Review of the CBA changes since the last published CBA version (4 December 2012):

- Storage

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Cost Benefit Analysis (CBA) methodology Workshop

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Outline

Scope of Application

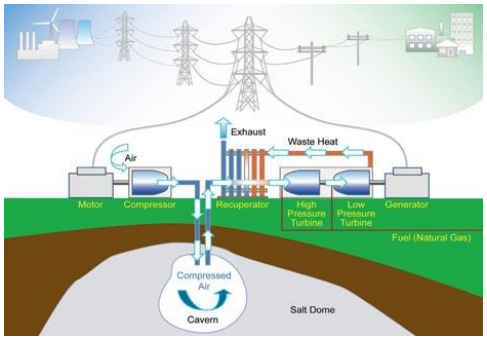
Detailed Methodology

Next steps

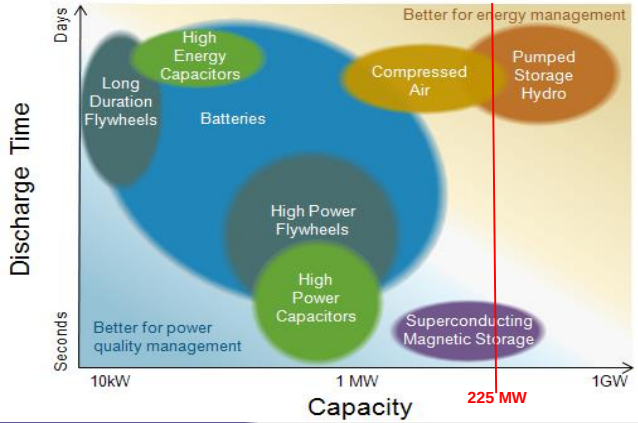
Scope of Application

EU Regulation 347/2013

- Claims a Cost Benefit Assessment methodology for Pan-EU storage projects, next to Pan-EU Transmission projects
- Project promoters can be utilities or TSO
- Whatever technology
- But only **bulk storage projects** :
  - ✓ **Power more than 225 MW**
  - ✓ **And Annual energy capacity more than 250GWh/y**



