Digitisation of the electricity system and Customer participation

Cyber-physical security
for low-voltage Grids
SALVAGE

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About the project

Project name: Cyber-physical security for low-voltage Grids

Acronym of project: SALVAGE
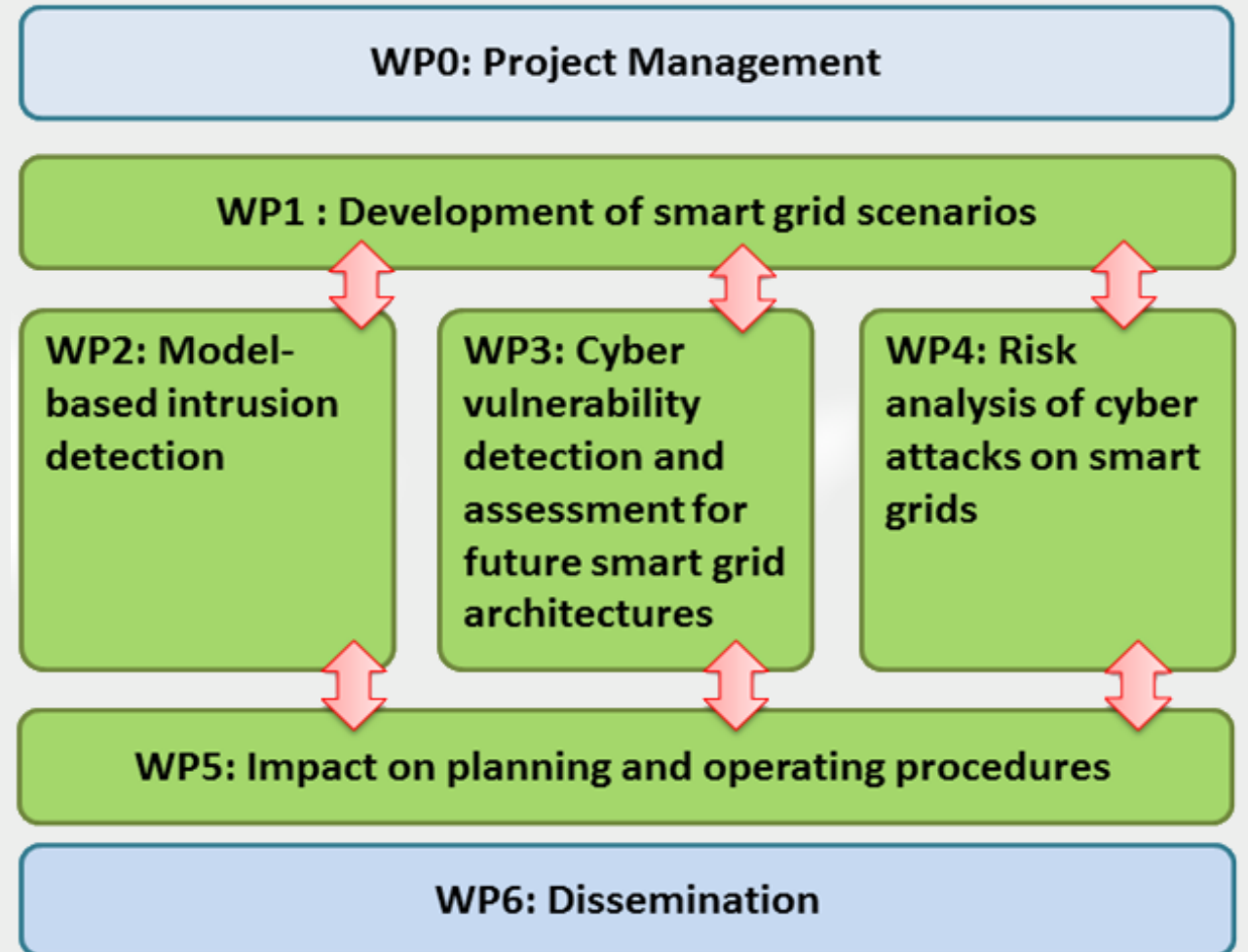
Funding scheme: SmartGrids ERA-Net

