STARGRID Workshop
"A point of view of Industry on Smart Grid Standardization: summary of results from the STARGRID survey"

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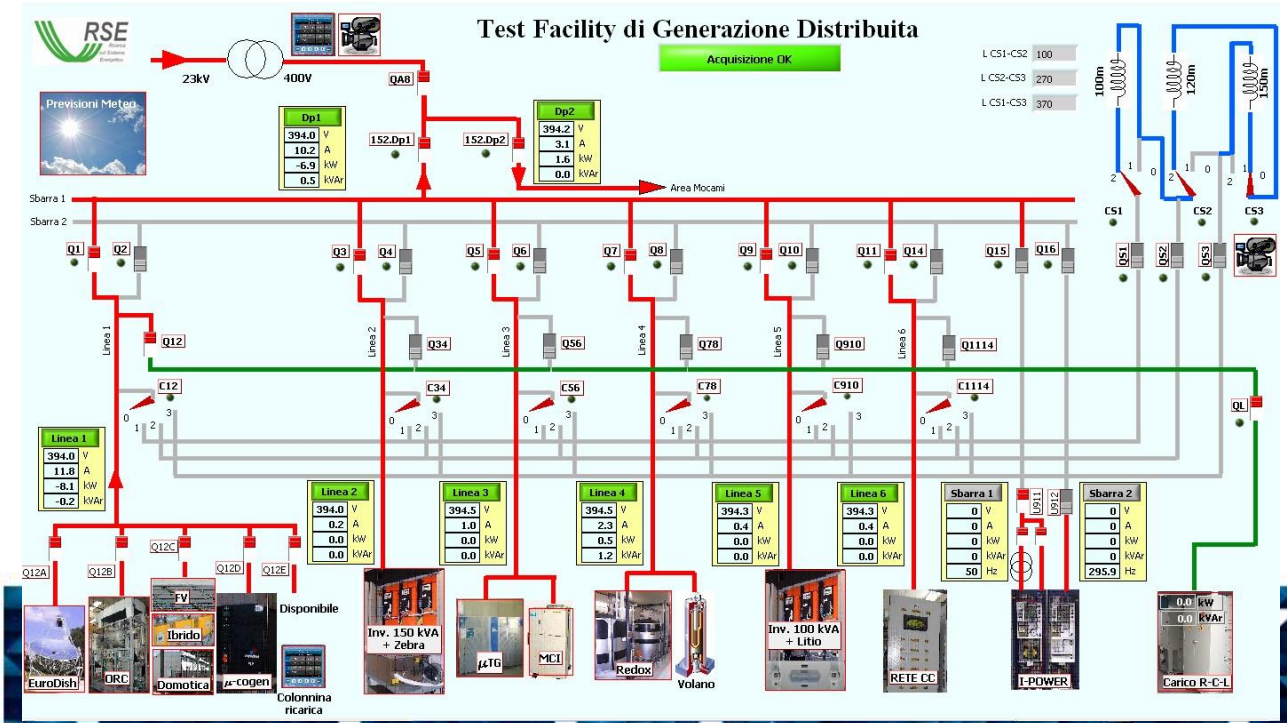
Hannover Messe, April, 10th 2014

Milano - Italy

Research activities in the electricity and energy sector with emphasis on experimental pilot applications

Year	Submitted	Funded	% Success
2007	29	11	38
2008	20	10	50
2009	16	7	44
2010	10	4	40
2011	12	5	42
2012	26	13	50
2013	28	12	43
all	141	61	45



RSE participation in EU Projects

Distributed Generation Test facility

Contents

- Objective and Context
- The Survey Method
- Roundup of the outcomes:
  - Synthesis of the questionnaires results
  - Hints to the discussion from the survey
- Conclusions & Next Steps

Main Objective of the WP4

"in-field" survey of
opinions/concerns/suggestions
by Industry
regarding standardization aspects
of the Smart Grid

Finalization of the WP4 activities

- To check the awareness level of Industry regarding standardization and std-related initiatives and the existing Standards on Smart Grids
- To assess the importance and the impact of the standardization works against the benefits expected by the Industry
- To provide feedback to Standardization Committees on the actual use of the Standards
- To identify the standardization requirements of the stakeholders and the lacks of existing standards against the selected Areas of Interest: DER Integration and Grid control; Demand-Response Management e Smart Metering
- To identify good practices, as well as technological and non-technological solutions to be considered in the standardization process

Interconnection with the other STARGRID WPs

WP2: Mapping on the std activities and Industry initiatives

WP3: Definition of Stakeholder's requirements. Analysis of pertinent documents

WP4: «in-field» assessment of Smartgrids Industry feedback regarding:

- Standards and Std Org. initiatives
- Regulations
- Industry initiatives

Relevant aspects

- Expectations and Maturity
- Constraints & Barriers
- Gaps
- Retrofit/Research/Development needs
- Opposition, Requirements & good solutions/practices

WP5: Summary & Recommendations

Deliverable D4.2 (end April `14)

Survey Method

Questionnaire Format

Section 1	Section 2	Section 3	Section 4	Section 5
General infos on the Organization and its involvement in STD process	**Core SG Standards**	Priority Topic 1: **DER Integration and Grid Control**	Priority Topic 2: **Demand – Response Management**	Priority Topic 3: **Smart Metering**
		General **STD requirements**		
		Gaps and required actions		
		Standardization initiatives awareness		

Interviews Check List Format (supported by the questionnaire)

Level	Subject
Level 1	Relevance of the raised **technical topics**
Level 2	Participation in the **STD process**
Level 3	Specific **requirements** in Standards
Level 4	Awareness/Assessment of STARGRID initiative

