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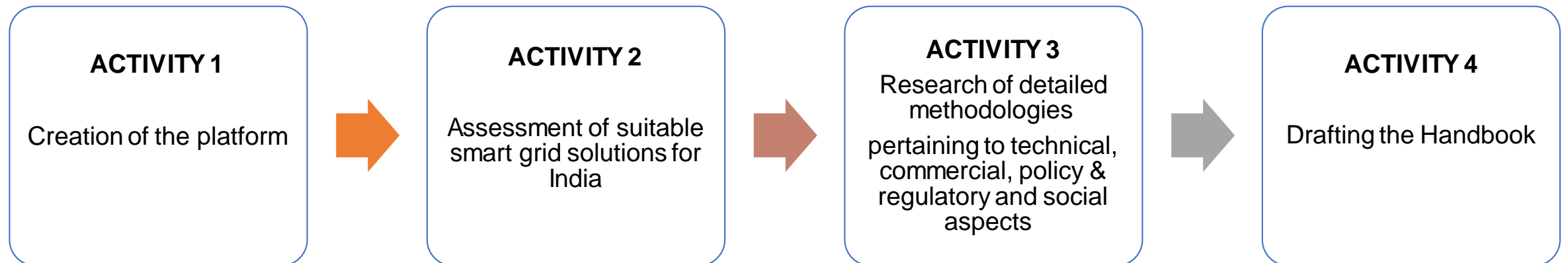


