖

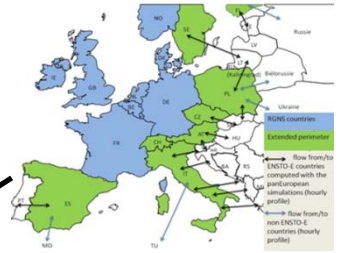
- Value of *possibly* required exchanges (risk hedging by increased system flexibility)

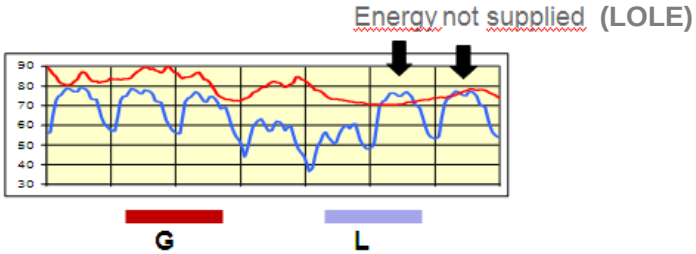
Current CBA : Security of Supply



Security of Supply (MWh/y)

Adequacy





Transmission and Storage projects can smooth the load pattern ("peak shaving") hence avoiding stressed situations for the load-generation balance, or networks congestions.

Both Market and Network studies will enable to measure this benefit

Future CBA : SoS

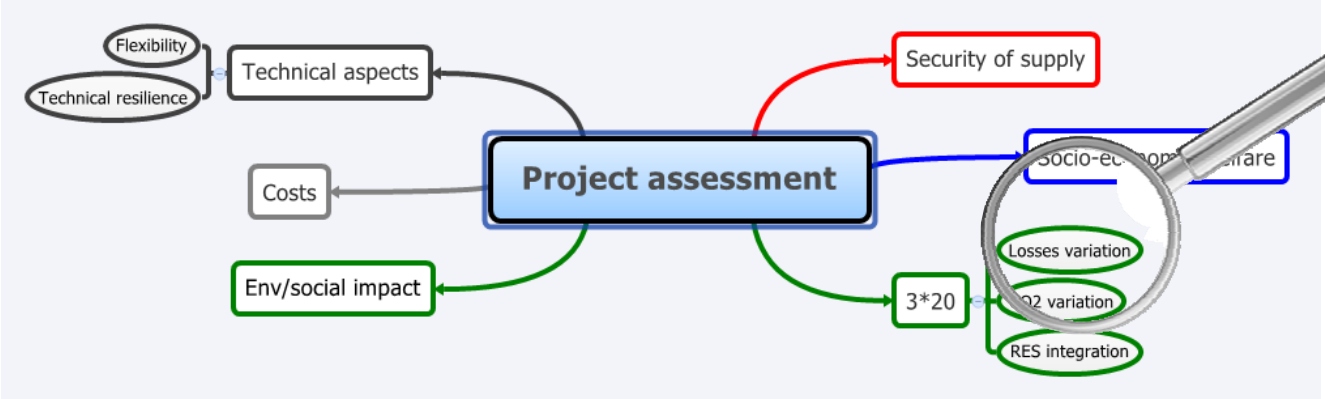
TYNDP2014 showed mostly zero-value SoS contributions per project.

This is understandable for a well-designed overall TYNDP architecture of pan-European projects.

But it does not mean that projects do not contribute to SoS : they increase the margin to the SoS problem

We have to review the methodology to highlight this security margin increase

Current CBA : Network Losses



Network Losses variations (MWh/y)

Depending on the location, the technology and the services provided, transmission and storage projects may increase or decrease network losses in the system.