Smart Grid Core Standards

Required Assessment: RELEVANCE & FUTURE IMPACT to the represented Organization Score: 1-5	Nr of valid answers	IEC 60870-5 Telecontrol equipment and systems Part 5: Transmission protocols (including parts 101/104)	IEC 60870-6 - Tase.2 Telecontrol equipment and systems - Part 6: Telecontrol protocols compatible with ISO standards and ITU-T	IEC 61850 - Power Utility Automation Communication networks and systems in substations	IEC 61968 - CIM for Distribution Application integration at electric utilities - System interfaces for distribution management	IEC 61970 - CIM for Energy Management Energy management system application program interface (EMS-API)	IEC 62325 - CIM for Market Communication Framework for energy market communications	IEC 62351 - Security Power systems management and associated information exchange - Data and communications security	IEC 62056 - DLMS / COSEM Electricity metering - Data exchange for meter reading, tariff and load control	IEC/TR 62357 - Service Oriented Architecture (SOA) Power system control and associated communications - Reference architecture for object models, services and	IEC PAS 62559 - Methodology IntelliGrid methodology for developing requirements for energy systems	IEC 62488-1 - Power line communication systems for power utility applications - Part 1: Planning of analogue and digital power line carrier systems operating over EHV/HV/MV	AVERAGE
OVERALL	64	3,14	2,81	3,54	3,16	3,13	2,70	3,11	3,31	3,00	2,60	2,60	**3,01**
ITALY	25	2,80	2,68	3,23	2,75	2,92	2,25	2,72	2,41	2,91	2,54	2,40	**2,69**
SPAIN	9	4,00	2,78	3,33	2,44	2,44	2,11	2,78	4,56	2,67	2,44	3,11	**2,97**
GERMANY	5	3,60	2,60	4,80	4,00	3,60	3,40	4,40	2,80	3,40	2,25	1,80	**3,33**
ROMANIA	6	3,67	3,83	4,00	3,20	3,33	3,33	3,33	3,17	3,50	3,17	3,33	**3,44**
MANUFACTURERS	14	2,93	2,36	3,20	2,77	3,08	2,38	2,79	3,31	2,85	2,69	2,62	**2,81**
RESEARCH	13	2,31	1,92	3,08	2,85	2,46	2,15	2,54	2,92	2,25	2,38	2,62	**2,50**
ICT	9	3,44	2,78	4,11	4,22	3,78	3,22	3,89	3,89	3,78	3,11	2,11	**3,48**
DSO	6	3,83	3,50	3,50	3,00	3,00	2,83	3,50	3,83	2,83	2,67	3,17	**3,24**
CONSULTING	10	3,60	3,30	4,10	3,50	3,50	3,10	3,50	3,30	3,00	2,44	3,00	**3,30**

Requirements (ex: DER Integration)

Required Assessment: PRIORITY for the represented Organization Score: 1-5		Grid management (Configuration and re-configuration; fault diagnosis, self-healing, island operation)	Safety (of the Grid and of the DER); protection schemes	Safety of the personnel	Seamless communication between control centers, substations and DER installations	EMC compatibility	Forecasting of power and loads	Electrical Connection of DER to the grid and disconnection	Remote control of DER	Integration into legacy grid control systems	DER Monitoring and Sensors	Support Quality of Supply (Continuity, Voltage and Frequency stability, FRT capability) - Ancillary Services	Provision of flexibility by DERs (control aspects)	Market Connection procedures	Aggregation of power and loads	Non- discriminatory Power Market access	Services Market (operation/flexibility conditions; revenue of the service)	Information and data exchange (definition of the information and data models)	Compliance Testing and certification specifications (incl. e.g. simulation models requirements)	Objective and non-discriminatory data access rules for service providers (like aggregators).	Access to the intl electric and energy market (including procurement)	Security of data and protection of the information	Harmonized and stable technical interconnection rules at national and EU level	AVERAGE
OVERALL	PRIORITY	4,10	4,00	3,46	4,00	3,49	3,87	4,03	4,00	3,66	3,75	3,82	3,73	3,33	3,60	3,40	3,21	3,83	3,78	3,46	3,18	4,02	3,87	**3,71**
ITALY		4,04	3,96	3,52	3,71	3,26	3,96	4,08	3,88	3,61	3,38	3,73	3,59	3,41	3,77	3,57	3,50	3,74	3,38	3,61	3,27	3,70	4,00	**3,67**
SPAIN		4,63	4,13	3,88	4,63	4,13	3,63	3,75	3,63	3,88	3,75	3,57	3,13	2,50	2,50	3,25	2,38	2,75	3,75	3,25	3,13	3,50	3,88	**3,53**
GERMANY		3,80	3,60	2,00	4,75	2,20	2,80	3,40	5,00	3,80	4,40	4,25	4,20	3,80	3,40	3,25	3,25	4,60	4,20	3,20	2,75	5,00	5,00	**3,76**
ROMANIA		3,80	3,80	3,80	3,80	4,20	4,00	4,00	3,80	3,80	4,00	4,20	4,25	2,75	3,75	3,50	3,00	4,50	4,00	3,25	3,50	4,00	3,75	**3,79**
MANUFACTURERS	PRIORITY	4,36	3,64	3,27	3,91	3,36	3,60	4,18	3,91	4,18	3,55	4,00	3,00	3,30	3,33	3,56	2,89	2,89	3,67	2,89	3,56	3,33	4,18	**3,57**
RESEARCH		3,87	3,80	2,79	3,73	3,07	3,93	4,13	3,87	3,13	3,67	3,67	3,73	2,73	3,47	2,64	2,60	3,40	3,57	2,93	2,67	3,73	3,67	**3,40**
ICT		4,50	4,44	3,75	4,44	4,00	3,78	4,25	4,33	3,88	4,22	4,00	4,25	4,00	3,75	3,63	3,88	4,56	4,50	4,00	3,25	4,56	3,56	**4,07**
DSO		3,80	4,40	3,80	4,20	2,60	4,40	4,00	4,40	3,20	4,00	4,00	3,40	3,00	3,00	4,00	3,50	3,80	3,80	3,80	3,50	4,00	3,60	**3,74**
CONSULTING		4,70	4,50	4,10	4,56	4,00	4,30	4,00	4,20	4,40	4,10	4,50	4,20	4,50	4,50	4,11	4,00	4,40	4,00	4,30	3,60	4,60	4,60	**4,28**

