

Řešení pro SmartGrid od STMicroelectronics

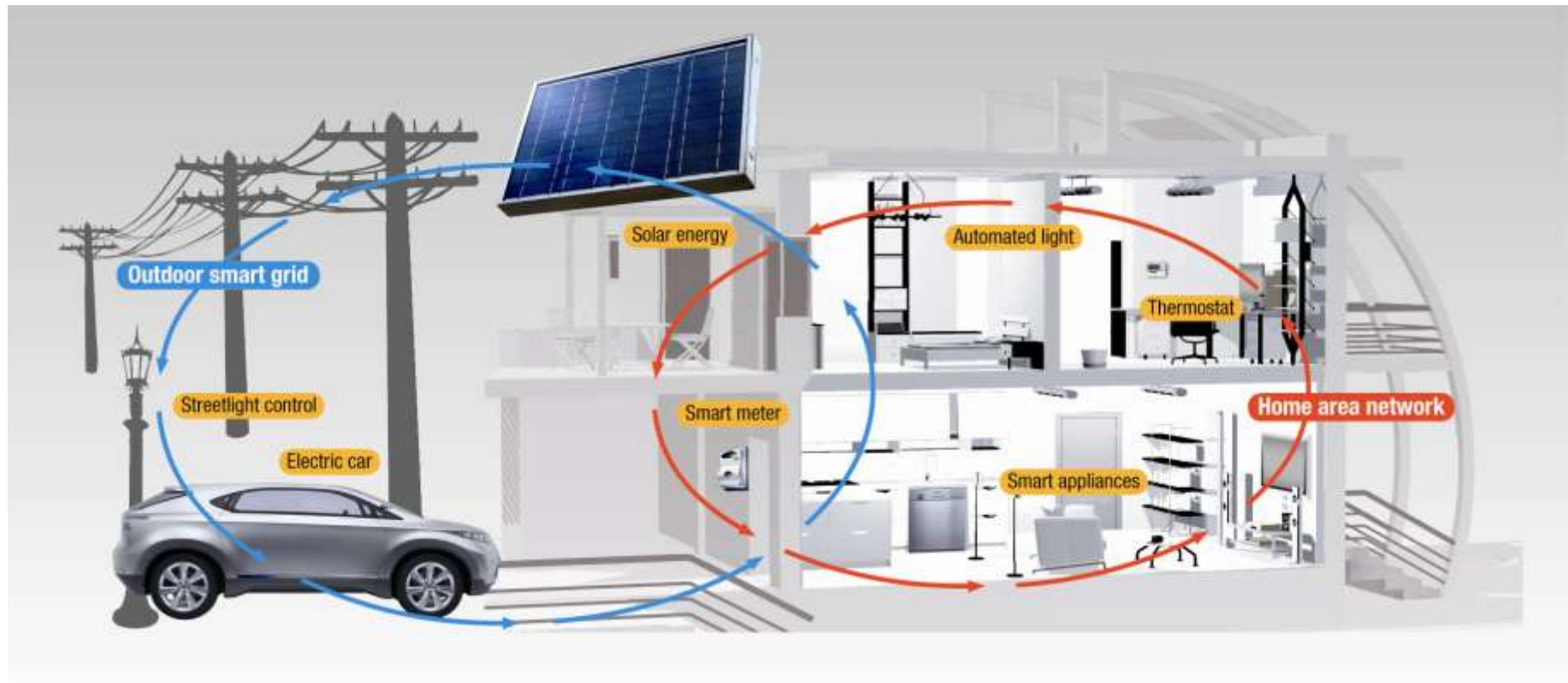
Milníky digitalizace – Smart Life
25. ledna 2011