This effect is measured by network studies

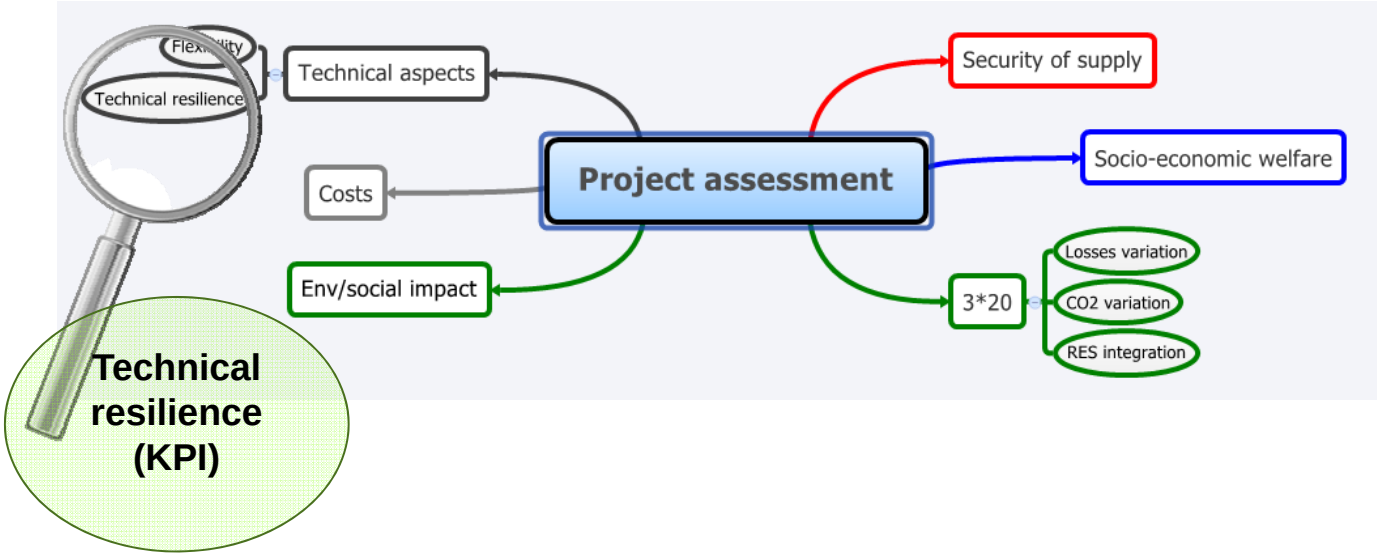
Future CBA : Losses

TYNDP2014 showed various practices

As soon as TYNDP 2016, we will generalise Regional assessment (and not only project nor national)

Going to European is technically demanding

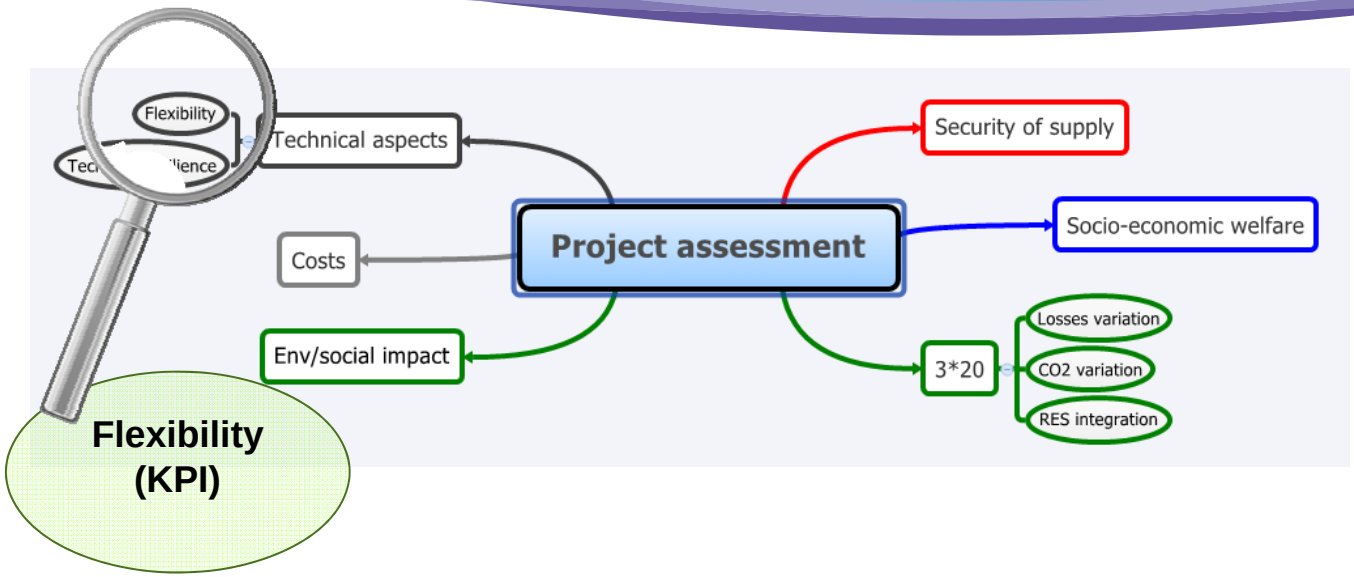
Current CBA : Resilience/System Safety



This indicator measures the improvement brought by the project to the system safety

Tthis aspect is measured out of technical studies through KPIs

Current CBA : Flexibility



As for transmission, the ability of storage projects to provide value across various scenarios may be assessed.