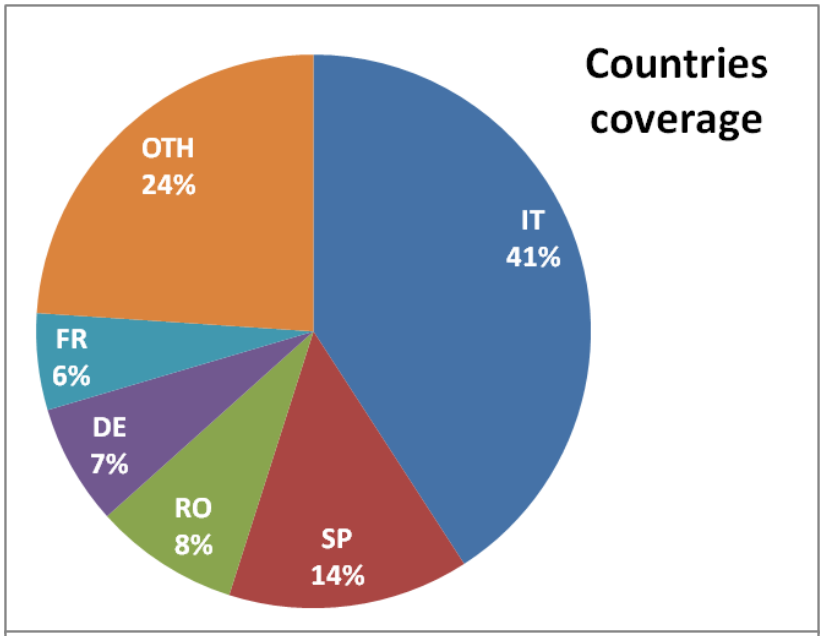
Gaps & Required Actions (ex: DER Integration)

