

Panel session 2: nanoelectronics & smart systems components – target areas: grid automation, DC homes, IoT

15h30-16h45



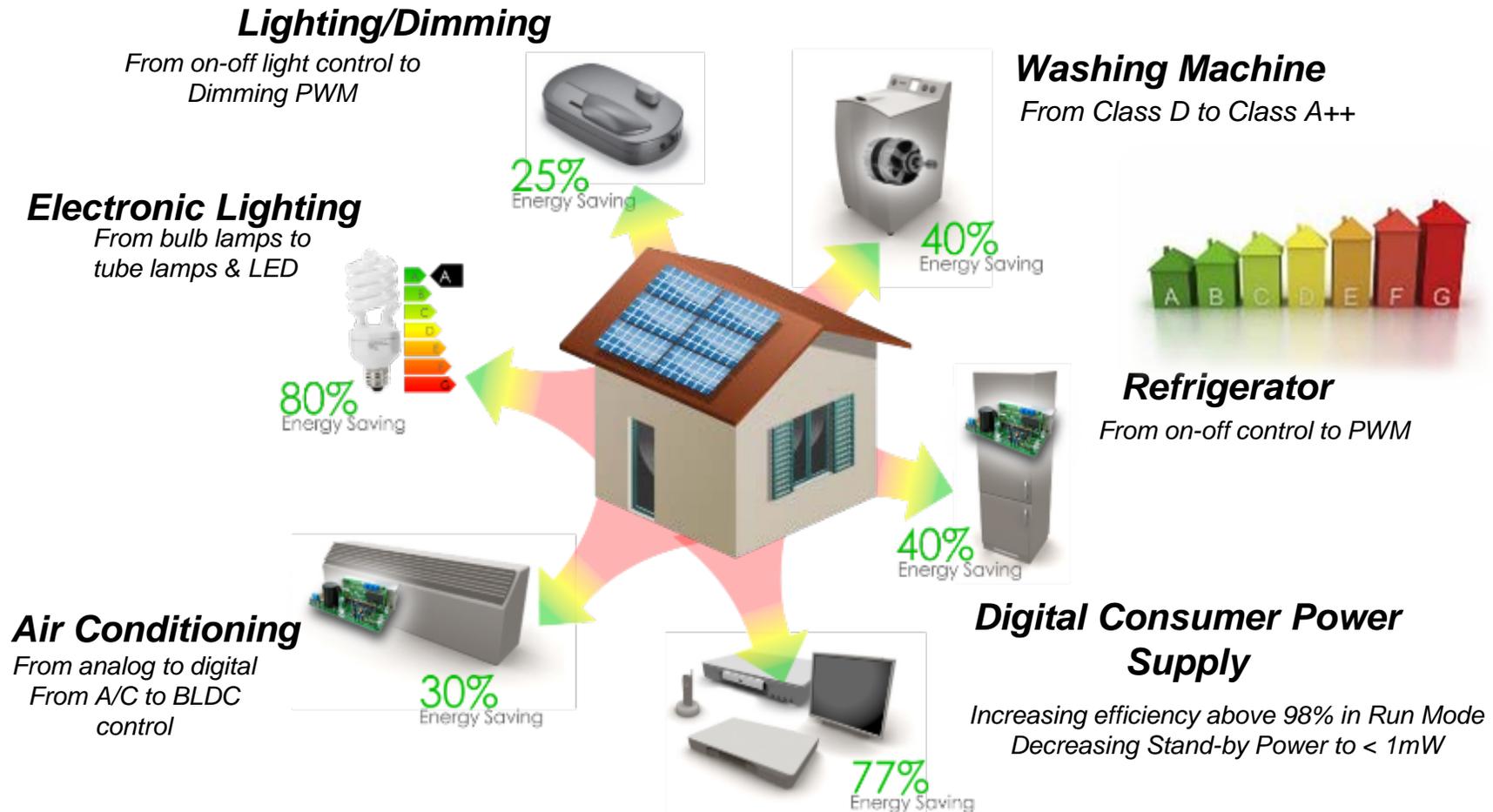
DG-ENERGY
Round Table
Brussels
September 4th, 2017