EU-India High Level Platform on Smart Grids



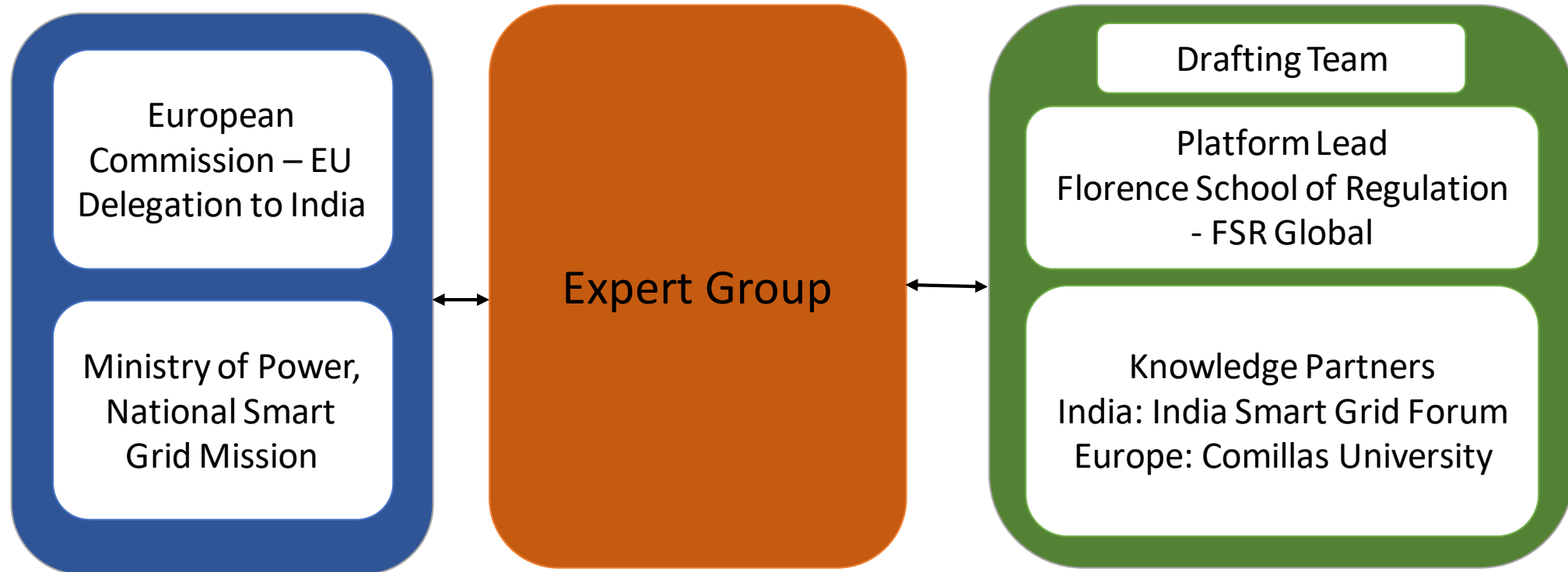
EU-India Smart Grid Platform

- The platform aims to bring together **30+ key senior experts** from the European and Indian side, who will discuss and deliberate key challenges with smart grid replication in India.
- The experts will identify possible opportunities and barriers in India for **replicating** and **up scaling** of smart grid projects and solutions including: technologies; financing issues; social/acceptance issues and regulatory and policy issues.
- Draw upon promising smart grid solutions that have been **demonstrated in Europe and India**.
- Develop a **handbook**



We started work on October 2020...

EU-India Smart Grid Platform Participants





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Round 1: Smart Grid Dimensions



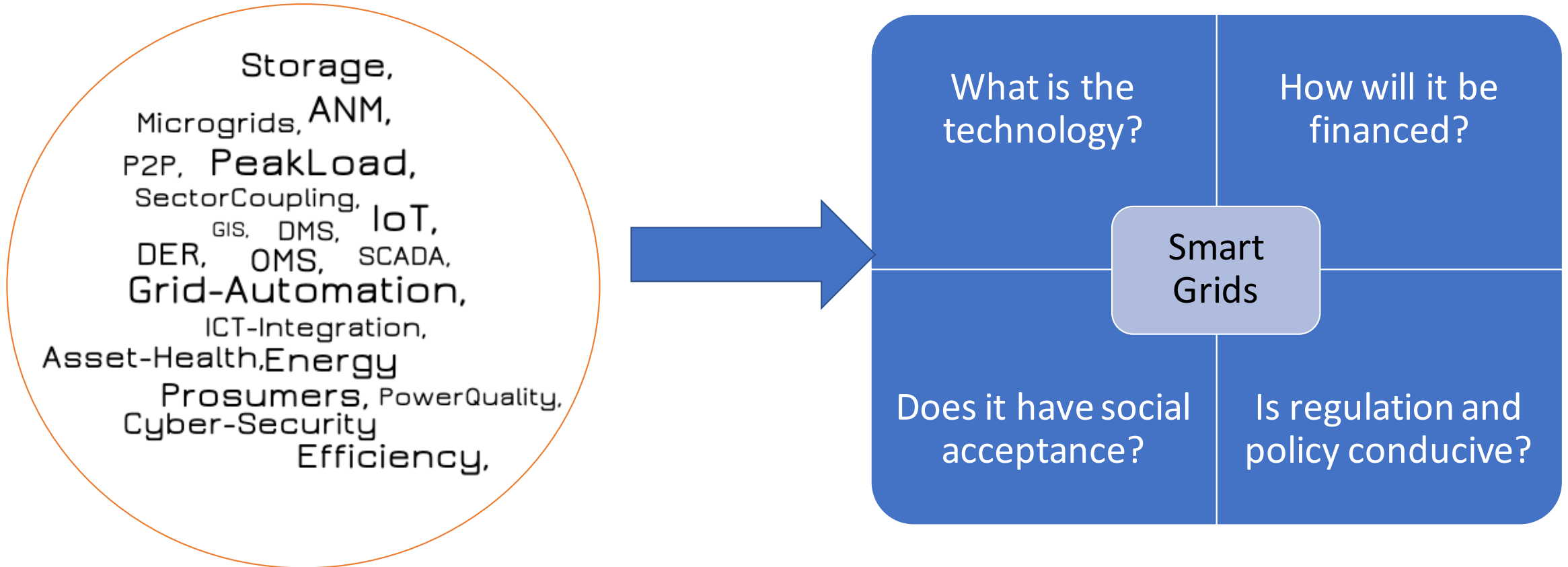
Smart Grid Dimensions

Cutting through the clutter



“The whole is greater than the sum of its parts”