Solution for SmartGrid from STMicroelectronics

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SmartGRID in ST portfolio

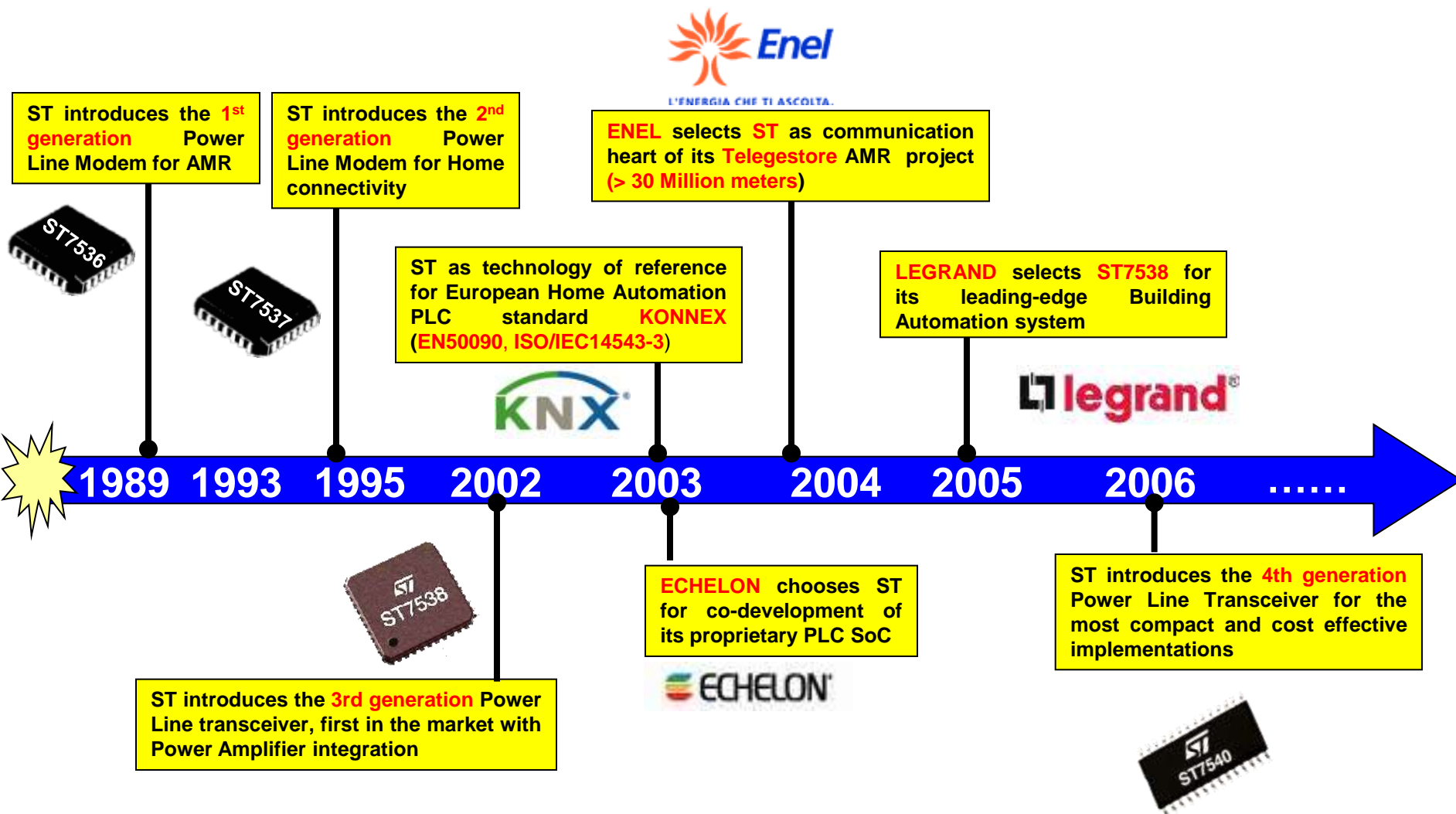


Power line modems (PLC): STarGRID

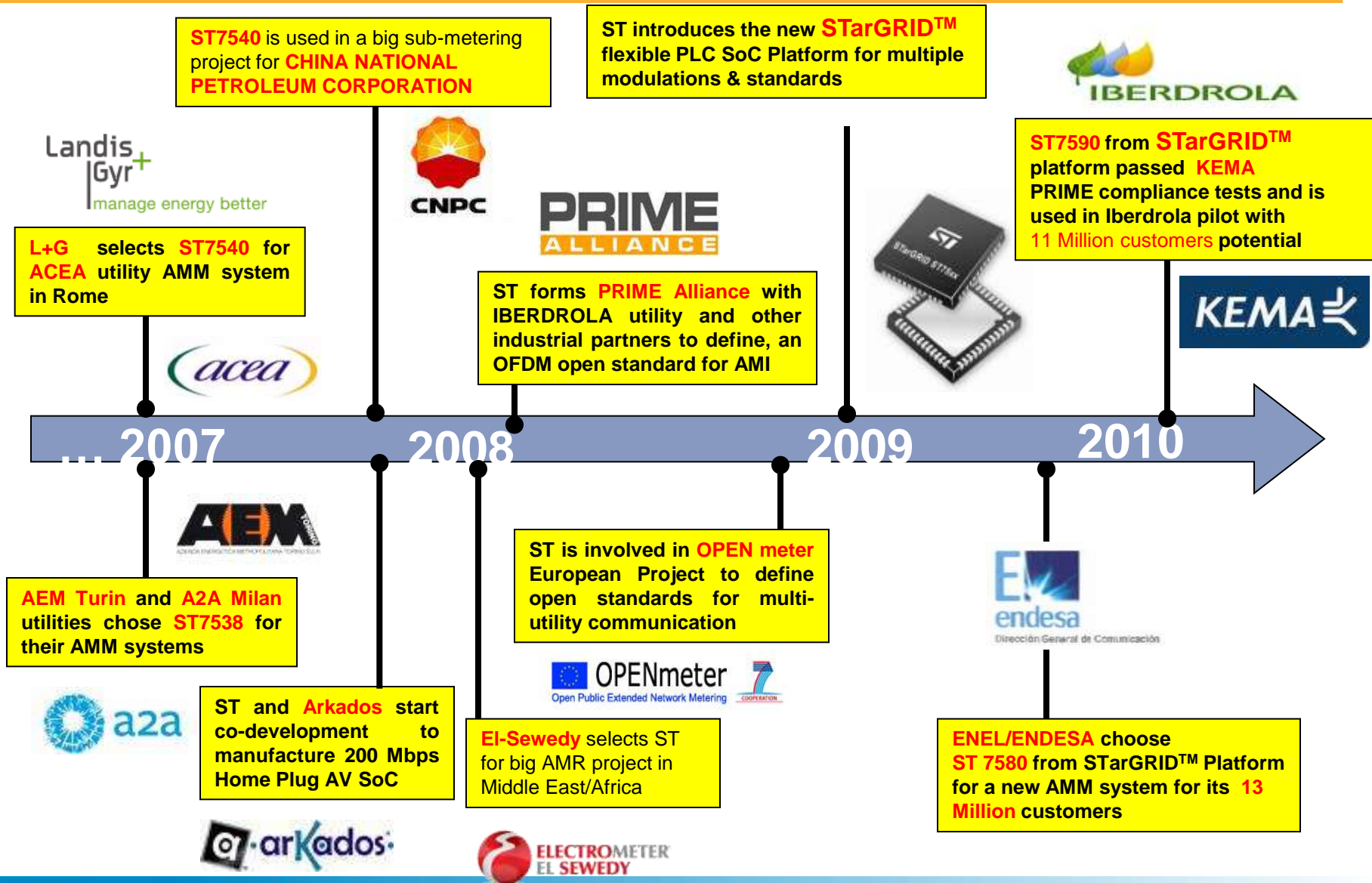
+ Smart plug

- **ST PLC solutions for Smart Grid, overview : from first modems to the new '*STarGRID*' platform**
- '*STarGRID*' platform basic description
- '*STarGRID*' specific System On Chip implementations:
 - **ST757x**
 - **ST758x**
 - **ST759x**

ST Power Line Communication evolution: from market pioneer ...



..... to market leader



Two standards in more details



<http://www.prime-alliance.org/>

