

# PROJECT FINAL REPORT



**Grant Agreement number:** 219343  
**Project acronym:** SMARTGRIDS ERA-NET  
**Project title:** SMARTGRIDS ERA-NET  
**Funding Scheme:** SP1-Cooperation  
Coordination and support action  
Coordination (or networking) actions  
**Period covered:** from 1<sup>st</sup> September 2008 to 28<sup>th</sup> February 2014

**Contact:**

**Ruud de Bruijne**

**Netherlands Enterprise Agency**

**Tel: + 31 88 602 2419**

**Mob: + 31 6 51425041**

**E-mail: ruud.debruijne@rvo.nl**

**[www.eranet-smartgrids.eu](http://www.eranet-smartgrids.eu)**

## Content

Executive summary	3
1. Summary	4
<b>1.1 Summary of the work carried out</b>	<b>4</b>
Work package 1, Coordination and dissemination	4
Work package 2, Information exchange	5
Work package 3, Strategic activities	5
Work package 4, Implementation of joint activities	6
Work package 5, transnational activities	6
<b>1.2 S&amp;T results</b>	<b>8</b>
<b>1.3 Impact</b>	<b>12</b>
<b>1.4 Contact</b>	Fout! Bladwijzer niet gedefinieerd.
2. Use and dissemination of foreground	14
<b>4.1 Report on societal implications</b>	<b>20</b>
3. FINAL REPORT ON THE DISTRIBUTION OF THE EUROPEAN UNION FINANCIAL CONTRIBUTION	26
<b>Report on the distribution of the European Union financial contribution between beneficiaries</b>	<b>26</b>

## Executive summary

The objective was also to establish cooperation beyond the ERA-NET and between RTD managers EU-wide. That objective was reached. More than 20 funding agencies from European countries have formed a new ERA-NET SG+ and committed themselves to a budget for ERA-NET cofund calls in 2014-2015 of approx. € 30 mio.

SmartGrids ERA-NET developed transnational research activities which speeded up the development of a Smart European Electrical Infrastructure. Smart Grids are a necessity for a successful realisation of Horizon 2020, the 2030 framework and the 2050 roadmap. All developments in the transition to sustainability are heading towards an electricity supply with a large share of renewables and high penetration levels of distributed generation. A challenge. And even a bigger challenge with the ongoing shift in energy (end) use to electricity. Smart grids can make it work.

Smart grids also enable the development to a smarter world, wherein the electricity supply changes from a centralized top down system to an interactive hybrid system with strong consumer responses.

SmartGrids ERA-NET and the follow up, ERA-NET SG+ is a network of managers responsible for funding Smart Grids related research activities within the national and regional public programmes. The network is closely connected to policy makers and the European industry. Hence, SmartGrids ERA-NET contributed to the mutual opening up of the research programmes, research infrastructures and joint activities (calls). An overview of SmartGrids projects and country snapshots were made to facilitate this.

The SmartGrids ERA-NET consortium represented national and regional programmes from 20 European regions/countries which gave network the critical mass required for successful operations. All members assigned senior staff to SmartGrids ERA-NET, experienced with home front programmes and international cooperation.

SmartGrids ERA-NET resulted in 3 joint calls, funded 9 international research projects in which 9 European and regions are involved and the formation of the ERA-NET SG+.

## 1. Summary

In this summary a short description of the work carried out in the different work packages is given including the main scientific results, the impact dissemination and exploitation of the results and an overview of contact information for those interested more detailed information.

### *1.1 Summary of the work carried out*

SmartGrids ERA-NET was set up to develop transnational research activities to speed up the development of a Smart European Electrical Infrastructure: A necessity for a successful realisation of The European Strategic Energy Technology Plan, European Electricity Grid Initiative and Horizon 2020.

SmartGrids change the European electricity supply with strong(er) consumer response, large scale supplies of renewable electricity and high levels of distributed generation. SmartGrids ERA-NET has provided co-ordination of the related research activities within the national and regional public (co)funded RTD. SmartGrids ERA-NET creates a network of programme managers, closely connected to policy makers and industry that undertakes joint activities.

The work was carried out in four stages, starting with information exchange among the partners, to reach mutual understanding (WP2). In the next step (WP3) a strategy was developed for intensifying cooperation between national and regional programmes, and for better alignment of these programs with the EC work plans (FP7; Horizon 2020). In the third step (WP4) joint activities were implemented and an ERA-NET Cofund call was prepared. Moreover this step led to a collaboration structure for programme owners and –managers beyond the project: The ERA-NET SG+

During the project ERA-NET SmartGrids three joint calls were prepared and executed (WP5). Dissemination activities and coordination of the project was undertaken continuously (WP1)

### ***Work package 1, Coordination and dissemination***

#### **Coordination**

This part of WP1 was led by the Netherlands Enterprise Agency. As from the start this ERA-NET was open for programme owners and –managers from all MS's, associated and candidate countries. During time the ERA-NET was strengthened with the addition of several new partners.

The Consortium represents National and Regional programmes of nearly 20 European countries, which gave the SmartGrids ERA-NET the critical mass required for successful operations. All members have assigned senior staff to this ERA-NET, who are experienced with home front programmes and international cooperation.

Since the start of the project, the SmartGrids landscape changed. The SmartGrids ETP (European Technology Platform) was reorganized; a Taskforce SmartGrids was formed and the network operators started the European Electricity Grid Initiative (EEGI) to comply with the SET plan targets for 2020 and beyond. SmartGrids ERA-NET has started to establish close cooperation with the European Electricity Grid Initiative (EEGI) for activities of common interest.

## Dissemination

EnergiNet.DK led the dissemination activities. All publications are available on the general ERA-NET website NETWATCH and on two project websites:

- [www.eranet-smartgrids.eu](http://www.eranet-smartgrids.eu)  
For the activities and results realized during the first 3 periods, the original project period
- [www.sgeranetplus.eu](http://www.sgeranetplus.eu)  
For the activities and results realized in the 4<sup>th</sup> (extended) period. This website is dedicated to the ERA-NET SG+ and ERA-NET Cofund calls.

### ***Work package 2, Information exchange***

On the bases of an inventory (Deliverable 2.2.2) mutual understanding between the consortium partners was reached. This inventory has been used as structured information exchange between RTD programme owners and –managers. Best practices in programme management and evaluation of proposals were shared and common RTD priorities have been identified. After finalising this work package in the first year of this ERA-NET, all results were published on the project website. The results were kept up to date and elaborated as part of Work package 3.

Work package 2 was led by Innobasque.

### ***Work package 3, Strategic activities***

WP3, led by Bacher Energie, deducted ERA-NET strategies for the cooperation between national and regional programmes. This covered the identification of relevant issues and topics for transnational collaboration; the identification of an organisational framework which clarifies processes related to project evaluation, reviews and information dissemination. During the project we saw an increasing relevance of smart grids research, the development and demonstration in Europe (SET plan, Horizon 2020, the SmartGrids ETP and the EEGI) and the need for more collaboration with other EU smart grids activities. This has led to an intermediate update of WP3 (Amendment 1) with changes to deliverables, their priorities and corresponding milestones.

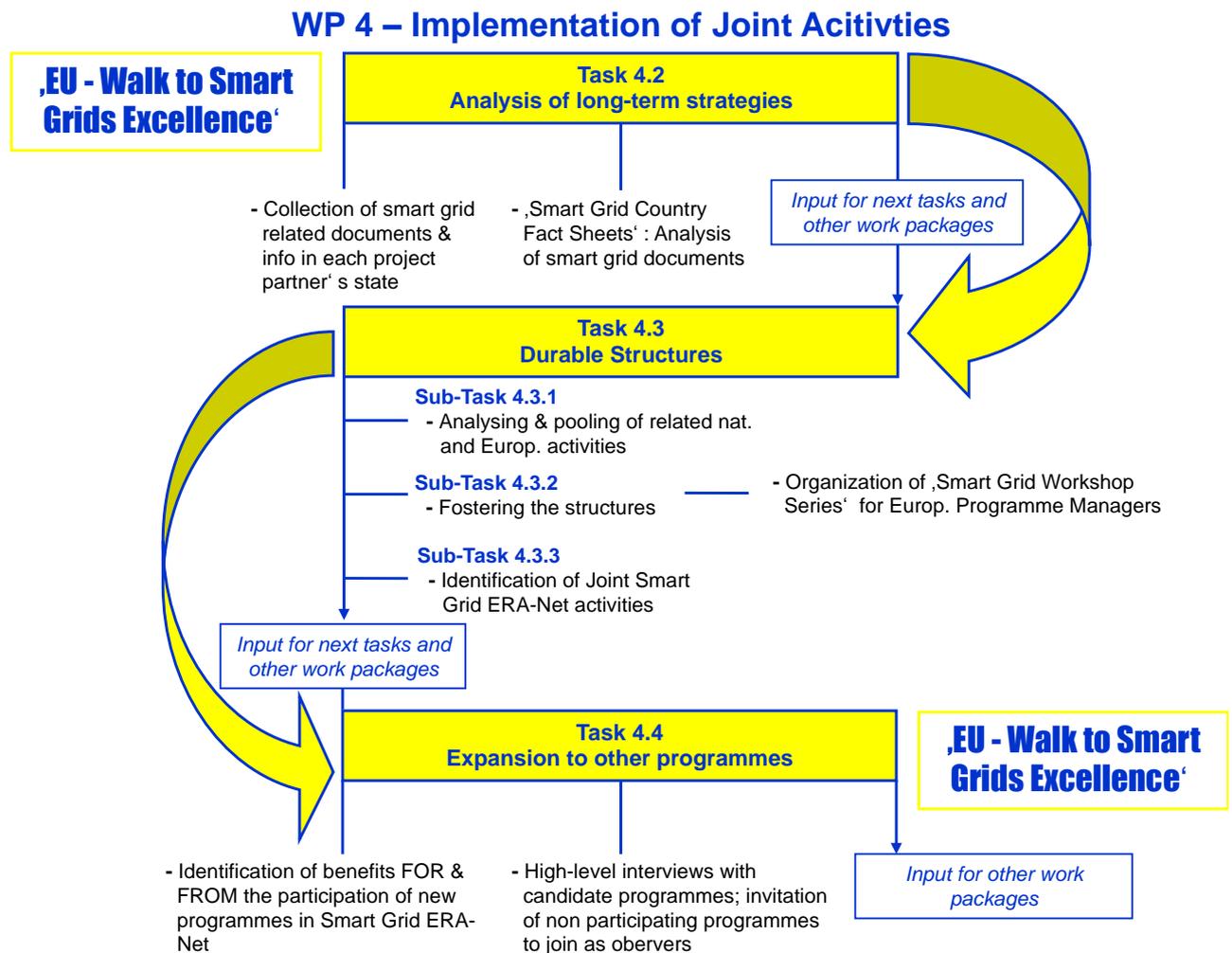
The key objectives of WP3 were to:

- identify gaps, complementarities and strategic opportunities for national programmes
- deduct a catalogue of prospective European research priorities on SmartGrids (achieved)
- identify barriers to transnational collaboration and d) to make suggestions to overcome these barriers proposing a transnational collaboration framework (achieved);
- prepare recommendations on shared reviewing, evaluation, monitoring and dissemination processes

All these objectives were reached and integrated in the setup of the ERA-NET SG+ quality and support project processes. Follow-up actions are foreseen for inherent quality management, starting in the year 2015. (see WP4).

**Work package 4, Implementation of joint activities**

WP4a leader was BMVIT (Austria). The WP’s aim was to create an ERA-NET Smart Grids Plus. That aim was reached with the formation of the ERA-NET SG+. The project has been working on fostering and enabling European research by implementing joint activities in the field of Smart Grids to improve the strategic position of the European Smart Grids know-how within the world-wide competitive environment . This was developed with a series of workshops with experts on different topics, the EU-walk to Smart Grid Excellence.



During the extended period of the project a core team formed the EAR-NET SG+, the created a working document for this ERA-NET SG+. This new ERA-NET will continue the work of the project. This is described in deliverable 4A.5.1 “Design of an effective collaboration structure” with Management Structure, definition of the roles and responsibilities of the ERA-NET SG+; the support project and the budget model.

**Work package 5, transnational activities**

WP leader was Nordic Energy Research (NER). A robust management system and efficient procedures for joint transnational calls were developed and used for three transnational calls, managed by NER on behalf of the programme managers of the individual participating national and regional

programmes. Next to the partners of the SmartGrids ERA-NET also other programmes have participated in joint calls.

The management system developed is documented in 3 deliverables: 5.2.1: Management system for transnational calls, 5.2.2: Electronic submission system and 5.3.1: Communication to the research community (announcement of call for proposals). NER promoted the calls in various meetings, on the SmartGrids ERA-NET homepage. NER and the funding agencies involved promoted the calls on their own websites.

In the first joint call, launched in 2010, research programmes from DK, NO, ES, CH, AU, FR, LV, EE and BE participated. The second call was published in 2011 wherein research programmes participated from DK, NO, ES, TR and CH. The third and last joint call was published in 2013 as a collaboration between programmes from DK, NO, SE, TR, HR and PL.

Titles of the 9 funded projects:

- The impact of prosumers
- Efficient identification of opportunities for distributed generation based on smart grid technology
- Power quality and safety requirements for people and electrical equipment in smart grid consumer domain
- Optimizing green energy and grid load by geographical steering of energy consumption
- Optimizing sizing and control of balancing power in the future European system considering transmission system constraints
- Integration households in the smart grid
- Protection of power electronically interfaced LV distributed generation networks
- Cyber physical security
- Flexible electric vehicle charging infrastructure.

## *1.2 S&T results and Foregrounds*

### ***S&T results***

There are two different sets of S&T results. First of all the consortium intensified the pan-European co-operation resulting in better alignment of regional, national and European programmes. This is related to the co-operation and information exchange between the consortium partners and associated stakeholders. This co-operation will continue beyond the project in the ERA-NET SG+, with the ongoing preparations of the first ERA-NET Cofund as a first concrete step.

The second set of S&T results is coming directly from the projects funded through the three joint calls. Although some of the funded projects are still ongoing, it already established new cooperation's between researchers and industry in several European countries. Articles have been published in scientific magazines and project results have been disseminated at different workshops and events. The funded projects contribute to expand the European knowledge base in this sector.

