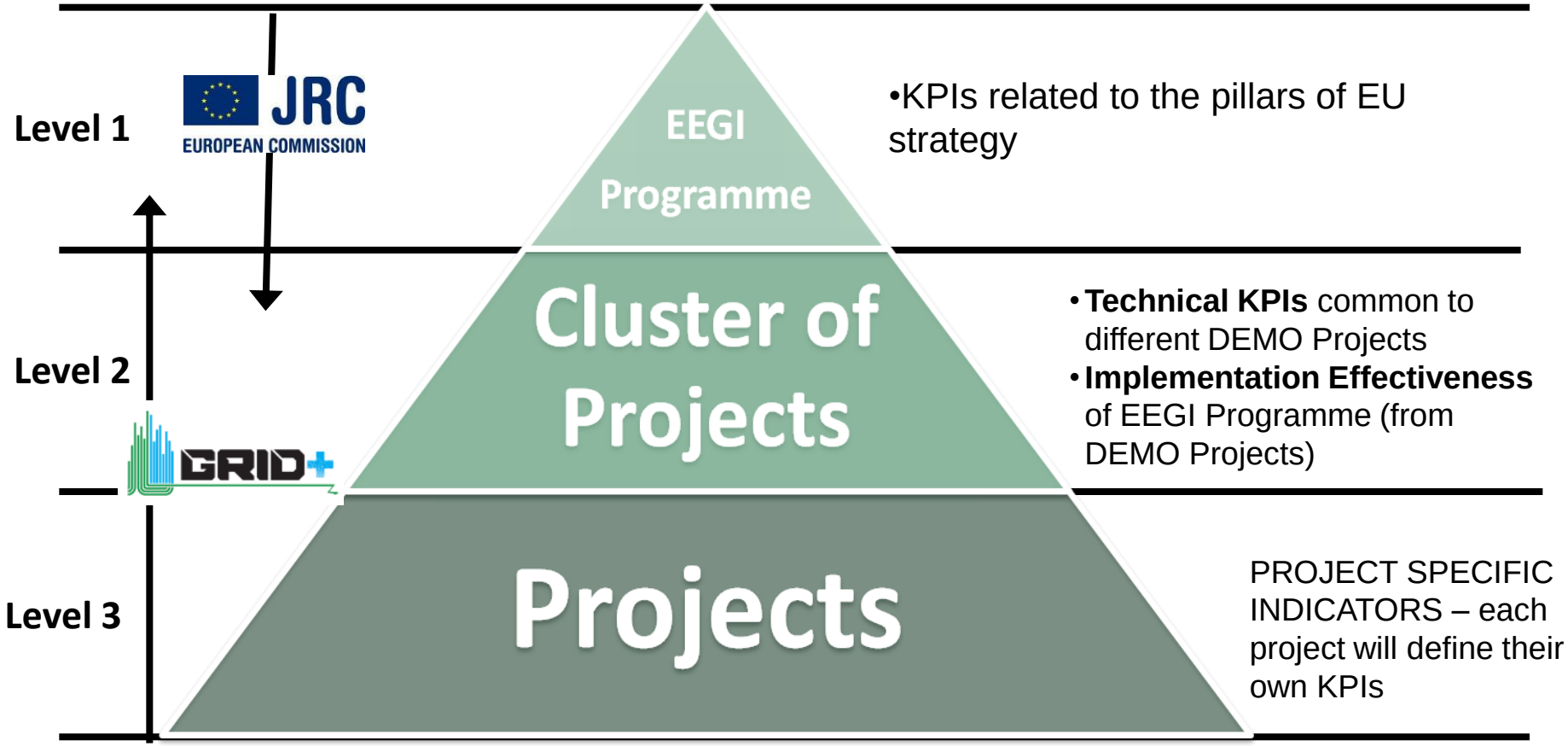
EEGI KPIs

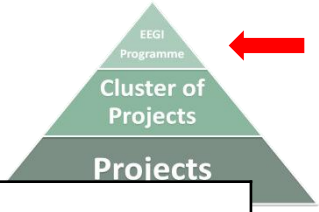
EEGI Team Meeting 7

May 2012

The structure of EEGI KPIs follows a 3-layer approach

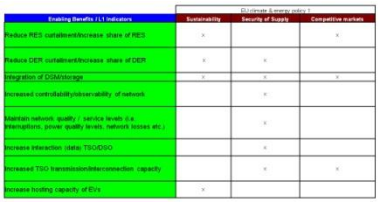


EEGI L1 indicators are related to specific enabling capacities of Transmission and Distribution Networks and linked to EU Strategic Climate and Energy Policy Pillars

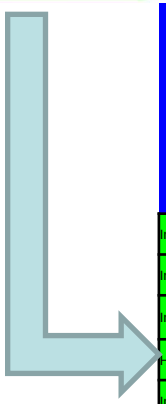


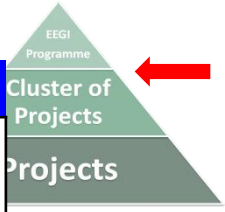
	Enabling Benefits / L1 Indicators	EU climate & energy policy 1		
		Sustainability	Security of Supply	Competitive markets
TSO / DSO	Reduce RES curtailment/increase share of RES	x		x
TSO / DSO	Reduce DER curtailment/increase share of DER	x	x	
TSO / DSO	Integration of DSM/storage	x	x	x
TSO / DSO	Increased controllability/observability of network		x	
TSO / DSO	Maintain network quality / service levels (i.e. interruptions, power quality levels, network losses etc.)		x	
TSO / DSO	Increase interaction (data) TSO/DSO		x	
TSO specific	Increased TSO transmission/interconnection capacity		x	x
DSO specific	Increase hosting capacity of EVs	x		

Expected enabling benefits of Level 1 linked to Level 2 Technical KPIs: DSO example



Enabling Benefits (L1 Indicators	EU climate & energy policy ? Sustainability	Security of Supply	Competitive markets
Reduce RES curtailment/increase share of RES	x		x
Reduce DER curtailment/increase share of DER	x	x	
Integration of DSM/storage	x	x	x
Increased controllability/observability of network		x	
Maintain network quality / service levels (i.e. interruptions, power quality levels, network losses etc.)		x	
Increase interaction (data) TSO/DSO		x	
Increased TSO transmission/interconnection capacity		x	x
Increase hosting capacity of EVs	x		





