KPIs for Cost Benefit Assessment

DISCERN Third External Workshop

Brussels, 28th January 2016

Our experience so far

KPIs and CBA applied to smart grid projects

Some of the most relevant projects in which Enel has experience in the definition and application of KIPs and/or a CBA to evaluate the deployment of smart grid technologies

e-mobility Italy

Progetto Isernia

POI

GRID4EU INNOVATION FOR ENERGY NETWORKS

GRID+

iGREENGrid

Green eMotion

evolvDSO

PAN

FLEXICIENCY

GRID+ STORAGE

JOINT RESEARCH CENTRE
Institute for Prospective Technological Studies (IPTS)

Guidelines for conducting a
Cost Benefit Analysis of Smart Grid Projects

Isernia project

Overview

A pioneering project integrating various Smart Grid elements

Funding: AEEGSI (Italian Regulator) – **Delibera 39**

+2% Additional WACC on investments

related to Smart Grids and energy efficiency

Project budget: Approx. 10M€

Objectives:

Demonstrate under real conditions, new telecommunication technologies aimed at testing a series of Smart Grid technologies(including storage systems)

Cost Benefit Analysis used for Isernia project

Approach

Applying and validating step by step the JRC's CBA framework to a real case study in Italy and in particular to the project Isernia

CBA process

Quantitative evaluation

1. Review and describe the technologies, elements and goals of the project
2. Map assets onto functionalities
3. Map functionalities onto benefits
4. Establish the baseline
5. Monetize the benefits and identify the beneficiaries
6. Identify and quantify the costs
7. Compare costs and benefits

Sensitivity analysis

Qualitative (non-monetary) appraisal

Using measurable KPIs/metrics with regard to specific objectives / criteria

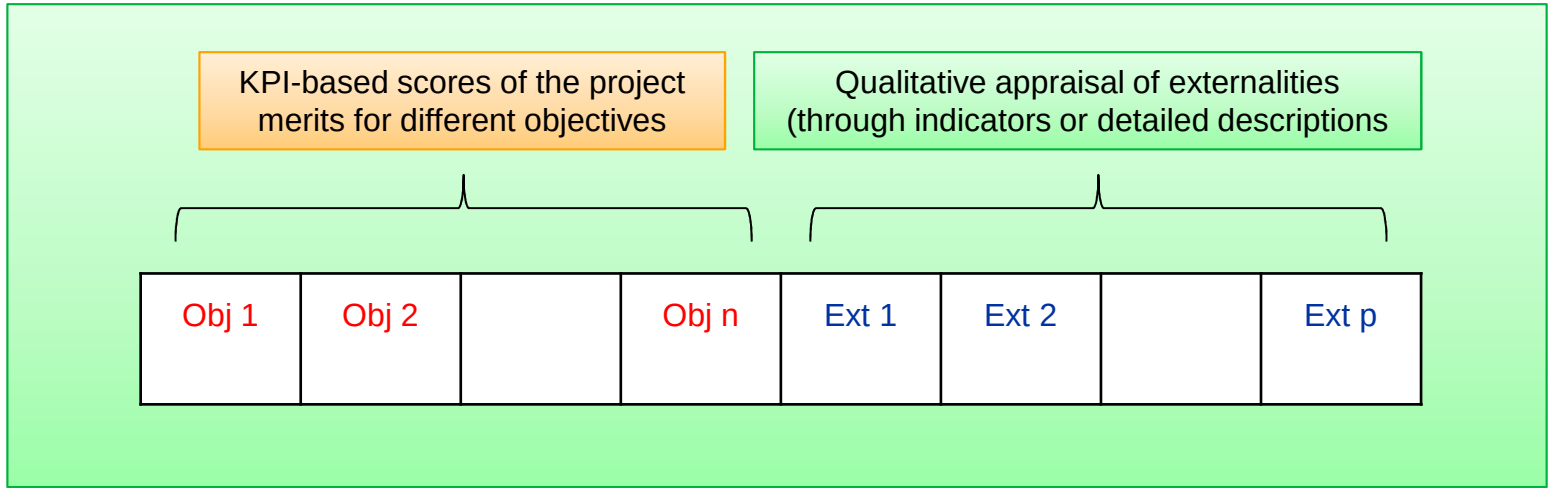
Both quantitative and qualitative outputs of CBA must be considered

Project assessment

Cost Benefit Analysis used for Isernia project

Qualitative (non-monetary) appraisal

Qualitative appraisal of some effects of the project which are more difficult to monetise. For example, energy efficiency applications and demand response



As recommended in the JRC guidelines, the outcome of the overall impact analysis will include:

1) **KPI-based scores of the projects merits for different objectives**
2) Qualitative appraisal of foreseen externalities

Key Performance Indicators

JRC guidelines

Merit deployment matrix

- In the JRC guidelines, a comprehensive set of benefits that cannot be easily monetised are provided with a corresponding set of KPIs
- Assessment approach is defined to link KPI and functionalities and to capture the merit of the project deployment
- The assessment framework proposed is based on a merit deployment matrix
- A link between benefits/KPI and functionalities achieved in the project has been evaluated by assigning a weight (in the range 0-1) to quantify how strong and relevant the link is

Key Performance Indicators

KPIs used for Isernia Project

An example of some of the KPIs that were used in the Isernia project based on the JRC guidelines

BENEFIT	**KPI**
Increased sustainability	Quantified reduction of carbon emissions
	Environmental impact of electricity grid infrastructure
	Quantified reduction of accidents and risk associated with generation technologies (during maintenance, production, installations, etc.)
Adequate capacity of transmission and distribution grids for collecting' and bringing electricity to the consumer	Hosting capacity for distributed energy resources in distribution grids
	Allowable maximum injection of power without congestion risks in transmission networks
	Energy not withdrawn from renewable sources due to congestion and/or security risks
	An optimised use of capital and assets

Practical application of KPIs in real demo projects

Conclusions

- **Qualitative analysis based on the definition of KPIs/metrics are more useful for benefits evaluation**
- **Combination with monetary value is not straightforward**
- **In absence of well-defined calculation methods, KPI assessment through the merit deployment matrix might be strongly affected by the subjectivity of the evaluator**
- **It is therefore fundamental to provide with objective explanations and evaluation methods**
- **In the CBA's monetary and non-monetary appraisals alike**
- **KPIs can support the definition of benefits for the CBA - we see the added value of the availability of these produced at European level**
- **It would not be recommended to use KPIs to compare the deployment of different solutions on different networks**
- **KPI results can support justification for investment but only with background understanding of the technologies, elements and goals of the project**
- **Sensitivity analysis should be used**