- Aristotle





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Round 2: Use-case selection



Selection Process



Identifying and prioritising benefits

Benefits
Optimized generation operation
Reduced generation capacity investment
Reduced cost of ancillary services (balancing)
Reduced congestion costs (redispatch)
Reduced/deferred transmission grid investments
Reduced/deferred distribution grid investments
Reduced equipment failure/longer useful life of assets
Reduced distribution maintenance costs
Reduced network operation costs (lower labour/vehicle-related costs)
Reduce technical losses
Reduce non-technical losses
Reduced electricity costs (for end user)
Reduced sustained outages
Reduced voltage sags and swells
Reduced CO2 emissions
Reduced SOx, NOx, and/or PM2.5 emissions
Enhanced grid observability, with applications for planning and operation
Improved phase balancing
Increased hosting capacity for distributed resources / faster grid connection



Survey: Prioritising potential smart grid benefits

Dear Expert,
As a member of the EU-India Smart Grid Platform, we request you to kindly fill in this survey, which will take no more than 10 minutes. Your survey input will help us identify the most relevant smart grid project for the Indian context. The results from this survey along with our further analysis will be shared at the next roundtable meeting of the platform.
Thank you,
FSR

* Required

1. Respondent's Name *

2. Presented below are a list of potential smart grid benefits. Please rate from 0-5 the relevance/importance of these benefits in the Indian context (5 being the highest importance/relevance and vice versa).

Note: the list of benefits displayed in this sheet is strongly based on the benefits defined by the Joint Research Centre of the EC in their methodology to perform cost-benefit analyses of smart grid projects (<https://ses.jrc.ec.europa.eu/smart-grid-costs-benefits-and-impacts>) *



Avg Score
4.09
3.64
3.82
3.55
3.82
4.09
4.27
4.27
4.27
4.36
4.36
3.73
4.55
3.73
3.64
3.36
4.45
3.91
4.64

Quantifying EU Use case impact by Comillas

Use case name	Use case goals and benefits																		
	Optimized generation operation	Reduced generation capacity investment	Reduced cost of ancillary services (balancing)	Reduced congestion costs (redispatch)	Reduced/deferred transmission grid investments	Reduced/deferred distribution grid investments	Reduced equipment failure/longer useful life of assets	Reduced distribution maintenance costs	Reduced network operation costs (lower labour/vehicle-related costs)	Reduce technical losses	Reduce non-technical losses	Reduced electricity costs (for end user)	Reduced sustained outages	Reduced voltage sags and swells	Reduced CO ₂ emissions	Reduced SO _x , NO _x , and/or PM2.5 emissions	Enhanced grid observability	Improved phase balancing	Increased hosting capacity / faster grid connection
MV automation and reconfiguration	0	0	0	0	0	3	0	0	3	2	0	0	5	3	2	0	4	0	3
Controlled islanded operation	0	0	0	0	0	4	0	2	4	0	0	4	5	2	0	0	4	4	2
Advanced voltage control in MV grids	0	0	0	0	0	5	1	1	0	4	0	0	1	5	2	0	4	0	5
Demand response/consumption optimization at end-user premises	4	2	3	2	1	4	1	1	1	2	4	5	1	2	4	0	4	3	4
Predictive maintenance of network assets	0	0	0	0	0	2	5	5	4	0	0	0	4	0	1	1	0	0	0
LV supervision and control	0	0	0	0	0	2	2	2	2	3	5	0	3	4	0	0	5	4	4
Aggregation of DER to provide balancing services to the TSO	4	2	5	0	0	0	0	0	0	0	0	4	0	0	2	1	0	0	0
Local management of flexible DER to alleviate network constraints	2	1	0	5	1	5	1	1	1	2	0	4	2	0	2	1	3	2	4
Anti-islanding protection	0	0	0	0	0	0	4	5	4	0	0	2	5	2	0	0	3	2	0
Voluntary demand response based on advanced tariff schemes or through gamification	2	1	1	4	2	4	1	0	0	2	0	5	0	0	2	1	2	1	3