Electricity Storage Technologies

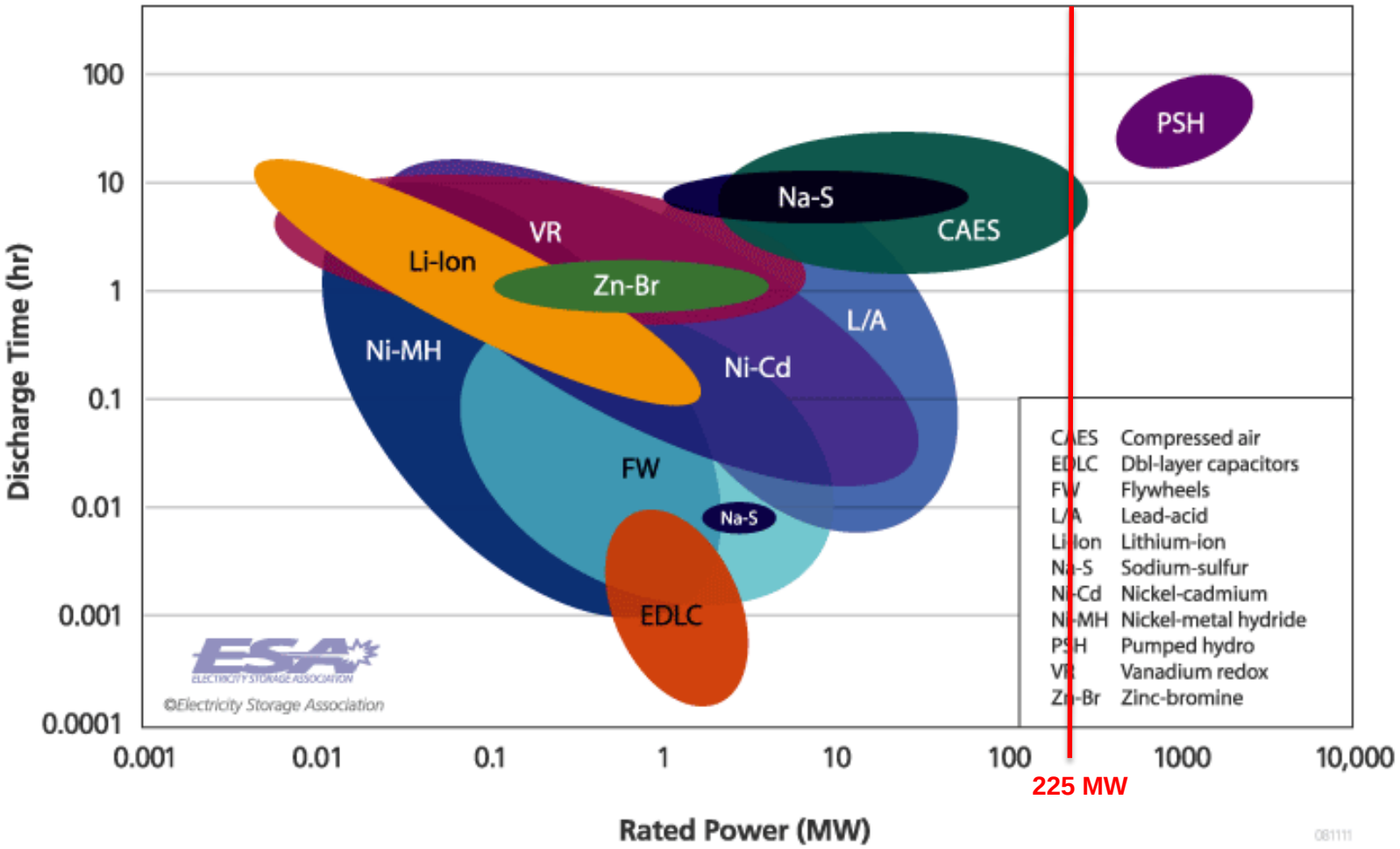


Hence electricity storage plants connected at the Distribution level and medium-sized electricity storage connected at transmission level are out of scope of this methodology.

➡ Currently concerned technologies :

- Hydro, CAES essentially
- Some batteries if grouped

Storage technologies characteristics



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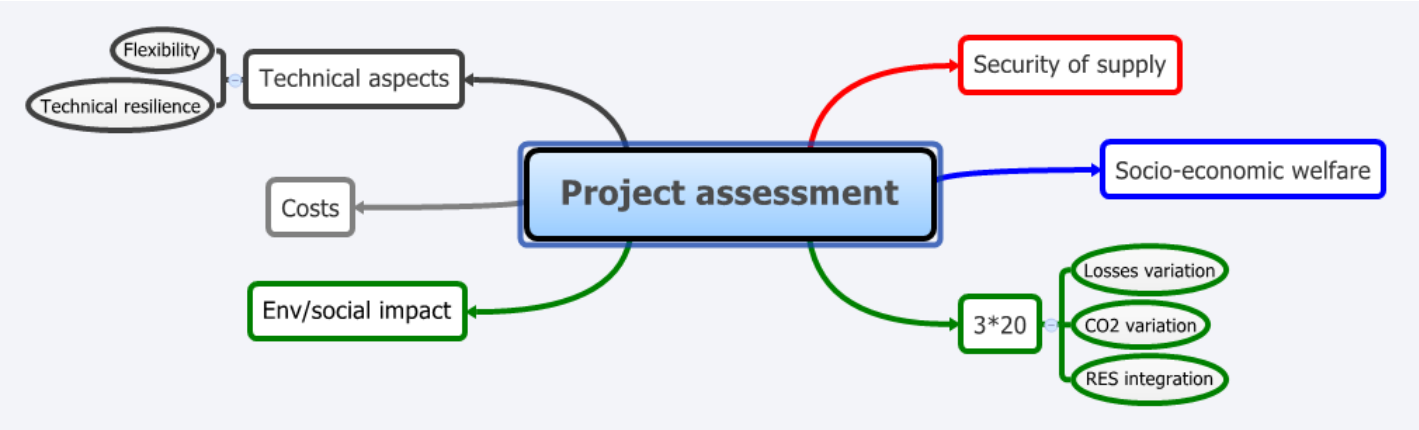
CBA Methodology for Storage projects : Basically the same as for Transmission lines