### ***Foregrounds***

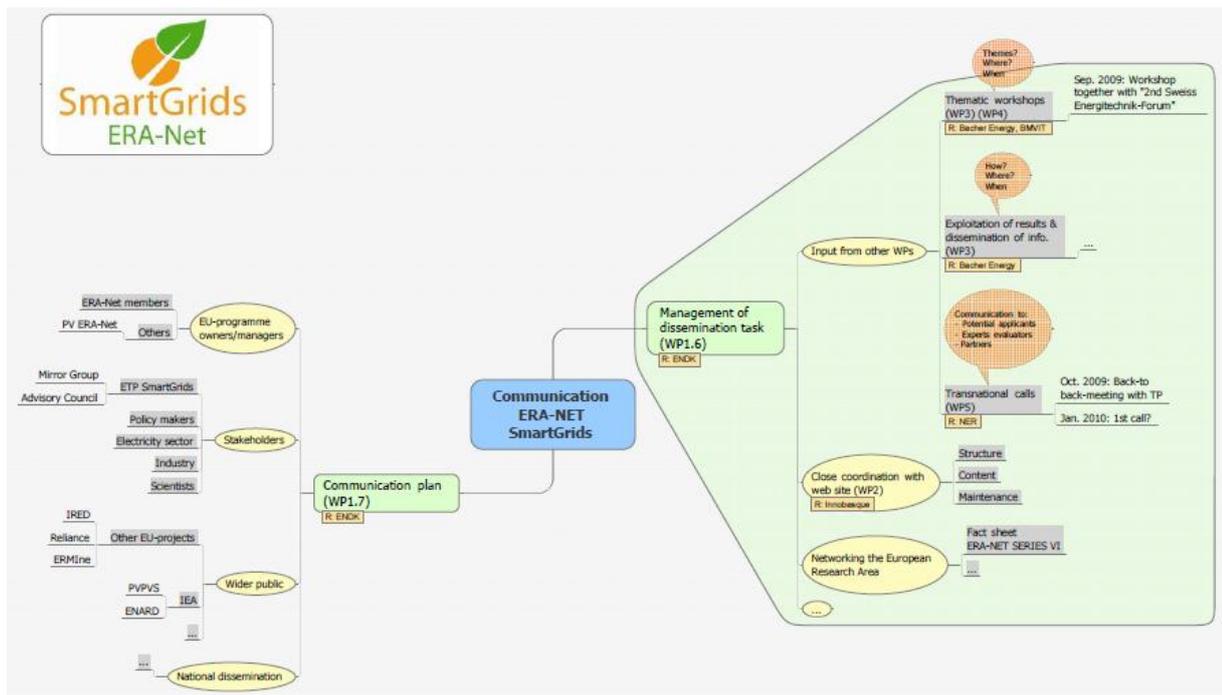
All results of the SmartGrids ERA-NET are foregrounds.

The most relevant deliverables are presented in table 1.

Table 1, overview most relevant deliverables.

Deliverable No.	Deliverable name	Delivery date	Nature	Status
D 2.2.2	Report with an overview of regional/national programmes, key actors and the overall RTD environment	2009-09-01	Report	PP Restricted to project participants
D 2.3.1	Collection of relevant RTD priorities for strategic, joint and transnational activities	2009-09-01	Report	PP Restricted to project participants
D 2.4.1	Project website with public and restricted domain	2008-12-01	Other	PU Public
D 3.2.1	Overview of complementarities, gaps and strategic opportunities for National and Regional Programmes	2009-11-01	Report	PU Public
D 3.3.1	Overview of inter-European research priorities	2010-03-02	Report	RE Restricted to group & EC
D 3.4.1	Description of barriers to transnational collaboration and suggestions for a prospective framework towards increased transnational project / programme cooperation	2010-12-01	Report	RE Restricted to group & EC
D 3.5.1	Suggestions for Common Evaluation, Monitoring and Dissemination Processes	2010-09-01	Report	RE Restricted to group & EC
D 4.2.1	Report about existing national structures and activities, energy targets, foresight studies and their impact to ERA NET smart grid	2011-01-01	Report	RE Restricted to group & EC
D 4.3.1	Joint action plan for foresight joint activities	2012-08-31	Report	RE Restricted to group & EC
D 4.3.2	Performance Indicators for the ERA NET structure	2012-08-01	Report	RE Restricted to group & EC
D 4A.1.1	Pre workshop analysis	2013-11-30	Report	PU Public
D 4A.1.2	Analysis EU SmartGrids initiatives	2013-11-30	Report	PU Public
D 4A.1.3	Analysis RTD structure	2013-11-30	Report	PU Public
D 4A.2.1	Monitoring report ongoing RTD projects	2013-11-30	Report	PU Public
D 4A.4.1	Collection of best-practise Smart Grids demo's	2013-12-31	Report	PU Public
D 4A.4.2	half-yearly SG ERA-Net newsletter	2013-12-31	Report	PU Public
D 4A.5.1	Design of an effective collaboration structure	2013-12-31	Report	PU Public
D 5.2.1	Management system for transnational calls	2010-06-02	Report	RE Restricted to group & EC
D 5.2.2	Electronic submission system	2010-06-02	Other	PU Public
D 5.3.1	Communication to the research community (announcements of call for proposals)	2010-09-01	Other	PU Public

An overview of the original communication plan is shown in the figure below.



For the different target groups:

- EU-programme owners/managers

The ERA-Net Smart Grids has held workshops with forums working with renewables. This includes the research areas:

- Photo voltaic (PV ERA-Net and IEA: PVPVS)
- Wind (IEA, Norway)
- Smart Cities
- E-Mobility

- Stakeholders

The ERA-NET has indeed gained from the fact that several key persons in the ERA-NET were also active in other forums, for instance EEGI, ISGAN, ETP Smart Grids, PVPVS IEA and GRID+.

The fact that a large number of key persons in the smart grids sector act in different forums was also very visible at the 4th General Assembly in Rome March 2012. For instance the presenters of the SRA 2035; the EcoGrid EU project and one of the chairs were ERA-NET partners. Finally the ERA-Net Smart Grids was an active member of the planning committee.

### **National dissemination**

All members of the ERA-NET gave high priority to the domestic dissemination of the ERA-NET findings. Unfortunately it is not possible to give an exact counting, but the table listing the presentations indicate a high level of activity. J

Given the relatively high number of pre-proposals in the three joint calls indicates that the national programme owners and managers have made an active effort in disseminating the SmartGrids ERA-NET activities.

### ***General dissemination***

Very early in the project period a project website was developed. This website is still up and running ([www.eranet-smartgrids.eu](http://www.eranet-smartgrids.eu)) and has been very useful in the dissemination of results, process of match making between research organisations in the three joint calls.

At the start of the project a project logo, a hand out and a fact sheet were made.

### ***Concluding remarks***

As the number of entities working within the area of smart grids exploded in the project period, it has been a delicate task to identify and reach out to the most relevant parties. The SmartGrids ERA-NET managed however cooperate with several entities as well as making a difference in the dissemination of how to utilize smart grid solutions in the future energy systems. The two major outcomes of the SmartGrids ERA-NET are:

- Trans-national collaboration of researchers, industries, manufactures and others was made possible by the three joint calls. Partners are brought together in a much smaller set-up than FP7 funded projects. New relations have been established, some of which certainly will continue beyond the funded projects.
- The engaged commitment of actually all partners as well as new ones to continue their activities in the ERA-NET SG+: This indicates clearly that the national and regional programme owners and managers are convinced that they can benefit of the activities in this kind of joint activities.

### 1.3 Impact

At meta level the SmartGrids ERA-NET contributes to a reliable, affordable and sustainable future electricity supply in the EU. The project lined up the European, National and Regional Research programmes, and led to more efficiency and more speed in delivery of public (co)funded RTD. It also prepared an ERA-NET Cofund call under Horizon 2020.

The international cooperation also contributes to a better functioning of the internal market and reaching an EU-wide level playing field for sustainable electricity generation. That can speed up deployment of renewables and energy savings in the electricity sector and contributes to stronger EU based industry.

Ideally the international cooperation in SmartGrids ERA-NET would have led to joint programming European, national and regional RTD programmes. SmartGrids ERA-NET made steps towards that situation. It brought mutual understanding among programme owners and –managers of the RTD needs in the EC. Secondly, SmartGrids ERA-NET provided good overviews of existing RTD projects. This paved the way to improve the quality and efficiency national and regional programmes and the publicly funded research in general.

In the collection and analysis of existing information, SmartGrids ERA-NET cooperated with likewise oriented EU-projects (i.e. IRED, Reliance and ERMIInE) and other networks such as the IEA Implementing Agreement ISGAN; the European Technology Platform SmartGrids and the European Electricity Grid Initiative (EEGI).

During 2008 – 2009 ERA-NET co-operated with the ETP SmartGrids. Their vision and Strategic Research Agenda was used to guide the SmartGrids ERA-NET in scope and activities.

The renewal of the SmartGrids landscape in 2009-2010 gave ERA-NET SmartGrids the opportunity to expand their cooperation with other organisations and networks. Cooperation's were established with the European Electricity Grid Initiative.

SmartGrids ERA-NET strongly interacted with the SmartGrids European Technology Platform in their process of drafting the Strategic Research Agenda 2035, the European Electricity Grid Initiative in their process of drafting their EEGI Roadmap 2010-2018 and Detailed Implementation Plan 2010-2012 , the SET-plan and Horizon 2020.

In 2012 SmartGrids ERA-NET organised a General Assembly, in cooperation with the SmartGrids European Technology Platform. The Technology Platform presented there the Strategic Research Agenda 2035; the ERA-NET presented their monitoring results, one of the key deliverables of the project.

At European-Regional Level SmartGrids ERA-NET also interacted with DACH Initiatives (cooperation between Germany; Austria and Switzerland) and National SmartGrids Platforms.

**SmartGrids ERA-NET final report**

CONTACT DETAILS SMARTGRIDS ERA-NET				
Project website	<a href="http://www.eranet-smartgrids.eu/">http://www.eranet-smartgrids.eu/</a>			
Co-ordinator	Ruud de Bruijne	ruud.debruijne@rvo.nl		
CONTACT DETAILS BENEFICIARIES				
Beneficiary organisation name	Country - Region	Contact person	E-mail	
MINISTRY OF ECONOMIC AFFAIRS - NATIONAL ENTERPRISE AGENCY	Netherlands	Ruud de Bruijne	ruud.debruijne@rvo.nl	
FEDERAL DEPARTMENT FOR ENVIRONMENT TRANSPORTS ENERGY AND COMMUNICATION	Switzerland	Dr. Michael Moser	michael.moser@bfe.admin.ch	
BUNDESMINISTERIUM FÜR VERKEHR, INNOVATION UND TECHNOLOGIE	Austria	Michael Hübner	michael.huebner@bmvit.gv.at	
NORDIC ENERGY RESEARCH	Nordic Countries	Filip Ehrle Eveling	filip.eveling@nordicenergy.org	
ENERGINET.DK	Denmark	Jeannette Møller Jørgensen	jmj@energinet.dk	
MINISTERIO DE ECONOMIA Y COMPETIVIDAD	Spain	Marian Ferre	marian.ferre@mineco.es	
NORGES FORSKNINGSRAD	Norway	Erlend Eggen	erlend.eggen@energidata.no	
KENTRO ANA NEOSIMON PIGON KE EXIKONOMISIS ENERGEIAS (CENTRE FOR RENEWABLE ENERGY SOURCES AND SAVING)	Greece	Stathis Tselepis	stslepe@cres.gr	
GENIKI GRAMMATIA EREVNAS KAI TECHNOLOGIAS, YPOURGIO PAIDIAS, DIA VIOUTHISIS & THRSKEVMATON	Greece	Vassilios Geros	vgeros@gst.gr	
VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V.	Belgium	Peter Verboven	peter.verboven@vito.be	
MINISTARSTVO ZNANOSTI, OBRAZOVANJA I SPORTA	Croatia	Davor Skrllec	davor.skrlec@fer.hr	
MINISTERSTVO ZA OBRAZOVANJE I NAUKA	Slovenia	Milena Cernilogar - Radez	milena.cernilogar-radez@gov.si	
BACHER ENERGIE AG	Switzerland	Dr. Rainer Bacher	rainer.bacher@bacherenergie.ch	
SIHTASUTUS EESTI TEADUSFOND	Estonia	Aare Ignat	aare.ignat@etag.ee	
LATVIJAS ZINATNU AKADEMIJA	Latvia	Gunta Šlihta	fei@edi.lv	
FACHHOCHSCHULE TECHNIKUM WIEN	Austria	Momir Tabakovic	momir.tabakovic@technikum-wien.at	
TÜBİTAK	Turkey	Ilknur Yılmaz	ilknur.yilmaz@tubitak.gov.tr	
NARADOWE CENTRUM BADAŃ I ROZWOJU	Poland	Hanna Sroczynska	hanna.sroczynska@ncbr.gov.pl	
CONTACT DETAILS NATIONAL SMART GRIDS PLATFORMS				
PLATFORM	Country - Region	Contact person	E-mail	website
TKI Switch2SmartGrids	Netherlands	Olivier Ongkiehong	olivier.ongkiehong@rvo.nl	<a href="http://tki-switch2smartgrids.nl/">http://tki-switch2smartgrids.nl/</a>
Slovenian Smart Grids Technology Platform	Slovenia	prof. Igor Papič	igor.papic@fe.uni-lj.si	<a href="http://www.smartgrids.si">http://www.smartgrids.si</a>
The Norwegian Smartgrid Center	Norway	Grete Coldevin	Grete.Coldevin@smartgrids.no	<a href="http://www.smartgrids.no">www.smartgrids.no</a>
Smart Grids Austria	Austria	Dr. Angela Berger	angela.berger@smartgrids.at	<a href="http://www.smartgrids.at/">http://www.smartgrids.at/</a>
Verein Smart Grid Schweiz	Switzerland	Oliver Krone	oliver.krone@bkw.ch	<a href="http://www.smartgrid-schweiz.ch">http://www.smartgrid-schweiz.ch</a>
Smart Grids Flanders	Belgium	Heidi Lenaerts	Heidi.lenaerts@smartgridsflanders.be	N/A
Danish Intelligent Energy Alliance	Denmark	Morten Baadsgaard Trolle	mob@danskenergi.dk	<a href="http://www.energi.dk/English.aspx">http://www.energi.dk/English.aspx</a>
DI network for smart grid	Denmark	Sune Thorvaldsen	sunt@di.dk	<a href="http://di.dk/shop/netvaerk/produktside/pages/produktside.aspx?productid=9094">http://di.dk/shop/netvaerk/produktside/pages/produktside.aspx?productid=9094</a>
Smart Energy Networks Partnership	Denmark	Jacob Østergaard	joe@elektro.dtu.dk	
Forum for Smart Grid and Renewable Energy – Danish Standards	Denmark	Regnar Schultz	rs@ds.dk	<a href="http://www.ds.dk/da/standardisering/foromraader/forum-for-smart-grid-og-vedvarende-energi/">http://www.ds.dk/da/standardisering/foromraader/forum-for-smart-grid-og-vedvarende-energi/</a>
OTHER CONTACTS				
DESCRIPTION	Country - Region	Contact person	E-mail	website
Annual Conference of the Technological Platform for Smart Grids	Slovenia	N/A	N/A	<a href="http://www.energetika.net/eu/events/announcements/engrds-014_2">http://www.energetika.net/eu/events/announcements/engrds-014_2</a>

## 2. Use and dissemination of foreground

### 2.1 *Section a, dissemination measures*

All results and public deliverables of the project have and will be disseminated by the consortium members and are distributed by the project website. The project website will be up and running beyond the project. To give an impression of this dissemination and overview of publications is presented in Table 2.

