Energy Management of Microgrids in a Smart City Environment

Meeting: **M2M Forum 2013**

Date: **May 14th 2013**

Presenter:

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Project Coordinator of EU GreenCom project, ISMB

GreenCom

Istituto Superiore Mario Boella – ISMB

- **ISMB** is an Operating Boby of Compagnia di San Paolo and it was founded in 2000 with Politecnico di Torino. The Institute is a **no profit Research & Innovation center** operating in the **ICT** domain.

To create **value-driven** and **socially relevant** technological & process innovations in close collaboration with industry and institutions.

60 SECONDS

TO PRESENT ISMB

125
RESEARCHERS & STAFF

ACTIVE PROJECTS
IN 2012

20 EU FUNDED (FP7)

40 INDUSTRIAL R&D

34 NATIONAL & REGIONAL

7 RESEARCH AREAS

3 STRATEGIC PROGRAMS

PUBLICATIONS

792 TOTAL

131 IN 2012

WORKFORCE COMPOSITION

80% MASTER DEGREE
70% ENGINEERS
28% Ph.D

OVERALL TURNOVER

11 M€

5 M€ CdSP FUNDING
6 M€ COMPETITIVE BUDGET

Some National and International Fora where ISMB is Involved

Energy@home is a no-profit association registered under the Italian laws with the purpose of developing & promoting technologies and services for **home energy efficiency** based upon device to device communication.

Founding Members

Electrolux

Enel
Distribuzione

INDESIT company

TELECOM ITALIA

Ordinary Members

EDISON

ST life.augmented

vodafone

Aggregate Members

FlexGrid

MAC srl
Developing the Unexpected

Gemino

intecs
the Brainware company

ISMB
Istituto Superiore Mario Boella

power-one®
Renewable Energy Solutions

Flyby
applied research solutions

eurotherm®
radiant comfort systems

freescale

IPSO Alliance – Enabling the Internet of Things

About IPSO:

> The IPSO Alliance is the leading organization promoting the use of Internet Protocol (IP) for smart object communications for use in energy, consumer, healthcare and industrial applications.

Vision:

- Providing the foundation for a network that will allow any sensor-enabled physical object to communicate to another as individuals do over the Internet.

Value Proposition:

- Create awareness of available and developing technology with IP for Smart Objects
- Coordinate marketing efforts to complement the standard work of the IETF
- Support, organize and market interoperability events

Promoters

Atmel · Bii 天地互连 · BOSCH Invented for life · CISCO · COOPER Power Systems · Duke Energy

dust networks · eDF · ELECTROTEST Sweden AB · ember · ERICSSON · freescale semiconductor · FUJITSU

greenWAVE REALITY · GRUNDFOS · ip infusion An ACCESS Company · Itron · Landis|Gyr+ · mocana

NIVIS · NXP · ORACLE · Proto6 · RENESAS · sensinode

SIGMA DESIGNS · SILVERSPRING NETWORKS · ST · SWEDISH INSTITUTE OF COMPUTER SCIENCE SICS · TOSHIBA Leading Innovation

TRIDIUM Connecting minds and machines · TURKCELL TEKNOLOJI

Contributors:
- Aidon Oy
- Concept Reply
- Connode
- Cubic GTS
- Econocom

- Eliko
- Elster
- Emerson
- EPRI
- Google
- Inria

- **ISMB**
- Lulea Univ of Tech
- MAXFOR
- Maxim Integrated Products
- Millennial Net

