

The European Commission's science and knowledge service

Joint Research Centre

Assessment Framework for Smart Grid PCI Candidates

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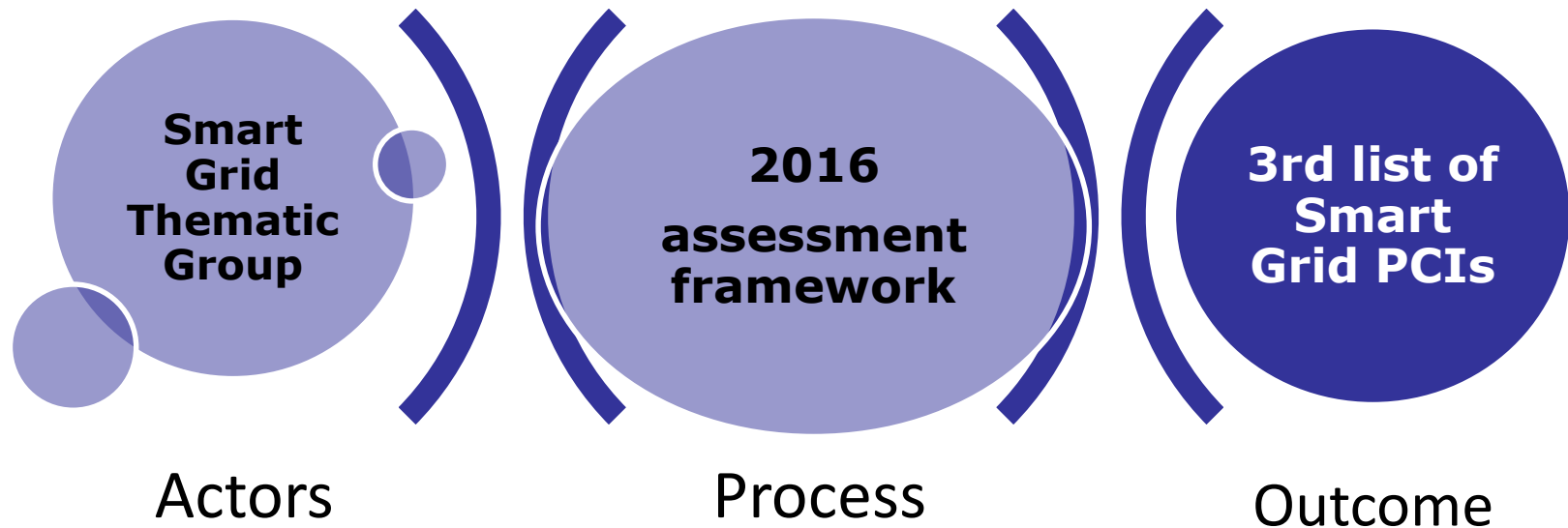
European
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Outline

- General overview – 3rd call for Smart Grid Projects of Common Interest
- Assessment framework – the big picture
- Request for information from project promoters
- Compliance with eligibility requirements
- Contribution to policy specific criteria
- Economic viability – Cost-Benefit Analysis
- Scenario development
- Overall project assessment

General overview – 3rd call for Smart Grid PCI

PCI included in the 2nd PCI list* + PCI candidates for the 3rd round



* Not commissioned yet

Assessment Framework – the big picture

Evaluation of projects proposals according to Reg. 347/2013



Request for information from project promoters - update

A. General description of the project			B. Impact of the project		
A1. Administrative information	A2. Project general information	A3. Compliance with eligibility requirements	B1. Overview of expected project impact	B2. Project performance against six policy specific criteria	B3. Economic appraisal

A3. Compliance with eligibility requirements

Evaluation of the project set-up			
A3.1 Necessity for the SG thematic area	A3.2 The project meets ANY of the following criteria		
	a. Involves at least two MS by <i>directly crossing a border</i> of two or more MS	b. Is located on the territory of one MS and has a <i>significant cross-border impact</i>	c. <i>Crosses the border</i> of at least one MS and a EEA country
To be demonstrated, in regards to Smart Grid dimension, elements, etc.	To be demonstrated with reference to " <i>directly crossing a border</i> " (and in line with the Smart Grid definition) e.g. line reinforcement by DLR	To be demonstrated with reference to " <i>significant cross-border impact</i> " e.g. coordinated actions for voltage control	To be demonstrated with reference to " <i>crosses the border</i> " (and in line with the Smart Grid definition) e.g. line reinforcement by DLR

A3. Compliance with eligibility requirements

If the project complies with A3.2 b, it needs to meet the technical requirements below:

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Project/technical requirement	Voltage level [kV]	Number of users	Consumption level [GWh/year]	RES variable in nature [%]	TSO-DSO cooperation
Project X	≥ 10 kV	≥ 50000	≥ 300	≥ 20	TSOs & DSOs from at least 2 EU MS

B2. Project contribution to policy specific criteria

- Reg. (EU) art. 4.1: "The potential overall benefits of the project, ***assessed according to the respective specific criteria*** in paragraph 2, outweigh its costs, including in the longer term"
- Reg. (EU) Annex IV (4): "Concerning projects falling under the category set out in **Annex II.1 (e)**, each ***function listed in article 4*** shall be evaluated against the following criteria..." using a set of defined Key Performance Indicators (slide nr. 10)

B2. Project contribution to policy specific criteria

- Reg. (EU) Annex II (e): "any equipment or installation, ***both at transmission and medium voltage distribution level***, aiming at ***two-way digital communication, real-time or close to real-time***, interactive and intelligent ***monitoring and management of electricity generation, transmission, distribution and consumption*** within an electricity network in view of developing a network efficiently integrating the behaviour and actions of all users connected to it – generators, consumers and those that do both – in order to ensure an economically efficient, sustainable electricity system with low losses and high quality and security of supply and safety"

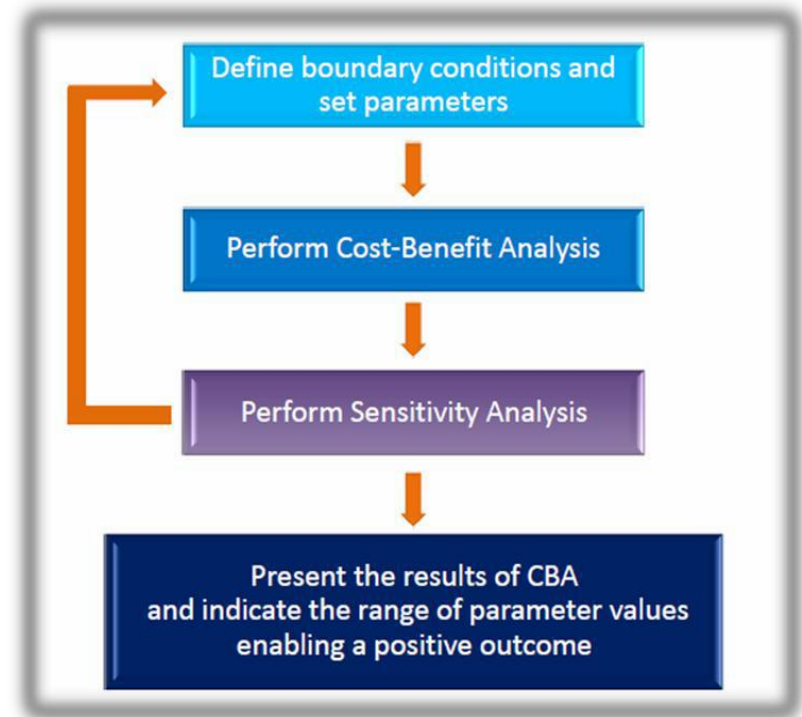
B2. Project contribution to specific criteria

B2.1 Integration and involvement of network users with new technical requirements with regard to their electricity supply and demand	B2.2 Efficiency and interoperability of electricity transmission and distribution in day-to-day network operation	B2.3 Network security, system control and quality of supply	B2.4 Optimised planning of future cost-efficient network investments	B2.5 Market functioning and customer services	B2.6 Involvement of users in management of their energy usage
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- **Level of sustainability:** **KPI₁** (reduction of GHG emissions); **KPI₂** (environmental impact of electricity grid infrastructure).
- **Capacity of TR and DR grids to connect and bring electricity from and to users:** **KPI₃** (installed capacity of distributed energy resources in distribution networks); **KPI₄** (allowable maximum injection of electricity without congestion risks in transmission networks); **KPI₅** (energy not withdrawn from renewable sources due to congestion or security risks).
- **Network connectivity and access to all categories of network users:** **KPI₆** (methods adopted to calculate charges and tariffs, as well as their structure, for generators, consumers and those that do both); **KPI₇** (operational flexibility provided for dynamic balancing of electricity in the network).
- **Security and quality of supply:** **KPI₈** (ratio of reliably available generation capacity and peak demand); **KPI₉** (share of electricity generated from RES); **KPI₁₀** (stability of the electricity system); **KPI₁₁** (duration and frequency of interruptions per customer, including climate related disruptions); **KPI₁₂** (voltage quality performance).
- **Efficiency and service quality in electricity supply and grid operations:** **KPI₁₃** (level of losses in TN and DN); **KPI₁₄** (ratio between minimum and maximum electricity demand within a defined time period); **KPI₁₅** (DSP in electricity markets and in energy efficiency measures); **KPI₁₆** (percentage utilisation of electricity network components); **KPI₁₇** (availability of network components and its impact on network performances); **KPI₁₈** (actual availability of network capacity with respect to its standard value).
- **Contribution to cross-border electricity markets by load-flow control to alleviate loop-flows and increase interconnection capacities:** **KPI₁₉** (ratio between interconnection capacity of a MS and its electricity demand); **KPI₂₀** (exploitation of interconnection capacities); **KPI₂₁** (congestion rents across interconnections).

