

SEESGEN-ICT

Thematic Network on

ICT for Energy Efficiency in SmartGrids

<http://seesgen-ict.rse-web.it>

Context and Objectives

Achieving the 20/20/20 EU strategy objectives claims for a deep transformation of the Electric System: from a passive network (where basically energy flows from large power plants towards the final users) to a scenario where local generators, distributors and empowered customers co-operate intelligently to ensure a secure operation.

This ongoing evolution to the Smart grids concept affects all aspects of the Electric System: organization, technology, market, regulations & standards and society. Information and Communication Technology (ICT) is essential to support the transformation. ICT provides solution-based tools to overcome fragmentation, i.e. integrating distributed power sources in Smart Grids; creating intelligent management of distributed systems and all their components; monitoring of performances such as recording and accounting of energy fluxes. ICT is also necessary for implementing Energy Efficiency strategies through Demand-side initiatives and to provide the instruments for the effective robust and resilient implementation of the new business models.

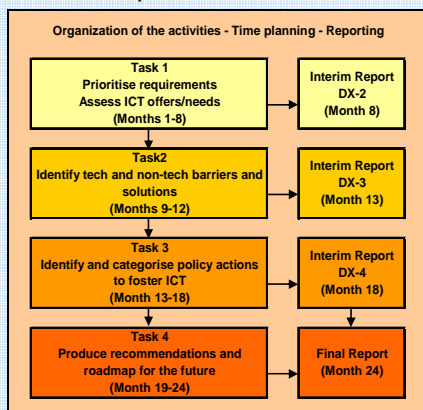
SEESGEN-ICT aims at producing harmonized frame of the priorities to accelerate the introduction of ICT within the complex system of the Smart Distributed Power Generation Grids, exploring requirements, barriers and proposing solutions. SEESGEN-ICT will produce policy recommendations, identify best practices and draw scenarios and roadmaps.

ICT enabling effects

- ICT sector accounts for 2% of global emissions but impacts the other 98% of global emissions.
- ICT could help curb emissions by anywhere between 15 and 40 % (ITU).
- SmartGrids could sustain 8% of emissions abatement target, enabling reduced T&D losses (45%), from RES integration (40%) and change Users behaviour (15%) (Smart 2020)
- Demand Response could contribute 200 TWh annual Energy Savings, avoid 50bn € of investments relating to peak generation capacity and T&D and save 25bn € in bills for customers (Vaasaett)

Summary

SEESGEN-ICT will report state of the art, good practices and recommendations regarding ICT and related successful business cases. It will also address new research and development initiatives to develop the needed solutions.



The TN is designed around the following priorities:

- Intra-grid (Energy and Communication) Management & Operation;
- Data handling and Service Monitoring;
- Demand Side integration;
- Business models and Aggregation potential;
- Environment protection;
- Test Facilities for validation of ICT solutions;

All the specific issues are studied under the same approach: ICT offers and needs; barriers and solutions; ICT and policy actions to end with an ordered list of actions and recommendations per Stakeholder to actively push the participation and deployment of advanced ICT.

Each phase results in public Deliverables, which are available for downloading in the SEESGEN-ICT website.

Milestones and expected results

- Identification and assessment of ICT supporting Energy Efficiency in the SmartGrids of the future.
- Roadmap for development needed in ICT.
- Identification of barriers and solutions to the effective exploitation of ICT.
- Identification of Best Practices for use of ICT and of suitable Business Models.
- Recommendations for policies addressing the widest and effective use ICT.
- Requirements and Directory of existing Test Facilities for validation of ICT.

EUROPEAN
COMMISSION



ICT POLICY SUPPORT
PROGRAMME



Call CIP ICT-PSP-2008-2
ICT for Energy Efficiency

Grant Number:
238868

Project duration:
June 2009 – May 2011

Budget:
478.000 €

Project Officer:
Feodora Von Franz

European Commission
DG Information Society
and Media
Feodora.von-franz@ec.europa.eu

Coordinator:
Giorgio Franchioni

RSE SpA – Italy
Via Rubattino, 54
20134 MILAN
Tel.: +39 02 3992 7612
Mob: +39 329 6675 701
giorgio.franchioni@rse-web.it
www.rse-web.it

Join the
SEESGEN-ICT
Group on
www.linkedin.com



Structure of the Thematic Network

SEESGEN-ICT project is organised in six technical Work Packages:

WP 2: ICT for management of SmartGrids with distributed energy resources

Survey and categorise the different ICT-approaches to SmartGrids management and their implementation in the electric grid operation.