- Nokia
- Sensus
- Smart Dutch
- Synapse Wireless
- Tampere Univ of Tech
- Texas Instruments
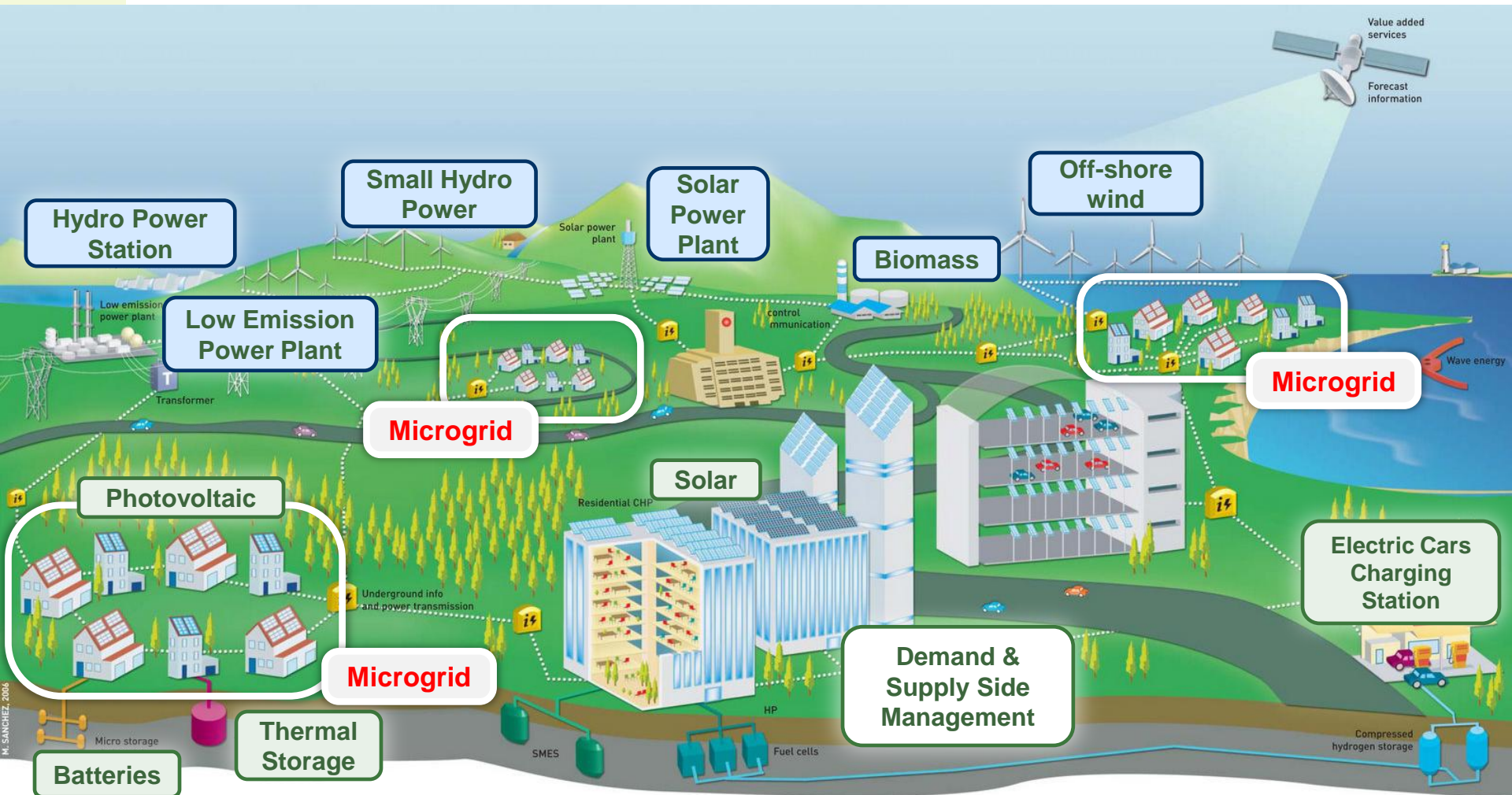
- TMC
- UTRC-I
- Watteco
- WISENET

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FP7 STReP research project funded by the EU and coordinated by ISMB

MyGrid; Energy Efficient and Interoperable Smart Energy Systems for Local Communities