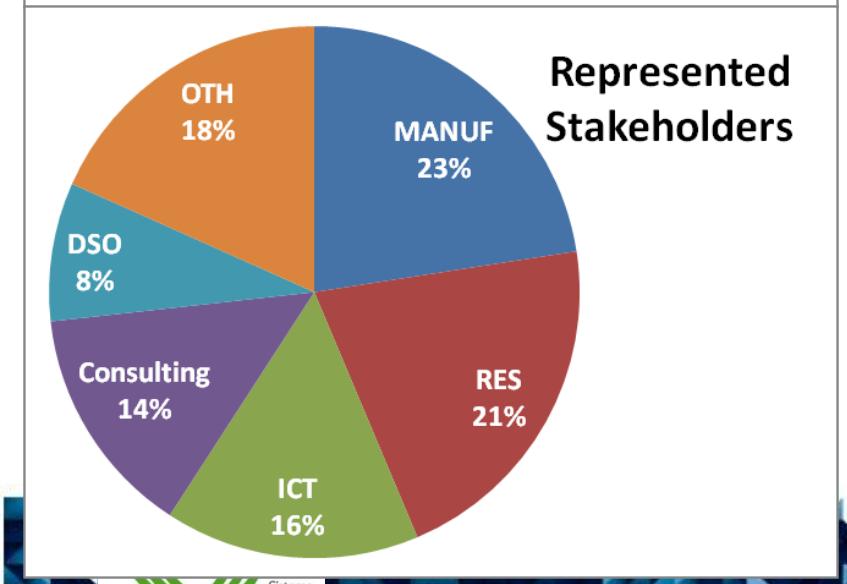
Required Assessment: AGREEMENT & RELEVANCE for the represented Organization Score: 1-5		Increased automation levels of the distribution grid, to ensure higher efficiency of operation, security, control and quality. Faults detectors will enhance operation and reduce shutdown times	Electrical connections and operation rules of DERs should be harmonized within Europe.	Too strict connection requirements may have financial impact and slow down the implementation of DER	New EMC requirements will arise from the development of the grid, requiring reviewing of the Standards	Available standards provide a sufficient level of cyber security to protect process control and business.	Installation rules of DER should be adapted to allow for new ways of operating grids, such as microgrid. Safety issues have to be covered for all kind of operation and plant technology	Ripple control technology offers sufficient means for the grid operator and service providers to control distributed energy resources.	Mature communication protocols for the control of distributed energy resources do exist already.	A single communication protocol for the remote control of DERs should be imposed in interconnection rules, to ensure interoperability.	Communication protocols as well as information data models for control center <-> DER communication have to be harmonized	New connection requirements may impact the design, the life time and the sizing of machines and equipment	Standards for auxiliary power systems are missing (low voltage DC networks): AC/DC converters, DC management systems, DC protection.	A centralized data access platform is necessary (e.g. containing information on the type of generators, capacity and location).	The current EU electricity wholesale market model (the so-called 'target model') has to be adapted for optimised market integration of DERs.	A capacity mechanism could support the market integration of DERs.	Tender requirements for ancillary grid services should be adapted to allow for participation of DERs (availability, minimum offer sizes, aggregation, etc).	AVERAGE
OVERALL	AGREEMENT	4,46	4,16	3,25	3,43	2,56	3,98	2,92	3,24	3,71	3,95	3,71	3,54	3,56	3,48	3,38	3,76	**3,57**
ITALY	AGREEMENT	4,32	4,22	3,59	3,33	2,73	4,05	3,13	3,58	3,56	3,88	3,68	3,44	3,90	3,65	3,50	3,74	**3,64**
SPAIN	AGREEMENT	4,75	4,25	2,88	4,13	2,29	4,00	3,00	3,25	5,00	3,88	3,71	3,86	3,29	2,86	3,14	3,50	**3,61**
GERMANY	AGREEMENT	4,40	4,20	2,40	2,00	1,80	3,00	2,40	2,80	0,00	4,40	3,40	2,80	2,60	3,20	2,50	3,50	**2,84**
ROMANIA	AGREEMENT	5,00	4,20	3,40	4,00	3,40	4,40	4,00	3,40	0,00	4,40	4,60	3,80	4,40	3,60	3,60	4,00	**3,76**
OVERALL	RELEVANCE	4,26	3,93	3,16	3,48	3,59	3,76	2,98	3,60	3,62	3,82	3,44	3,19	3,52	3,22	3,18	3,35	**3,51**
ITALY	RELEVANCE	3,95	4,13	3,27	3,30	3,38	3,71	3,06	3,57	3,67	3,83	3,52	3,30	3,84	3,33	3,21	3,53	**3,54**
SPAIN	RELEVANCE	4,75	4,38	3,63	4,50	3,88	3,71	2,67	3,38	3,00	3,63	3,71	3,43	3,57	3,00	2,67	3,00	**3,56**
GERMANY	RELEVANCE	4,40	3,60	1,20	1,50	3,80	3,20	2,75	4,50	0,00	4,20	3,20	2,00	2,40	2,20	2,50	1,75	**2,70**
ROMANIA	RELEVANCE	4,60	4,20	3,20	4,20	3,25	4,60	4,00	4,00	0,00	4,00	3,60	3,80	4,20	3,40	3,50	3,60	**3,63**
MANUFACTURERS	AGREEMENT	4,58	4,50	2,92	3,50	2,45	3,70	3,25	3,08	4,50	3,83	3,67	3,64	3,73	3,64	3,50	3,25	**3,61**
RESEARCH	AGREEMENT	4,07	4,00	3,29	3,29	2,50	4,00	3,08	3,07	4,00	3,71	4,00	3,50	3,38	2,83	3,00	3,73	**3,47**
ICT	AGREEMENT	4,50	4,25	3,38	3,50	2,88	4,63	3,00	3,44	2,50	3,78	3,56	3,25	3,38	4,00	3,86	4,00	**3,62**
DSO	AGREEMENT	4,60	4,00	3,20	3,00	2,25	3,40	2,50	2,60	0,00	4,40	4,20	4,20	3,40	3,20	3,75	4,25	**3,31**
CONSULTING	AGREEMENT	4,56	4,11	3,44	3,67	2,11	4,22	2,67	3,56	4,50	4,67	3,67	3,38	4,11	4,11	3,78	4,00	**3,78**
MANUFACTURERS	RELEVANCE	4,00	4,17	3,08	3,42	3,18	3,50	2,63	3,50	5,00	3,82	3,36	2,90	3,70	3,30	3,11	3,00	**3,48**
RESEARCH	RELEVANCE	4,14	3,93	3,29	3,54	3,00	4,00	3,18	3,69	3,80	3,46	3,33	3,08	3,33	2,83	2,83	3,00	**3,40**
ICT	RELEVANCE	4,25	4,13	2,88	3,50	4,25	3,38	2,50	3,56	3,00	3,67	3,33	3,00	3,38	3,50	3,50	3,50	**3,46**
DSO	RELEVANCE	4,20	3,80	3,40	3,25	3,80	3,40	3,33	3,50	0,00	4,40	4,40	4,00	3,80	3,40	3,33	4,25	**3,52**
CONSULTING	RELEVANCE	4,78	3,89	3,11	3,44	4,00	4,22	3,67	3,78	4,00	4,33	3,78	3,33	3,78	3,44	3,56	3,33	**3,78**

Standardization related initiatives (ex: DER Integration)