Panel session 2: Open Questions

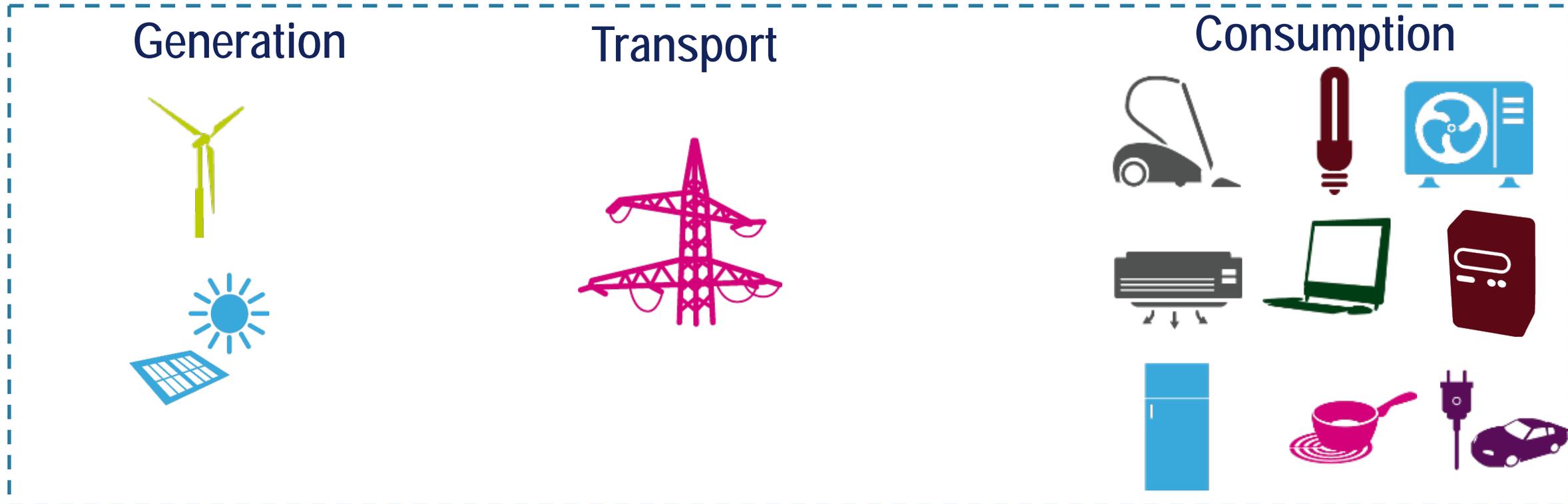
1. What is the degree of application of nanoelectronics & smart systems components in the energy system and what R&D are needed at electronic component and system level aiming at speeding up the deployment of an intelligent grid?
2. Which are the potential applications of nanoelectronics & smart systems components in the energy domain in light of the development of an intelligent decentralised grid?
3. DC homes, storage and smart appliances: How can nanoelectronics & smart systems components contribute to their development and integration?
4. How can the increasing energy demand of IT systems (data centres) be tackled on components improvement point of view as well as exploitation on the energy point of view?

Energy Efficiency Increase

SEMICONDUCTORS are key to reduce global power consumption, with an estimated impact **up to 27%** on average of energy savings from now to 2030.



Everywhere in energy got a piece of silicon...



Integration of
Renewable energy

Advanced Transmission
Grid Monitoring & Control

Smart Metering & Appliances
Energy storage & EV Charging
Efficient Consumption



Nanoelectronics help to reduce losses along the entire Distribution Chain

What is a Smart Grid?