An overview of the dissemination activities undertaken during the project period is presented in Table 3.

Table 2

Scientific publications										
NO.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers	Open access
1	Probabilistic N-1 security assessment incorporating Dynamic Line Ratings	M. Bucher, M. Vrakopoulou & G. Andersson	Proc. IEEE Power & Energy Society General Meeting	21-25 July 2013	IEEE	Vancouver	2013	1-5	10.1109/PESMG.2013.6672679	YES
2	Balancing Reserve Procurement and Operation in the Presence of Uncertainty and Transmission Limits	M. Bucher & G. Andersson	Proc. 48th International Universities' Power Engineering Conference	2-5 Sept. 2013	IEEE	Dublin	2013	1-6	10.1109/UPEC.2013.6714854	YES
3	Managing Flexibility in Multi-Area Power Systems	M. Bucher, S. Chatzivasileiadis & G. Andersson	Proc. Power Systems Computation Conference	18-22 August 2014		Wroclaw	2014		submitted	YES
4	Control Reserve Power Node Simulator	M. Bucher	Internal report	2012	ETH Zurich	Zurich	2012			YES
5	Adoption of Model-Driven methodology to aggregations design in Power Grid	Igor Kaitovic and Slobodan Lukovic	Proc. Industrial Informatics (INDIN), 2011 9th IEEE International Conference on Industrial Informatics	26-29 July 2011	IEEE	Caparica, Lisbon	2011	533-538	10.1109/INDIN.2011.6034936	YES
6	Software architecture for Smart Metering systems with Virtual Power Plant	Srdan Vukmirović, Aleksandar Erdeljan, Filip Kulić, and Slobodan Luković	Proc. MELECON 2010 - 2010 15th IEEE Mediterranean Electrotechnical Conference	26-28 April 2010	IEEE	Valletta	2010	448-451	10.1109/MELCON.2010.5476237	YES
7	Sustainable Advantage through Time Based-Business Models: Theoretic Foundations and the Case of Smart Grids	Loock, M., Helms, T. & Kuenzel, K	Strategic Management Conference. – Atlanta.	2013		Atlanta, USA	2013			YES
8	Customer Value of Smart Metering - Explorative Evidence from a Choice-based Conjoint Study in Switzerland	Kaufmann, S; Kuenzel, K, Loock, M	Energy Policy, 53	2013			2013	229-239		YES
9	Generic Customer Segments and Business Models for Smart Grids, Markets	Curtius, H, Künzel, K, Loock, M	International Journal of Marketing, 51	2012			2012	63-74		YES
10	SmartGen model solutions for Distributed Generation and Load Management	A.Mutule, A.Lvov, A.Obusev, H.Segerberg and R.Bacher.	5th International conference on Liberalization and modernization of Power Systems: Smart Technologies for Joint Operation of Power Grids	06-10 August 2012		Irkutsk	2012		ISBN: 978-5-93908-081-1	YES
11	Efficient identification of opportunities for Distributed Generation based on Smart Grid Technology	A.Mutule, A.Obushev, A.Lvov, H. Segerberg, N. Shao, S. You, R. Bacher, H. Sauvain, J. Remund, U. Schröder, A. J. Engen	2013 4th IEEE PES Innovative Smart Grid Technologies Europe (ISGT Europe), Conference Proceedings	6-9 October 2013		Copenhagen	2013			YES
12	Intégration des sources d'énergies renouvelables dans le réseau électrique	Christoph Kramer und Grégoire Chauvin	Travail de Bachelor, HES Fribourg	2012		Fribourg	2012			YES
13	Das künftige Stromsystem. Erneuerbare Energien: Umweltfreundliche Versorgung (Hanspeter Eicher, Editor)	R. Bacher	Book, Faktor-Verlag Switzerland	2014		Switzerland	2014		ISBN 978-3-905711-26-4	YES
14	EnergieRespekt. Der Schlüssel für eine nachhaltige Energieversorgung	R. Bacher, et al.	Book, Faktor-Verlag Switzerland	2014		Switzerland	2014		ISBN 978-3-905711-27-1	YES
15	National Smart Grids -R&D Initiatives in Europe	Michael Hübner, Natalie Prügler			Austrian Federal Ministry for Transport, Innovation and Technology	Radetzkystraße 2, A-1030 Vienna, Austria	2010	133		YES
16	Smart Grids Initiatives in Europe	Michael Hübner, Natalie Prügler			Austrian Federal Ministry for Transport, Innovation and Technology	Radetzkystraße 2, A-1030 Vienna, Austria	2011	112		YES
17	SMART GRIDS COUNTRY FACT SHEETS	Michael Hübner, Natalie Prügler			<a href="http://www.eranet-smartgrids.eu/">http://www.eranet-smartgrids.eu/</a>		2011			YES

Scientific publications										
NO.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers	Open access
18	JOINT ACTION PLAN FOR FORESIGHT JOINT ACTIVITIES	Michael Hübner, Natalie Prügler			<a href="http://www.eranet-smartgrids.eu/">http://www.eranet-smartgrids.eu/</a>		2012	139		YES
19	REPORT ABOUT IDENTIFICATION OF NEW ERA-NET MEMBER Programs	Michael Hübner, Natalie Prügler			<a href="http://www.eranet-smartgrids.eu/">http://www.eranet-smartgrids.eu/</a>		2012	89		YES
20	BRIEFING DOCUMENTS FOR INTERVIEWS FOR CANDIDATE	Michael Hübner, Natalie Prügler			<a href="http://www.eranet-smartgrids.eu/">http://www.eranet-smartgrids.eu/</a>		2012	7		YES
21	Joint event - SmartGrids ERA-Net and ERA-NET Transport		Visual Minutes Joint event - SmartGrids ERA-Net and ERA-NET Transport		<a href="http://issuu.com/cre-aid/docs/joint_event_era-net">http://issuu.com/cre-aid/docs/joint_event_era-net</a>		2013	52		YES
22	Joint Call Activities on PV Integration within the framework of the ISGAN, PV/PS and Smart Grids ERA-Net	Morir Tabakovic, Fritz Fahringer, Michael Hübner			<a href="http://www.eranet-smartgrids.eu/">http://www.eranet-smartgrids.eu/</a>		2013	122		YES

Table 3

Dissemination activities								
NO.	Type	Main leader	Title	Date/Period	Place	Type of audience	Size of audience	Countries addressed
1	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	02 April 2009	Oslo, Norway	Policy makers	7	Denmark, Finland, Iceland, Norway and Sweden
2	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	18 August 2010	Oslo, Norway	Policy makers	6	Denmark, Finland, Iceland, Norway and Sweden
3	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	19 October 2011	Oslo, Norway	Policy makers	2	Finland
4	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	18 March 2011	Reykjavik, Iceland	Industry	6	Denmark, Finland, Iceland, Norway and Sweden
5	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	26 April 2011	Oslo, Norway	Policy makers	7	Denmark, Finland, Iceland, Norway and Sweden
6	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	07 March 2012	Oslo, Norway	Policy makers	7	Denmark, Finland, Iceland, Norway and Sweden
7	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	01 June 2012	Stockholm, Sweden	Industry	5	Denmark, Finland, Norway and Sweden
8	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	14 March 2013	Trondheim, Norway	Scientific Community (higher education, Research)	18	Denmark, Finland, Norway and Sweden
9	Presentation	NER	Presentation of activities in NER inter alia Smart Grids ERA-Net	07 May 2013	Trollhättan, Sweden	Scientific Community (higher education, Research)	10	Sweden
10	Presentation + on-line transmission	NCBR	Presentation of NCBR's activities in ERA-NETs inter alia Smart Grids ERA-Net	25 April 2013	Poznań, Poland	Scientific Community (higher education, Research); Industry	above 100 + on-line view ers	Poland
11	Presentation	NCBR	Presentation of NCBR's activities in ERA-NETs inter alia Smart Grids ERA-Net	21 June 2013	Kraków, Poland	Scientific Community (higher education, Research)	ca. 80	Poland
12	New sletter	NCBR	New sletter with the new est and significant information concerning NCBR's activities	7 June 2013	E-mail	Medias	ca. 6650	Poland
13	Conference	ME	Conference of the Technological Platform for Smart Grids	Annual	Slovenia	Scientific Community (higher education, Research); Industry; Policy makers		Slovenia
14	Workshop	Energidata	strategy workshop for Norwegian R&D in Energy Systems		Norway	Scientific Community (higher education, Research); Industry		Norway
15	Workshop	Energidata	presentation at the strategy workshop for the Norwegian Smartgrid Center		Norway	Scientific Community (higher education, Research); Industry		Norway
16	Workshop	Energidata	strategy workshop for the ENERGIX programme at the Research Authority of Norway		Norway	Scientific Community (higher education, Research); Industry		Norway
17	Presentation	FHTW	Presentation of activities in Smart Grids ERA-Net	06 June 2013	Nicosia, Cyprus	Policy makers	2	Cyprus
18	Presentation	FHTW	Presentation of activities in Smart Grids ERA-Net	15.March.2013	Ulm,Germany	Scientific Community (higher education, Research)	10	Slovakia, Germany, Hungary
19	Presentation	FHTW	Presentation of activities in Smart Grids ERA-Net	15.March.2013	Ulm,Germany	Scientific Community (higher education, Research)	10	Slovakia, Germany, Hungary
20	Presentation	FHTW	Presentation of activities in Smart Grids ERA-Net	21 November 2013	Vienna, Austria	Scientific Community (higher education, Research)	40	Croatian, Finland, Germany,
21	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	03 June 2009	Bern, Switzerland	Applied university professors	10	Switzerland
22	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	09 September 2009	Bern, Switzerland	Scientific Community (higher education, Research); Industry; Policy makers	145	Switzerland + ERA-NET members
23	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	23 September 2009	Horw, Switzerland	Industry	25	Switzerland
24	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	23 October 2009	Otten, Switzerland	Industry	150	Switzerland
25	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	10 December 2009	Zürich, Switzerland	Industry	20	Switzerland
26	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	28 May 2010	Zürich, Switzerland	Policy makers	20	Switzerland
27	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	16 June 2010	Bern, Switzerland	Policy makers	25	Switzerland

Dissemination activities								
NO.	Type	Main leader	Title	Date/Period	Place	Type of audience	Size of audience	Countries addressed
30	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	03 December 2010	Bern, Switzerland	Swiss utilities, e-mobility experts	20	Switzerland
31	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	05 April 2011	Zürich, Switzerland	Scientific Community (higher education, Research); Industry	50	Switzerland
32	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	08 June 2011	Winterthur, Switzerland	Scientific Community (higher education, Research); Industry; Policy makers	75	Switzerland
33	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	15 November 2011	Bern, Switzerland	Policy makers	10	Switzerland, EC
34	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	31 October 2012	Bern, Switzerland	Industry	40	Switzerland
35	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	17 January 2013	Zürich, Switzerland	Industry	40	Switzerland
36	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	30 October 2013	Bern, Switzerland	Industry	40	Switzerland
37	Presentation	SFOE	Presentation of Swiss energy R&D funding including Smart Grids ERA-Net	16 January 2014	Zürich, Switzerland	Industry	40	Switzerland
38	Presentation	LAS	Smart Grids ERA-NET Cofund	18 December 2013	Milan, Italy	Scientific Community (higher education, Research)	~45	EU wide
39	Book	VITO	Casebook Smart Grids					Belgium
40	Presentation	Tubitak	National Public Private Partnerships Infoday and Brokerage Event	14-15 June 2012	Istanbul, Turkey	Policy makers, industry		Turkey
41	Workshop	Tubitak	GAP-YENEV Business Model and Building Specifications Workshop	4 July 2012	Şanlıurfa, Turkey	Industry		Turkey
42	Workshop	Tubitak	FP7 Infoday at Istanbul Metropolitan Municipality	19 September 2012	Istanbul, Turkey	Policy makers, Industry		Turkey
43	Workshop	Tubitak	Information Day to TUBITAK Marmara Research Center Institutes	18 May 2012	Gebze, Turkey	Scientific Community (higher education, Research)		Turkey
44	Presentation	Tubitak	Network Coordination and Advancement of Sub-Saharan Africa-EU Science and Technology Cooperation African NCPs Networking Visit to TUBITAK	26-27 June 2012	Ankara, Turkey	Policy makers, industry		Turkey, Sub-Saharan Africa
45	Presentation	Tubitak	Horizon2020 Training Anadolu University, 13.09.2013	13 September 2013	Anadolu	Scientific Community (higher education, Research)		Turkey
46	Presentation	Tubitak	Horizon2020 Training Boğaziçi University, 26.09.2013	16 September 2013	Boğaziçi	Scientific Community (higher education, Research)		Turkey
47	Presentation	Tubitak	Horizon2020 Training Mustafa Kemal University, 26.06.2013	26 June 2013	Alahan - Antakya	Scientific Community (higher education, Research)		Turkey
48	Presentation	Tubitak	Horizon2020 Training Doğuş University, 12.06.2013	12 June 2013	Kadıköy	Scientific Community (higher education, Research)		Turkey
49	Presentation	Tubitak	Horizon2020 Training Bülent Ecevit University, 21.06.2013	21 June 2013	Zonguldak	Scientific Community (higher education, Research)		Turkey
50	Presentation	Tubitak	Horizon2020 Training Koç University, 15.11.2013	15 November 2013	Istanbul, Turkey	Scientific Community (higher education, Research)		Turkey
51	Presentation	Tubitak	Horizon2020 Training Istanbul University, 12.12.2013	12 December 2013	Istanbul, Turkey	Scientific Community (higher education, Research)		Turkey
52	Presentation	EnergiNet.DK	Concept for controlling the power system in 2025 - a part of SmartGrids in Denmark. 1st ERA-Net SmartGrids workshop	March 2010	Amsterdam			EU wide
53	Presentation	EnergiNet.DK	Reference group for Control and Regulation of the power system	June 2010				Denmark
54	Presentation	EnergiNet.DK	The Smart Grid network of the Danish Ministry of Climate and Energy, Group 3: Research, Development and Demonstration	February 2011	RISØ			Denmark
55	Presentation	EnergiNet.DK	Several presentations describing the ForskEL programme and ERA-Net SmartGrids supporting research and development of environmentally friendly power generation.	2009-2014	Denmark			Denmark
56	Presentations	RVO	Series of presentations	2009-2014	Netherlands	Scientific Community (higher education, Research)	15	Netherlands
57	Presentations	RVO, Bacher, BMW/IT	General Assembly	04 July 1905	Italy	Scientific Community (higher education, Research)	200	EU wide

## 2.2 Section B, Use of foregrounds

All results and deliverables are public. There are neither patents nor IPR issues applicable.