Required Assessment: AWARENESS & RELEVANCE for the represented Organization Score: 1-5		pr IEC 62689 Ed. 1.0 Current and Voltage sensors or detectors, to be used for fault passage indication purposes - Part 1: System aspects; Part 2: General principles and requirements; Part 3: Communica	ENTSO-E Network Codes: RfG: Requirements for Grid Connection; DCC: Demand Connection Code; OS: operational Security; etc.	prEN 50438:2013 (DER operation system) Requirements for the connection of micro-generators to LV distribution networks (CLC TC8X WG3)	FprTS EN 50549:2012 (DER operation system) Requirements for the connection of generators above 16A to LV and MV distribution networks (CLC TC8X WG3)	Pr IEC 61000-X: Electromagnetic Compatibility (EMC) (TC 77)	IEC 62786 Ed. 1.0 Smart Grid User Interface: Demand Side Energy Sources Interconnection with the Grid (TC 8)	IEC/TS 62351-8 Ed. 1.0 Power systems management and associated information exchange - Data and communications security - Part 8: Role-based access control (TC 57 WG 15)	CLC HD 60364-1 Rules for the design, erection, and verification of electrical installations: safety of persons, livestock and property (CLC TC 64)	IEC 61850-90-X Communication networks and systems for power utility automation (e.g. IEC 61850-90-14 for FACTS (Flexible AC Transmission Systems))	IEC 61968 - Common Information Model (CIM) / Distribution Management. Part 8: Interface Standard For Customer Support	IEC 62361-X Harmonization of Quality Codes across TC 57 (TC 57 WG 19)	National interconnection rules please specify in comments1	AVERAGE
OVERALL	AWARENESS	2,15	2,79	2,38	2,22	2,88	2,62	2,77	1,96	3,17	3,22	2,40	2,67	**2,60**
ITALY	AWARENESS	2,26	2,47	2,33	2,24	2,67	2,94	2,72	1,94	3,00	2,89	1,94	2,83	**2,52**
SPAIN	AWARENESS	2,88	2,63	2,50	2,25	3,00	2,25	2,50	2,14	3,25	3,00	1,86	2,50	**2,56**
GERMANY	AWARENESS	1,00	3,80	1,40	1,40	1,80	2,00	3,80	1,20	4,00	4,00	3,80	3,00	**2,60**
ROMANIA	AWARENESS	2,80	3,00	4,00	2,50	3,80	2,75	2,80	3,00	4,00	3,60	2,25	3,25	**3,15**
OVERALL	RELEVANCE	3,02	3,45	3,13	3,02	3,31	3,40	3,50	2,72	3,61	3,59	2,98	3,13	**3,24**
ITALY	RELEVANCE	3,19	3,25	3,33	3,25	3,19	3,44	3,24	2,63	3,59	3,33	2,50	3,08	**3,17**
SPAIN	RELEVANCE	3,80	3,33	3,00	2,60	3,83	2,83	3,17	2,80	3,33	3,17	2,60	3,14	**3,13**
GERMANY	RELEVANCE	2,00	3,80	2,20	2,40	1,80	2,80	4,40	2,20	4,60	4,60	4,20	3,67	**3,22**
ROMANIA	RELEVANCE	3,60	3,75	3,50	3,50	4,20	3,50	3,25	3,60	3,60	3,25	3,00	3,25	**3,50**
MANUFACTURERS	AWARENESS	2,45	2,27	2,10	2,11	3,40	2,30	2,70	2,22	3,20	2,40	1,90	2,56	**2,47**
RESEARCH	AWARENESS	2,00	2,75	2,67	2,67	2,83	2,33	2,00	2,08	2,92	3,33	2,58	2,38	**2,55**
ICT	AWARENESS	1,75	2,71	1,57	1,29	2,25	1,86	3,25	1,29	3,75	4,00	2,00	2,00	**2,31**
DSO	AWARENESS	2,00	3,00	2,00	2,25	2,00	3,20	3,00	1,75	3,20	3,80	3,50	2,00	**2,64**
CONSULTING	AWARENESS	2,33	3,22	3,11	2,33	3,22	3,22	3,22	2,11	3,38	3,33	2,89	3,43	**2,98**
MANUFACTURERS	RELEVANCE	3,38	3,25	3,25	3,43	3,63	3,38	3,38	3,00	3,88	3,00	2,63	2,67	**3,24**
RESEARCH	RELEVANCE	2,89	3,50	3,00	3,20	3,36	3,10	2,91	2,64	3,36	3,45	2,60	2,78	**3,07**
ICT	RELEVANCE	2,88	3,57	2,86	2,29	3,25	3,43	3,75	2,38	4,00	4,29	2,75	2,83	**3,19**
DSO	RELEVANCE	1,67	3,75	2,67	3,00	2,33	3,75	4,50	2,33	3,50	4,50	4,33	2,67	**3,25**
CONSULTING	RELEVANCE	3,67	3,44	3,44	3,44	3,00	3,56	3,89	3,11	4,00	3,89	3,56	3,75	**3,56**

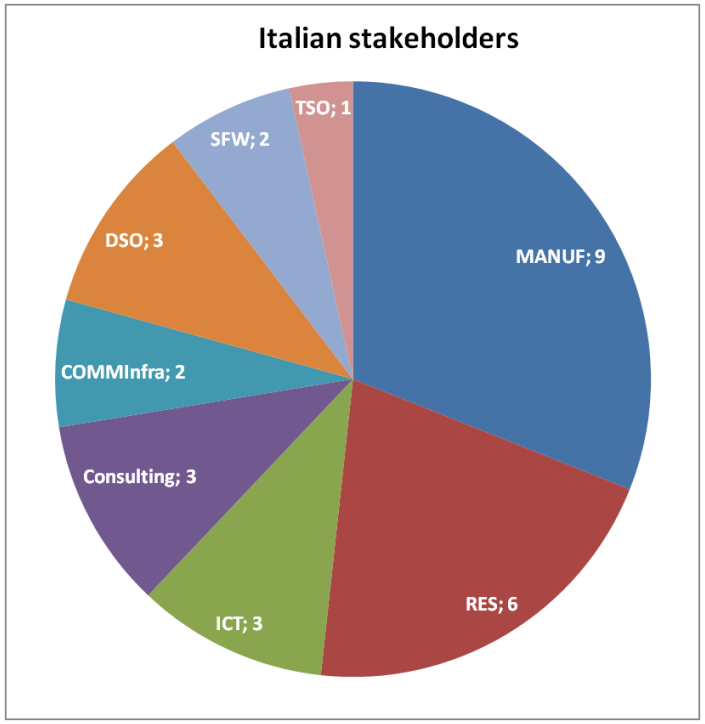
Survey Statistics: feedbacks





COUNTRIES

IT	29
SP	10
RO	6
DE	5
FR	4
GR	2
EU	2
CY	1
BE	1
UK	2
SI	1
USA	2
PL	1
NO	1
CZ	1
SE	1
AT	1
WW	1
TOT	71



MANUF	RES	ICT	Consult	COMM Infra	DSO
16	15	11	10	2	6

STAKEHOLDERS

SFW	Utility	Consum	TSO	Bulk Gen	TOT
3	3	1	2	2	71

Roundup of the outcomes: synthesis of the questionnaires results

IEC 60870-5: Telecontrol equipment and systems - Part 5: Transmission protocols (including parts 101/104)