WP 3: ICT for Energy Efficiency Monitoring in SmartGrids

Identify and prioritise the new needs, provide good-practice solutions and roadmaps for data handling and inter-stakeholders service monitoring.

WP 4: ICT for demand-side integration

Explore the interaction between demand side requirements and ICT solutions to support an efficient and easy integration of an active customer in an "intelligent" grid.

WP 5: ICT for business models management

Analyse business models and relevant ICT tools to support the implementation of the energy efficiency, demand management and distributed energy services in SmartGrids in competitive market.

WP 6: ICT and environment protection in SmartGrids.

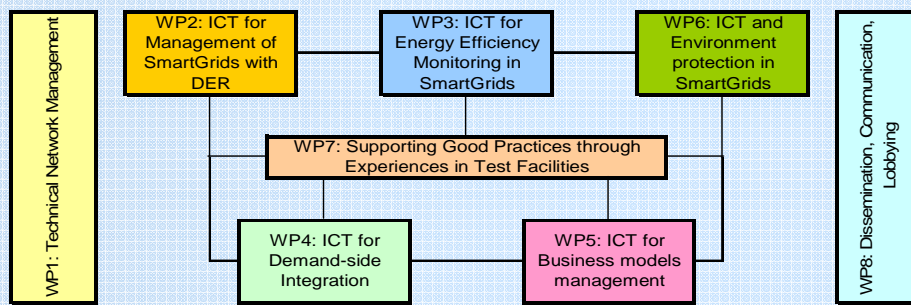
Energy Efficiency management of ICT-systems for use in Smartgrids and ICT requirements and solutions to support emissions trading models .

WP 7: Supporting Best Practices through Experiences in Test Facilities

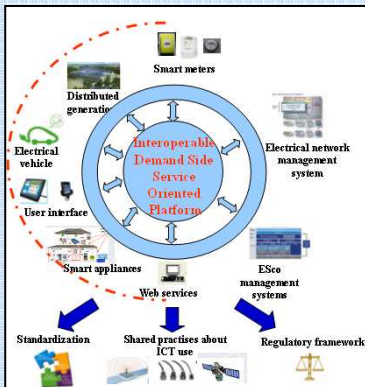
Requirements for Test Facilities suitable for the validation of Best Practices of ICT solutions supporting Energy Efficiency in smart generation grids.

The Consortium

RSE	IT
ENEA	IT
K.U.Leuven	BE
VTT	FI
GRENOBLE-INP	FR
BTH	SE
TECNALIA	ES
ECN	NL
SAP	DE
AIT	AT
CRES	GR
DTU	DK
VITO N.V.	BE
CARDIFF UN.	UK
IWES	DE
ICCS-NTUA	GR
GeSI	BE
UNIV. LODZKJ	PL
ICEMENERG	RO
SINTEF	NO
ASEW	DE
ENEL-DISTR	IT
PPC	GR
ECPE E.V.	DE



Final Outputs



The concept of Demand Side Oriented Platform to overcome tech and non-tech barriers to ICT deployment

The results of SEESGEN-ICT are fully described in the public Deliverables, which can be freely downloaded at the project website <http://seesgen-ict.rse-web.it>

SEESGEN-ICT R1: Recommendations Family on "Interoperability, Standardization, Communication, Data Aggregation, Data Handling and Security"

COMMUNICATION & STANDARDIZATION	<ul style="list-style-type: none"> Go for interoperable communication protocols and information models based on open standards and open source software Go for unified open Standard Harmonize standards & Enforce the Standardization framework
COOPERATION	<ul style="list-style-type: none"> Enhance cooperation and funding for research Foster a cooperation framework on common standards Enhance exchange of validated descriptive information and grid models Enhance exchange, validation and sharing models to develop intra-grid applications Favour exchange of information and data and improve coordination among TSOs and DSOs Interconnect local and wide area systems
SECURITY AND PRIVACY	<ul style="list-style-type: none"> Strengthen a Legislation Framework to ensure Data Privacy and Security Enhance awareness of access to personal data by stakeholders Ensure safety of Data Handling (through anonymity and aggregation)
RELIABILITY AND SECURITY	<ul style="list-style-type: none"> Enhance redundancy of information to improve robustness Map interdependencies of Infrastructure and decrease vulnerability

SEESGEN-ICT R2: Recommendations Family on "Intelligent embedded ICT components"