DSO Benefits	Percentage PEAK LOAD REDUCTION (%)	Percentage reduction in energy consumption (%)	Increased network hosting capacity for distributed energy resources in LV distribution network (%)	Increased network hosting capacity for distributed energy resources in MV distribution network (%)	Percentage increase in hosting capacity of EVs (%)	Percentage reduction in energy grid losses (%)	Percentage reduction in out of band voltage variations in LV lines, as defined in EN 50160 standard (%)Percentage reduction in out of band voltage variations in LV lines, as defined in EN 50160 standard (%)	Percentage reduction in out of band voltage variations in MV lines, as defined in EN 50160 standard (%)standard (%)	Percentage reduction in total harmonic distortion factor THDU, measured according to the EN 50160 standard (%)	Percentage increase in remote operations out of total MV grid devices operations (%)	Percentage improvement in SAIDI (%)	Percentage improvement in SAIFI (%)	Percentage reduction in time needed for localization and resolution of grid fault (%)	Percentage reduction in ENERGY NOT SUPPLIED from distributed energy resources in distribution network due to improved network conditions (%)	Percentage increase in NETWORK AVAILABILITY of communication infrastructure of distribution grid (%)
Increase share of DER/hosting capacity			x	x											
Integration of DSM	x	x													
Integration of Storage							x	x	x					x	
Hosting of EV					x										
Increased controllability/observability of network										x			x		x
Maintain the power quality							x	x	x						
Reduction of interruptions											x	x			
Reduction of energy losses						x									

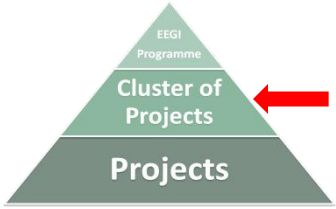
KPI:

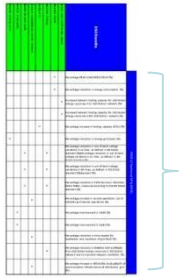
Percentage improvement in total time needed for localization and resolution of grid fault (%).