There are three types of foregrounds which will be used and disseminated beyond the project:

- Results from projects funded by the joint calls
- Monitoring results
- Network

### **Results from projects funded by the joint calls**

The results of the projects funded by the joint calls will be disseminated by the research consortia themselves. This will be done by scientific publications and presentations on scientific conferences.

### **Monitoring results**

One of the key deliverables of the project are the monitoring results. The database of smart grid projects, best practises, the country information, the overviews. This information is all made accessible on the project website. This website will be up and running beyond the project.

ERA-NET SG+ has foreseen to continue these important monitoring as part of the support project(s) of ERA-NET Cofund call(s).

### **Network**

With the consortia meetings, workshops and other events (co)organised as part of the project, a strong network of programme-owners and –managers was created. This has led to mutual understanding of the smart grid development in Europe, and together with the monitoring results, it was used for national programming en first steps towards joint programming.

The created strategic knowledge will be used in the ER-NET SG+ as input for further national and joint programming (status of development, different approaches, and comparison of solutions regarding different aspects like economic efficiency, resilience and security aspects).

ERA-NET SG+ is the most important materialization of the use of foregrounds. The working document in which the approach of this new ERA-NET, the committed countries and regions, the proposed scoping and the structure and organisation have been described is attached to this report.

### 3 Report on societal implications

<b>A General Information</b> <i>(completed automatically when Grant Agreement number is entered.</i>	
<b>Grant Agreement Number:</b>	219343
<b>Title of Project:</b>	SmartGrids ERA-NET
<b>Name and Title of Coordinator:</b>	Ruud de Bruijne
<b>B Ethics</b>	
<p><b>1. Did your project undergo an Ethics Review (and/or Screening)?</b></p> <ul style="list-style-type: none"> <li>If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports?</li> </ul> <p>Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 'Work Progress and Achievements'</p>	<b>0Yes XNo</b>
<p><b>2. Please indicate whether your project involved any of the following issues (tick box) :</b></p>	<b>NO</b>
<b>RESEARCH ON HUMANS</b>	
• Did the project involve children?	
• Did the project involve patients?	
• Did the project involve persons not able to give consent?	
• Did the project involve adult healthy volunteers?	
• Did the project involve Human genetic material?	
• Did the project involve Human biological samples?	
• Did the project involve Human data collection?	
<b>RESEARCH ON HUMAN EMBRYO/FOETUS</b>	
• Did the project involve Human Embryos?	
• Did the project involve Human Foetal Tissue / Cells?	
• Did the project involve Human Embryonic Stem Cells (hESCs)?	
• Did the project on human Embryonic Stem Cells involve cells in culture?	
• Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	
<b>PRIVACY</b>	
• Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	
• Did the project involve tracking the location or observation of people?	
<b>RESEARCH ON ANIMALS</b>	
• Did the project involve research on animals?	
• Were those animals transgenic small laboratory animals?	
• Were those animals transgenic farm animals?	
• Were those animals cloned farm animals?	
• Were those animals non-human primates?	
<b>RESEARCH INVOLVING DEVELOPING COUNTRIES</b>	

<ul style="list-style-type: none"> <li>• Did the project involve the use of local resources (genetic, animal, plant etc)?</li> </ul>	
<ul style="list-style-type: none"> <li>• Was the project of benefit to local community (capacity building, access to healthcare, education etc)?</li> </ul>	
<b>DUAL USE</b>	
<ul style="list-style-type: none"> <li>• Research having direct military use</li> </ul>	0 Yes X No
<ul style="list-style-type: none"> <li>• Research having the potential for terrorist abuse</li> </ul>	

**C Workforce Statistics**

**1. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).**

Type of Position	Number of Women	Number of Men
Scientific Coordinator	1	2
Work package leaders	7	9
Experienced researchers (i.e. PhD holders)	8	16
PhD Students	2	3
Other	N/A	N/A

<b>4. How many additional researchers (in companies and universities) were recruited specifically for this project?</b>	<b>N/A</b>
Of which, indicate the number of men:	N/A

<b>D Gender Aspects</b>		
<b>5. Did you carry out specific Gender Equality Actions under the project?</b>	<input type="radio"/>	Yes
	<input checked="" type="radio"/>	No
<b>6. Which of the following actions did you carry out and how effective were they?</b>		
<b>Not at all effective</b>		<b>Very effective</b>
<input type="checkbox"/> Design and implement an equal opportunity policy	○ ○ ○ ○ ○	
<input type="checkbox"/> Set targets to achieve a gender balance in the workforce	○ ○ ○ ○ ○	
<input type="checkbox"/> Organise conferences and workshops on gender	○ ○ ○ ○ ○	
<input type="checkbox"/> Actions to improve work-life balance	○ ○ ○ ○ ○	
<input type="radio"/> Other: <input style="width: 300px;" type="text"/>		
<b>7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?</b>		
<input type="radio"/> Yes- please specify <input style="width: 200px;" type="text"/>		
<input checked="" type="radio"/> No		
<b>E Synergies with Science Education</b>		
<b>8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?</b>		
<input type="radio"/> Yes- please specify <input style="width: 200px;" type="text"/>		
<input checked="" type="radio"/> No		
<b>9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?</b>		
<input type="radio"/> Yes- please specify <input style="width: 200px;" type="text"/>		
<input checked="" type="radio"/> No		
<b>F Interdisciplinarity</b>		
<b>10. Which disciplines (see list below) are involved in your project?</b>		
<input checked="" type="radio"/> Main discipline <sup>1</sup> :		
<input checked="" type="radio"/> Associated discipline <sup>5</sup> :	<input type="radio"/> Associated disciplin:	
<b>G Engaging with Civil society and policy makers</b>		
<b>11a Did your project engage with societal actors beyond the research community? (if 'No', go to Question 14)</b>	<input checked="" type="radio"/>	Yes
		No
<b>11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?</b>		
<input checked="" type="radio"/> No		
<input type="radio"/> Yes- in determining what research should be performed		
<input type="radio"/> Yes - in implementing the research		
<input type="radio"/> Yes, in communicating /disseminating / using the results of the project		

<sup>1</sup> Insert number from list below (Frascati Manual).

<p><b>11c</b> In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?</p>	<input type="radio"/> <input checked="" type="radio"/>	<p>Yes No</p>
<p><b>12.</b> Did you engage with government / public bodies or policy makers (including international organisations)</p>		
<p> <input type="radio"/> No  <input checked="" type="radio"/> Yes- in framing the research agenda  <input checked="" type="radio"/> Yes - in implementing the research agenda  <input checked="" type="radio"/> Yes, in communicating /disseminating / using the results of the project         </p>		
<p><b>13a</b> Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?</p> <p> <input checked="" type="radio"/> Yes – as a <b>primary</b> objective (please indicate areas below- multiple answers possible)  <input checked="" type="radio"/> Yes – as a <b>secondary</b> objective (please indicate areas below - multiple answer possible)  <input type="radio"/> No         </p>		
<p><b>13b</b> If Yes, in which fields?</p>		
<p>Agriculture Audiovisual and Media Budget Competition Consumers Culture Customs Development Economic and Monetary Affairs Education, Training, Youth Employment and Social Affairs</p>	<p><b>Energy</b> Enlargement Enterprise <b>Environment</b> External Relations External Trade Fisheries and Maritime Affairs Food Safety Foreign and Security Policy Fraud Humanitarian aid</p>	<p>Human rights <b>Information Society</b> Institutional affairs Internal Market Justice, freedom and security Public Health <b>Regional Policy</b> <b>Research and Innovation</b> Space Taxation Transport</p>

<b>13c If Yes, at which level?</b> <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Local / regional levels</li> <li><input checked="" type="radio"/> National level</li> <li><input checked="" type="radio"/> European level</li> <li><input type="radio"/> International level</li> </ul>		
<b>H Use and dissemination</b>		
<b>14. How many Articles were published/accepted for publication in peer-reviewed journals?</b>	<b>N/A</b>	
<b>To how many of these is open access<sup>2</sup> provided?</b>		
<b>How many of these are published in open access journals?</b>		
<b>How many of these are published in open repositories?</b>		
<b>To how many of these is open access not provided?</b>		
<b>Please check all applicable reasons for not providing open access:</b>		
<input type="checkbox"/> publisher's licensing agreement would not permit publishing in a repository <input type="checkbox"/> no suitable repository available <input type="checkbox"/> no suitable open access journal available <input type="checkbox"/> no funds available to publish in an open access journal <input type="checkbox"/> lack of time and resources <input type="checkbox"/> lack of information on open access <input type="checkbox"/> other <sup>3</sup> : .....		
<b>15. How many new patent applications ('priority filings') have been made? ("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).</b>	<b>N/A</b>	
<b>16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).</b>	Trademark	<b>N/A</b>
	Registered design	<b>N/A</b>
	Other	<b>N/A</b>
<b>17. How many spin-off companies were created / are planned as a direct result of the project?</b>	<b>N/A</b>	
<b>Indicate the approximate number of additional jobs in these companies:</b>		
<b>18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:</b>		
<input type="checkbox"/> Increase in employment, or <input type="checkbox"/> Safeguard employment, or <input type="checkbox"/> Decrease in employment, <input type="checkbox"/> Difficult to estimate / not possible to quantify	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="radio"/>	In small & medium-sized enterprises In large companies None of the above / not relevant to the project

<sup>2</sup> Open Access is defined as free of charge access for anyone via Internet.

<sup>3</sup> For instance: classification for security project.

<p><b>19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (FTE = one person working fulltime for a year) jobs:</b></p> <p>Difficult to estimate / not possible to quantify</p>	<p><b>30</b></p> <p><input type="checkbox"/></p>		
<p><b>I Media and Communication to the general public</b></p>			
<p><b>20. As part of the project, were any of the beneficiaries professionals in communication or media relations?</b></p> <p style="text-align: center;"> <input checked="" type="radio"/> Yes         <span style="margin-left: 150px;"><input type="radio"/> No</span> </p>			
<p><b>21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?</b></p> <p style="text-align: center;"> <input type="radio"/> Yes         <span style="margin-left: 150px;"><input checked="" type="radio"/> No</span> </p>			
<p><b>22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding: 2px;"> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Press Release</li> <li><input type="checkbox"/> Media briefing</li> <li><input type="checkbox"/> TV coverage / report</li> <li><input type="checkbox"/> Radio coverage / report</li> <li><input type="checkbox"/> Brochures /posters / flyers</li> <li><input type="checkbox"/> DVD /Film /Multimedia</li> </ul> </td> <td style="width: 50%; vertical-align: top; padding: 2px;"> <ul style="list-style-type: none"> <li><input type="checkbox"/> Coverage in specialist press</li> <li><input type="checkbox"/> Coverage in general (non-specialist) press</li> <li><input type="checkbox"/> Coverage in national press</li> <li><input type="checkbox"/> Coverage in international press</li> <li><input checked="" type="checkbox"/> Website for the general public / internet</li> <li><input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café)</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Press Release</li> <li><input type="checkbox"/> Media briefing</li> <li><input type="checkbox"/> TV coverage / report</li> <li><input type="checkbox"/> Radio coverage / report</li> <li><input type="checkbox"/> Brochures /posters / flyers</li> <li><input type="checkbox"/> DVD /Film /Multimedia</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Coverage in specialist press</li> <li><input type="checkbox"/> Coverage in general (non-specialist) press</li> <li><input type="checkbox"/> Coverage in national press</li> <li><input type="checkbox"/> Coverage in international press</li> <li><input checked="" type="checkbox"/> Website for the general public / internet</li> <li><input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café)</li> </ul>	
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Press Release</li> <li><input type="checkbox"/> Media briefing</li> <li><input type="checkbox"/> TV coverage / report</li> <li><input type="checkbox"/> Radio coverage / report</li> <li><input type="checkbox"/> Brochures /posters / flyers</li> <li><input type="checkbox"/> DVD /Film /Multimedia</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Coverage in specialist press</li> <li><input type="checkbox"/> Coverage in general (non-specialist) press</li> <li><input type="checkbox"/> Coverage in national press</li> <li><input type="checkbox"/> Coverage in international press</li> <li><input checked="" type="checkbox"/> Website for the general public / internet</li> <li><input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café)</li> </ul>		
<p><b>23 In which languages are the information products for the general public produced?</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding: 2px;"> <ul style="list-style-type: none"> <li><input type="checkbox"/> Language of the coordinator</li> <li><input type="checkbox"/> Other language(s)</li> </ul> </td> <td style="width: 50%; vertical-align: top; padding: 2px;"> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> English</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Language of the coordinator</li> <li><input type="checkbox"/> Other language(s)</li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> English</li> </ul>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Language of the coordinator</li> <li><input type="checkbox"/> Other language(s)</li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> English</li> </ul>		

## 4. FINAL REPORT ON THE DISTRIBUTION OF THE European Union FINANCIAL CONTRIBUTION

Report on the distribution of the European Union financial contribution between beneficiaries