As for Transmission,
this aspect is measured out of technical studies through KPIs

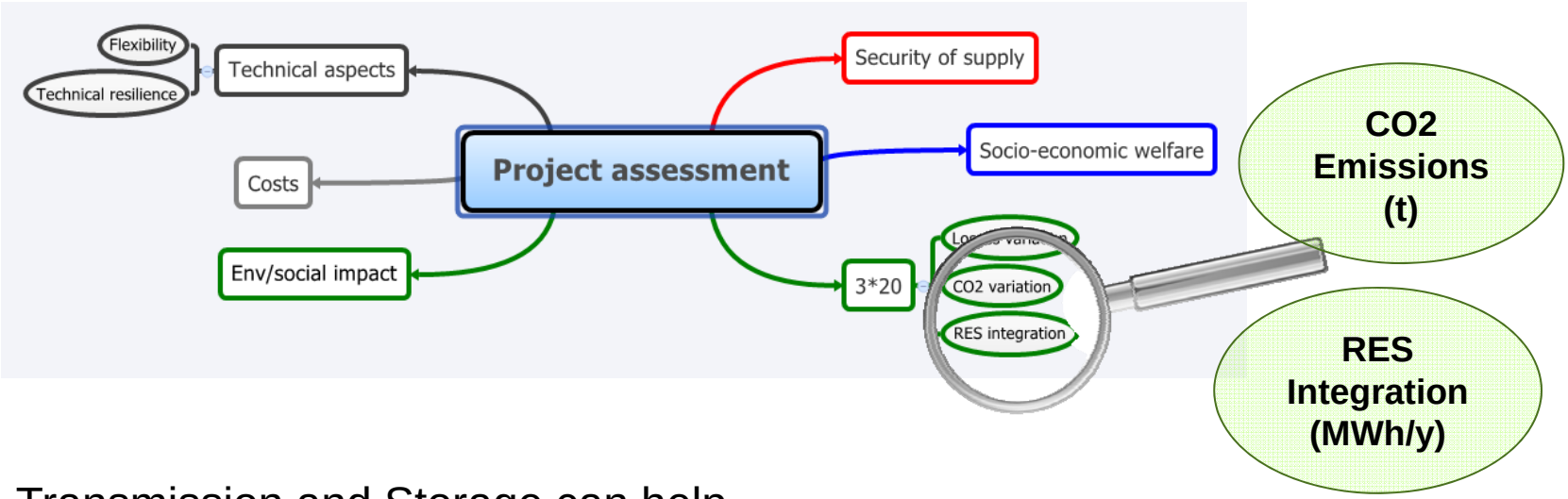
Future CBA : System flexibility, technical resilience revised

TYNDP2014 showed por understanding of these indicators

They will e re-drafted may be as soon as TYNDP 2016 :

- “Robustness” not the good term : cross-vision usefulness ?
- Flexibility :
  - should be understood as system flexiblity (ability to cope with fast changes in generation or demand)
  - Can be incorporated in the SoS indicator
- Technical resilience : Can be incorporated in the SoS indicator