- PRIME is the new proposed Standard for **Power Line Communication** based on an **open narrowband OFDM** specification for all kinds of **Smart Grid** services over electricity networks. ST is a member. (ST7590)



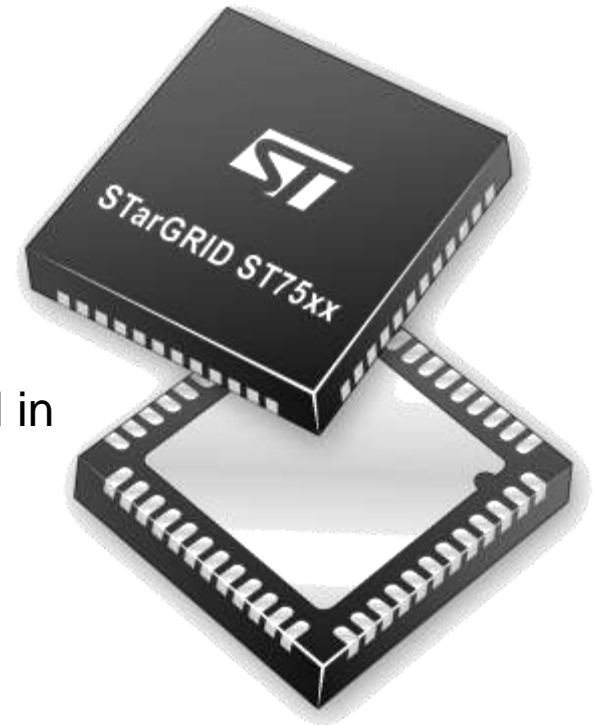
<http://www.openmeter.com/>

- PRIME is the PLC **base line technology** of the **Open Meter** project, the **European Multi Utility Standardization Project** supported by the largest European Utilities. ST is a partner.

- ST PLC solutions for Smart Grids overview:
from first modems to the new '*STarGRID*'
platform
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- '*STarGRID*' specific System On Chip
implementations:
 - ST757x
 - ST758x
 - ST759x