Distributed Energy Resources



Traditional power plants



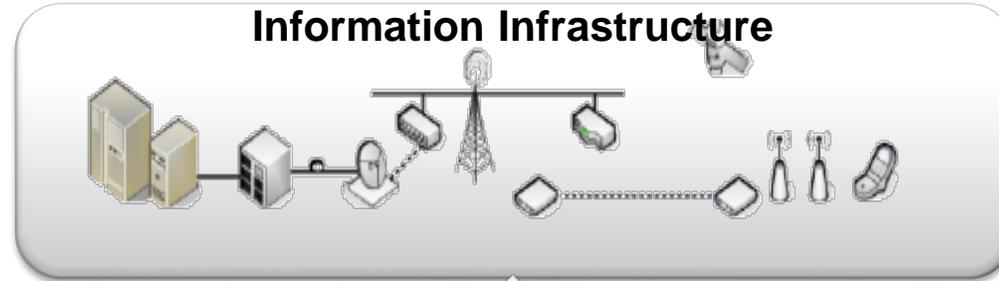
Solar generation



Wind farms



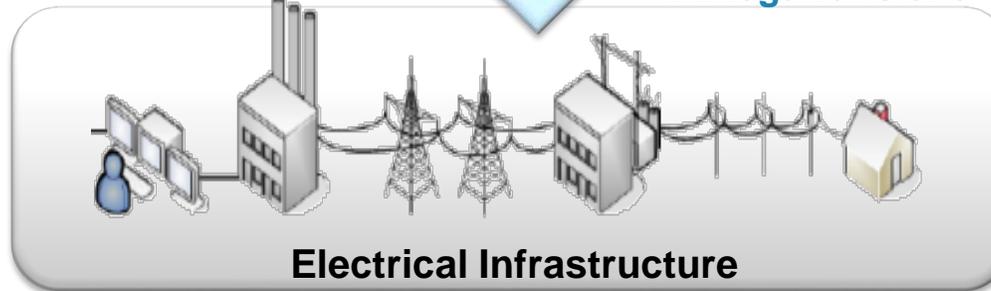
In-House Generation



Megabytes of data to move...