Name of beneficiary	Final amount of EU contribution per beneficiary in Euros
1. MezLi	374.562,36
2. Detec	7.821,94
3. BMVIT	177.266,14
4. n.a.	0
5. NER	316.164,88
6. n.a.	0
7. ENDK	53.633,44
8. ADEME	24.305,41
9. CNRS	0
10/27. MINECO / MICINN	2.722,66
11. RCN	41.612,30
12. CRES	56.731,38
13. GSRT	0
14. MON	0
15. VITO	91.237,12
16. MZOS	16.536,17
17. n.a.	0
18. ME	910,36
19. Innobasque	168.113,58
20/21. Bacher Energie AG	450.419,69
22. Basque Government	13.660,65
23. ETAG	16.610,92
24. LAS	26.829,93
25. FH Technikum Wien	252.426,58
26. Arsenal Research	43.465,58
28. NCBR	6.008,95
29. TUBITAK	6.253,98
<b>Total</b>	<b>2.167.722,98</b>

## **ANNEX I**

### **Working Document ERA-Net Initiative Smart Grids Plus**

**Working Document**

## **ERA-Net Initiative Smart Grids Plus**

**Consolidated final version**

**February 14<sup>th</sup> 2014**

**An initiative of European Member States, associated states and regions for the coordination of Smart Grids programs in Europe.**

**Goal: To support deep knowledge sharing between regional and European Smart Grids initiatives by promoting and financing joint projects and joint accompanying activities, building on the knowledge base, R&D initiatives as well as research and demonstration facilities already in place at regional, national and European level.**

*This initiative has been prepared by the core ERA-Net Smart Grids Plus working group (Michael Hübner, Rainer Bacher, Fredrik Lundstrom / Gunilla Andréé, Jan Segerstam) on the basis of inputs collected through the process “Smart Grids Programming in Europe- Knowledge Exchange and Preparation of an ERA-Net PLUS Call” (<http://www.smartgrids.ch/sgeranetplus>) under consideration of the work on Smart Grids provided by the Member States JAWG for the SET-Plan Steering Group*

## Content

1.	The challenge of modernising the electricity grids in Europe	31
2.	The challenge of knowledge exchange, replicability and transferability, interoperability in order to develop technology and service markets in Europe	33
	<u>    </u> <b>Smart Grids innovation process from local trials to large scale demos</b>	<b>34</b>
3.	The ERA-Net Smart Grids Plus approach	36
	<u>    </u> <b>European added value that the initiative can provide:</b>	<b>37</b>
	<u>    </u> <b>Benefits for participants:</b>	<b>37</b>
	<u>    </u> <b>Integrating “new players”</b>	<b>38</b>
	<u>    </u> <b>An integrated research model for the smart energy system</b>	<b>38</b>
4.	Committed countries and regions:	41
	<u>    </u> <b>Available budget</b>	<b>41</b>
5.	Scoping and prioritisation of topics	42
	<u>    </u> <b>Potential areas of cooperation</b>	<b>44</b>
	<b>Working on boundaries between research areas and Interfaces to the initiatives such as smart cities</b>	<b>46</b>
6.	Intended Joint Call in 2014/2015	49

7.	Vertical and horizontal activities	50
8.	The Structure and organisation of the Joint Programming Network ERA-Net Smart Grids Plus	51
	<u>    </u> <b>Cooperation Structure</b>	<b>51</b>
	<u>    </u> <b>Coordination</b>	<b>52</b>
	<u>    </u> <b>Support Project</b>	<b>52</b>
	<u>    </u> <b>Financial Model of the network</b>	<b>54</b>

## 4 The challenge of modernising the electricity grids in Europe

*- enabling an increased flexibility of the European power system, efficiently providing increased transfer capacity and enabling an active participation of users and new market actors*

The overall goal to reduce greenhouse gases by at least 80% by 2050 will require a modernisation and upgrade of our energy networks towards high efficient, synergetic and flexible networks that are able to serve 21st century energy technologies and services. In particular there is a need for a major modernisation of European electricity networks, enabling them to deliver a growing fraction of our overall energy consumption to its final uses. Future networks will need to integrate new energy resources, technologies and approaches motivated by the EU political and regulatory frameworks, which today promote the internal energy market, renewable energy, alternative fuels for transport, local active consumption and storage as well as auxiliary services for grid stability, grid-scale storage, micro-generation, electric vehicles, smart metering, smart grids and the exploitation of digital technologies and services.

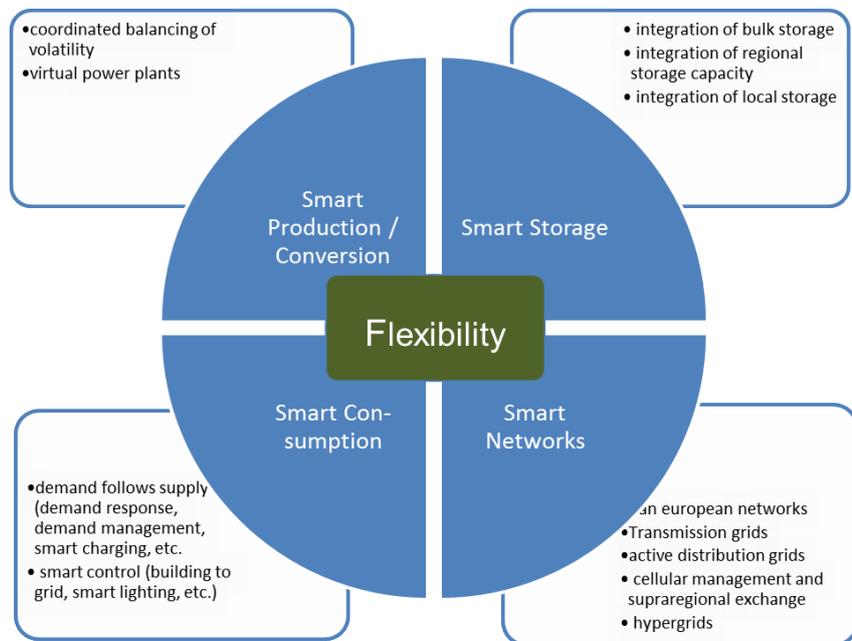
---

---

Smart grids contribute to the following objectives:

- Enabling a massive reduction of CO2 emissions and an increasing share of renewable energy. Smart grids support integration of renewable energy sources (RES) into the energy system, reducing the cost of this integration and making RES more competitive compared to conventional sources of energy.
  - Enabling energy savings: Smart grids lead to increased consumer awareness and energy savings. Studies show that increased awareness can lead to 3%-10% energy savings.
  - Market-based competitive prices for energy: Smart grids increase the possibilities of differentiating commercial propositions and conditions for consumers, contributing to a competitive energy market and consumer choice resulting in reductions in energy costs prices.
  - Stronger position of European enterprises: Smart grids comprise a huge market for ICT and consumer electronics. Due to the complexity and high-tech nature of the smart grid concept, development is relatively slow. Getting (and staying) in the lead will result in a huge market for European manufacturers selling smart grid technology and smart grid services internationally.
  - Competitive options for renewable energy: Smart grids enable end users to cash their flexibility in the use of energy, maintaining / increasing security of supply and optimising / decreasing grid costs by flattening power demand peaks and increasing consumption when (renewable) energy is readily available. Furthermore, smart grids offer opportunities for new energy-related services.
- 
-

**A first challenge** is enabling an increased **flexibility** of the power system to cope with the growing share of intermittent and decentralised renewable generation, and managing the complex interactions among millions of energy resources. This flexibility could be found either within the electricity system itself or by linking it to other energy grids and systems like e.g. the natural gas or district heating networks. **A second challenge** is cost-efficiently enhancing available **network capacity** to deliver energy over longer distances, to support increased flows from renewables and those resulting from the integrated energy market. **A third challenge** is providing the information, services, market architectures and privacy guarantees to support **open markets** for energy products and services and to activate the participation of consumers in energy markets. The modernisation of energy networks also needs to maintain or enhance service quality, reliability and security and to mitigate capital and operational costs.



**To address these challenges, innovation is needed** in system integration, interoperable technologies, services, tools, co-ordination schemes, business processes, market architectures and regulatory regimes to plan, build, monitor, control and safely operate end-to-end networks in an open, competitive, decarbonised, sustainable and climate-change resilient market, under normal and emergency conditions. Potential synergies with different (supply-) infrastructures (as the built environment, other energy networks, telecommunication networks, water and sewage networks, etc.) should be taken into account. Future convergence of technology- and application areas should be anticipated. Essential design principles like security and privacy, system- resilience, energy and resource efficiency of equipment, systems and components shall be integral part of the developed solutions as well as the implementation of future proof technologies and systems with respect to potential risk of lock-in effects of early deployment.

## **5 The challenge of knowledge exchange, replicability and transferability, interoperability in order to develop technology and service markets in Europe**

On the European level the Electricity Grids Initiative (EEGI) was set up very successfully during the last years to bring smart grids development forward in a coordinated way. European R&D agendas and innovation roadmaps (as there are the EEGI Research and Innovation Roadmap 2013-2022, the ENTSO-E Research and Development Roadmap 2013-2022, the ENTSO-E Implementation Plan 2014-2016 and the Smart Grids Strategic Research Agenda 2035 by the European Technology Platform Smart Grids) have been developed, and have become the basis for common actions of industry stakeholders, grid operators and research organisations. According to national priority setting and encouraged through the identification as a priority in the European SET-Plan many member states, associated states and regions in Europe started initiatives to develop smarter electricity grids. **According to analyses by the JRC<sup>4</sup>, the EEGI member states initiative on Mapping & Gap Analysis of current European Smart Grids Projects<sup>5</sup>, the SmartGrids ERA-NET<sup>6</sup> and the GRID+ project<sup>7</sup> more than 280 relevant smart grids projects have been developed in the recent years all over Europe.** Furthermore, according to the member states initiative “Energy Storage Innovation in Europe- a mapping exercise”<sup>8</sup> 391 projects have been identified in the field of energy storage. These are not only electrochemical storage projects (mostly batteries), but also thermal storage or Power-To-Gas. That means, that in a large number of regional demonstration projects smart grids approaches have been developed, according to regional grid technology, regional energy system parameters, regional market and regulatory framework, models and roles as well as to involved technology providers. The granularity of the regions as well as the size of the involved grid operators is very diverse.

The major challenge is now to **overcome the fragmentation of knowledge** and accelerate knowledge exchange between these demonstration projects and R&D initiatives with the goal to enable them to **develop European wide interoperable solutions, according to a common reference architecture. With this, critical masses shall be reached in the development of a European market for smart grids technology providers and smart grids service providers.**

**This initiative does not intend to find the final specifications for smart grids, but to organise the learning down to regional SmartGrids stakeholders, beyond the demonstration phase also along**

---

<sup>4</sup> JRC Reference Report “**Smart Grid** projects in Europe: lessons learned and current developments (<http://ses.jrc.ec.europa.eu/jrc-scientific-and-policy-report>)

<sup>5</sup> EEGI member states initiative final report on Mapping & Gap Analysis of current European Smart Grids Projects ([http://www.smartgrids.eu/documents/EEGI/EEGI\\_Member\\_States\\_Initiative\\_-\\_Final\\_Report.pdf](http://www.smartgrids.eu/documents/EEGI/EEGI_Member_States_Initiative_-_Final_Report.pdf))

<sup>6</sup> SmartGrids ERA-Net project collection at <http://www.smartgrids.ch/sgmonitor>

<sup>7</sup> GRID+ results of the mapping exercise (<http://www.gridplus.eu/Documents/events/Hannover/Presentation-smart-grids-forum-hannover-messe-rse.pdf>)

<sup>8</sup> Energy Storage Innovation in Europe. A mapping exercise. (<http://www.gridplus.eu/Documents/events/energy%20storage/Energy%20Storage%20report.pdf>)

**the implementation path (learning process for people, institutions and systems; future proof technologies, learning systems, ...).**

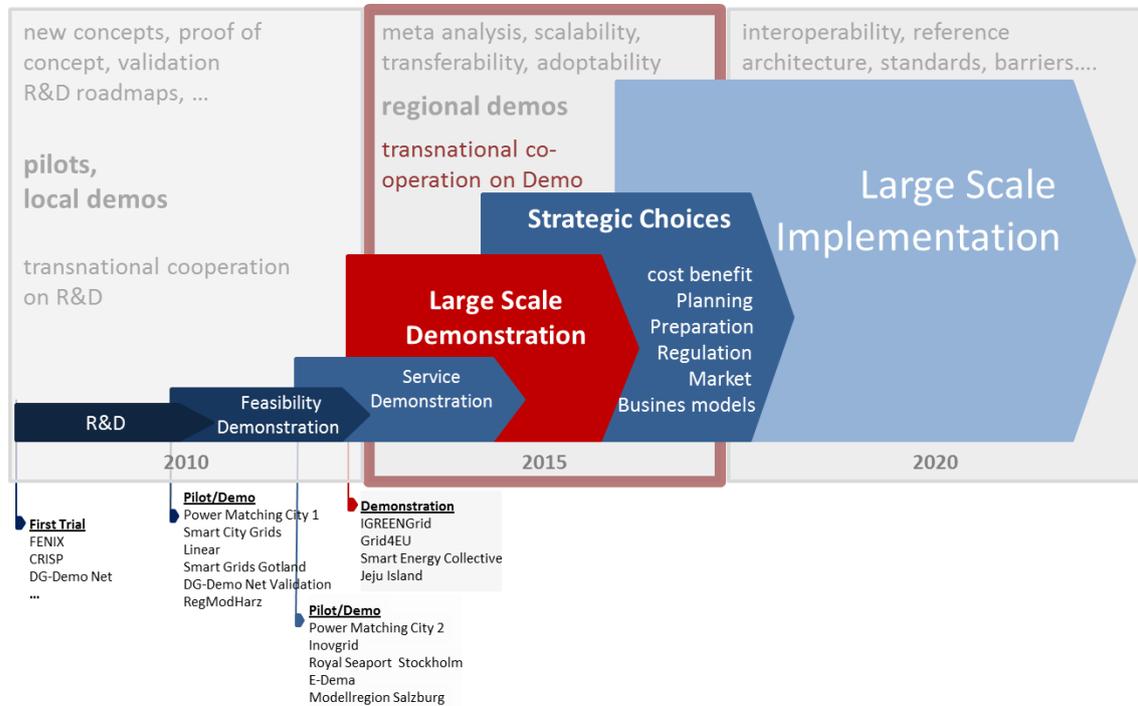
**To address these challenges, mechanisms of knowledge sharing on different levels must be established.** These mechanisms have to involve deep knowledge exchange by performing transnational and trans-regional R&D projects, utilising the existing demonstration projects to take the next steps in smart grids development in Europe and building on the existing implementations. Further knowledge exchange between the national and regional smart grids initiatives and the EEGI has to be accelerated, using, expanding and complementing existing platforms like the GRID+ project or the European Technology Platform Smart Grids (ETP SG). Finally the knowledge exchange between the funding programs and the relevant decision makers has to be strengthened, in order to enable an efficient and synergetic assignment of financial resources. This includes the appropriate analysis and aggregation of results and information for the members in the EEGI- team. The fragmented knowledge identified in the latest EEGI-roadmap (page 16) calls for meta-analysis of the projects that have been performed until today. In fact, under the GRID+ initiative such an analysis is carried out. In 2012 the “Mapping & Gap Analysis of current European Smart Grids Projects” report by the EEGI Member States Initiative was published. Many projects under FP7 have a part of the innovations clusters mentioned in tables 1, 2 and or 3 on page 28-29 of the EEGI roadmap in their scope, such as MERGE, REALISEGRID, PEGASE, REAL-SMART, METAPV, HIPERDNO, INTEGRIS, W2E, OPENNODE. Others have been mentioned in table A.6.2 and C.6.2 of the EEGI roadmap. The results of relevant national and regional projects should be included in the European knowledge base as well, to give an opportunity to understand better what we know and what we don’t know.