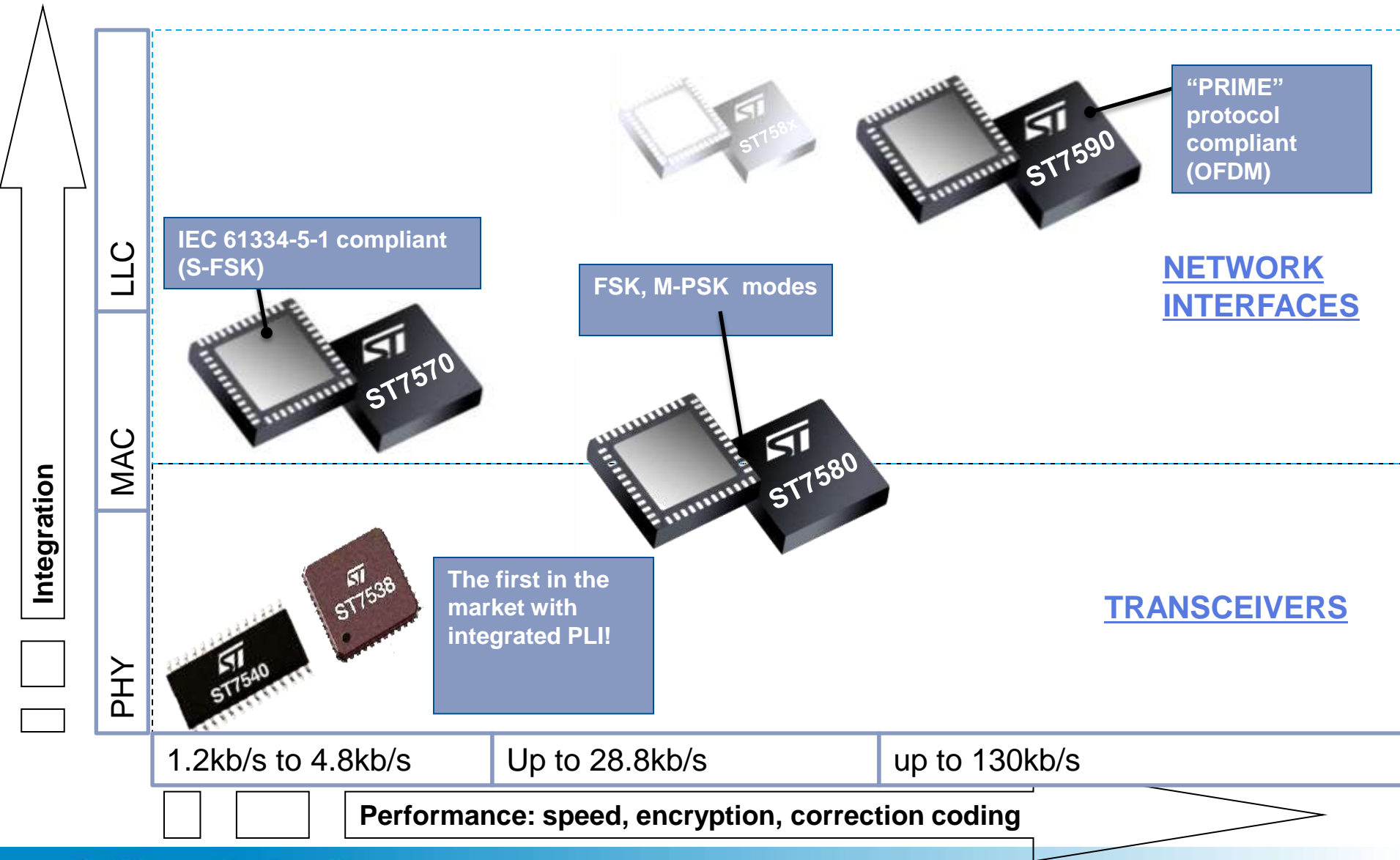
New PLC 'STarGRID' Platform - Key Features

- High modularity and flexibility:
 - ✓ Programmable modulations and protocol stacks (ROM)
 - ✓ Suitable for products differentiations and customizations
- High Scalability:
 - ✓ Cost-driven
 - ✓ Performance-driven
 - ✓ Features/integration-driven
- Openness: not proprietary modulations, no royalties
- Highest integration: all PLC system blocks embedded in a single chip:
 - ✓ Micro Core for Protocol stack management
 - ✓ DSP Engine for PHY layer processing
 - ✓ Analog Front End
 - ✓ **Power Amplifier**
 - ✓ Encryption
 - ✓ Auxiliary functions/blocks ...



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STARGRID ROAD MAP



ST PLC Solutions: summary table



**Protocol
features (typ.)**

**Point to point
Ping protocol**

**Static
routing**

**Intelligent/dynamic
routing**

**Plug &
Play**

Speed

1.2 kbps

2.4 kbps

4.8 kbps

9.6 kbps

19.2 kbps

28.8 kbps

...

130 kbps

- ❖ KNX and HDLC standard compatible
- ❖ CTM protocols

Ideal for:

- ✓ Very cost effective simple implementations
- ✓ Custom protocol AMR
- ✓ Command & control (AC & DC)

FSK

ST7538/40

- ❖ IEC 61334-5-1 compliant

Ideal for:

- ✓ Cost effective implementations
- ✓ HAN (AC)
- ✓ AMR for DLMS/COSEM applic.
- ✓ Command & control (AC)

S-FSK

ST757x

- ❖ ENEL-SITRED protocol compatible
- ❖ CTM protocols
- ❖ ST7538/40 backward compliant

Ideal for:

- ✓ HAN (AC & DC)
- ✓ Advanced Meter Management and AMI
- ✓ Home, Building & factory automation
- ✓ Smart Energy applications

**FSK, BPSK
QPSK, 8PSK**

ST758x

- ❖ PRIME protocol compliant

- ✓ High Performance Smart Metering
- ✓ TCP/IP and DLMS/COSEM standard utilities applications
- ✓ Advanced Metering Infrastructure
- ✓ Smart Grid applications (AC & DC)

OFDM

ST759x

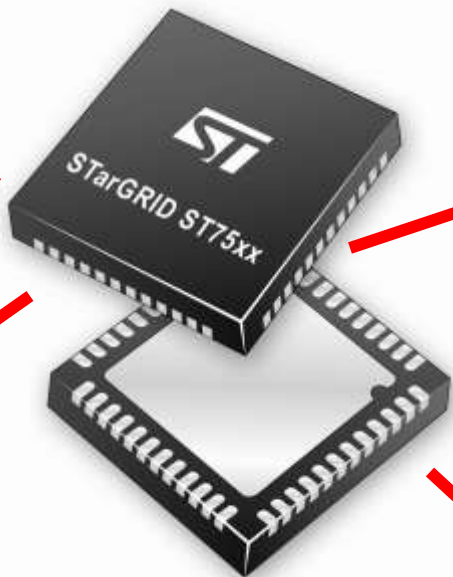
More more than 30 Million PLC transceivers sold in the last 5 years!