IEC 60870-6 - Tase.2: Telecontrol equipment and systems - Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations

IEC 61850 - Power Utility Automation: Communication networks and systems in substations

IEC 61968 - CIM for Distribution: Application integration at electric utilities - System interfaces for distribution management

IEC 61970 - CIM for Energy Management: Energy management system application program interface (EMS-API)

IEC 62325 - CIM for Market Communication: Framework for energy market communications

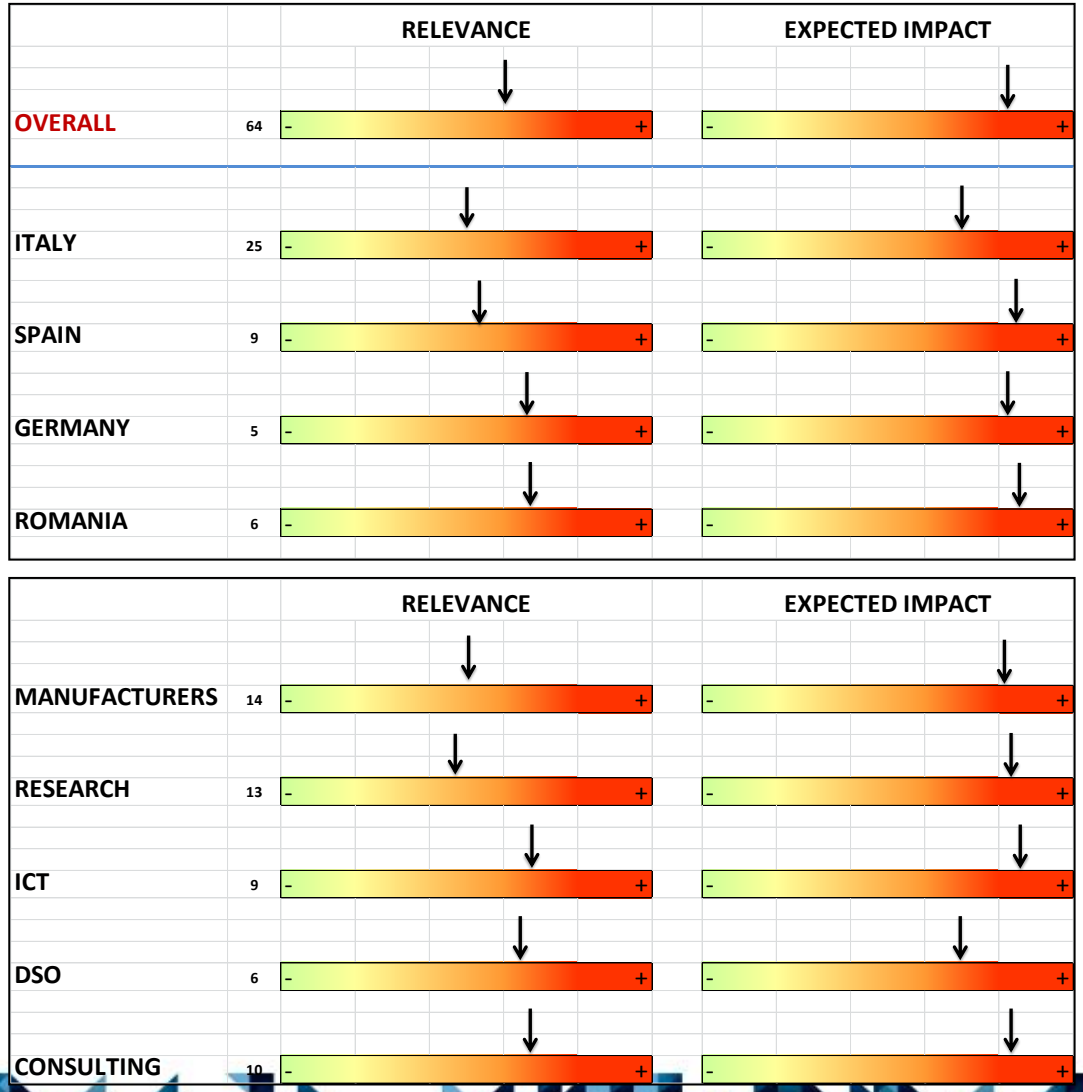
IEC 62351 – Security: Power systems management and associated information exchange - Data and communications security

IEC 62056 - DLMS / COSEM: Electricity metering - Data exchange for meter reading, tariff and load control

IEC/TR 62357 - Service Oriented Architecture (SOA): Power system control and associated communications - Reference architecture for object models, services and protocols

IEC PAS 62559 – Methodology: IntelliGrid methodology for developing requirements for energy systems

IEC 62488-1 - Power line communication systems for power utility applications - Part 1: Planning of analogue and digital power line carrier systems operating over EHV/HV/MV electricity grids



Smart Grid Core Standards

DER Integration: GAPS priority

Gaps and required actions	AVG Agr /Rlv	IT	SP	DE	RO	MAN	ICT	DSO	TSO
Std gap: Smart Grids request increased automation levels of the distribution grid, to ensure higher efficiency of operation, security, control and quality	4,46	4,32	4,75	4,40	5,00	4,58	4,50	4,60	4,50
	3,51	3,95	4,75	4,40	4,60	4,00	4,25	4,20	4,00
Std gap: Electrical connections and operation rules of DERs should be harmonized across Europe	4,16	4,22	4,25	4,20	4,20	4,50	4,25	4,00	4,50
	3,93	4,13	4,38	3,60	4,20	4,17	4,13	3,80	4,00
Std gap: Installation rules of DER should be adapted to allow for new ways of operating grids, such as microgrid.	3,98	4,05	4,00	3,00	4,40	3,70	4,63	3,40	4,00
	3,76	3,71	3,71	3,20	4,60	3,50	3,38	3,40	4,50
Reg gap: Communication protocols as well as information data models for control center have to be harmonized	3,95	3,88	3,88	4,40	4,40	3,83	3,78	4,40	3,50
	3,82	3,83	3,63	4,20	4,00	3,82	3,67	4,40	4,00
Std gap: New EMC requirements will arise from the development of the grid, requiring reviewing of the Standards	3,43	3,33	4,13	2,00	4,00	3,50	3,50	3,00	3,50
	3,48	3,30	4,50	1,50	4,20	3,42	3,50	3,25	3,50