...Megawatts of efficient delivery



Energy Consumer



Smart meters



Smart house



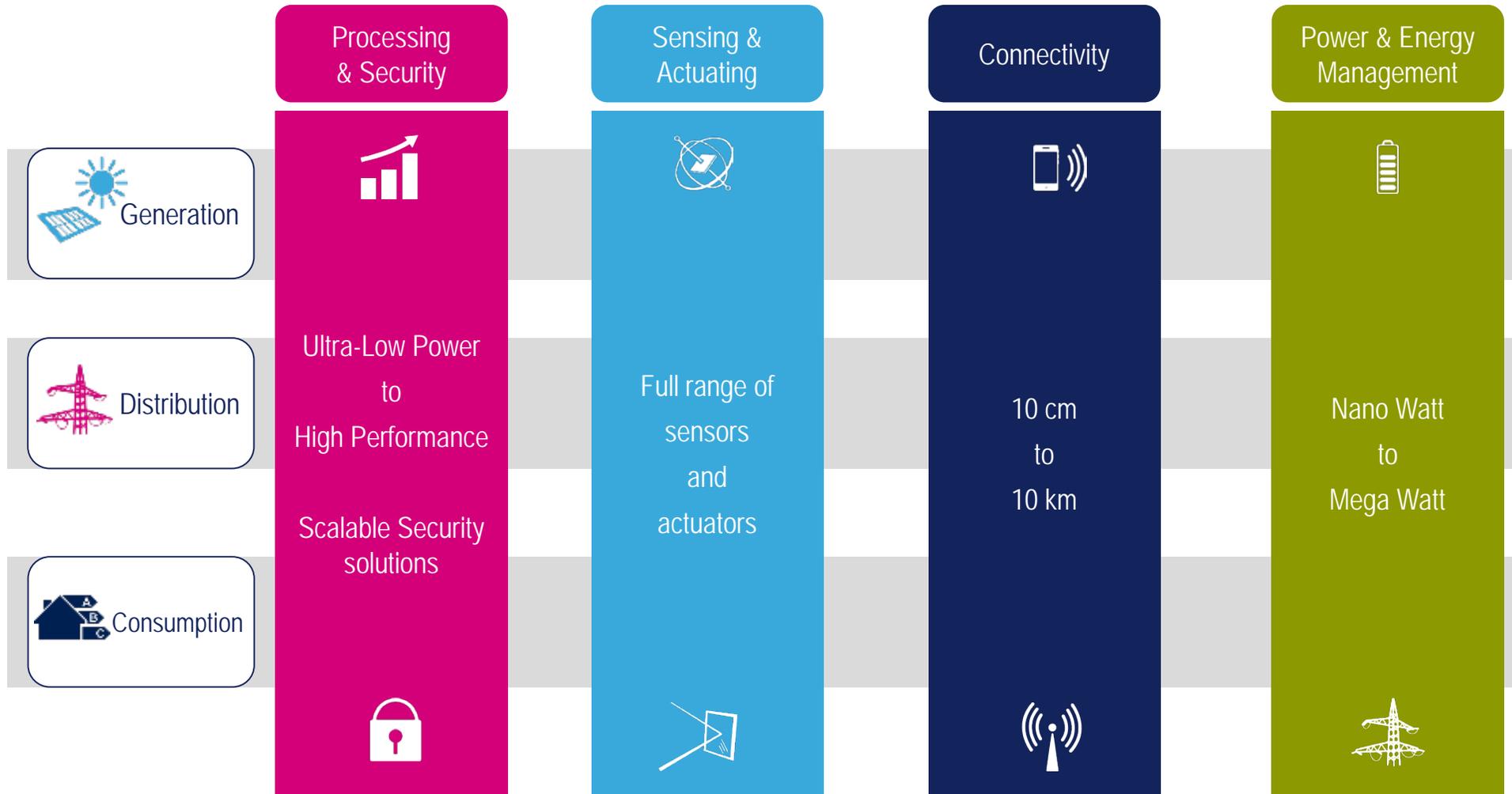
Plug-in vehicles



Industry

Smart grid enables two-way communication and digital control throughout the electricity delivery infrastructure