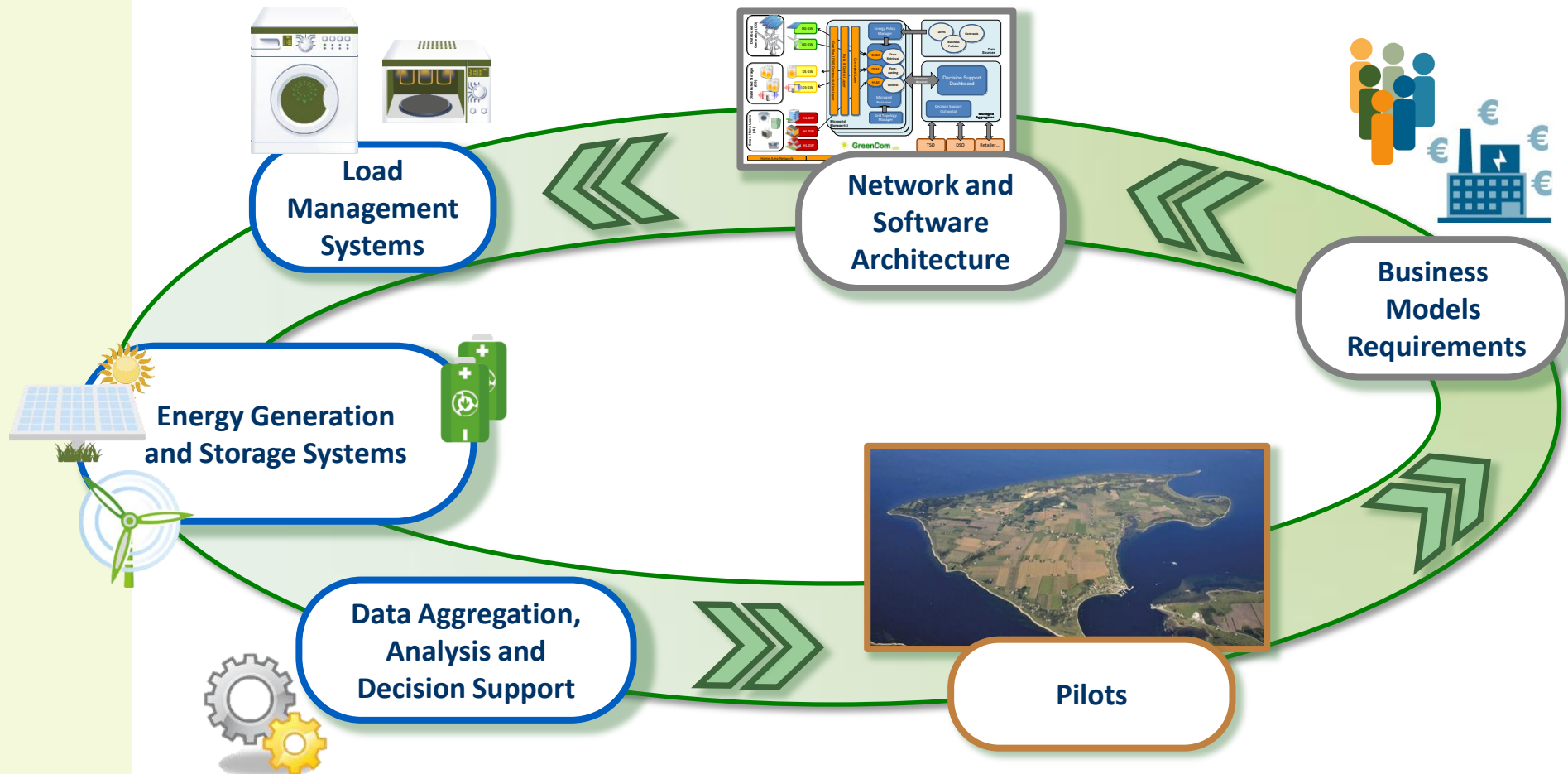7 partners / 5 Countries / 36 months / 390 PMs - 3.459 M€
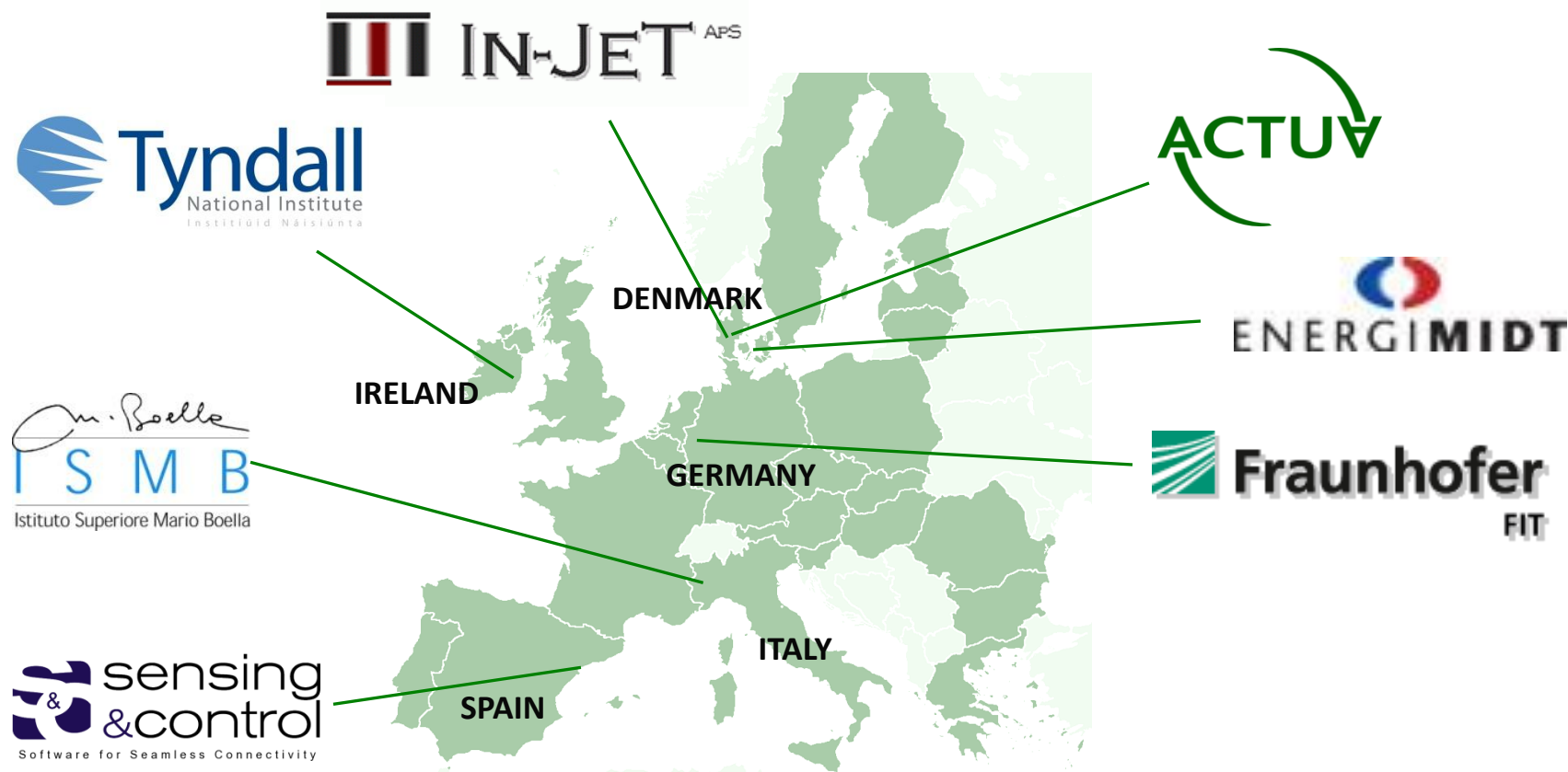
Smart Grid Scenario