DER Integration: Awareness of STD initiatives

Standardization related Initiative	AVG	IT	SP	DE	RO	MAN	ICT	DSO	TSO
IEC 61850-90-X Communication networks and systems for power utility automation (e.g. IEC 61850-90-14 for FACTS (Flexible AC Transmission Systems))	3,17	3,00	3,25	4,00	3,00	3,20	3,75	3,20	3,50
IEC 62786 Ed. 1.0 Smart Grid User Interface: Demand Side Energy Sources Interconnection with the Grid (TC 8)	2,62	2,94	2,25	2,00	2,75	2,30	1,86	3,20	1,50
IEC 61968 - Common Information Model (CIM) / Distribution Management. Part 8: Interface Standard For Customer Support	3,22	2,89	3,00	4,00	3,60	2,40	4,00	3,80	2,00
IEC/TS 62351-8 Ed. 1.0 Power systems management and associated information exchange - Data and communications security - Part 8: Role-based access control (TC 57 WG 15)	2,77	2,72	2,50	3,80	2,80	2,70	3,25	3,00	1,50
Pr IEC 61000-X: Electromagnetic Compatibility (EMC) (TC 77)	2,88	2,67	3,00	1,80	3,80	3,40	2,25	2,00	2,50
ENTSO-E Network Codes (RfG): Requirements for Grid Connection of Generators	2,79	2,47	2,63	3,80	4,00	2,27	2,71	3,00	3,00

Demand Response & customer energy management: GAPS priority

Gaps and required actions	AVG Agr /Rlv	IT	SP	DE	RO	MAN	ICT	DSO	TSO
Std. gap: There is an urgent market need (in Europe) for a Demand Response standard, defining the communication between service providers (e.g. utilities or aggregators) and end customers	4,14	4,20	4,33	4,20	4,80	3,71	4,29	4,33	4,00
	3,78	3,67	3,67	3,67	4,40	3,83	3,67	3,50	4,00
Std. gap: The definition of a data model that can be mapped to different information layer standards is a suitable approach to handle the problem of incompatible protocols	3,40	3,40	3,33	3,50	3,40	4,00	3,30	3,30	3,00
	3,22	3,70	3,20	1,90	3,70	4,00	3,20	2,70	3,50
Std. gap: Standardised protocol converter and runtime environment for energy management applications at the customer premises are required	3,60	3,60	3,67	3,40	3,60	3,80	3,60	3,50	2,75
	3,17	3,20	3,67	1,60	3,30	3,30	3,25	3,50	3,00
Regulation gap: The current EU electricity wholesale market model has to be adapted to allow for market integration and Ancillary Services	3,71	3,76	4,00	4,75	3,40	3,71	4,00	4,25	2,50
	3,48	3,88	3,33	2,67	3,40	3,40	3,57	3,67	2,50

Demand Response & customer energy management: Awareness of STD initiatives

Standardization related initiative	AVG	IT	SP	DE	RO	MAN	ICT	DSO	TSO
IEC 61850-7-420 ed. 2 [current IEC/TR 61850-90-X]-Distributed energy resources logical nodes	3,10	2,87	2,67	4,50	3,40	3,17	3,71	2,33	3,00
ENTSO-E Demand Connection Code (DCC)	2,71	2,33	3,33	3,00	2,75	2,50	2,83	3,67	2,50
ZigBee Home Automation Profile - ZigBee Smart Energy Profile (SEP) 1.x/2.0	2,53	2,40	2,33	1,75	1,80	2,60	2,86	2,80	1,00
IEC 62746: System interfaces and communication protocol profiles relevant for systems connected to the Smart Grid (TC 57 WG 21)	2,43	2,13	2,33	1,75	2,40	2,17	2,71	2,33	1,50

Smart Metering: GAPS priority

Gaps and required actions	AVG Agr/ Rlv	IT	SP	DE	RO	MAN	ICT	DSO	TSO
Std. gap: Interoperability for the different smart meter standards to be achieved at the data model level (for example, using DLMS/COSEM)	3,20	3,13	3,40	2,50	4,00	3,29	3,11	2,67	2,50
	3,39	3,47	3,40	3,25	3,80	4,00	3,33	3,67	3,00
Regulation gap: Strong security mechanisms (encryption & authentication) mandatory for the WAN communication of the smart meter gateway	4,13	3,87	4,00	4,75	4,20	3,86	4,56	4,33	4,50
	3,87	3,47	3,40	3,00	3,80	3,57	4,44	3,67	4,00
Regulation gap: Full access to grid related smart meter data at the customer connection point by the grid operators (for example: voltage, current, cos ϕ)	4,07	4,29	4,40	4,00	4,60	4,71	4,00	5,00	3,50
	3,74	3,71	3,40	3,33	4,60	4,29	4,00	4,33	3,50
Regulation gap: Home devices control: smart meters to be the gateway by which electricity supply can be controlled remotely (entire supply or individual appliances)	3,93	4,14	4,00	3,50	4,40	4,43	4,25	4,00	4,00
	3,59	4,07	3,40	2,25	4,00	4,00	3,63	4,33	3,50
Std. gap: Standardized communication profile for the connection of controllable loads or an energy management system to the smart meter gateway is missing	3,77	4,00	3,80	3,75	3,60	4,29	4,13	4,00	3,00
	3,23	3,57	3,00	3,25	3,60	3,71	3,25	3,67	3,00