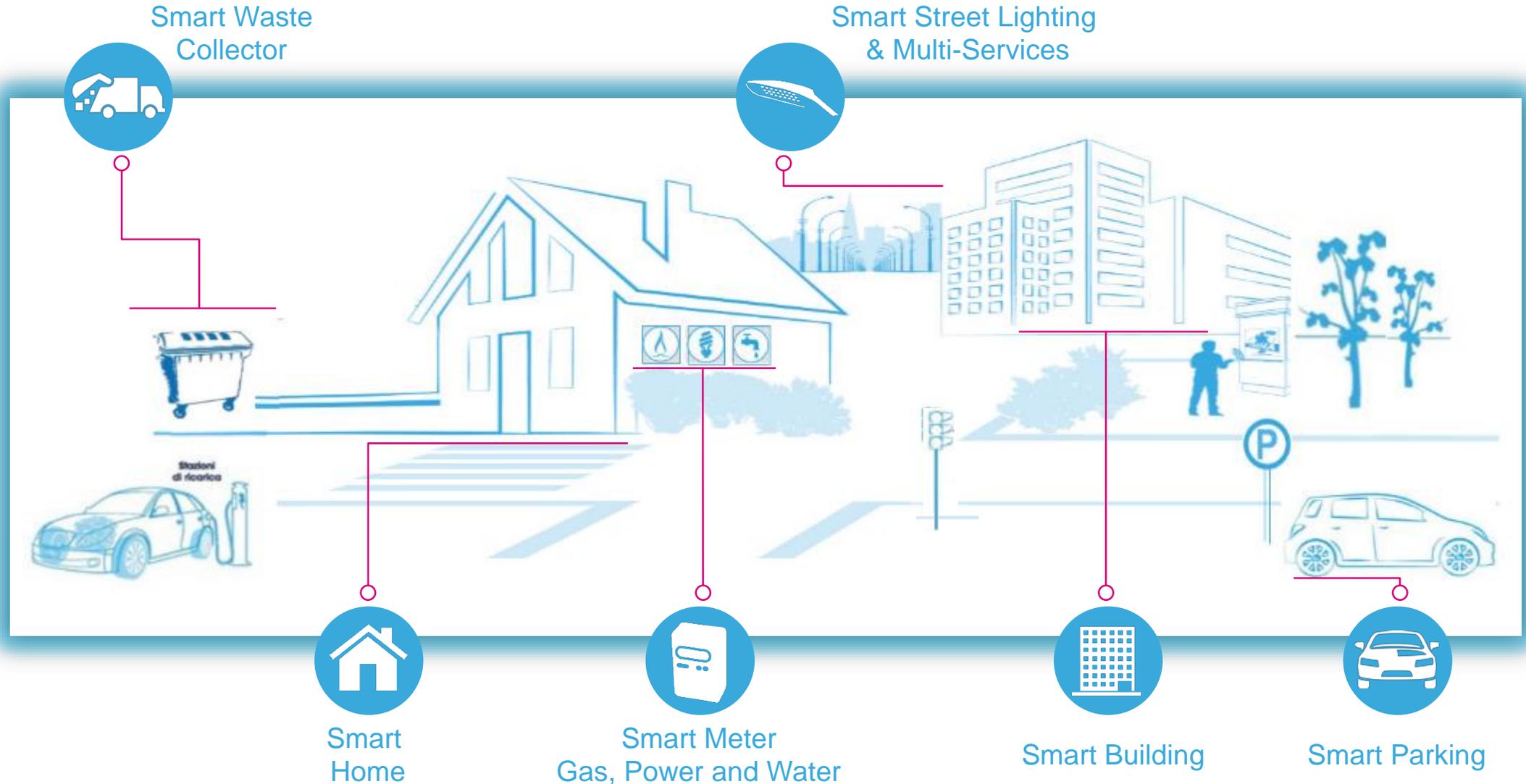
Nanoelectronics Enabling the Smart Grid



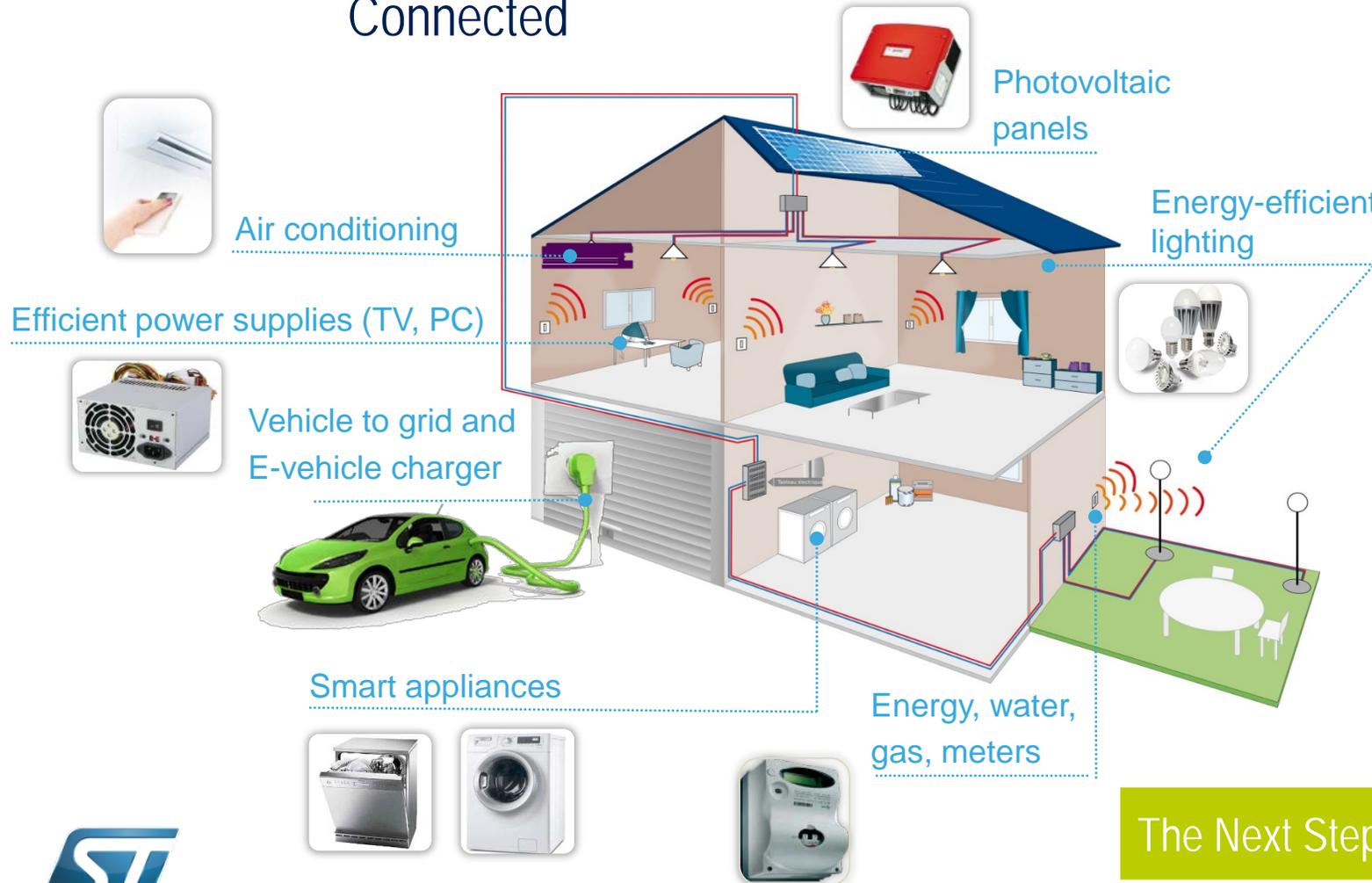
Related projects in ECSEL: past and future