Business Model Driven Iterative Process

Load Management Systems

Network and Software Architecture

Business Models Requirements

Energy Generation and Storage Systems

Data Aggregation, Analysis and Decision Support

Pilots

GreenCom

Novel sustainable Business Models – 1

To **actively engage** consumers in their energy supply and demand at the **personal** as well as at the **community** level

- increasing consumers' **awareness** of efficient energy behaviors

- promoting the take-up and widespread use of **local**, **renewable energy sources** and innovative **energy storage** concepts

Microgrid resources
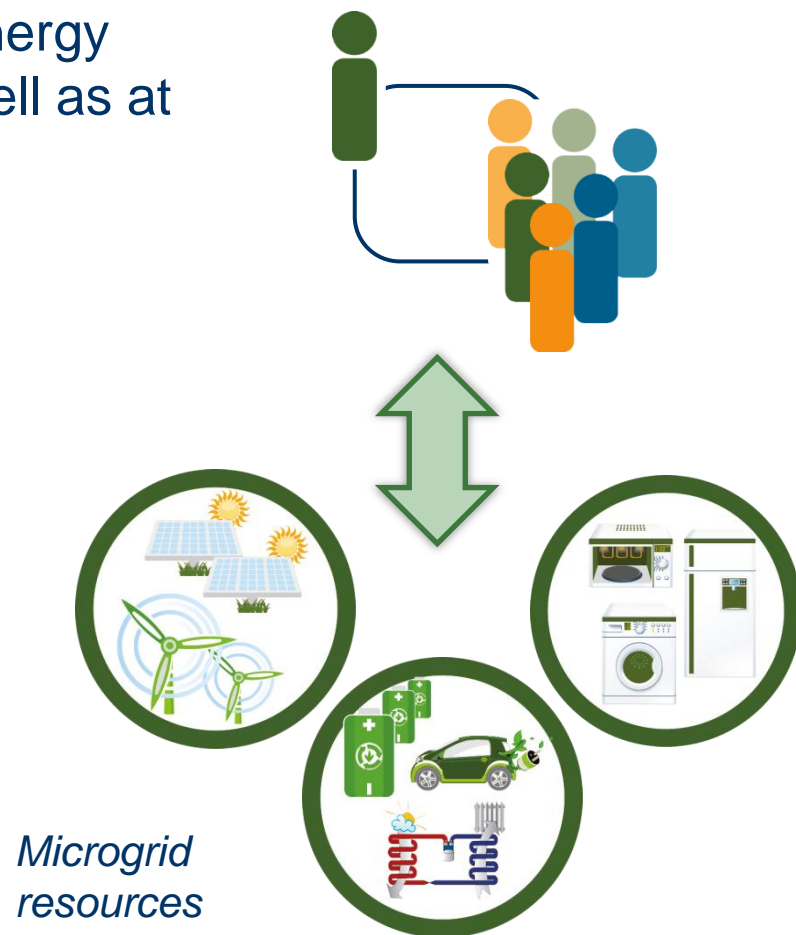
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Novel sustainable Business Models – 2