EMBEDDED INTELLIGENCE AND MONITORING	<ul style="list-style-type: none"> Develop a coherent Technological Ecosystem based on embedded ICT components Ensure Inter-changeability and Interoperability of components and applications Improve inside the monitoring Network
SERVICE IMPLEMENTATION	<ul style="list-style-type: none"> Develop Coordination Mechanisms as the Service Level Agreement for the implementation of Services Define criteria and KPI for the assessment of the Quality of the Active Demand provided by Aggregators Develop/Foster Technology for service implementation and security
OPERATIONAL TOOLS	<ul style="list-style-type: none"> Develop optimization tools for DER aggregation and management Enhance Smart Meters functionalities and requirements tied to the applications Standardize the exchange of information on demand elasticity and response

SEESGEN-ICT R3: Recommendations Family on "Cross-cutting structural and social issues"

MARKET AND REGULATORY ISSUES	<ul style="list-style-type: none"> Ensure adequate market context and regulatory framework to motivate and foster the Market Enhance shift from passive to active system by incentivizing DGs Foster a specific Market for flexible resources in Europe Facilitate the Coordination of Aggregators activities with System Operators and rule the management of sensible information Limit uncertainties to Avoid Economic risk related to market operation
BENCHMARKING	<ul style="list-style-type: none"> Put Benchmarking on a firm basis for validation of ICT solutions Adequate Test Facilities to Benchmarking purposes (especially with ref. to interoperability)
SOCIAL CONSENSUS	<ul style="list-style-type: none"> Sustain research and development initiative about economical and sociological aspects of the ICT for DSI Surveys on consumers Provide education and awareness Ensure Data availability and information transparency

SEESGEN-ICT R4: Recommendations Family on "Energy Efficiency and CO2 emissions"

ENERGY EFFICIENCY IN DATA CENTRES	<ul style="list-style-type: none"> Promote solutions for saving energy since the design and effective management applications of DC Standardize Energy performance metrics for Data Centres. Encourage metering and benchmarking. Foster labelling Introduce requirements of best design for efficiency of data centres in commercial building codes and elaborate procurement guidelines Foster Cloud Computing as an Energy Efficiency solution. Incentivise the use of new technologies. Foster the sharing of the existing resources instead the creation of duplicate solutions
CO2 EMISSIONS AND TRADING SYSTEMS	<ul style="list-style-type: none"> Provide a suitable legal framework for the inclusion of distribution companies and consumers in an open Emission Trading System Standardise methods and tools for the measurement, calculation, data collection and reporting of CO2 emissions

SEESGEN-ICT R5: Recommendations Family "EU large scale demonstrators, social and economic testing facilities"

RESEARCH INFRASTRUCTURES AND TEST FACILITIES	<ul style="list-style-type: none"> Strengthen research infrastructure through reality set-ups and virtual test facilities Improve Test Range and Simulation capability Foster synergies and complementary activities among the Test Facilities
TEST FACILITIES RELIABILITY	<ul style="list-style-type: none"> Improve Test Facilities reliability through the standardization of methods and tests Set up a Mutual Accreditation system for laboratories in the field of the Smartgrids validation
APPLICATIONS NEEDED FOR SMARTGRIDS VALIDATION	<ul style="list-style-type: none"> Foster feasibility and economical benefit of Smartgrids approach Impact of Regulatory policies Cyber security Social Barriers and incentivising models Education and awareness
TEST FACILITY INVESTMENTS OPTIMIZATION	<ul style="list-style-type: none"> Adopt investment policies for the improvement of TF tied to the application of priority Projects Foster investments on synergies and complementarities among the facilities Coordinate investments through independent supervisor entity

SEESGEN-ICT R6: Miscellaneous of Recommendations on "Intelligence for the T&D Networks required for SmartGrids"

STANDARDIZATION	<ul style="list-style-type: none"> Select scenarios and use cases of true relevance to be used as standard for Smartgrids validation Elaborate a common reference (dynamic) architecture to standardization extents Assess the suitability of current Standards to Smartgrids extents and to ICT specific applications
COMMUNICATION NETWORK	<ul style="list-style-type: none"> The CN should suit the QoS in the real-time constraints and the current status, including emergency and critical situations of the electric grid Sufficient energy back-up in the communications nodes; path/systems redundancies; self healing capabilities should be suitably considered Consider diverse information and communication networks and transmission technologies to adapt against huge volume of data in crowded areas
MARKET COMPETITIVENESS AND FLEXIBILITY	<ul style="list-style-type: none"> Enhance competition in supplying free communication services in Smartgrids Foster a multiple choice in communication technologies bridging interoperability and the excessive complexity Conceive flexible and diverse communication infrastructures suitable to the different criticality of the services
SMART GRIDS ICT CARBON FOOTPRINT	<ul style="list-style-type: none"> Adopt actions to limit the carbon footprint of the home distributed smartness

Recommendations and policy actions proposed by SEESGEN-ICT