Consortium:
1 - Technical University of Denmark (DTU) - **Denmark**
2 - Kungliga Tekniska Högskolan (KTH) - **Sweden**
3 - Wroclaw University of Science and Technology (WUST) - **Poland**
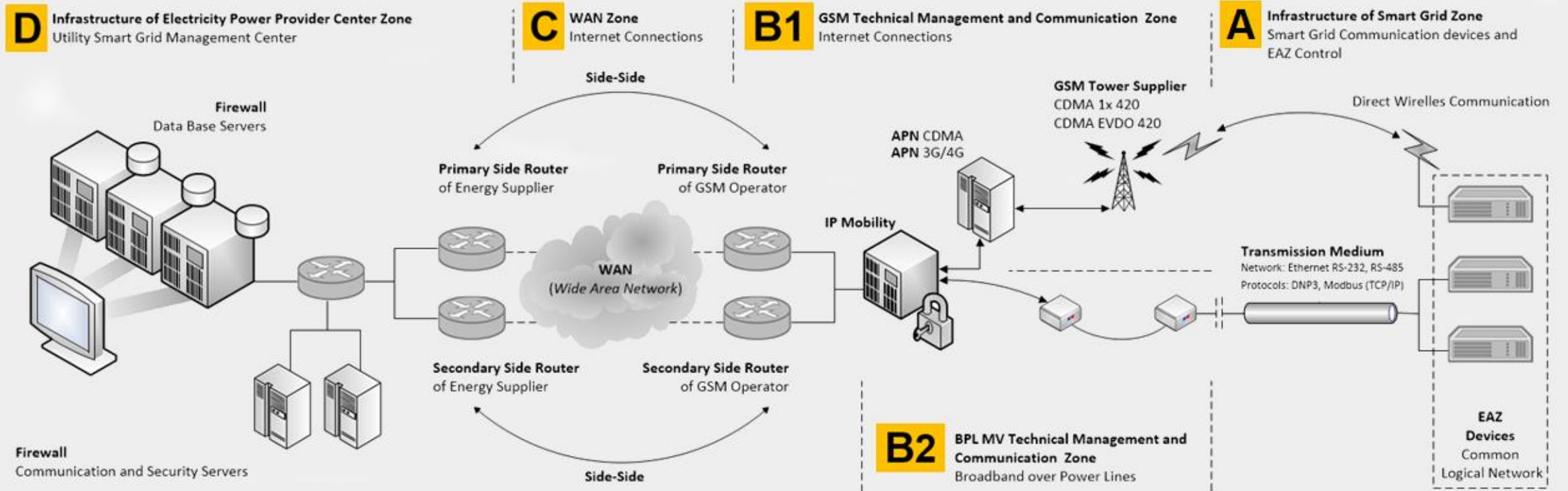
Duration: 3 years (April 2014 - March 2017)

Budget: 911 289 Euro

Project page: http://www.salvage-project.com

About consortium

Our project area

Sections:

A - Infrastructure of Smart Grid Zone - *Smart Grid Communication devices and Smart Meter Network*

B - GSM Technical Management and Communication Zone - *Internet Connections*

C - WAN Zone - *Internet Connections*

D - Infrastructure of Electricity Power Provider Center Zone - *Utility Smart Grid Management Center*

Our directions

PUBLICATIONS (35) / REPORTS (15)

managing and designing
(recommendation)

technology and methodology
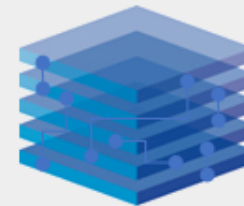(tools & models)

security policy for LV & HAN

cybersecurity in SCADA, AMI, SM
communication

energy theft techniques

anomaly detection
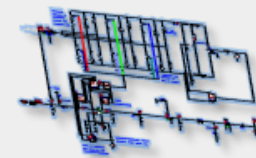
technical sollution against atacks
IPS/IDS, CySeMoL

CySeMoL*

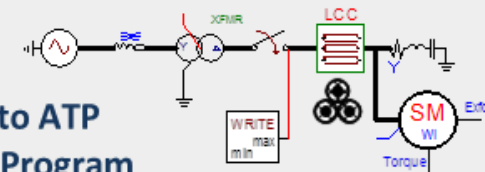Enterprise Architecture
Analysis Tool
Industrial Information and Control Systems
Object Modeler

*developed by KTH

ATP Draw
The graphical preprocessor to ATP
Electromagnetic Transients Program

Results:

Key effects:

1. new programming tools for cybersecurity analysis,

2. reference model of electric power subnetwork,

3. model of intrusion detection system engine for smart grid,

4. model of reconfiguration of network after failure (simullation study),

5. analysis of weaknesses and vulnerabilities to cyber attacks (technical reports),

6. technical sollutions and recommendations for distributors and managemnents of SG.

Parallel & future work

Modeling:

1. more advanced reference models (e.g., SCADA systems, substation automation systems, distributed energy resources, smart home, electric vehicles…),

2. modeling, automated analysis of metamodel for cyber security evaluation,

3. analysis of the cyber vulnerability of smart grid environments,

4. research on the impact analysis of cyber-attacks on power system,

5. development of model based intrusion detection for smart grid components.

Implementations

Our services (Salvage Project):

1. Review of strengths and weaknesses of Smart Grid (SG) ICT architecture with identification,
2. Security Policy for Smart Grid and Smart Metering (SM),
3. Recommendations for management of future Energy Power Sector,
4. Classification of hazards as a result of cyber-attacks,
5. Architecture of Cybersecurity models (LV/MV),
6. Review of modern telecommunication systems and solutions dedicated to SG,
7. Cyber-physical security for Home Area Network,
8. Digital solution against energy theft techniques,
9. Most frequent mistakes in ICT implementation,
10. Solution and recommendation to SG operators (Cybersecurity),
11. Cybersecurity models for ICT Smart Grid (CySeMoL – vulnerability simulation),
12. Power network models (ATP Draw – Reconfiguration in case of failure occurrence),
13. Present regulations and future SG Roadmap.

Thank you for your attention

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SmartGrids
ERA-Net