To produce tangible **value propositions** for **prosumers**, and create **real market demand** for GreenCom smart energy system solutions

- Investigation of technical and business aspects related to community programs for **virtual peer-to-peer energy exchange** models (**net zero-energy communities**)

Microgrid resources

GreenCom
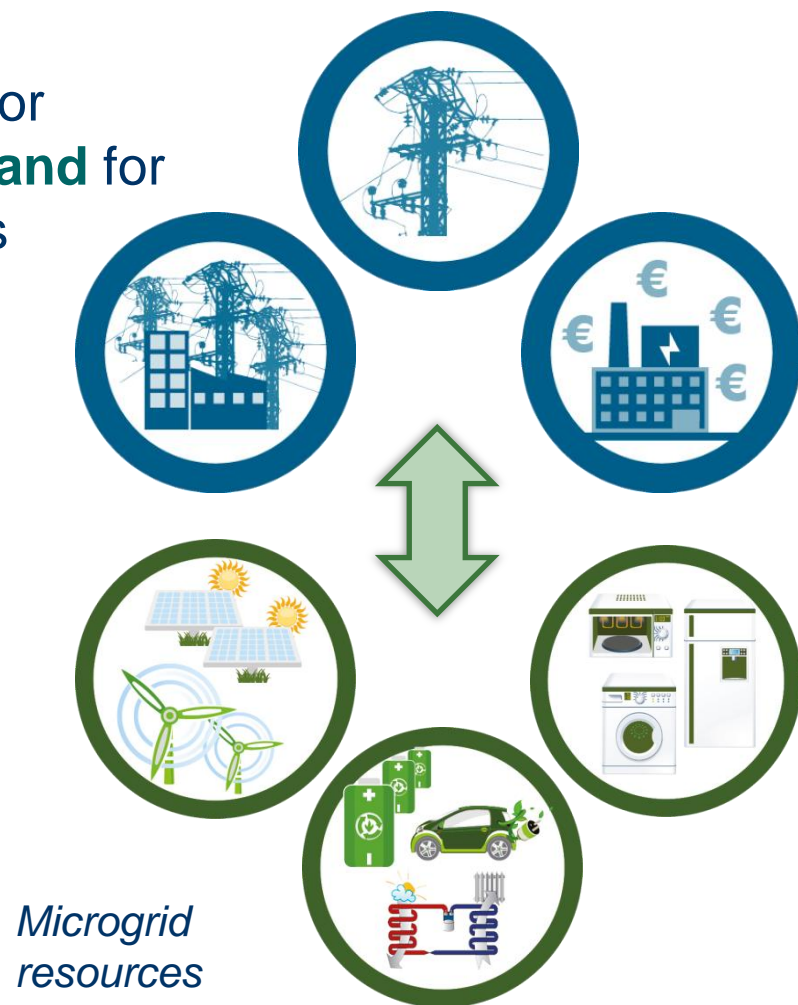
A **Smart Energy Management System** for information *aggregation* and *decision support*