- **IoE** (ARTEMIS 2010) Internet of Energy for Electric Mobility
- **MOTORBRAIN** (ENIAC 2010) Nanoelectronics for Electric Vehicle Intelligent Fail safe Power-Train.
- **ERG** (ENIAC 2010) Energy for a Green Society: from sustainable harvesting to smart distribution. Equipment, Materials, Design solutions and their applications.
- **E2SG** (ENIAC 2011) Energy To Smart Grid, Optimization of energy consumption by usage of relevant environment and grid information, energy efficient power technologies and smart drivers.
- **R2POWER300** (ECSEL 2014) Preparing R2 extension to 300mm for BCD Smart Power and Power Discrete, i.e. the precursor project of R3-POWERUP.
- **CONNECT** (ECSEL 2016) Innovative smart components, modules and appliances for a truly connected, efficient and secure smart grid.

Few Application examples



Self-sufficient
Environmental friendly
Connected



Smart Homes

Generating energy through photovoltaic panels and photovoltaic coated building walls

Increased power efficiency through zero stand-by

Anti-theft and ambient Light Control,

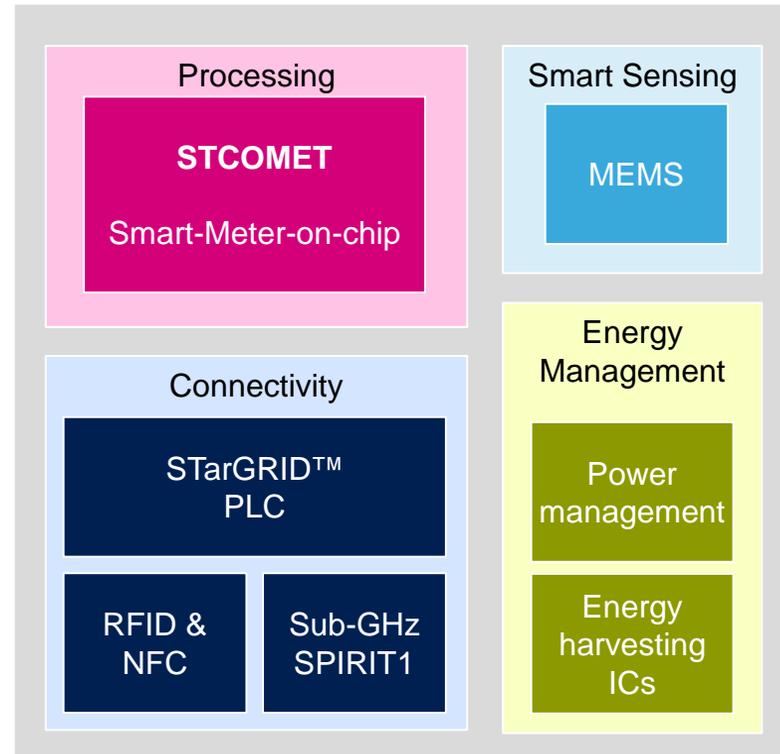
Smart appliances: fridge, washing machine, ovens, air conditioning