✓Benefit framework



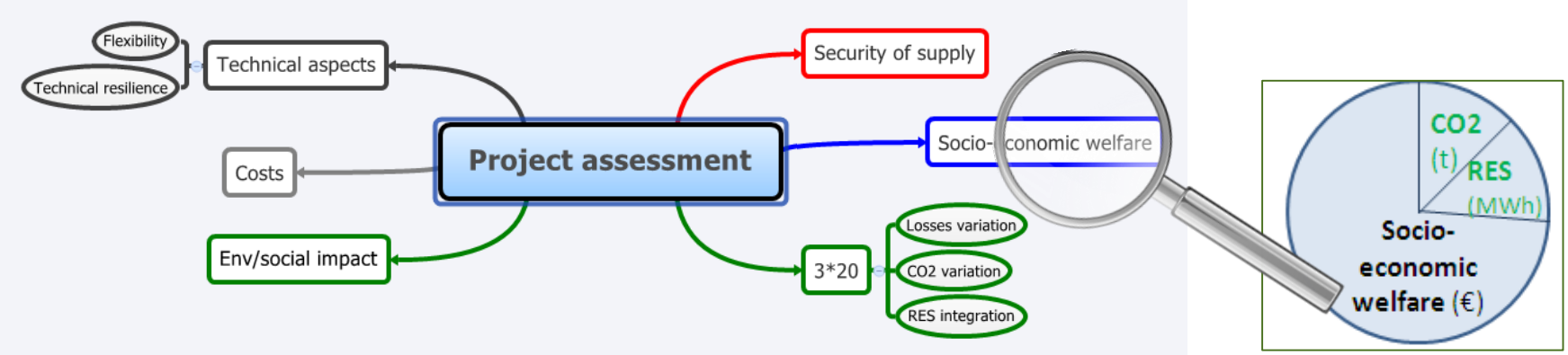
Stem from European Policies + draft Regulation (=TYNDP 2012)

Quantification of all main indicators (new)

Recommended Analysis with and without the project : TOOT methodology

EASE is in favour of a CBA method for storage as close as possible to the CBA method for interconnections. Indeed, these two technical solutions can either be complementary or in competition.

Benefit analysis: short glance on Socio-Economic Welfare



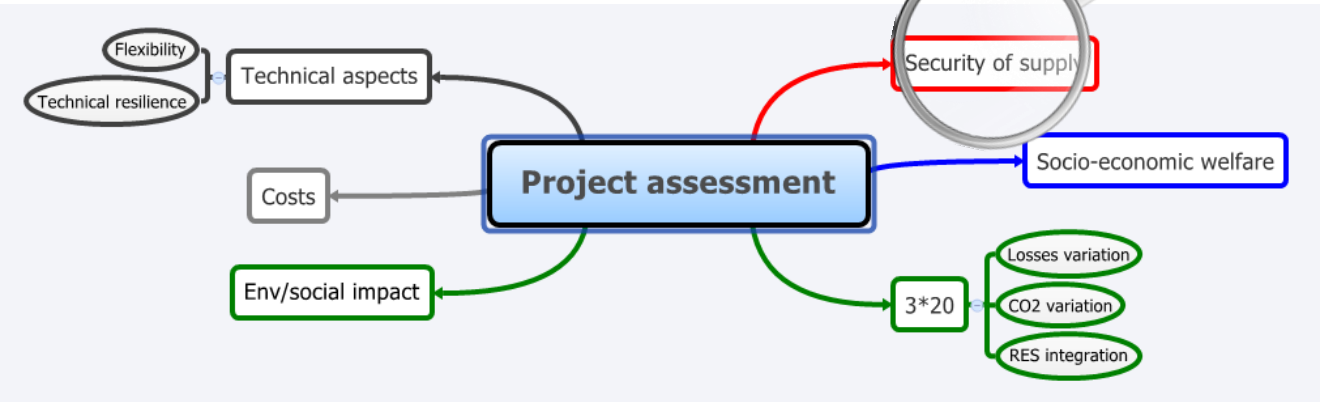
As Transmission lines, Storage allows optimisation of existing generation portfolios