microgrid

DISTRIBUTED GENERATION

DISTRIBUTED STORAGE

SMART HOME LOADS

MIDDLEWARE

GreenCom

MICROGRIDS AGGREGATOR

DSO

TSO

ESCO
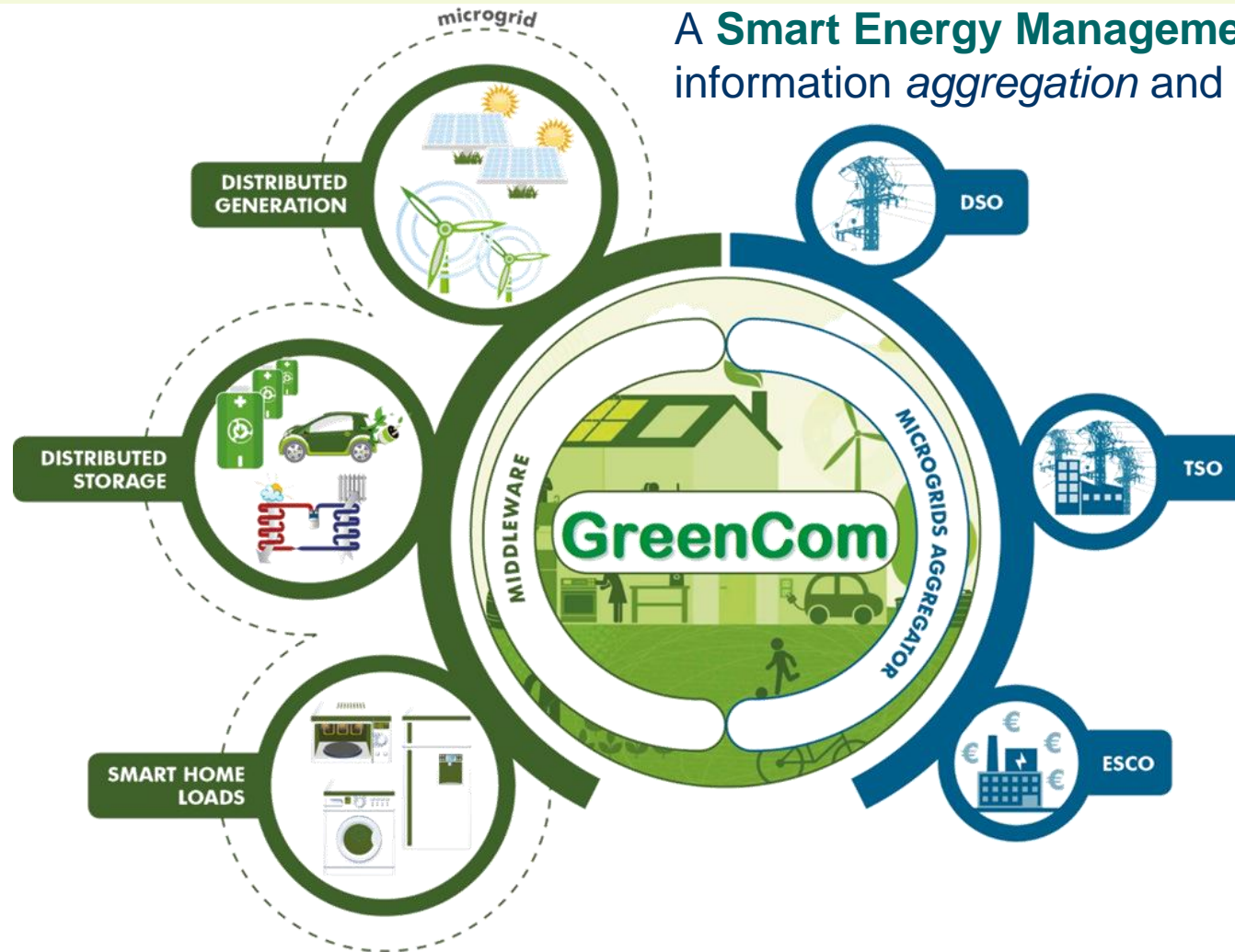
Demand management and control at the community level
to *reduce critical peak* situations and *balance electricity load demand*