The Next Step

Augmented Reality with wireless sensor network, smart systems, fast power line modems



Smart meters allow power generators to match consumption in a more efficient way and give users more control over their usage



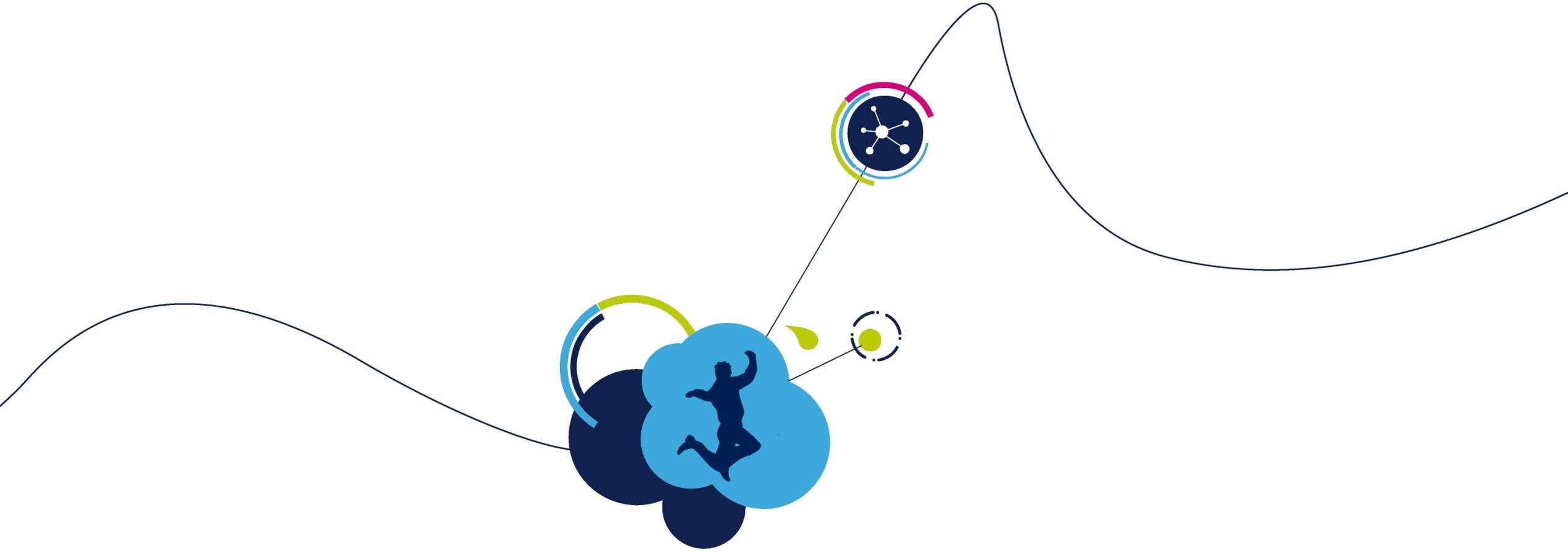
Real-time bidirectional information for consumers and utility companies

Precise real-time consumption, malfunction and fraud info for providers

Real-time flexible tariff profiles visibility

The Next Step

Electricity meters will be home gateways enabling new services like high speed multimedia, home monitoring and control



Thank You - 2