#### *1.4 Smart Grids innovation process from local trials to large scale demos*

During the last years, via the numerous demonstration projects and pilots, the ability of the involved stakeholders was developed to better understand the new challenges and opportunities. This has created a good environment for collaboration and explorative experimentation. The next step, which ERA-Net Smart Grids Plus is aiming to support, enables us to compare, analyse and scale the different approaches adopted to overcome technical challenges like voltage control or imbalance handling. This will enable us to create critical mass for viable solutions that fit the evolving market structures and further the spirit of the electricity market directive.

- Future Smart Grids need all levels and models of flexibility to ensure security of supply. In this ERA-Net initiative we will be able to explore and discover dynamic solutions for flexibility from the different use cases tested on local levels like eMobility, demand side management, building to grid etc. Interaction and iteration will create new dynamics and test scalability
- The local demonstrators have built on structures and constraints that are different in different regions and market implementations. The cooperation in the ERA-Net initiative enables us to explore different market and technology dynamics and discover viable combinations. We will

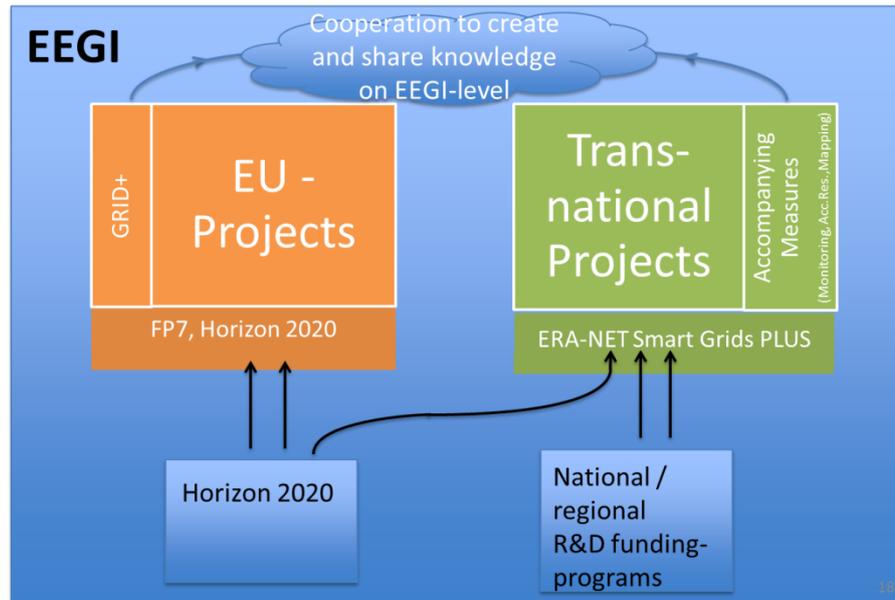
support the creation of solutions that are scalable and replicable across markets, in line with wholesale market dynamics



Source: adapted from ISGAN case-book on Active Demand / Netherlands Power Matching City

## 6 The ERA-Net Smart Grids Plus approach

The ERA-Net Smart Grids Plus initiative of European Member States, associated states and regions therefore wants to initiate and organise the **coordination of national and regional programs on Smart Grids, to support deep knowledge sharing between regional and European Smart Grids R&D initiatives** by promoting and financing joint projects and joint accompanying activities, building on the knowledge base of the R&D initiatives as well as research and demonstration facilities already in place. The initiative aims at **performing joint calls for projects to finance transnational R&D and demonstration projects** (with and without top-up funding of the EC) as well as at developing **appropriate accompanying measures and activities** like meta-analysis, mappings, workshops and events to support the knowledge sharing on other levels. In this



network, policy makers in the field of energy innovation and funding program managers will work together with researchers, consultants and industry-stakeholder platforms, **seeking the close link to the European Electricity Grid Initiative (EEGI) via the EEGI team and supporting institutions and projects like the JRC and the GRID+ project, as well as the cooperation with the EERA Joint Program on Smart Grids and the ETP SG, and IEA ISGAN.** This initiative will develop interfaces to those of other related areas such as smart cities and e-mobility.

The activities of this initiative are meant to complement the work of the EEGI, **in line with and referring to the above mentioned European Agendas in the field of Smart Grids R&D.** In advancement of the former Smart Grids ERA-Net and the promoted joint calls, this initiative intends to actively and substantially involve industry and grid operators in the projects and activities (including SMEs and regional/local grid operators). The initiative intends a broad coverage of topics (e.g. transmission grid and distribution grid topics and the interfaces between them, topics related to better system integration, enhanced retail and consumer and regulatory questions) and types of projects to be able to integrate as many member states, associated states and regions as possible, knowing that the potential thematic areas of cooperation are diverse by regions and dependent on the respective approach and status of smart grids development.

The initiative is **focussing on applied research leading to demonstration, including socio-economic and consumer involvement aspects.** As a consequence the initiative is aiming to **actively and**

**substantially involve industry and grid operators** in the transnational projects and activities (including SMEs and regional/local grid operators)

### *1.5 European added value that the initiative can provide:*

- help **overcoming the fragmented innovation process** to develop technology and service markets (and interconnections) for energy, power and ancillary services in contrast to incompatible national/regional solutions
- the **mobilisation and coordination of national R&D funding** for the Development of Smart Grids on a European level
- supporting the of **burden sharing in financing smart grids development** in Europe
- the **utilisation of regional demonstration projects and research initiatives** to accelerate smart grids development in Europe
- the support of **deep knowledge sharing** between Smart Grids R&D initiatives in Europe on different levels
- the additional provision of structures and processes that enable and strengthen the transnational cooperation including regional grid operators and regional demonstration projects

### *1.6 Benefits for participants:*

#### Program owners and program managers:

- learning about best practice of smart grids programming
- creating strategic knowledge as an input for national and joint programming (status of development, different approaches, comparison of solutions regarding different aspects like economic efficiency, resilience and security aspects, ...)
- burden sharing in financing smart grids research and demonstration

#### Grid Operators:

- Knowledge Exchange
- Additional learnings through synergetic and complementary developments in demonstration projects in other countries (other use-cases, puzzle pieces for successful smart grid implementation, same use-cases with different approach, cost benefit analyses, ...)

#### Industry and research:

- Access to other test beds to develop their methods, models and products

### *1.7 Integrating “new players”*

Developing smart energy systems requires a holistic approach that encompasses different value chain participants. At the same time the development environment is diverse across platforms and requires dynamic, adaptable development. Smart Grid development needs to grow from technologies to implementable secure, sustainable and market oriented processes.

In order to enable this, new dynamic players will allow for a new kind of iterative development process. The ERA-Net Smart Grids Plus Initiative intends to enable new players because of the approachability of the instrument through local, regional and national towards transnational channels: It intends to connect multiple national development initiatives. This could create a new kind of dynamic matrix that can test, iterate and develop “common, standardized or even open-access” solutions that work across the development areas with the goal to bring actual environments closer to implementation.

The initiative will stimulate collaboration between research and industry, including SMEs, in a way that is more approachable due to the local, regional or national contact interface and access to existing demonstration environments for iteration. This sets the initiative apart from previous research oriented initiatives and also allows for creating an understanding of how Smart Grid solutions can work in a multi-party energy market environment. It also brings together the different focus areas of knowledge gathered in the different development- could you please provide some input here.

### *1.8 An integrated research model for the smart energy system*

The European energy system and the electricity system in particular are going through a paradigm shift in many aspects. The drivers for change can be seen as result of (old and new) challenges appearing together with new enabling technologies (opportunities to “re-think”). In order to move forward in such a multi-dynamic environment it is necessary not only to continue developing and introducing the right enabling technologies, but also to develop and structure the market with new goods and services and to learn more about how to overcome barriers built into communities and society. The essential innovations to be achieved can be seen on **three layers**:

➤ **Stakeholders / Adoption** -overcoming; why do we or don't we do it?

*Goal:* overcome barriers to massive user adoption

*Research targets:* people, community, stakeholders, society, industry

*Typical topics:* innovation and transition, consumer acceptance, prosumer interaction, education, policy, retail, community/Society, human behaviour, privacy, business modelling methods  
European scope, social research, etc.

*Transnational cooperation is necessary because* habits are different all over Europe and many learning can be made through this diversity (comparisons, similarities, differences, etc.). Such cooperation will comprise findings sharing on, for instance, typical observed behaviours.

➤ **Marketplace** - structuring; how do we organize it?

*Goal:* create solutions for energy market participants to leverage smart resources across national borders and participate in changing energy market structures

*Research targets:* goods and services

*Typical topics:* (retail market and interfaces, business modelling methods, standards, abolition of barriers between member states, prosumer interaction, forecast, demand side management, integration of microgrids, flexibility, energy exchange with neighbours, economic research, etc.

*Transnational cooperation is necessary because* smart technologies create stability challenges in all countries and divergent solutions lead to market failure at borders. Such cooperation will comprise several projects by transnational consortia on convergent issues and different aspects of future energy market structures.

➤ **Technology** - enabling; which technology do we need?

*Goals:*

- Develop innovative technological concepts for sustainable energy systems (Low TRL)
- Bring these solutions towards a transnational Proof of Concept and possibly Demonstration (Medium TRL)
- Try to bridge the “valley of death” by accompanying measures such as solving practical implementation issues or studying the potential and barriers for the innovative technologies in question.

*Research targets:* (energy and ICT) technology

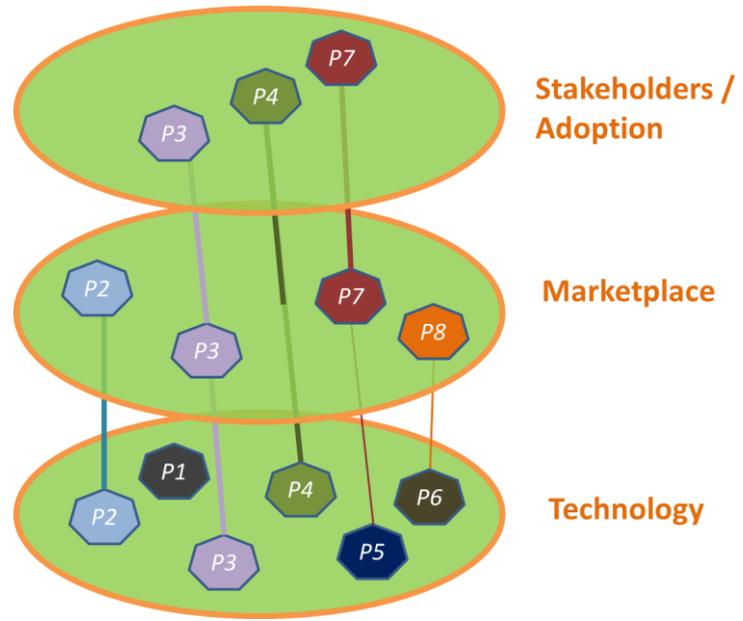
*Typical topics:* energy storage, high-voltage direct current, power quality, integration of microgrids, standards, security, energy exchange with neighbours, integration of renewable energy sources, power system planning, big data, etc.

*Transnational cooperation is necessary because:*

- It integrates a wider range of requirements to a technical solution that leads to better scalability and transferability

- Transnational consortia have a better chance to sustainably disseminate their findings to a wider audience
- for SMEs, transnational cooperation can open wider markets for innovative technologies

According to recent discussions with industry stakeholder platforms, the ERA-Net Smart Grids Plus initiative is aiming to promote projects that cover more than one of the three levels. Such projects shall be given priority over “technology only” projects. Projects that cover only levels “stakeholder/adoption” and/or “goods and services” must however have a strong link to technology projects by substantial cooperation.



## 7 Committed countries and regions

So far the following European countries and regions have committed themselves to the initiative by providing detailed information about their programs, priorities, potential areas of cooperation, involved funding agencies and by contributing actively to the work:

**Switzerland, Sweden, Spain, Norway, Latvia, Denmark, Austria, Finland, Turkey, Germany, Romania, Netherland, France, Flanders and Wallonia in Belgium, Scotland**

Additionally the following countries / regions have shown interest in the cooperation:

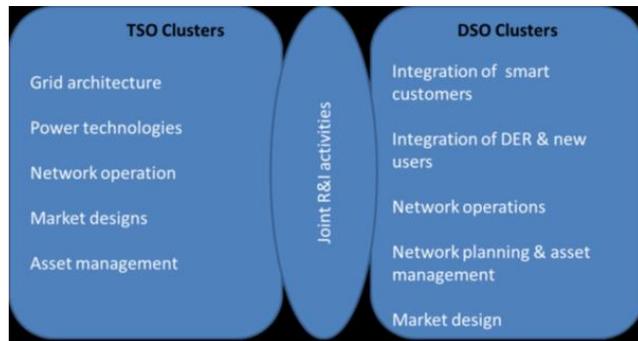
Lombardia, (Italy), Marseille (France), Baden-Württemberg (Germany), Berlin-Brandenburg (Germany), Bavaria (Germany),Slovenia, Estonia, Nordic Energy Research Alliance, United Kingdom

### *1.9 Available budget*

So far the committed countries and regions together have indicated budgets from national programs for joint calls of approximately 32 **Mio Euro**, available for calls in 2014/2015. This figure does not yet include the expected contributions from the participating industrial project partners which benefit immediately from the projects. All figures are indicative and non-binding at this point of time. But clearly, the indicated budget figure can still increase if one or the other of the interested countries joins the initiative or the financial engagement of some countries is increased during the proposal phase.