**Aggregator** system managing multiple microgrids
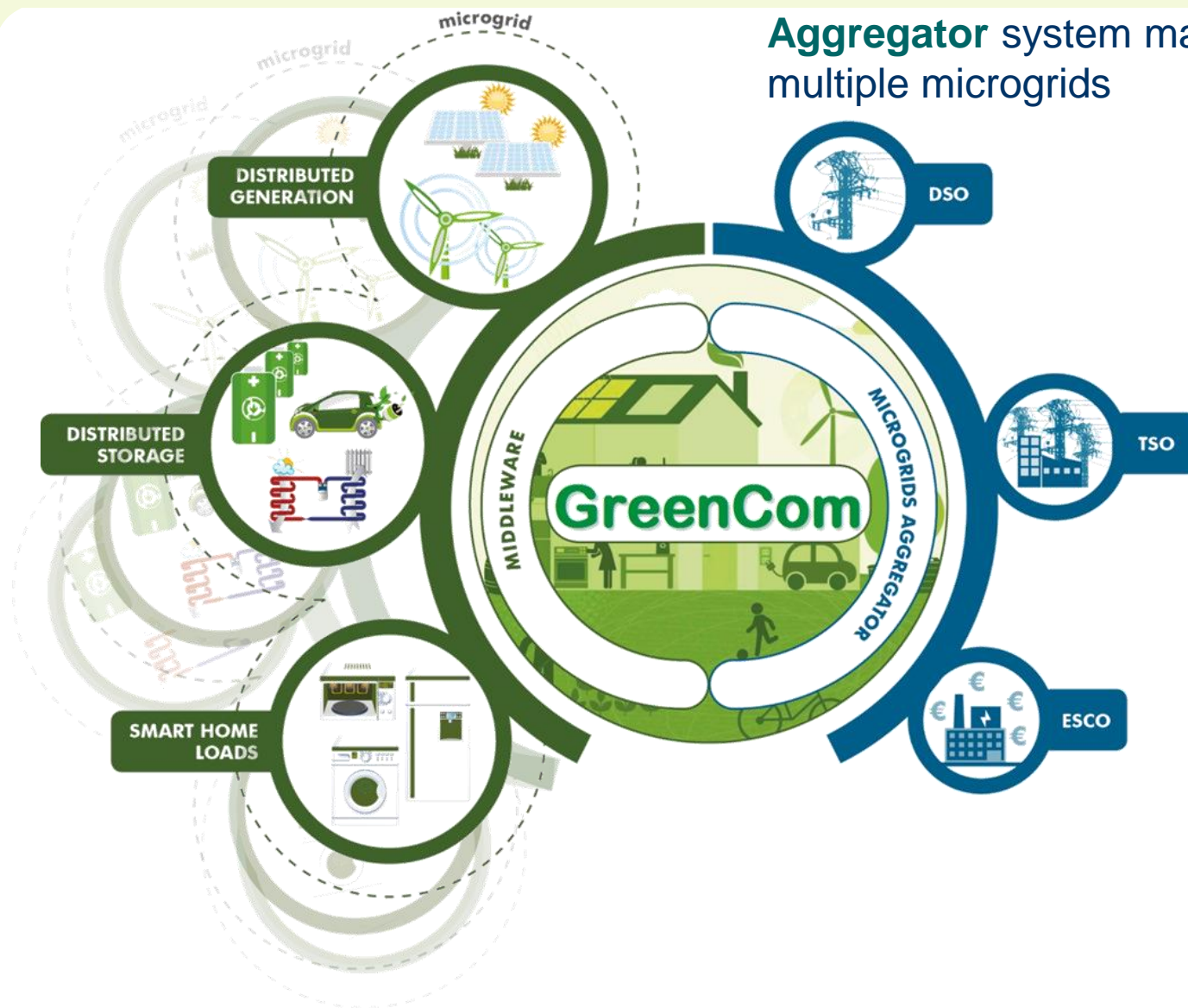
Middleware-powered IoT

Abstract device-specific models and characteristics

Syntactic interoperability: M2M communication among devices supports heterogeneous networking media and protocols

Semantic interoperability: Provides a common **semantic** description of context and data exchanged within **Service Oriented Architecture**
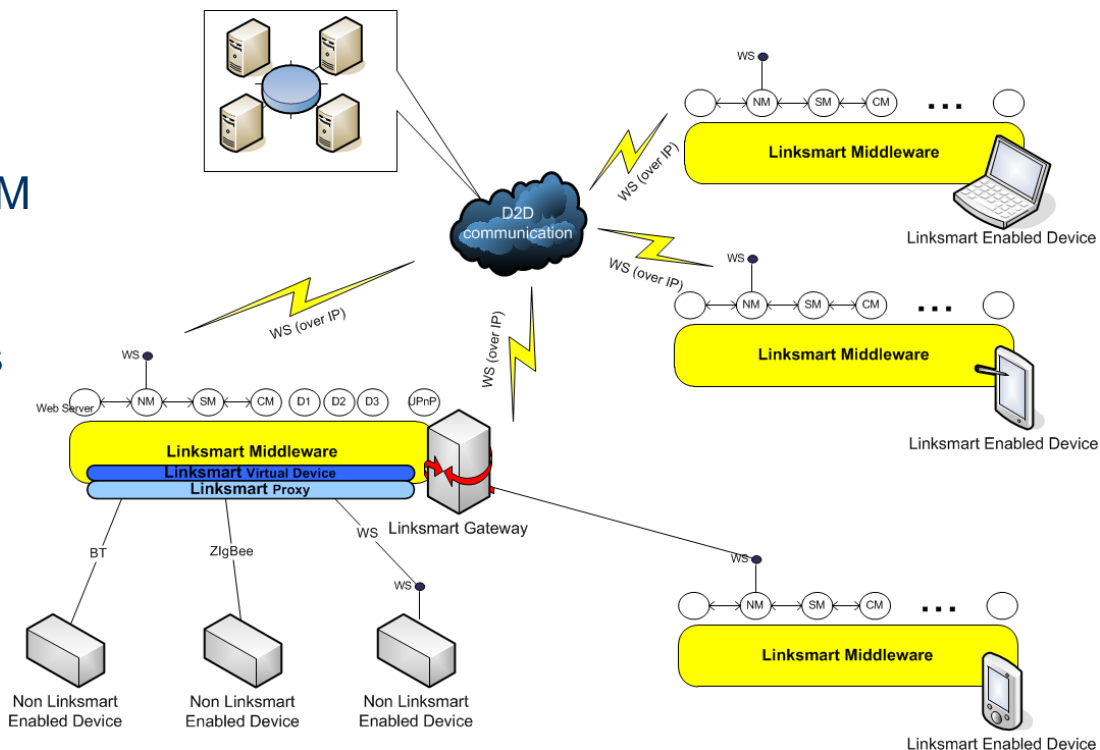
Middleware in GreenCom

