Joint Call 2016

Smart Energy Systems ERA-Net

Strategies and operator tools for grid restoration with massive renewable energy sources

Cluster

Resilience

Topics

supply security, restoration strategies, control center tools, RES utilisation, smart ancillary service

Results

Technology **M**arket **A**doption

- **T** Modelling strategy for artificial LV- and MV-grid
- **T** Residual load models for restoration process studies
- **T** Supporting tools for system operators for grid restoration in grids with a high share of RES
- **M** Specification and implementation guidelines for restoration tools
- **M** Strategies for future grid restoration
- **A** Overview on grid restoration challenges considering high shares of renewables

Runtime 2017/2020

TRL 2 — 6

Smart Energy Systems ERA-Net

www.t1p.de/4kzt

NETZOÖ
Ein Unternehmen der Energie AG

TU WIEN

Kärnten Netz
Ein Unternehmen der Kelag

SIEMENS

TECHNISCHE UNIVERSITÄT KAISERSLAUTERN

Partners for Further Development

- Transmission system operators
- Distribution system operators
- Control center manufacturers

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

FI SMEP
FIWARE for Smart Energy Platform

Joint Call 2016

Smart Energy Systems ERA-Net

FIWARE for Smart Energy Platform

Cluster

Grid Management

Topics

smart grids, automation, smart energy, cloud platform

Results

Technology **M**arket **A**doption

- **T** Design and implementation of open source automation services for MVDC networks
- **T** Platform with distributed architecture and semantics for energy efficiency, performance and user-based adaptation of energy systems
- **T** District Heating Energy Management (CESO)
- **T** ERO app for residents' energy usage
- **M** Innovative SOA platform as open source for rapid implementation of IoT solutions and newly built apps
- **M** Test sites for complex testing of platforms
- **A** Use case evaluation with standards like SAREF and other ontologies
- **A** Methods for engaging customers to test flexibility
- **A** Supporting new business models for e.g. customer involvement

Runtime 2017–2020

TRL 3 — 7

FI SMEP
FIWARE for Smart Energy Platform

Smart Energy Systems ERA-Net

www.fismep.de

Malmö stad

CHALMERS UNIVERSITY OF TECHNOLOGY

e·on

EnergoBit

MicroDERLab

FORSCHUNGSCAMPUS FLEXIBLE ELEKTRISCHE NETZE

E.ON Energy Research Center | RWTH AACHEN UNIVERSITY

Partners for Further Development

- Open source technology providers
- Distribution system operators
- RDI projects
- Developers of energy management systems
- Energy providers
- Municipalities
- Housing associations

HORIZON 2020

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

LarGo!
Large-Scale Smart Grid Application Roll-Out

Joint Call 2016

Smart Energy Systems ERA-Net

Large-Scale Smart Grid Application Roll-Out

Cluster

Grid Management

Topics

resilience, smart grid applications, security, software deployment

Results

Technology Market Adoption

- **T** Knowledge-based deployment process for smart grid applications
- **T** Method for identification of security and safety critical issues
- **T** Resilient optimal rollout schedules through rollout analysis and validation
- **T** Evidential networks for the identification of root causes of rollout failures
- **M** Software maintenance for field devices as a service
- **A** Guidelines and best practices for seamless, safe and secure application deployment for grid and customer
- **A** Templates for communication and workshops with stakeholders

Runtime 2017–2020

TRL 5 — 6

LarGo!
Large-Scale Smart Grid Application Roll-Out

Smart Energy Systems ERA-Net

www.largo-project.eu

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

OFFIS

Fraunhofer ISE

SIEMENS

KTH VETENSKAP OCH KONST

WIENER NETZE

Partners for Further Development

- Utility operators
- Energy management operators
- System integrators
- Scientific community
- Communication/ICT operators

HORIZON 2020

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

M2M-GRID

Joint Call 2016

Smart Energy Systems ERA-Net

From micro to Mega-GRID: Interactions of micro-grids in active distribution networks

Cluster

Local Energy Communities and Microgrids

Topics

micro-grids, interface, storage, demand response, distribution system operators, aggregators, renewable energy sources

Results **T**echnology **M**arket **A**doption

- **T** Optimization tool for energy scheduling of multiple grid-connected micro-grids
- **T** ICT interfaces for physical and commercial micro-grids validated
- **T** Algorithms to control and exchange information to enable load sharing among micro-grids
- **M** Demonstrated, coordinated optimal operation of two battery energy storage-based MG-EMS
- **M** Assessment of the impact of market design aspects on the overall market efficiency
- **A** Procurement strategies and quantification tools for flexibility for network issues

Runtime 2017–2020

TRL 5 — 6

M2M-GRID

Smart Energy Systems ERA-Net

www.m2m-grid.eu

Partners for Further Development

- DSOs facing capacity issues
- Developers of software for the management (of DSOs and EMS) of micro-grids
- Testbed for local energy communities
- Designers of products and services for local grids
- Research community around incentives for loss reduction and optimal operation
- Aggregators, planners and operators of local microgrids

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

ERA-Net SmartLoad

Joint Call 2016

Smart Energy Systems ERA-Net

Smart Meter Data Analytics for Enhanced Energy Efficiency in the Residential Sector

Cluster

Demand Response and Consumer Activation

Topics

data analytics, smart meter, machine learning, forecasting

Results

Technology **M**arket **A**doption

- **T** Machine learning prediction methods for household efficiency characteristics and consumer behaviour
- **T** Algorithms to identify electricity base load of households
- **M** Targeting tool to identify customers likely to switch to an eco-tariff
- **M** Prospecting tool to identify customers willing to invest in sustainable energy systems for generation and storage
- **A** Customer segments with interest to adopt sustainable energy products
- **A** Design principles for prediction systems to individualize offers and consultancies for end-customers

Runtime 2017–2020

TRL 4 — 6

ERA-Net SmartLoad

Smart Energy Systems ERA-Net

www.t1p.de/wnnx

CKW.