## 8 Scoping and prioritisation of topics

The ERA-Net Smart Grids Plus initiative is referring to the existing European R&D agendas in the field of smart grids- the EEGI Research and Innovation Roadmap 2013-2022, the ENTSO-E Research and Development Roadmap 2013-2022, the ENTSO-E Implementation Plan 2014-2016 and the Smart Grids Strategic Research Agenda 2035 by the European Technology Platform Smart Grids. An important basis for future activities and projects is provided by the gap analyses that has been done in the EEGI framework<sup>9 10</sup>



Clusters according to the Research and Innovation Roadmap 2013-2022

DOMAIN	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	TD1	TD2	TD3	TD4	TD5
Hardware																		
Software tools																		
System integration																		
Market des.																		
CBA																		
Grid services regulation																		
Stakeholder involvement																		
System reliability																		

Table 3 -Maturity level of transmission projects (source [1])

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
Hardware												
Software tools												
Technology integration												
Interoperab.&standard												
Market Design												
business scenario												
Custom. involvement												
privacy/data security												
Improved planning												

MEANING IN DISTRIBUTION ANALYSIS	MEANING IN TRANSMISSION AND TSO/DSO ANALYSIS	
Not relevant	Not relevant	
No needs identified	Ready to deploy at large scale	
Exchange of info is needed	Need demos to validate the maturity	
Objectives partially met; addressed by existing demos	Need moderate development (work with manufacturers)	
Obj. not met; included in few demos	Need more research (work with research institutes)	

T1...T13 – Transmission Clusters  
 TD 1..TD5 – Transmission/Distribution Clusters  
 D1. D12 – Distribution Clusters

... in the EEGI Implementation Plan

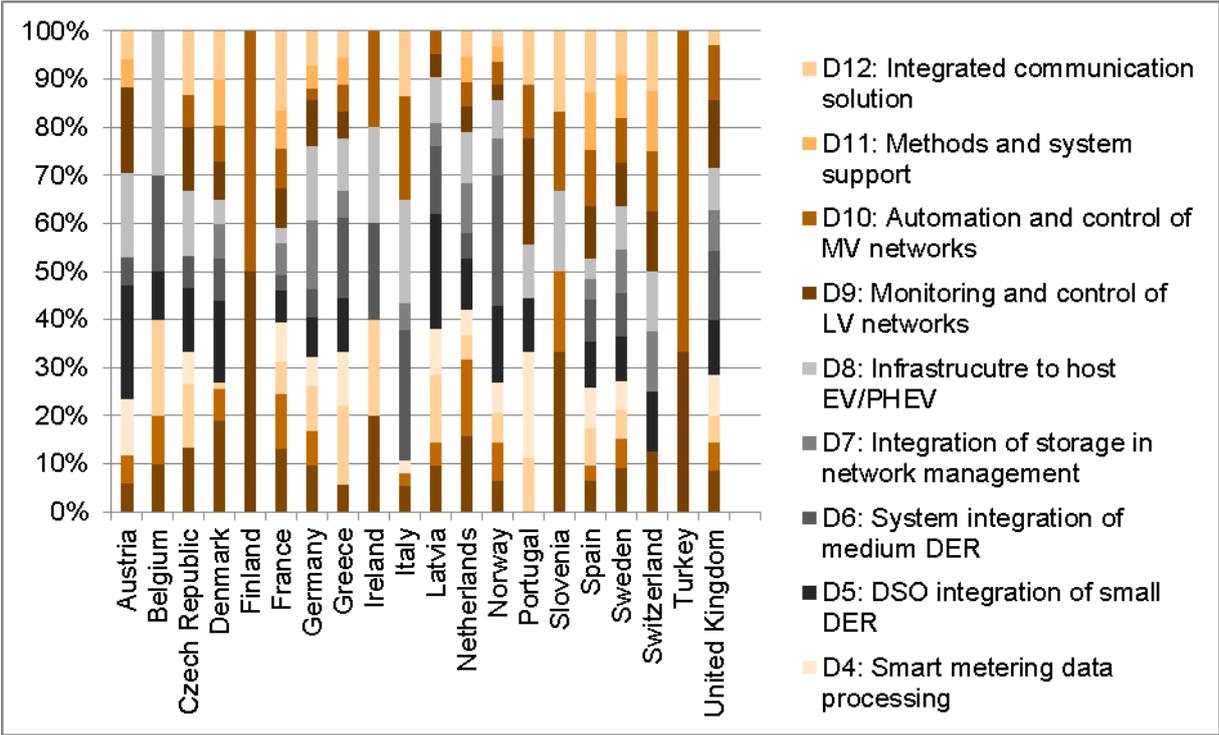
Maturity level of projects in the EEGI-clusters on Transmission, Distribution and Transmission/Distribution- source [4]

<sup>9</sup> I. Losa, M. de Nigris, T. Vu Van, C. Llanos Lebumberrì, M. Galvez, N. Biegala, I. Herold and W. Hribernik, "D1.1-Progress Report- Map of initiatives"[Online]. Available: <http://www.gridplus.eu/publications>

<sup>10</sup> Helfried Brunner, Michele de Nigris, Angel Díaz Gallo, Irmgard Herold, Wolfgang Hribernik, Ludwig Karg, Kari Koivuranta, Igor Papič, Joao Peças Lopes, Peter Verboven in cooperation with ERA-net Smart Grids and bmvit / Michael Hübner [http://www.smartgrids.eu/documents/EEGI/EEGI\\_Member\\_States\\_Initiative\\_-\\_Final\\_Report.pdf](http://www.smartgrids.eu/documents/EEGI/EEGI_Member_States_Initiative_-_Final_Report.pdf)

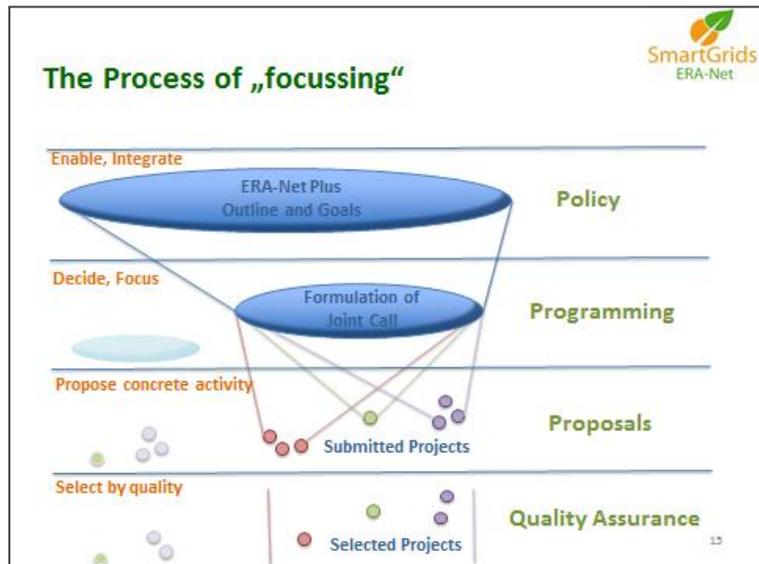
A mapping with respect to the demos in different member states shows, that EEGI relevant demos in different countries or regions have different approaches and focus. For example: AT: Integration of small DER, IT, NO: Integration of medium DER, ES: Smart Distribution Network, Integration of storage und EV infrastructure: DE, Active Demand Response: DM, DE, FR, Communication solutions: FR, ES, DM, etc.

This analysis might not be fully representative and is not a final picture but provides valuable insights, which will be further improved by the EEGI labelling process.



EEGI relevant projects mapped to functional projects per member state (Source: member states initiative on mapping and gap analyses)

This ERA-Net initiative basically intends a broad coverage of topics (e.g. transmission grid and distribution grid topics and the interfaces between them, topics related to better system integration, enhanced retail and consumer and regulatory questions) and types of projects, to be able to integrate as many member states, associated states and regions as possible, knowing that the potential thematic areas of cooperation are diverse by regions



and dependent on the respective approach and status of smart grids development. **The initiative is focussing on applied research leading to piloting and demonstration, including socio-economic and consumer involvement aspects (taking into account residential, commercial and industrial consumers).** Currently, it is not yet fully clear, how many of the participating programs in Europe will also be able to fund project at TRL (Technology Readiness Levels) higher than 7. The initiative intends to elaborate more on this issue in joint activities in the future.

### 1.10 Potential areas of cooperation

A first survey in the group of committed countries and regions during the ERA-Net smart grids plus preparation phase brought up 63 topics of interest that were clustered to 23 potential areas of cooperation<sup>11</sup>.

The main conclusions from this survey and the discussion are:

- There is potential for transnational collaboration in a number of topics (many topics have three or more interested countries/regions)
- Some countries/regions (with, however, minor contribution to call budgets) might have difficulties to fund higher TRL levels. Thus, it will be challenging for them to be involved in transnational projects, as they can only bring in research partners, covering parts of the projects with lower TRL-levels, while the general focus EC cofounded projects has to be on higher TRL levels, according to the co-funding rules
- The process of building up a sound common understanding of the topics and – based on that – a revision and improvement of the indications of areas of potential cooperation has not been

<sup>11</sup> Not all of the ERA-Net partners were able to provide the full detailed information.



		<i>Technology</i>	<i>Goods and Services</i>	<i>Stakeholders/Adoption</i>
<b>Demand Management</b>	<b>Side</b>	<i>Wide area monitoring and dynamic control</i>	Market tools	<i>Industrial processes, micro production</i>
<b>ICT Interfaces</b>		Data models, reference architecture	<i>Standardization and operability, market models,</i>	
<b>(autonomous) Management</b>	<b>Grid</b>	<i>Real-time monitoring/analysis, state estimation, distributed control systems, self-healing systems</i>		
<b>Communication and security</b>	<b>and</b>	<i>Smart meter data processing, reliable communication structures, cyber security, mathematical models highlighting potential threats</i>	<i>Regulatory framework (ownership of data etc...)</i>	<i>Privacy concerns</i>
<b>Smart Market</b>		Data models	<i>Business models, market design, regulatory framework</i>	
<b>Integration of RES/DER</b>	<b>of</b>	<i>Integration of RES/DER incl. Voltage- and reactive power control, DSO-tools for LV and MV grids</i>		
<b>Combined RES</b>			<i>New market places for integrated infrastructures</i>	<i>Integration with other infrastructures. Consumer involvement</i>
<b>Pan-European Network</b>			<i>Compatibility Issues, capacity markets, Local/national flexibility vs pan-European commodity market</i>	<i>New planning approaches,</i>
<b>Management of RES</b>		<i>RES management and optimization rural vs urban, predominant wind vs solar generation.</i>		
<b>Smart Grids and E-Mobility</b>		<i>Grid infrastructures to host EV, PHEV</i>		

### *1.11 Working on boundaries between research areas and Interfaces to the initiatives such as smart cities*

The field of stakeholders relevant for the development of smart grids is rather broad and diverse, asking for a cyclic exchange between “what is possible” (technology) and “what is desirable” (society). This requires a broad dialogue. Links with other EU or international innovation activities or roadmaps on other areas such as ICT, PV, Wind, smart cities, electro mobility, storage, behavioural sciences, etc. will be important in the future work and their establishment has been started on the level of the SET-plan initiatives. In the preparation phase for ERA-Net Smart Grids Plus especially the overlap/interface with the smart cities joint actions and e-mobility in the framework of ERA-Net transport have been explored. Furthermore the team has organised workshops on PV- and wind-integration during the preparation phase in the year 2013.

Main conclusions:

- Smart Grids for Smart Cities- storage and hypergrids:

*Following the outcomes of the workshop on “smart grids for smart cities”, a discussion paper on “Synergies between (smart) electricity grids and other energy grids and systems has been*

*developed. In this discussion paper the potential synergetic topics are explored, taking into account the results from the member states activities “Mapping and Gap Analysis of current European Smart Grids Projects” and “Energy Storage innovation in Europe- a mapping exercise<sup>12</sup>” as well as the matching with the European research agendas (SRA, EEGI implementation plan).*

The analyses shows the importance of cross-energy carrier aspects as well as the need for further research in the field of interactions between the different energy carriers for providing additional flexibility to the electricity system. In particular- with regards to the Horizon 2020 workprogramme 2014/2015- the topic of cross-energy carrier mid-scale storage projects (from 5 to 50 MW) was identified. According to that a promising area would be Power-To-Heat in particular, if the practical experiences gained in Scandinavia could be transferred to Central and Western Europe.

**According to the discussion in the ERA-net consortium, ERA-Net Smart Grids Plus shall cover topics on synergies with other energy carriers, as far as the focus remains on creating flexibility for the electricity grids.** It is important to mention that this is complementary to the last working paper of the Smart Cities Member States Initiative regarding future transnational R&D calls, e.g. in the framework of a Smart Cities ERA-Net Plus. A clear delineation will be worked out for the proposal, in close coordination with the ERA-Net Smart Cities initiative

- Wind integration and transmission grids

*Following the outcome of the workshop on “Integration of RES – Focus wind systems”, a scope-of-call for an idea on “European cooperation projects between researchers, wind TSO’s, DSO’s, manufacturers and owners” was raised. The aim would be to formulate projects towards large system simulations.*

The European perspective is essential as more renewable energy production is introduced to the system. To meet the European goals (20-20-20) for 2020 studies at European level would be desirable. Grid codes should be harmonized on a European level. Currently, larger transnational projects are not dealing with connecting data between regions and nations.

The aim would be to build a database for large simulation systems. The database would allow studies directed both towards technical challenges such as product innovation (studying ancillary services) as well as real time market design on a transnational level. The database could be built by coupling bleeding points from several nations. The bleeding point could be located at e.g. universities and other official institutes to avoid the inclusion of a broader range of end consumers at the current stage. The TRL of such projects would be in the range of 4-7 depending on partner execution level.