- ✓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*

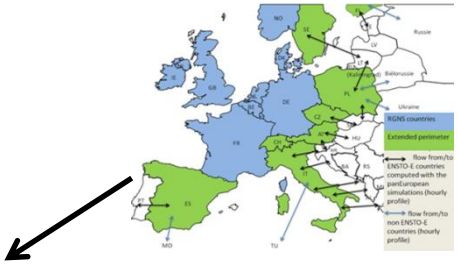
* *In some countries, depending on particular regulatory framework, the owners of storage plants may not always be likely to capture the full value of storage devices (e.g. a TSO owner will not be able to capture any arbitrage value, or private owners may not be able to capture any system service value).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

Benefit analysis: short glance on Security of Supply

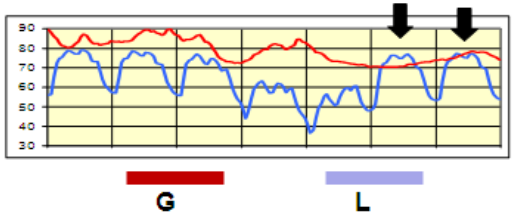


Security of Supply (MWh/y)

Adequacy



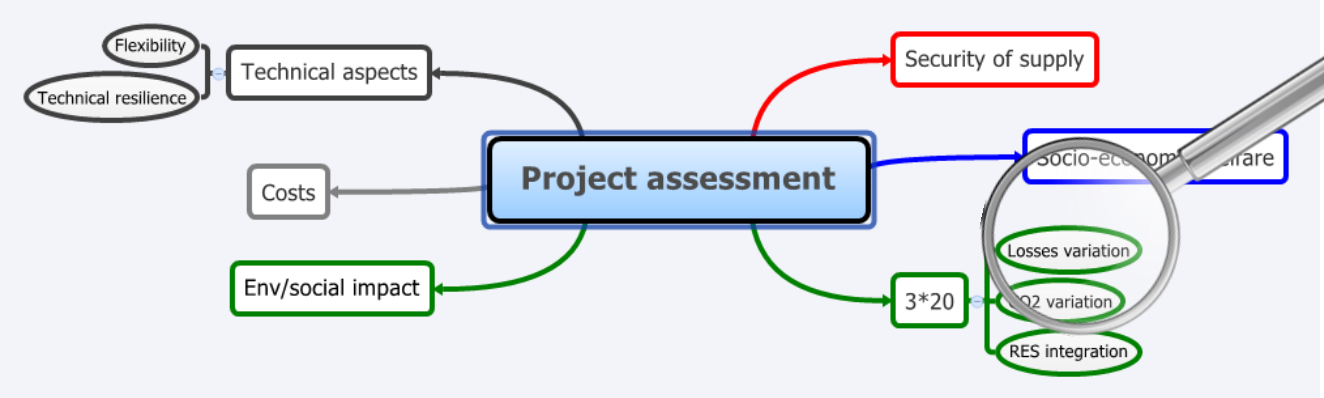
Energy not supplied (LOLE)