Definition:

$$\Delta t = \frac{t_{SG} - t_{standard}}{t_{standard}}$$

The set of defined EEGI L2 Technical KPIs are related to a specific EEGI Functional Project: DSO example

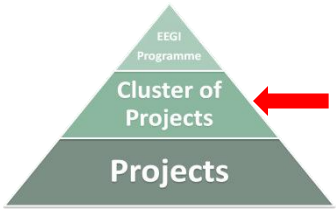




EEGI L2 Technical KPIs (DSO)	DSO Functional Projects											
	D1: Active Demand	**D2:** Energy Efficiency coming from network integration of Smart Homes	**D3:** Smart Meter Infrastructure	**D4:** Smart metering data processing	**D5:** DSO integration of small renewables	**D6:** System integration of medium DER	**D7:** Integration of storage in network management	**D8:** Infrastructure to host EV / PHEV	**D9:** Monitoring and control of LV network	**D10:** Automation and control of MV network	**D11:** Methods and system support	**D12:** Integrated communication solutions
Percentage PEAK LOAD REDUCTION (%)	X	X										
Percentage reduction in energy consumption (%)	X	X										
Increased network hosting capacity for distributed energy resources in LV distribution network (%)					X							
Increased network hosting capacity for distributed energy resources in MV distribution network (%)						X						
Percentage increase in hosting capacity of EVs (%)								X				
Percentage reduction in energy grid losses (%)									X	X		
Percentage reduction in out of band voltage variations in LV lines, as defined in EN 50160 standard (%)					X				X			
Percentage reduction in out of band voltage variations in MV lines, as defined in EN 50160 standard (%)						X	X			X		
Percentage reduction in total harmonic distortion factor THDU, as defined in EN 50160 standard (%)							X		X	X		
Percentage increase in remote operations out of total MV grid devices operations (%)										X		X
Percentage improvement in SAIDI (%)									X	X		
Percentage improvement in SAIFI (%)									X	X		
Percentage reduction in time needed for localization and resolution of grid fault (%)									X	X		X
Percentage reduction in ENERGY NOT SUPPLIED from distributed energy resources in distribution network due to improved network conditions (%)					X	X	X		X	X		
Percentage increase in NETWORK AVAILABILITY of communication infrastructure of distribution grid (%)												X

www.gridplus.eu

The set of defined EEGI L2 Technical have been taken from specific KPIs used in analyzed demonstration projects in Europe



EEGI L2 Technical KPIs (DSO)	D1: Active Demand	D2: Energy Efficiency coming from network integration of Smart Homes
Percentage PEAK LOAD REDUCTION (%)	X	X

EEGI L2 Technical KPIs (TSO)	T5: Demonstration of Renewable integration	T7: Tool for stability evaluation
Reduce RES curtailment	X	X

Mutual links of different level: applicable for both TSO, DSO

EU Strategic Pillars

L1 INDICATORS / BENEFITS

Enabling Benefits /L1 Indicators	EU climate & energy policy !		
	Sustainability	Security of Supply	Competitive markets
Reduce RES curtailment/increase share of RES	x		x
Reduce DER curtailment/increase share of DER	x	x	
Integration of DGM/storage	x	x	x
Increased controllability/observability of network		x	
Maintain network quality / service levels (i.e. interruptions, power quality levels, network losses etc.)		x	
Increase interaction (data) TSO/DSO		x	
Increased TSO transmission/interconnection capacity		x	x
Increase hosting capacity of EVs	x		