B3. Project economic viability - COST-BENEFIT ANALYSIS

- Definition of boundary conditions (e.g. demand growth forecast, forecast of supply side evolution, local grid characteristics, etc.)
- Societal cost-benefit analysis (ENPV, EIRR, B/C, etc.) – KPIs can be used to monetise some impacts (benefits)
- Sensitivity analysis of the CBA outcome to variations in key variables/parameters (identification of switching values, volatility of benefits and costs, mitigation actions)
- **Not all project impacts can be expressed in monetary terms → KPI-based analysis**
- Project commercial viability



Colour-code evaluation for the non-monetary impacts

Green: a positive impact has been assessed with sufficient level of confidence.



Yellow: some positive impact has been assessed with some confidence, however uncertainties might persist (in the information provided or in the assumptions made).



Red: limited impact has been assessed or stronger impact could not be assessed with a sufficient level of confidence due to significant lack of information.



B2. Project contribution to policy specific criteria

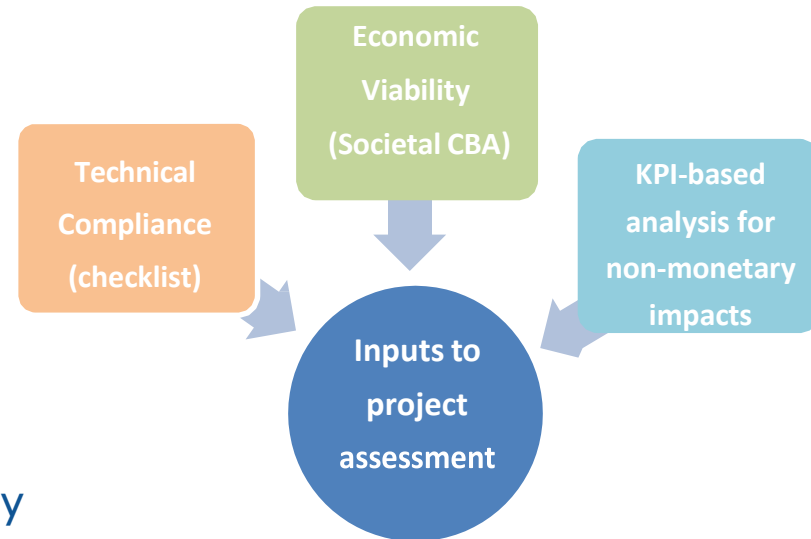
- **Criteria and KPIs may pull in the opposite direction**
- **Influence of local conditions on the project evaluation**
- **KPIs influenced by developments beyond the control of project promoters**

Scenario development

- **The current assessment framework considers two scenarios:**
 - Business as Usual (BaU) scenario (without Smart Grids deployment), as reference scenario to assess the impact of the Smart Grid project
 - Smart Grid project implementation (SG scenario), *i.e.* the scenario with the Smart Grid project in place
- **Explore the possibility to align the scenario content with the ENTSO-E visions:**
 - Having more than one SG scenario
 - Main difference in the boundary conditions (in terms of demand profile, generation mix, RES profile, etc.)
 - Use of ENTSO-E values in the CBA and KPI-based analysis for: annual demand, installed capacity and annual generation for *each* ENTSO-E scenario? (NB: the figures are at a country level!)
- **Critical variables (e.g. demand/generation profiles, installed capacity, etc.) to be extensively varied in the sensitivity analysis**

Overall project assessment

- **Project compliance with the eligibility requirements – to be demonstrated in section A3 of the template**
- **Project contribution to the specific criteria set out in Reg. (EU) 347/2013 by:**
 - Demonstrating the economic viability of the project (section B3 of the template)
 - KPI-based analysis for the non-monetary impact (Section B2 of the template)



Project assessment summary table

	SG Scenario	CBA indicators			Non-monetary impacts (KPI-based analysis)
		NPV	IRR	B/C	
Project A					
Project B					
...					

Thank you for your attention!

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