Storage 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

Benefit analysis: short glance on Network Losses

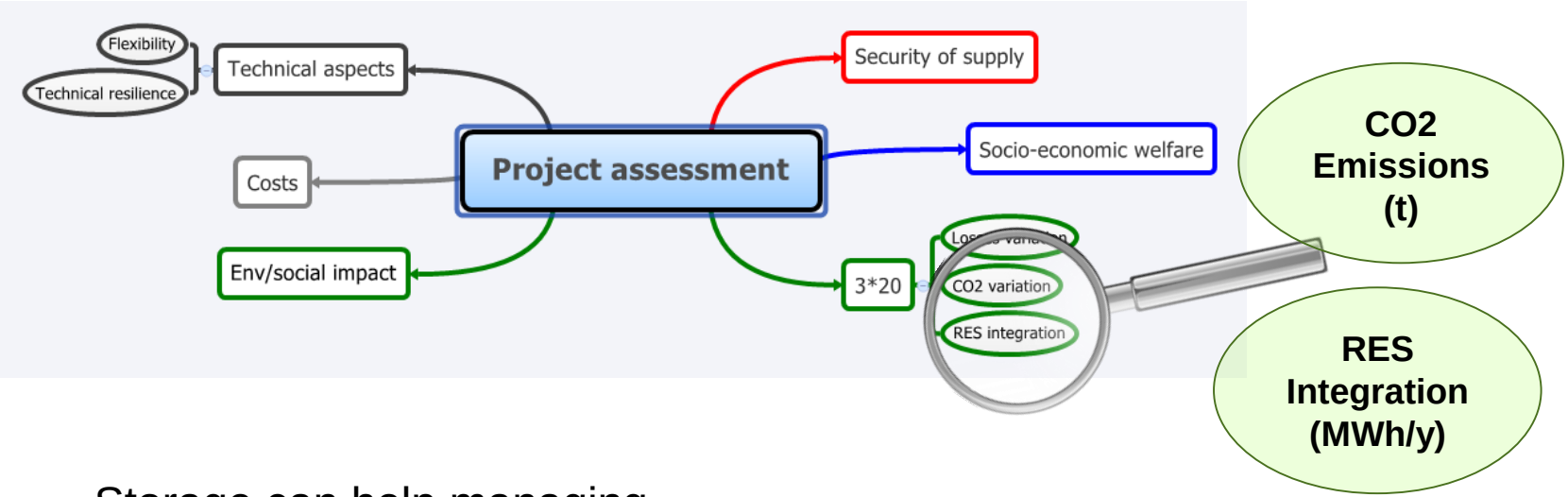


Network Losses variations (MWh/y)

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

This effect is measured by network studies

Benefit analysis: short glance on RES Integration and CO2 emissions



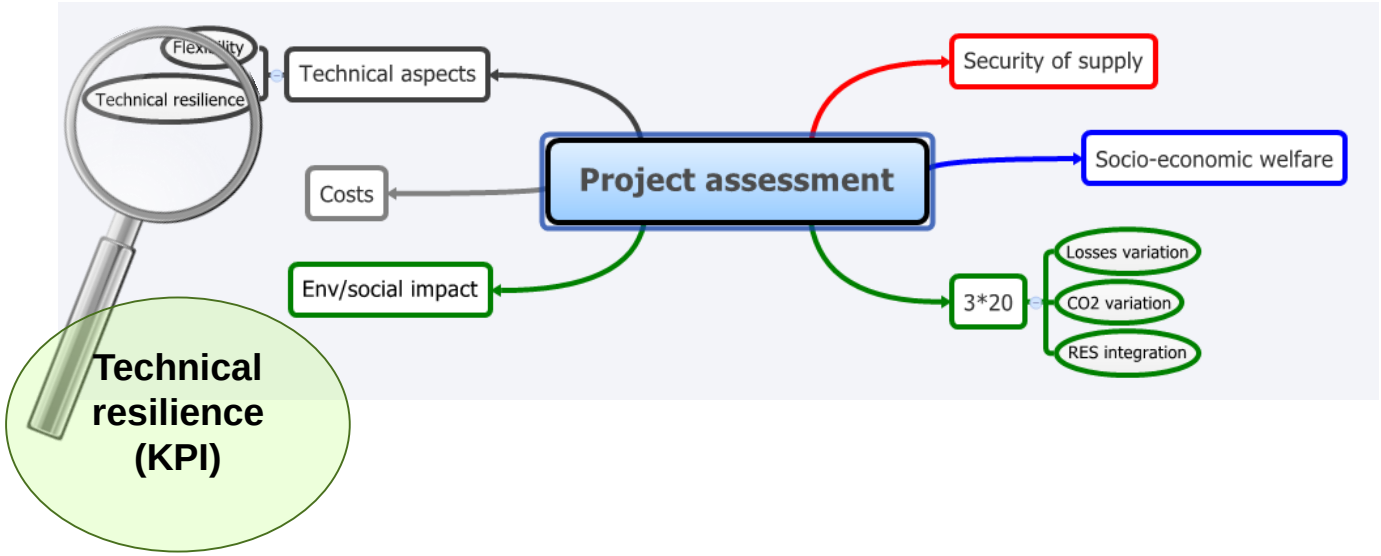
Storage can help managing intermittency, and in particular limit the RES curtailment.