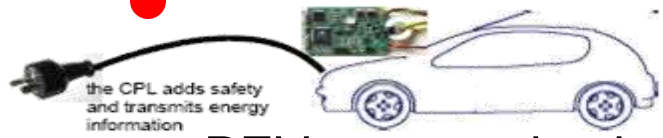
Smart Meters



PV Monitoring,
Street lighting control

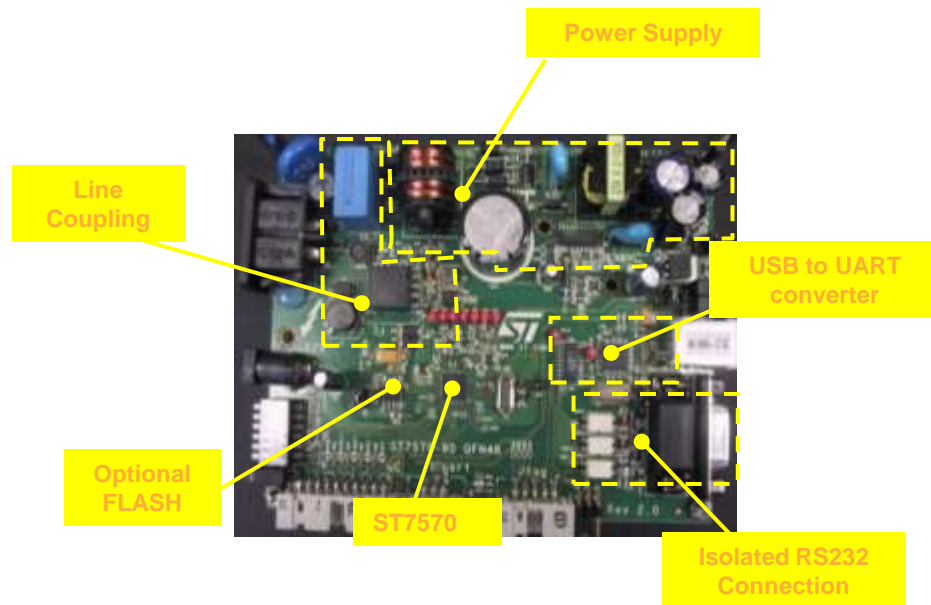


Home Area Networking (HAN)
Home and Building automation
Smart Energy control
Connectivity....

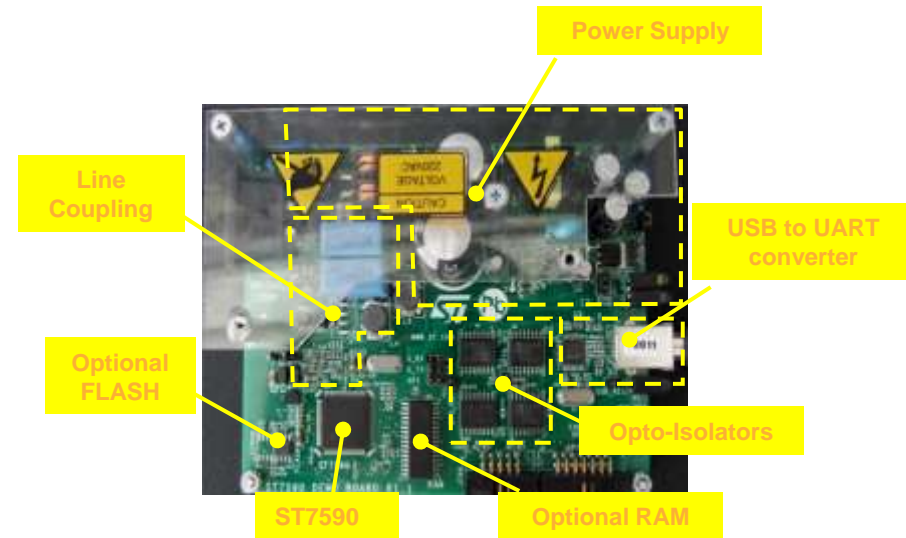


PEV communication

‘STarGRID’ first reference designs



ST7570/80 Reference Design



ST7590 Reference Design

Poly-phase meter with PLC reference design



Modular development tool for electricity meter with AMR (PLM)

Order code: **STEVAL-IPP001V2**

STM32F103VET6: 32bit MCU ARM Cortex-M3

STPMC1: 1,2 and 3-phase energy meter calculator

STPMS1: IFs sigma-delta power meter

STPM01: mono-phase energy meter
(alternative to STPMC1+STPMS1)