BEN Energy

UNIVERSITY OF BAMBERG
OTTO-FRIEDRICH-UNIVERSITÄT BAMBERG

Partners for Further Development

- Energy utilities
- Electricity retailers
- Vendors of renewable energy systems like heat pumps or photovoltaic installation
- Research communities interested in energy feedback and dissemination of sustainable products
- Data analytics/artificial intelligence vendors

HORIZON 2020

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

NEMOGrid

Joint Call 2016

Smart Energy Systems ERA-Net

New Energy Business Models in the Distribution Grid

Cluster

Demand Response and Consumer Activation

Topics

business models, participation, prosumer, consumer, peer-to-peer market, blockchain

Results

Technology **M**arket **A**doption

- **T** Python package for short-term forecasting tool
- **T** Simulation environment with grid simulation tools for agent-based modelling of interaction between end-users and grid
- **T** Ethereum smart contracts for energy markets
- **M** Mechanisms for the right definition of the electricity market price
- **M** Criteria for the evaluation of the economic profitability of energy communities
- **M** Design for a mutual win-win market, with a benefit and cost pooling system
- **A** Consumer/prosumer requirements for different business models and market designs
- **A** User-centered approaches enhancing social acceptance and user collaboration

Runtime 2017–2020

TRL 3 — 6

NEMOGrid

Smart Energy Systems ERA-Net

www.nemogrid.eu

Partners for Further Development

- Local municipalities in cooperation with their citizens
- Communities of pro- and consumers
- Distribution grid operators and related business administrators interested in business models for distributed energy resource (DER) integration
- Researchers interested in user-centered design of self-consumption communities
- Researchers interested in acceptance and gamification concepts for DER management

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

Joint Call 2016

Smart Energy Systems ERA-Net

Efficient Demand and Supply Matching by Incentivizing End-Users in Buildings

Cluster

Demand Response and Consumer Activation

Topics

smart grids, flexible demand-response, user acceptability, control systems, intelligent buildings, living labs

Results

Technology **M**arket **A**doption

- **T** User-proof building energy management systems
- **T** Scalable, automated ICT platform for supply-demand matching
- **T** Automated control designs based on algorithms for innovative, integrated future demand-supply management
- **M** Models for local energy markets
- **M** Management schemes for energy savings
- **M** Analysis of key incentives for promoting demand-supply matching
- **A** Integration of social aspects in models
- **A** User control preferences
- **A** Motive-based incentives and interventions

Runtime 2017–2020

TRL 2 — 7

Smart Energy Systems ERA-Net

www.matchit.info

university of groningen

METRY

ELLEVIO

VETENSKAP OCH KONST

KUNGL TEKNISKA HÖGSKOLAN

Partners for Further Development

- Network operators
- Distribution and micro-grid operators
- Developers of energy management systems
- Energy service companies
- Energy companies aiming to provide energy feedback and automated control solutions
- Owners and managers of buildings
- (Local) governments and policy makers

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

E-REGIO

Joint Call 2016

Smart Energy Systems ERA-Net

Smart Community Markets

Cluster

Demand Response and Consumer Activation

Topics

local markets, end-user engagement, digitalization, business models

Results

Technology **M**arket **A**doption

- **T** ICT platform for a decentralized, local energy market with neighbourhood battery as market center supported by software agents
- **T** System for providing flexibility to TSOs based on aggregating residential offers and smart charging
- **T** Monitoring, forecast and optimization tools for the provision of flexibility
- **M** Validated business model for stacked flexibility services for the frequency market
- **M** Flexibility services for households
- **A** Approaches for negotiating with local authorities
- **A** Guidelines for local market designs including best practice for implementation

Runtime 2017–2020

TRL 5 — 7

E-REGIO

Smart Energy Systems ERA-Net

www.eregioproject.com

SMART INNOVATION NORWAY

eSmart SYSTEMS

Skagerak Energi

TU/e Technische Universiteit Eindhoven University of Technology

eit InnoEnergy Knowledge Innovation Community

Partners for Further Development

- Technology suppliers for battery storage, ICT and hybrid technologies
- DSOs and TSOs of distributed grids with high renewables share and frequency market
- Building owners aiming to improve the building environment
- Research and development community of flexibility market, smart energy and EVs
- Experts with AI technology in energy fields

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.

EMBS

Joint Call 2016

Smart Energy Systems ERA-Net

Energy Management Building Set

Cluster

Demand Response and Consumer Activation

Topics

demand response, aggregator, energy cooperatives

Results

Technology Market Adoption

- **T** ICT architecture for an heterogeneous multi-vendor system
- **T** Energy monitoring and controlling architecture
- **T** Forecasting tool to optimize the provision of thermal and electric energy
- **T** Automated control application for local optimization based on different data sets (price, weather, consumption)
- **M** Strategies for optimizing KWKG benefits
- **M** Sensitivity analysis for CO_2 pricing, e.g.: Energy Sources Act
- **A** Feedback from EMBS prototype installation at partner side
- **A** Feedback from EMBS backend installation (security, firewall, backup)

Runtime 2017–2020

TRL 5 — 7

EMBS

Smart Energy Systems ERA-Net

www.srfg.at/embs

s&t

ove
Contracting mit Energie

Fraunhofer IEE

Partners for Further Development

- Model developers
- Modelers of design tools
- Integration architects
- Energy communities
- Energy contractors
- Housing associations
- Power system integrators
- Local energy communities

HORIZON 2020

ERA-Net SES receives funding from the EU H2020 Research & Innovation Programme.