- Smart Grids for Electromobility:

---

<sup>12</sup> Source: Energy Storage Innovation in Europe. A mapping exercise.; see:  
<http://www.gridplus.eu/Documents/events/energy%20storage/Energy%20Storage%20report.pdf>

*Based on the outcomes of the workshop on Smart Grids for Electromobility together with ERA-Net Transport, a discussion paper is under development. The current conclusions are as follows:*

Some areas of common interest have been identified like Smart Market, User involvement, Communication and Security, Forecasting, Demand Side Management. Furthermore the exchange of knowledge on the basis of existing roadmaps on transport and smart grids in the different countries was seen as a possible way forward to bring the two domains with their partly overlapping communities closer to each other. A mapping of already existing projects would be an important basis for the targeted further development.

The conclusions is so far, that there is a sound potential for collaborative, transnational projects as well in ERA-Net Transport as in ERA-Net Smart Grids plus. The exchange between the networks therefore should be kept alive.

## 9 Intended Joint Call in 2014/2015

**First Call, 2014 (call budget approx. 32 Mio Euro from national/regional programs): joint transnational call for proposals with EU co-funding, according to EC Workprogramme 2014/15 Horizon 2020, LCE 18 – Supporting Joint Actions on demonstration and validation of innovative energy solutions (ERA-Net Cofund),** to fund multinational innovative research initiatives to implement and validate smart grid solutions to the above described challenges, that have already reached TRL 5-6 and bringing them to TRL 6-7. The **core projects** of this call are expected to contribute to field demonstration of system integration, up-scaling and replication, including supporting research. Demonstration projects and related R&D are expected to respond to the priorities identified in the above mentioned coordinated European R&D agendas and to the gap analysis. The utilisation of regional demonstration projects and the realisation of deep knowledge sharing between them shall be integral part of the projects. Non-technical aspects shall be included according to the proposed three-level integrated research model. The involvement of appropriate professions and research expertise is expected. Additionally, **cross cutting meta-analysis and education projects** are foreseen. These projects are meant to support systematic knowledge sharing and meta-analysis on certain crosscutting issues, building on already existing national and regional projects or transnational projects. Furthermore the development of concepts and activities for practice-oriented education and training building on the opening up of demonstration facilities is encouraged.

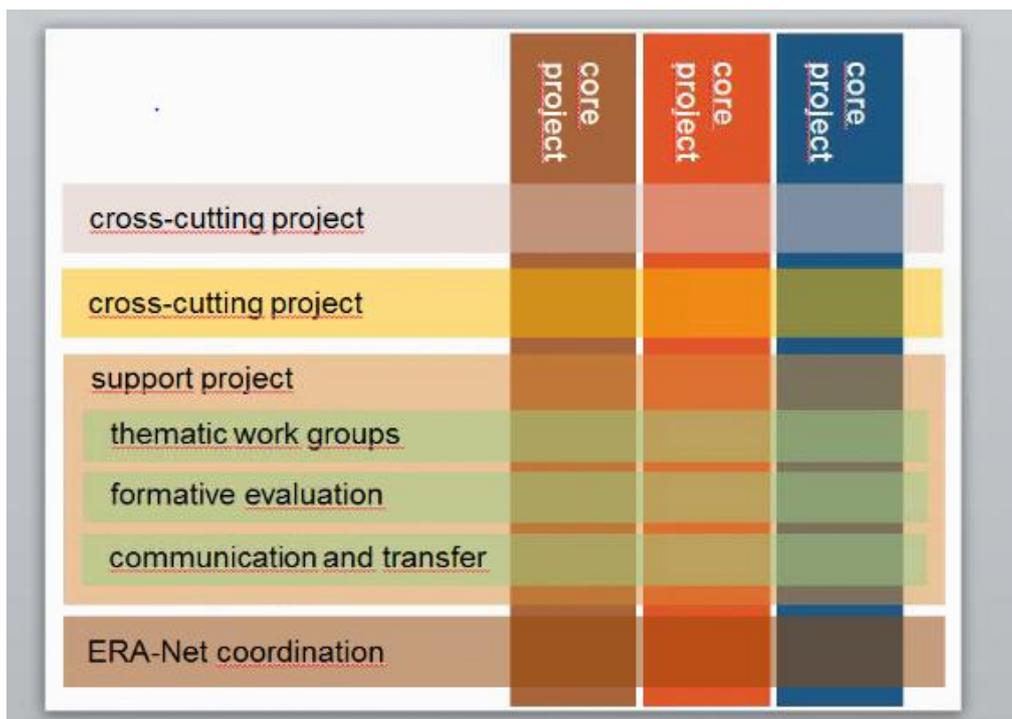
To ensure systematic knowledge sharing, meta-analysis and preparation of findings for the EEGI Team, the **inclusion of a knowledge sharing work package in the projects is mandatory**. It is meant to provide the basis for cooperation with horizontal activities, especially the support project.

## 10 Vertical and horizontal activities

By definition the ERA-Net projects follow a multilevel approach. They have to tackle the three vertical levels technology, marketplace and stakeholder/adoption. Expert teams in multiple countries will set out to select specific use cases and frameworks to develop and demonstrate specific approaches to smart grid solutions. Splitting topics and tackling them in vertical projects can guarantee effective and efficient transnational work. However, consistent smart grid development, true innovation and finally replication and scaling up of solutions will only happen if project groups meet to exchange ideas and experiences and to exchange crosscutting topics.

SmartGrids ERA-Net foresees 3 types of horizontal activities:

- The ERA-Net Management, managing the cooperation of the consortium of programs
- A Support Project, providing the basis for strategic joint programming by monitoring of project progress and results, organising active networking and cooperation between the transnational ERA-Net projects and on this basis providing strategic knowledge for the program owners and program managers as well as for the exchange on the EEGI level by building the link to the GRID+ project.
- Cross-Cutting Projects (as mentioned above) to tackle specific challenges that are relevant for multiple (vertical) core projects (e.g. big data management, transnational market design, etc.)

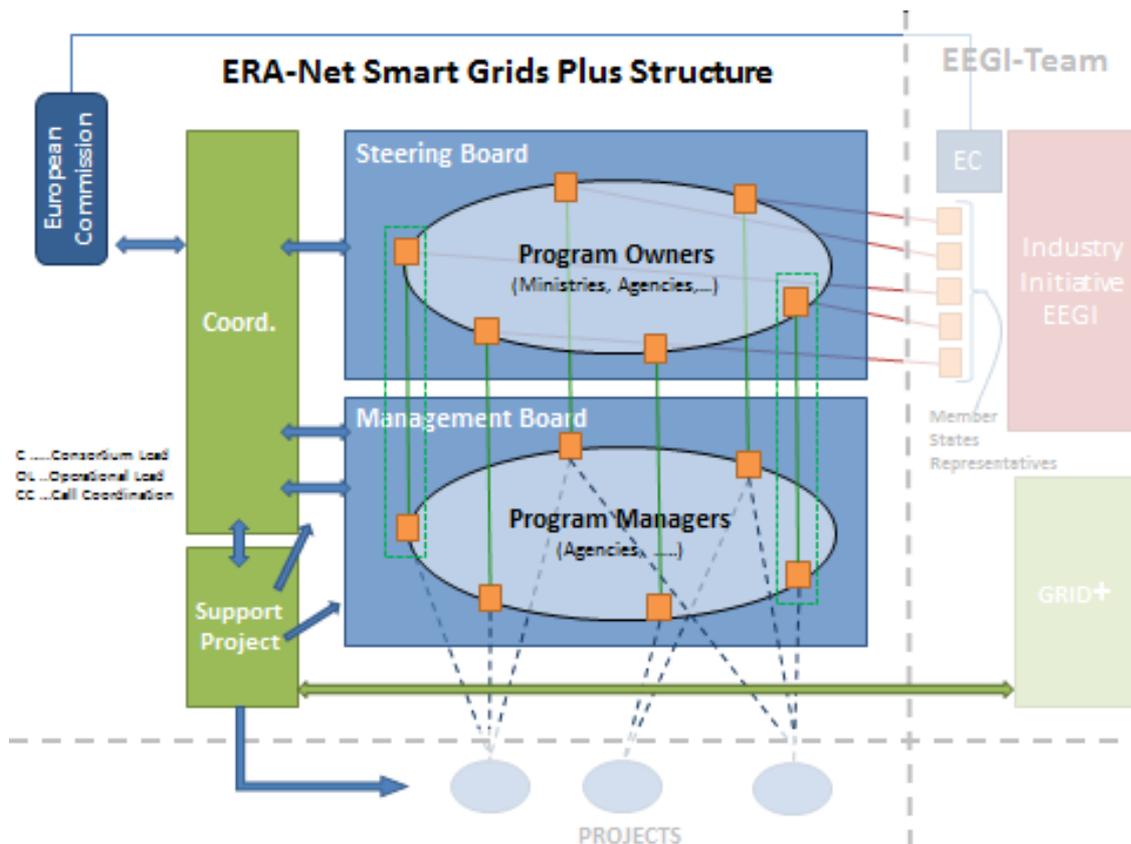


## 11 The Structure and organisation of the Joint Programming Network ERA-Net Smart Grids Plus

The proposed structure for the ERA-Net is intending to serve the following principles

- In line with Horizon 2020 co-fund rules
- Enabling a continuous program cooperation beyond a single call
- Ensuring feasible capacity for the coordination and support of the network
- Joint programming- going beyond just financing joint projects, generating strategic knowledge for national/regional program owners and program managers
- facilitating contribution of the ERA-Net on the EEGI level

### 1.12 Cooperation Structure



The core activity of the cooperation will be the promotion of a joint call: It will be implemented by the national/regional program managers (agencies) - in the picture referred to as “management board”. This cooperation will be supported by the ERA-Net coordination (“call coordination”). The

main communication with the applicants and later the transnational projects will have to be done by the national/regional agencies, according to the different national funding rules and requirements. Beyond that, the program owners shall meet in a steering board approx. once a year to discuss the further development of the network (next calls, other joint activities, ...) on the basis of the inputs (strategic knowledge) from the support project. These meetings will be facilitated by the ERA-Net coordination.

### ***1.13 Coordination***

The ERA-Net coordination will support the cooperation of the consortium, network. It will be responsible for the transfer of the EC top-up money into the consortium, national/regional agencies, for contractual and consortium agreement issues, support of the management board and for the call coordination (operative services for coordination of national/regional agencies, project selection and evaluation together with the EC, etc). The ERA-net coordination will – together with the support project- provide strategic and monitoring knowledge for the network, including quality management with respect to the goals of ERA-Net Smart Grids Plus (Cofund). Furthermore, the coordination will provide the communication to new interested ERA-Net partner countries / regions as well as to potential applicants, providing general information and guiding them the way to the national access points (agencies,..).

### ***1.14 Support Project***

The multilevel approach to tackle the challenges of future Smart Grid development and deployment projects is new and poses new challenges to the coordination and evaluation of the ERA-Net plus programme. To that end, a series of measures shall be implemented that support the programme coordination activities and the programme office. Such measures shall be implemented in the framework of a specific Support Project.

The Support Project provides for

- continuous networking of the transnational ERA-Net Projects in cross-cutting work groups (e.g. with topics interoperability or legal frameworks)
- evaluation of progress and results of the transnational ERA-Net projects
- consistent and effective communication and transfer activities.

Tasks of the Support Project:

*(The tasks of the support project will be further developed by the support project team on the basis of a discussion document (Ludwig Karg, Rainer Bacher). The following ideas give a summary of the current state of discussion).*

The SmartGrids ERA-Net project will use proven methods. But it will add innovation in terms of ICT intelligence, new business models and stakeholder involvement. Activities in the support

project will provide optimum integration between otherwise more or less distinct, separate projects and disciplines by

- horizontally linking experts of all disciplines in the SmartGrids ERA-Net development and deployment projects (intra-link)
- evaluate the SmartGrids ERA-Net activities against best practices, international trends and standards
- disseminate and transfer project results and thus foster replication (inter-link)

**Thematic work groups.** The support project will setup a cooperation structure for the entire SmartGrids ERA-Net transnational projects and all its partners in the prototype, pilot and demonstration regions, cities and beyond. Cross-cutting international work groups will be implemented to discuss solution designs on a regular basis, link them to national and international requirements and derive necessary adaptations in the approaches. Topics to be treated are for example: Interoperability and standardisation, system architecture and implementation modelling, legal and regulatory frameworks, consumer involvement (considering residential, commercial and industrial consumers), market development. Work groups shall meet face-to-face approximately twice a year and in virtual meetings as needed. Experts from other projects, academia as well as national and international platforms will be invited as permanent or occasional members of the work groups.

**Formative evaluation.** The overall aim of the evaluation is to ensure that SmartGrids ERA-Net market models and technological concepts and functionality are in line with interests, objectives and constraints of all smart grid stakeholders (including consumers) and that these are compatible with general advancements in the Smart Grid development throughout Europe. The activities follow the principle of formative evaluation. In that sense the support project coordinates the content related activities of the transnational ERA-Net Projects and guarantees the usability of the project results for later replication and scaling-up. An initial investigation will identify and describe all standards and standardization processes relevant to the design and implementation of SmartGrids ERA-Net stimulated solutions. This effort can build on existing project results for example from FP7 projects GRID+ or FINSY.

**Communication and transfer.** The support project further aim to minimize the risk that that SmartGrids ERA-Net prototype, pilot or demonstrator projects (even those recognised as performing well) remain as isolated examples of action without achieving wider adoption locally, nationally or at the European and even global level. The support project is designed to overcome the significant barriers to replication of innovative pilots through targeted actions at different geographical levels, and actions designed to influence specific types of stakeholder. Using the experiences from the demonstrations and the results of surveys a scalability investigation will show the potentials for a rollout of SmartGrids ERA-Net project solutions.

### 1.15 Financial Model of the network

The financial model design of the network takes into account the fact that the coordination and management cost have mainly to be covered by the national programs. According to the ERA-Net co-fund rules in Horizon 2020 the EC is providing top-up funding to the national/regional funding to the transnational projects (33% of the total call budget, calculated on the basis of the national funding provided to transnational projects). Additionally the EC provides “union cost” for coordination (11.962,50 Euro per year, per partner). The budget model for ERA-Net Smart Grids Plus foresees that the union costs are directly handed over to the national/regional program managers. The coordination and the support project shall be financed by using a minor part of the EC top-up money.

#### ERA-Net Smart Grids Plus Budget Model