ST7580: Power Line Communication Modem

LIS331AL: Accelerometer

SPZB260-PRO: ZigBee module

M24128-BWMN6TP: 128Kbit I²C EEPROM

Altair04-900 : AC/DC regulator

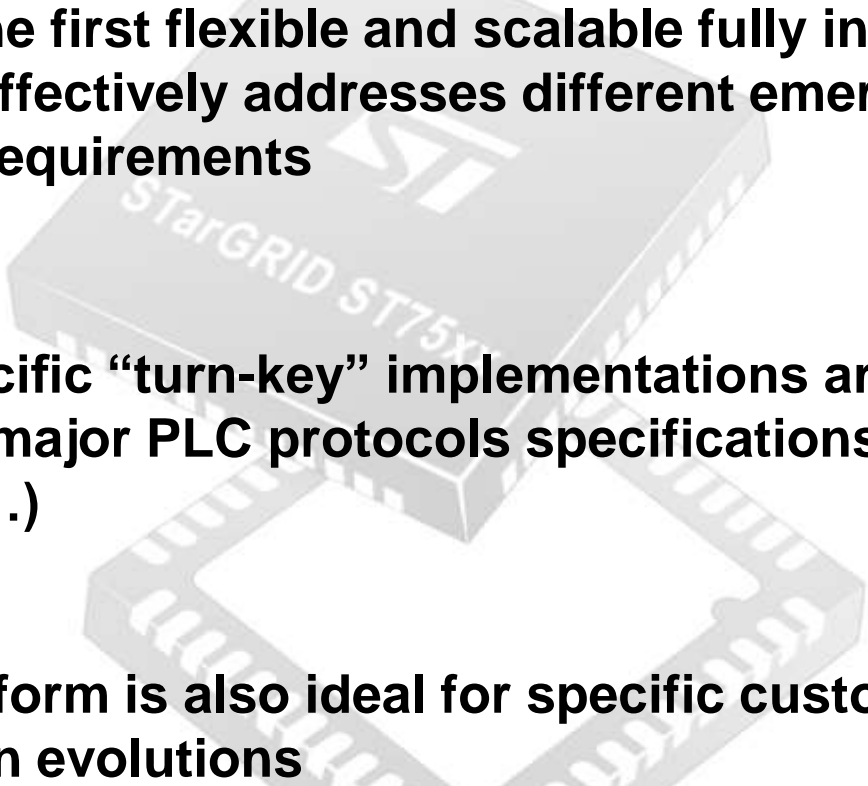
ST3232EBDR : RS232 interface



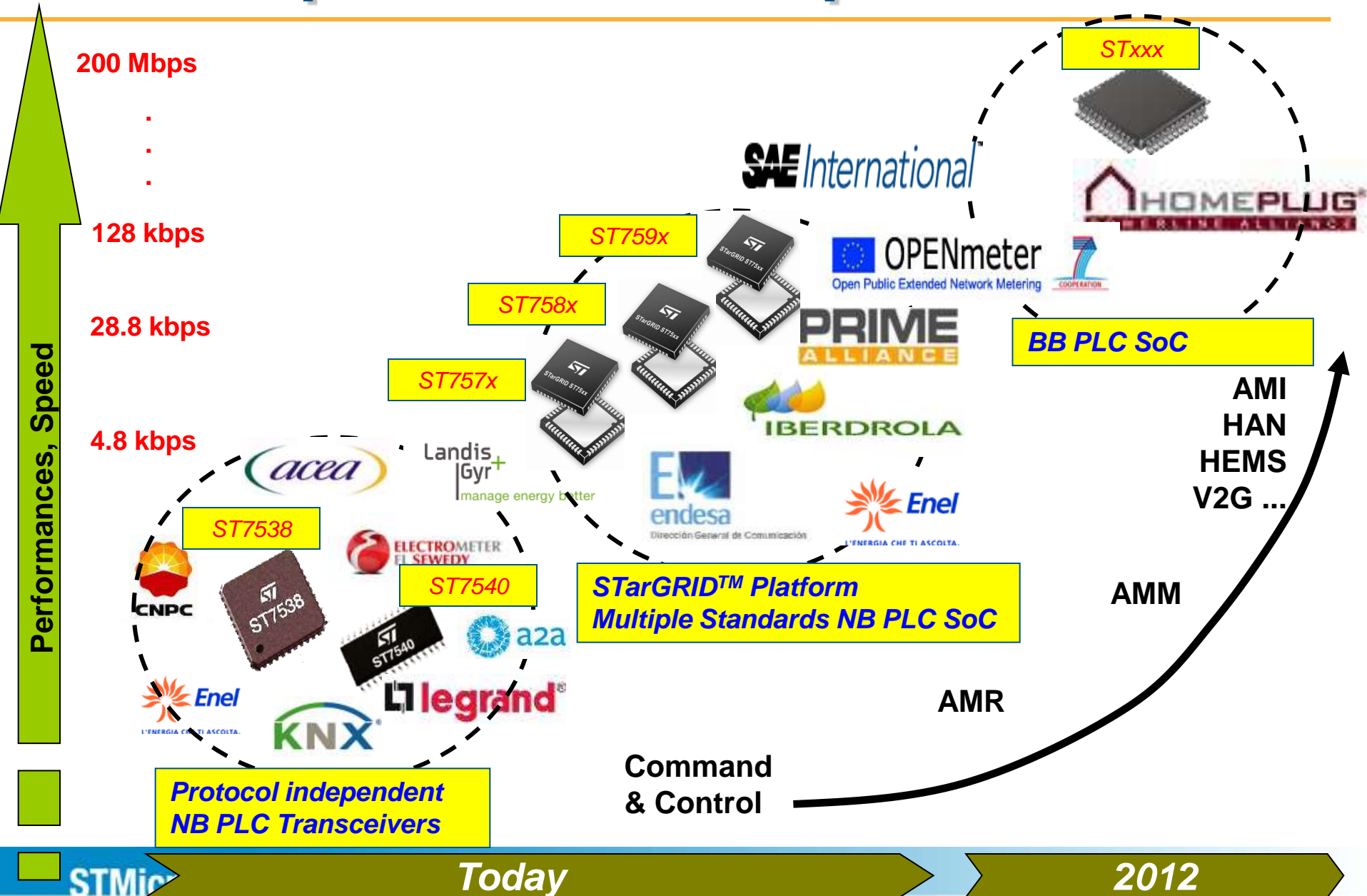
Energy Meter : Final Board



STPMC1-STPMS1 energy measurement (external) board.

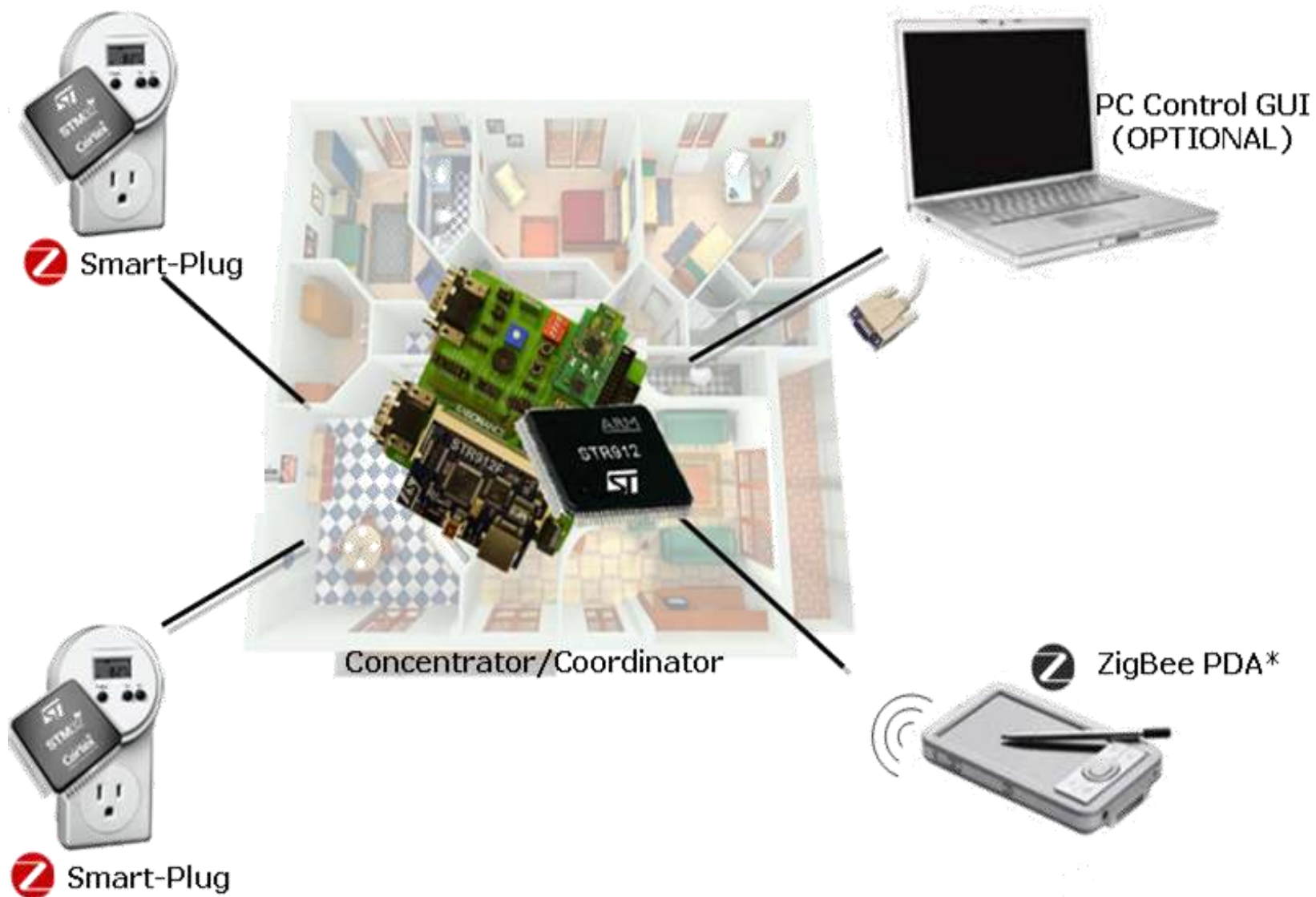
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- **STarGRID** is the first flexible and scalable fully integrated PLC SOC platform which effectively addresses different emerging Smart Metering and Smart Grid requirements
 - **STarGRID** specific “turn-key” implementations are already available and suitable for major PLC protocols specifications (IEC 61334-5-1, PRIME, SITRED...)
 - **STarGRID** platform is also ideal for specific customizations and future application evolutions