And more generally, storage plants 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

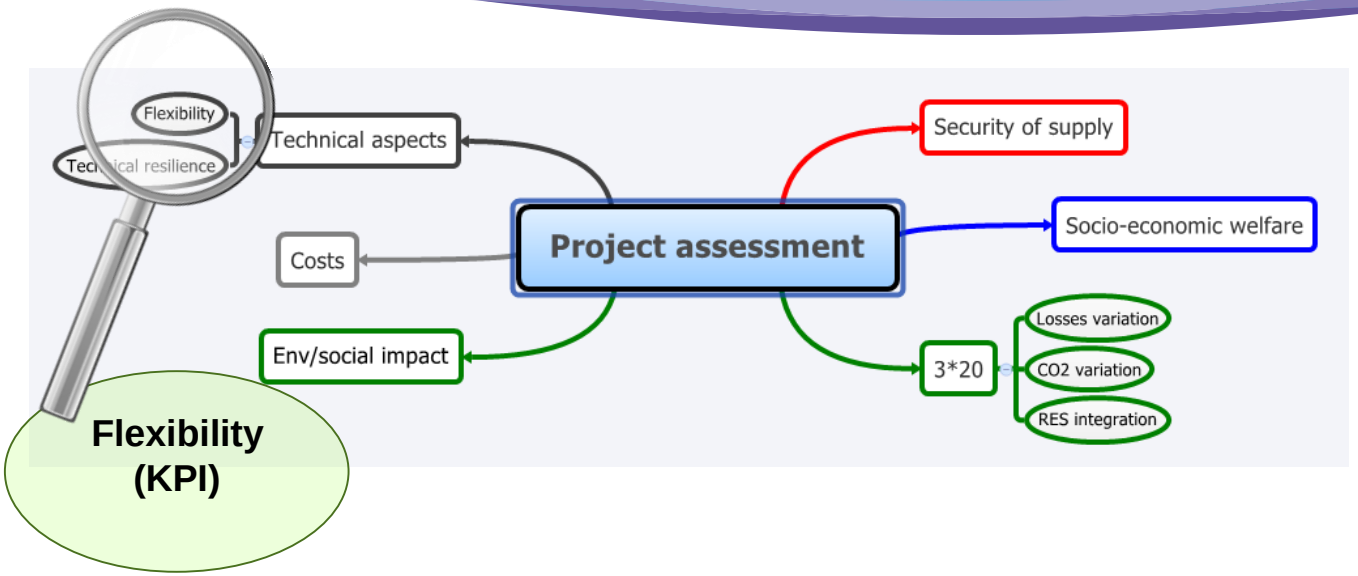
Benefit analysis: short glance on Resilience/System Safety



Storage can be employed to control power fluctuations (ancillary services), and to improve management of large incidents

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

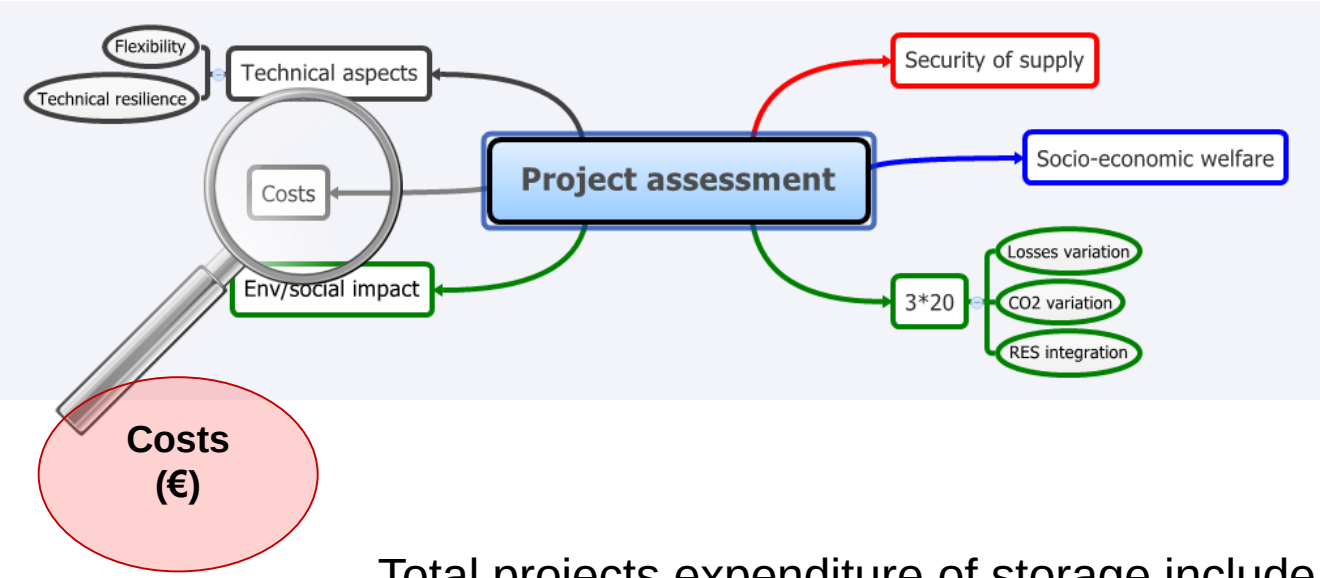
Benefit analysis: short glance on Flexibility