Level 1

L1 INDICATORS / BENEFITS

EEGI L2 KPIs

FUNCTIONAL PROJECTS

EEGI L2 KPIs

EEGI L2 Technical KPIs	DSO Functional Projects											
	D1: Active Demand	D2: Energy Efficiency consumption from network integration of Smart Meters	D3: Smart Meter implementation	D4: Smart metering data processing	D5: DSO integration of smart meter data	D6: System integration of decentralized DER	D7: Integration of storage in network management	D8: Infrastructure to host E-PHEV	D9: Monitoring and control of LV networks	D10: Automation and control of MV network	D11: Methods and system support	D12: Integrated communication solutions
Percentage PEAK LOAD REDUCTION (%)	x	x										
Percentage reduction in energy consumption (%)	x	x										
Percentage of energy losses reduction for distributed energy resources in LV distribution network (%)					x							
Increased network hosting capacity for distributed energy resources in LV distribution network (%)						x						
Percentage increase in hosting capacity of EVs (%)								x				
Percentage reduction in energy grid losses (%)									x	x		
Percentage improvement in average value of the nominal LV voltage, measured according to the EN 50160 standard (%)					x				x			
Percentage improvement in average value of the grid nominal MV voltage, measured according to the EN 50160 standard (%)						x	x			x		
Percentage reduction in total harmonic distortion factor THDu, measured according to the EN 50160 standard (%)							x		x	x		
Percentage increase in remote operations out of total MV grid devices operations (%)										x		x
Percentage improvement in SAIDI (%)									x	x		
Percentage improvement in SAIFI (%)									x	x		
Percentage reduction in time required for localization of grid fault (%)									x	x		x
Percentage reduction in ENERGY NOT SUPPLIED from distributed energy resources in distribution network due to improved network conditions (%)					x	x	x		x	x		
Percentage increase in NETWORK AVAILABILITY of communication infrastructure in distribution grid (%)												x

Level 2

PROJECT X PROJECT Y PROJECT Z

Level 3

For linking EEGI Level3 and Level2, appropriate tools for SCALING UP and REPLICATION of results from demonstration projects are needed

LEVEL2

EEGI L2 Technical KPIs

Potential for scalability and replicability of solutions, using EEGI L2 Technical KPIs

EU Toolbox for:

- SCALABILITY of results
- REPLICATION of results

SIGNIFICANT RESEARCH still required in the development of this common EU toolbox

Results of demo projects

LEVEL3

PROJECT SPECIFIC KPIs

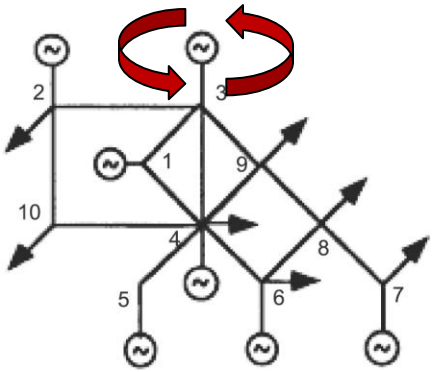
ProjectX	ProjectY	ProjectV
-KPI1	-KPI1	-KPI1
-KPI2	-KPI2	-KPI2
-KPI3	-KPI3	-KPI3

Simulation Test bed developed by T&D Europe can serve to validate technical KPIs and serve as a first step in necessary EU toolbox