ST PLC product roadmap



- *The growing demand for improved energy efficiency and high value services to the end users are driving Power Grids evolution into **Smart Grids***
- *By exploiting Power Grids as communication medium, **Power Line Communication (PLC)** is one of the most attractive communication technology for Smart Grids*
- ***ST** offers **20+ years** leading position **in Power Line Communication***

Smart-Plug

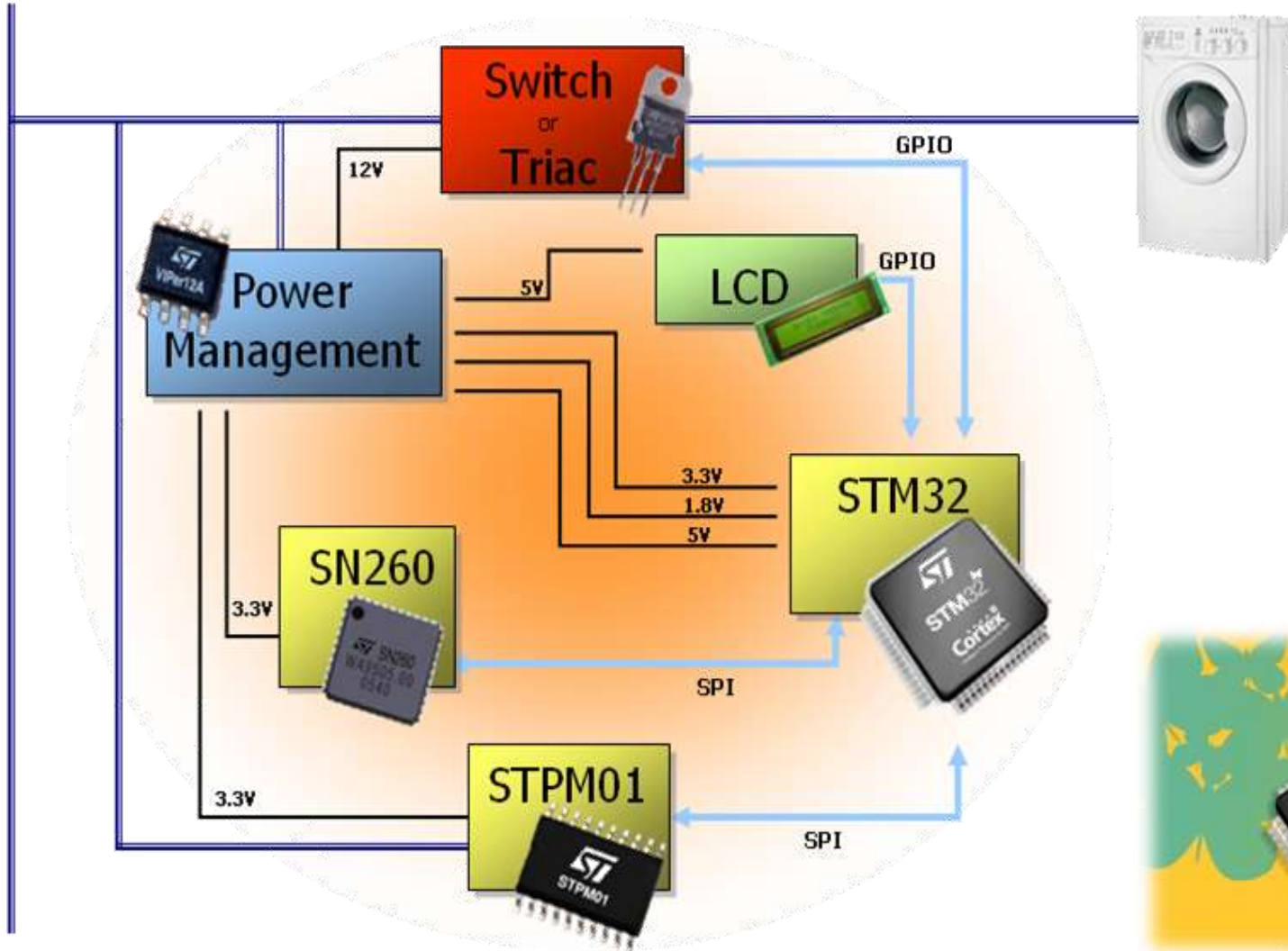




ZigBee™ Smart-Plug



MAINS



ZigBee™ **Smart-Plug**

ZigBee Mesh Networking provides a robust Home Area Network from demand response and energy management that can be used to increase energy efficiency.

ZigBee is substantially impacting the wireless market, enabling innovative applications for home control, building automation and industrial automation.



Thank you for your attention



Děkuji za Vaši pozornost