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

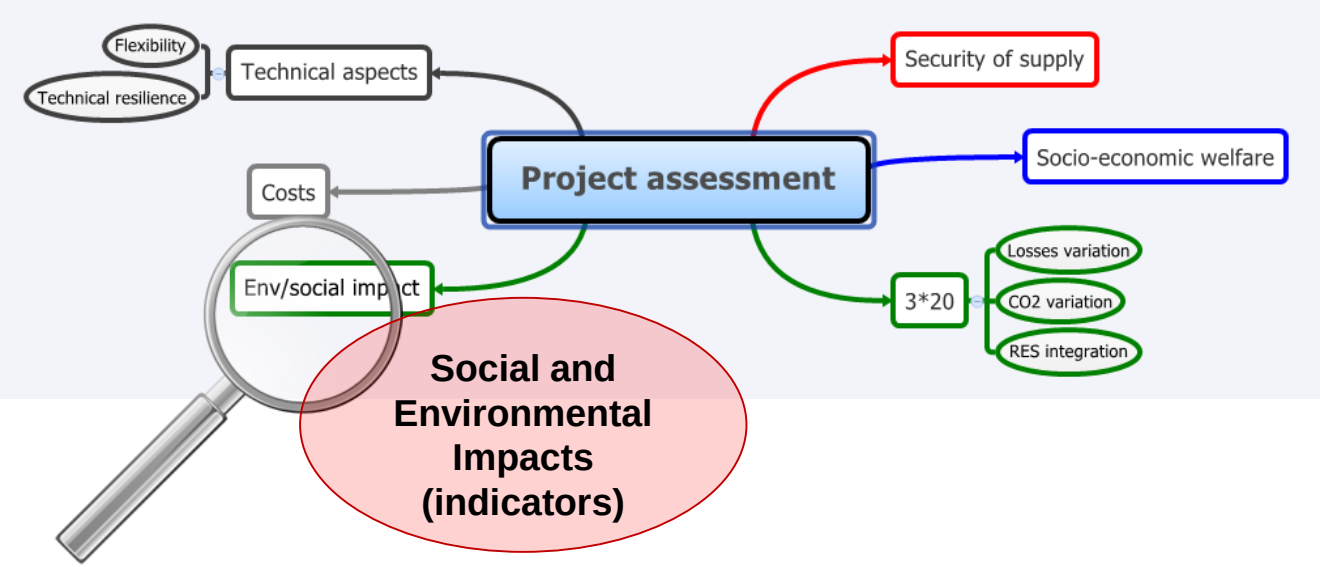
As for Transmission, this aspect is measured out of technical studies through KPIs

Cost analysis: short glance on Costs



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

Benefit analysis: short glance on 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

In the framework of the PCI selection process, the industrial and job impacts should be one of the inputs, as the CBA, to fully assess the interest of projects. They are not integrated into the CBA itself.

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Next steps for the CBA methodology for storage

First Application trials in TYNDP 2014

Full Application in TYNDP 2016

2 identified future improvements to work on

Investigate possibilities for assessing economy on avoided investments on the generation fleet

New storage development may avoid or postpone some other investments for peak generation (or demand response). Here the Socio-Economic Welfare takes into account the replacement of energy delivered by some power plants by the storage devices, but not the possible avoidance of investment costs.

This statement is also true for Transmission Lines cost-benefit assessment.