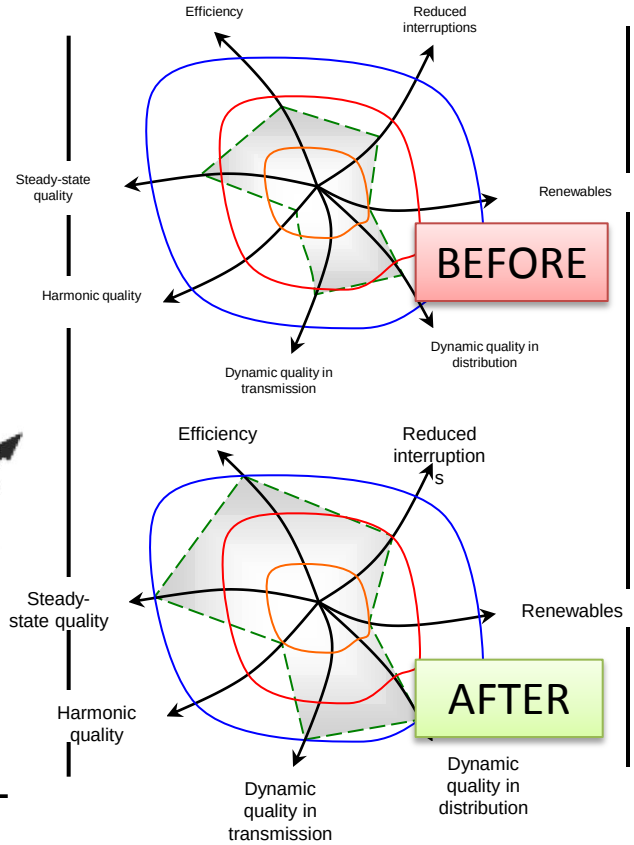
KPI

VALUE

BENEFIT



TSO / DSO
NETWORK MODEL

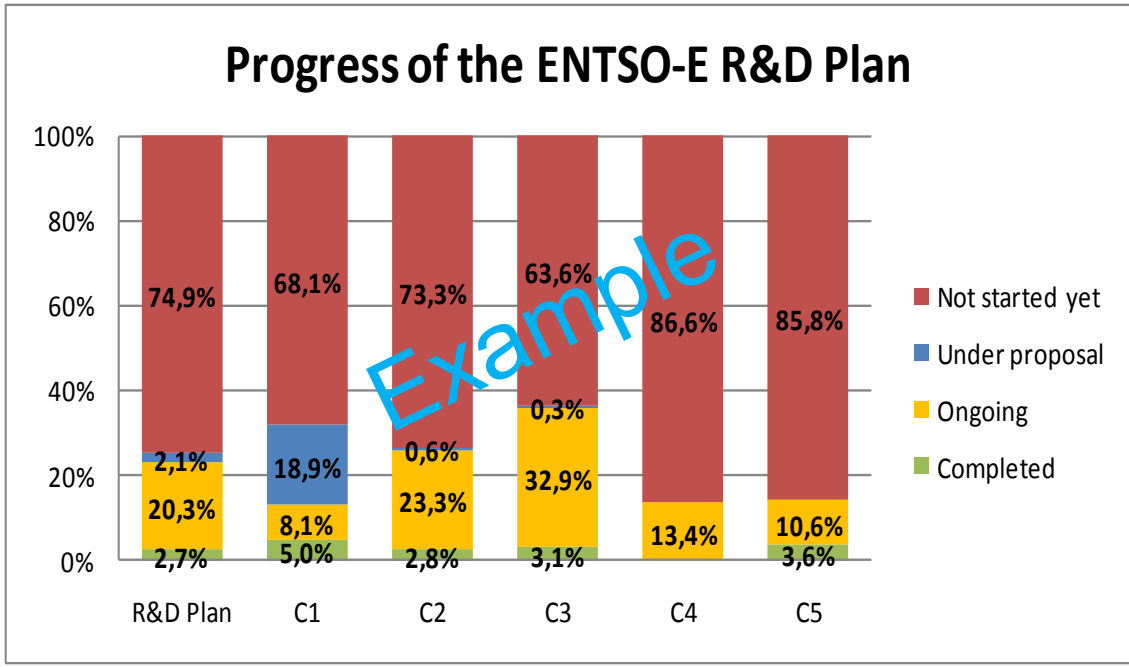


KPI
VALIDATION

TARGET → ACTION → MEASURE → BENEFIT

An example of ENTSO-E R&D Plan level – implementation effectiveness

- This is a proposal to monitor the progress of the R&D Plan
- To find out what projects are contributing to a Functional Project and a Cluster
- The results can estimated through a project survey to coordinators



Note: number are not real but just an example

A similar method will be used to monitor the EEGI roadmap

Thank you

www.gridplus.eu