Current CBA : RES Integration and CO2 emissions



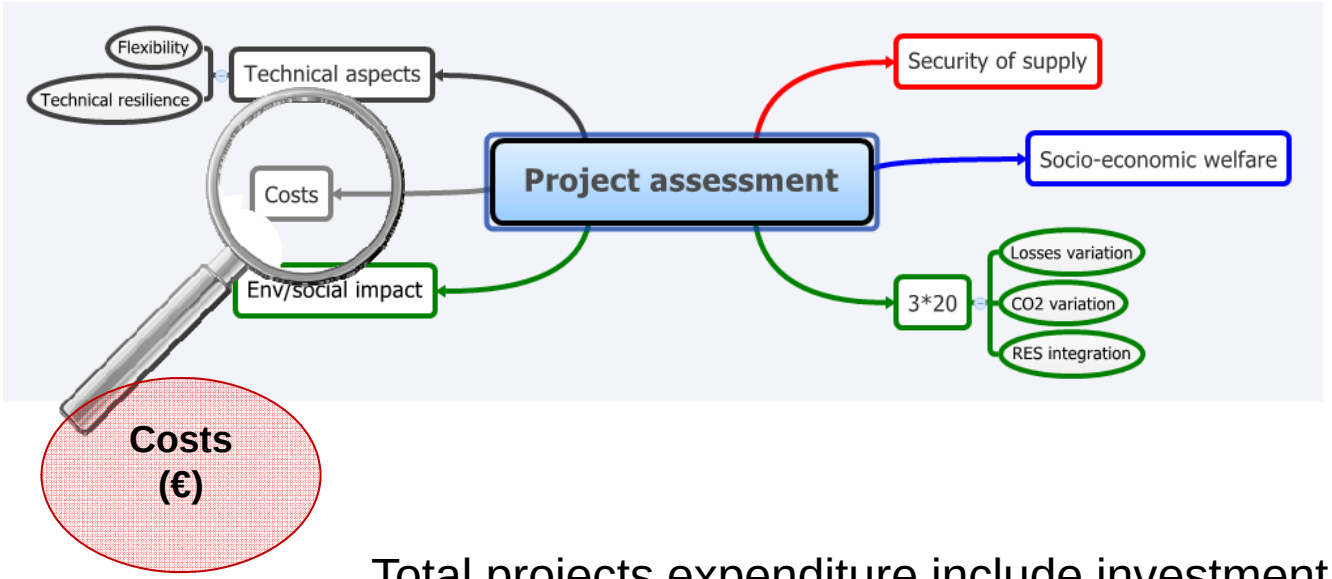
Transmission and Storage can help managing intermittency, and in particular limit the RES curtailment.

And more generally, they can modify the generation portfolio optimisation, hence modifying CO2 emissions.

The economic value of RES Integration and CO2 Emissions are internalised within Socio-Economic Welfare Measured through Market Studies

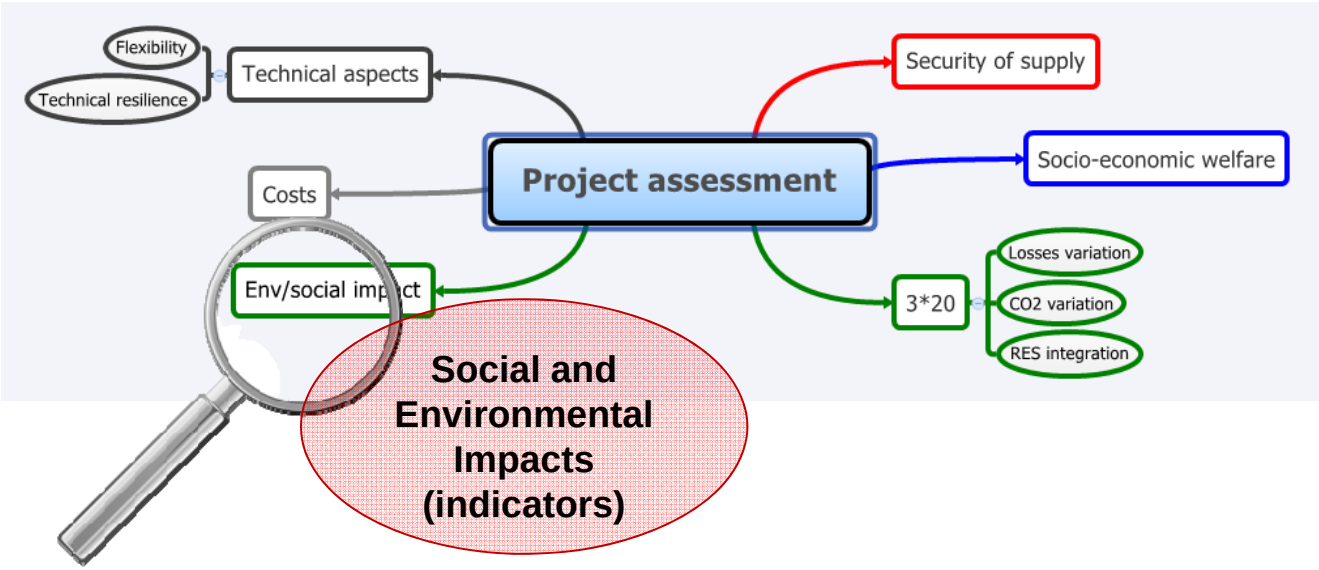
A quantitative indication is given as a complement

Current CBA : Costs



Total projects expenditure include investment costs, costs of operation and maintenance during the project lifecycle, as well as environmental costs (compensation, dismantling costs,...)

Current CBA : Social and Environmental Sensibility



Social and environmental impact of storage project is different from Transmission, and highly dependent on technology.

Specific indications will have to be provided by project promoters

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