Quantifying Indian Projects by ISGF

Implementing Agency	Use case goals and benefits																		
	Optimized generation operation	Reduced generation capacity investment	Reduced cost of ancillary services (balancing)	Reduced congestion costs (redispatch)	Reduced/deferred transmission grid investments	Reduced/deferred distribution grid investments	Reduced equipment failure/longer useful life of assets	Reduced distribution maintenance costs	Reduced network operation costs (lower labour/vehicle-related costs)	Reduce technical losses	Reduce non-technical losses	Reduced electricity costs (for end user)	Reduced sustained outages	Reduced voltage sags and swells	Reduced CO ₂ emissions	Reduced SO _x , NO _x , and/or PM _{2.5} emissions	Enhanced grid observability	Improved phase balancing	Increased hosting capacity / faster grid connection
POSOCO	5	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POWERGRID	5	0	0	0	0	0	0	0	0	4	0	4	0	0	5	0	0	0	0
POWERGRID	0	0	0	4	4	0	3	0	5	3	0	0	0	5	0	0	5	5	0
Tata Power DDL	0	0	0	0	0	5	0	0	0	0	0	4	4	0	5	0	0	0	4
Tata Power DDL	0	0	0	0	0	5	5	5	5	4	5	5	5	5	5	5	5	5	4
CESC Mysore	0	0	0	0	0	5	4	5	4	4	5	4	5	4	4	4	4	4	4
UGVCL, Gujarat	0	0	0	0	0	5	4	5	4	4	5	4	5	4	4	4	4	4	4
TSSPDCL, Telangana	0	0	0	0	0	5	4	5	4	4	5	4	5	5	4	4	4	5	4
TSECL, Tripura	0	0	0	0	0	5	4	5	4	4	5	4	5	4	4	4	4	4	4
APDCL, Assam	0	0	0	0	0	5	4	5	4	4	5	4	5	4	4	4	4	4	4
MPPKVCL, MP	0	0	0	0	0	5	4	5	4	4	5	4	5	4	4	4	4	4	4

Final rating for EU Use cases and Indian Projects

EU Use cases	Final Score
Demand response/consumption optimization at end-user premises	194.64
LV supervision and control	153.73
Local management of flexible DER to alleviate network constraints	149.73
Controlled islanded operation	129.82
Voluntary demand response based on advanced tariff schemes or through gamification	122.82
Advanced voltage control in MV grids	117.91
Anti-islanding protection	114.36
MV automation and reconfiguration	106.73
Predictive maintenance of network assets	93.18
Aggregation of DER to provide balancing services to the TSO	68.27

Indian Projects	Final Score
Tata Power DDL	279.18
TSSPDCL, Telangana	255.45
CESC Mysore	247.82
UGVCL, Gujarat	247.82
TSECL, Tripura	247.82
APDCL, Assam	247.82
POWERGRID	137.18
Tata Power DDL	90.27
POWERGRID	71.00
POSOCO	35.73

Mapping Indian projects and the EU use cases

Indian project	DISCOM	European use case					
		Demand response/consumption optimization	LV supervision and control	Local management of DER to alleviate grid constraints	Advanced voltage control in MV grids	MV automation and reconfiguration	Predictive maintenance of network assets
Better network management and resource optimization	Tata Power DDL			X	X	X	
Increase in revenue through better load management, loss reduction and resource optimization	TSSPDCL, Telangana	X	X			X	X
Better load and asset management for improving DISCOM revenue	CESC Mysore	X	X			X	
Increase in revenue through better load management, loss reduction and resource optimization	UGVCL, Gujarat	X	X			X	X
Better network management and higher revenue realization	TSECL, Tripura	X	X				
Better load and asset management for improving DISCOM revenue	APDCL, Assam	X	X			X	
Keywords from indian projects		PLM, load optimization	AMI, Revenue management, loss reduction	ADMS, load optimization	ADMS	OMS, improve outage restoration time	Improved asset life

Shortlisted use cases



Demand response/consumption optimization

LV supervision and control (including AMI)

Local management of DER to alleviate network constraints (includes voltage management with DISCOM own resources)

MV grid automation and reconfiguration



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Round 3: SRA and CBA Analysis



Final shortlisted use cases for SRA and CBA

Demand response/consumption optimization

LV supervision and control (including AMI)

MV grid automation and reconfiguration

Looking at the EU experiences and the lessons learnt and how this can apply to India





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Smart Grid Handbook to be out later this year – Stay tuned !



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