Loads, generation and **storage** devices made by different brands but sharing a common set of functionalities will be transparently monitored and controlled, enabling **Demand-Side energy management & optimization**
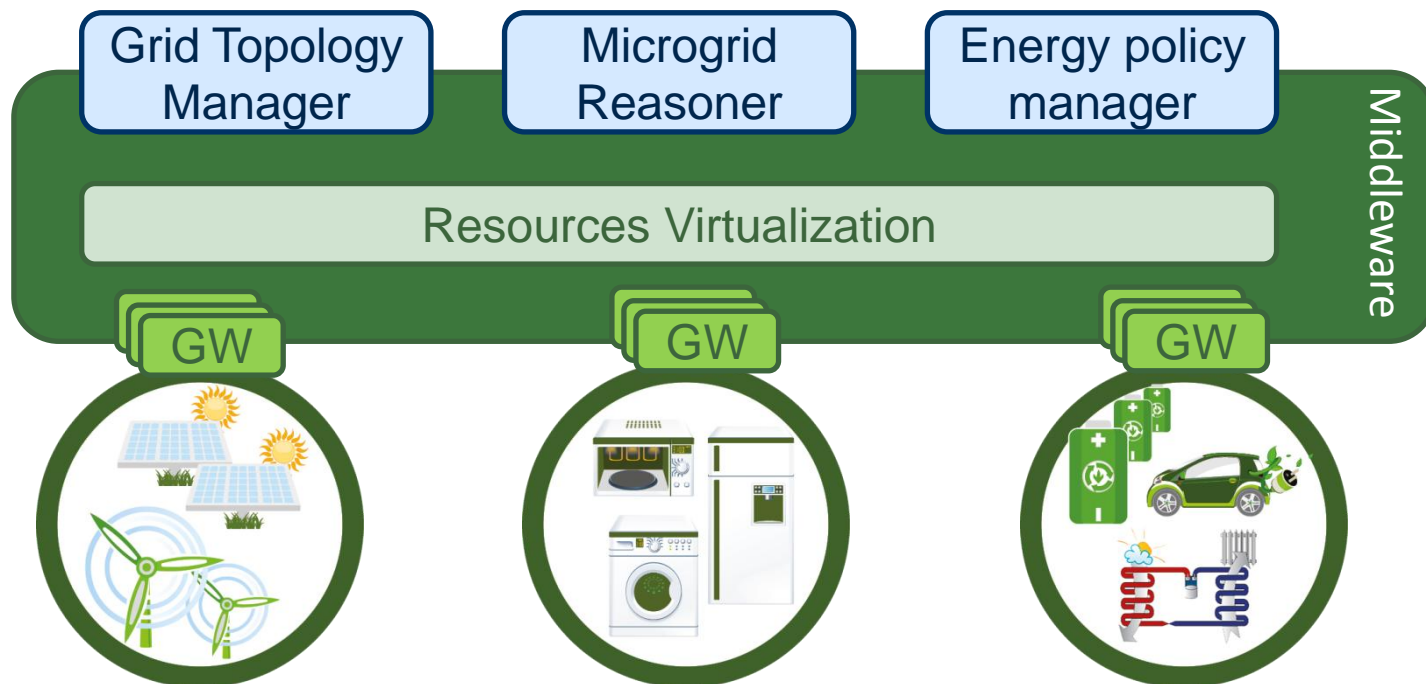
Pilot – Innovation Fur

- A development project and test bed formed by the **island of Fur**, the municipality of **Skive** and GreenCom Partner **E-MIDT**

- Innovation Fur is running for the period 2011 to 2015

- The overall objective is to demonstrate how modern technology and innovative energy solutions can contribute to the digital, sustainable society of the future.
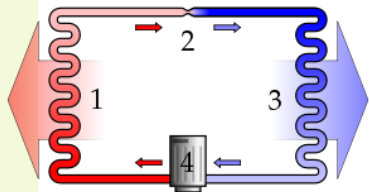
Thanks for your attention

Please see us here: www.Greencom-project.eu