Smart Metering: Awareness of STD initiatives

Standardization related initiative	AVG	IT	SP	DE	RO	MAN	ICT	DSO	TSO
IEC 62056 Series (incl. DLMS/COSEM)	3,02	2,36	4,40	2,50	2,60	3,33	4,00	2,67	1,50
IEC 61334 - DLMS (PLC) Distribution automation using distribution line carrier systems (TC 57 WG 9)	2,88	2,14	4,40	2,75	2,40	2,83	3,63	2,67	2,00
IEC 61968-9 - CIM for Distribution Application integration at electric utilities - System interfaces for distribution management Part 9: Interface Standard for Meter Reading & Control (TC 57 WG 14)	2,71	2,14	2,20	3,50	2,80	2,83	3,38	2,00	2,00
IEC 62056-6-9 Mapping between the Common Information Model CIM (IEC 61968-9) and DLMS/COSEM (IEC 62056) data models and message profiles (TC 13)	2,68	2,07	3,40	3,00	2,25	3,17	3,14	3,33	2,00
ZigBee Smart Energy Profile (SEP) 2.0	2,59	2,50	2,00	2,00	1,50	2,67	3,57	2,67	1,00
prTS 50567-1 (PRIME) Meter data exchange over power lines – Part 1: Lower layer profile using OFDM modulation Type 1 (CLC TC 13)	2,52	2,14	4,80	1,00	2,80	2,50	3,25	2,33	1,50

Summary of hints from "Industry" on Smart Grid Standardization issues

Summary of Industry hints -1

Topic	Ref Standard - Document	Industry hints
Interoperability & Conformance	General	Interoperability Testing methods to be developed and standardized to guarantee full automation. Std conformance tests are not enough. Interoperability should not limit the potential for innovation and differentiation. Open standards is a basic condition but not sufficient to reach real interoperability: standard should cover specifications of the complete functionality
Security	IEC 62351 IEC 62443	The complexity of the system highly increases the risk of aimed attacks and makes ineffective the old security scheme. A new scheme is necessary based on the anti-intrusion rules. Interoperability and harmonization of data models.
Privacy and data protection	IEC 62056 IEC 62351 M/441	Requirements on security/privacy and information models are not clear and agreed enough. Consumer/customer data protection is the pre-requisite for his participation in the business and the realisation of forecast benefits. Measures for smart meters personal data protection should be harmonized. Standards for Energy Usage Data are still missing in EU. Remote control of supply only possible with express consent of the consumer.

Summary of Industry hints -2

Topic	Ref Standard - Document	Industry hints
Safety	HD 60364	The probability of uncontrolled islanding and the risk of damages for equipment and personnel will increase. Anti-islanding defense actions may differ according to the operational criteria and protection schemes. A scrutiny of present prescription set by each national regulatory authority at national level might be appropriate.
Communication & Info exchange	IEC 60870 IEC 61850 IEC 62325 IEC 61968 IEC 62488 IEC 62746 …	Information flows need to be harmonized in different domains. Semantic interoperability should be guaranteed to allow devices being automatically connected. Technology is on the shelf. OpenADR, CIM, are sufficiently mature solutions. Appropriate communication infrastructures have to be fixed for the different applications, especially for the remote control of DER (at LV). Reliability of Internet and PLC is questioned; fiber glass is unavailable and expensive. GSM/GPRS solution (CEI 0-16) is a compromise.
Costs	General	Lack of harmonization leads to great adaptation costs. Standards should pursue minimum costs/ maximum benefits objectives. Provisions of STD should be modulated in relation to the functionality requirements; these latter should be related to the plant power, to guarantee scale economy.

Summary of Industry hints -3

Topic	Ref Standard - Document	Industry hints
Services & Revenue Metering	EN 62056 IEC 61968 IEC 61850-7 IEC 61850-90 ….	Smart meters not enough to enhance hosting capacity.: smart Business Models and other metering equipment have to be developed that turn available data into business opportunities. Standardized connection/ measurement schemes are necessary, compatible with incentives, supporting transparent methods for the analysis and the quantification of the trade-off and, in general, sustaining the new business models. Mandatory measures incompatible with open market
Regulations	ENTSO-E RfG & DCC TS 50549-1/2 EN 50438	Connection codes can lead to increased costs and lengthier procedures, but may have positive impact on DERs integration, provided that DSOs have full access to the communication devices. Harmonization of std and rules across EU facilitate the deployment of DERs. Capacity market revealed very effective in US.
Standardization process	EN-IEC-IEEE	International approach (i.e. constant ref to IEC-IEEE) is necessary to guarantee open access to market.
Other issues	General	Research, education, awareness, constant connection to policy makers

Conclusions & Next steps

Conclusions:

- Questionnaires, coupled with interviews, have provided:
  - Bottom-up prioritization of requirements and gaps of the Smart Grid Standardization process in the three Areas of Interest (DER intgration; Demand Response; Smart Metering
  - Indications on the awareness level of industry (not only) on the progress standardization related initiatives
- Hints (suggestions, recommendations, concerns and opinions) about general and specific issues on standardization

Next Steps:

- Completion of the assessments on the survey and synthesis of the outcomes -> end of April, with submission of the Deliverable D4.2
- Discussion of the results with stakeholders (through targeted interviews) –> May 2014
- Issuing of Recommendations (WP5 activity) -> Summer 2014

Thank you of your attention

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