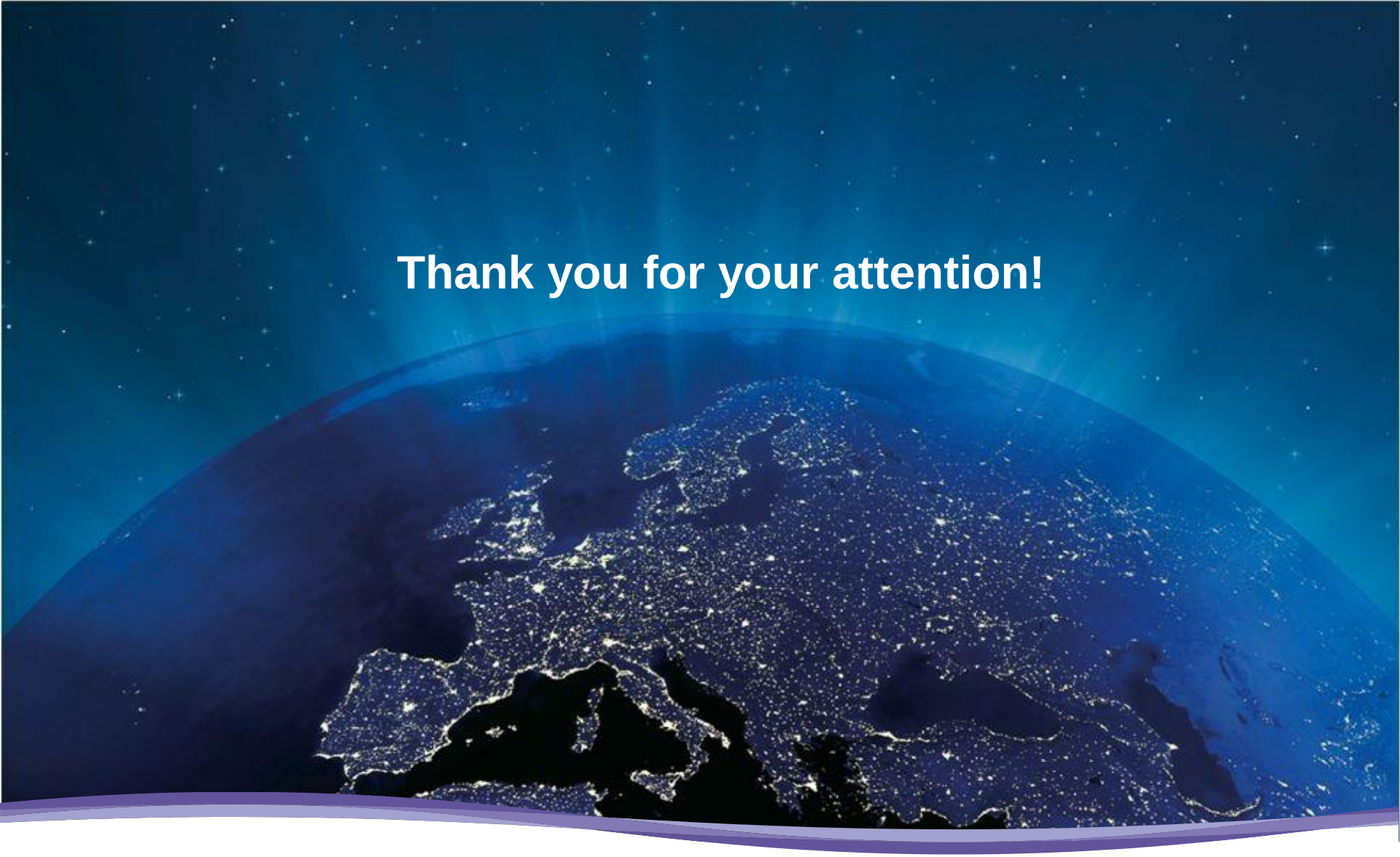
Investigate possibilities to quantify of ancillary services provided by storage

Storage devices provide some ancillary services, and hence can improve the total cost of these service (e.g. some thermal units can produce at the same cost without keeping a power margin)

But these two issues are admittedly very difficult to handle in the studies.

These topics deserve research work, and may be source for improvement in next versions of CBA

Thank you for your attention!



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