

Microchip Smart Metering and Sustainability



A Leading Provider of Smart, Connected and Secure Embedded Control Solutions



SMART | CONNECTED | SECURE

May 2023

Microchip in Sustainability



Energy Generation, Storage and Distribution

- Solar Power Systems, Solar Inverters
- Wind Turbines
- Energy Storage Systems
- Smart Grid Applications
- Hydrogen Fuel Cells
- Alternative Energy such as Biomass



Efficient Energy and Water Use

- Smart Agriculture
- High Efficiency Power Supplies/Inverters
- Higher Efficiency Motor Control
- LED Lighting
- Smart Dimmers, Actuators and Valves
- Heating, Ventilation and Air Conditioning
- Energy STAR® Appliances



Resource Monitoring and Optimization

- Smart Electric/Water/Gas Meters
- Energy Usage Displays and Awareness
- Motion Sensors
- Leak Detection
- Building Management (Light, Energy use)



Waste Reduction and Reuse

- Smart Waste Management
- Water Bottle Refilling Stations
- Smart Irrigation Systems
- Asset Tracking
- Restroom Dispensers (Soap, Paper, Water)
- Low Standby Power

Taiwan really have enough energy?

Are you worried about the Power Line Down again?

What could we monitor the energy in Taiwan?

AMI介紹

依據行政院最新核定的「智慧電網總體規劃方案」內容中，智慧電網涵蓋「智慧調度與發電」、「電網管理」、「儲能系統」、「需求面管理」、「資通訊基礎建設」、「產業發展」及「法規制度」等7項構面，其中「需求面管理」中的AMI智慧電表基礎建設(Advanced Metering Infrastructure, AMI)由台電公司負責規劃及建置。主要由智慧型電表搭配通訊系統(含通訊網路)及電表資料管理系統組成，除可記錄用戶用電情形、定時回傳電表資料外，亦可取代人工抄表。



Did you install Taiwan Smart Meter?



+ 未來全台會換裝智慧電表嗎？

- 依行政院核定之智慧電表布建期程，台電公司須於113年完成300萬及119年完成600萬智慧電表布建目標，另依111年3月30日國發會公布之2050淨零排放路徑規劃，台電公司應於2035年(124年)完成100%智慧電表全面布建。

Do **You** really have enough energy?

When will you have your 1st BEV (Battery Electric Vehicle)?

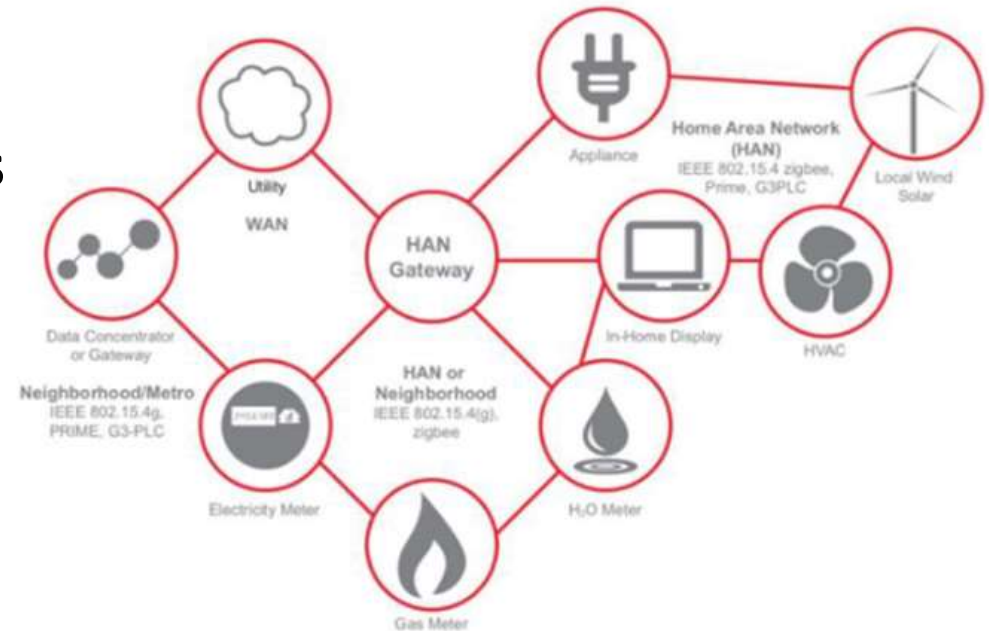
管委會同意嗎? 社區夠電嗎? 充電突發意外能定位嗎?

Sub-Metering is important!

Smart Metering and Sustainability

Smart Meters/Monitors = **Smarter Decisions**

- **Reduce consumption:**
 - In peak demand times
 - Based on presence
- **Monitor Local Generation Capabilities**
- **Leak monitors/alerts**
- **Real time cost information**



Smart Energy Platform

- **At the Heart of Sustainable Applications**

- Smart e-Meters
- Smart Grid Gateways and Advanced Metering Infrastructure
- Communications Solutions for Smart Grid applications
- Sub-metering applications
- EV charges

- **One Platform, Multiple Designs**

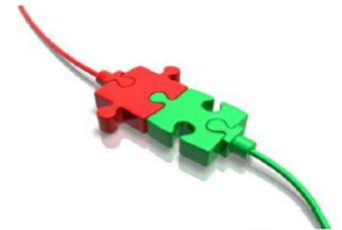
- Product options optimized for variety of designs
- Common firmware libraries and architecture
- Improved Time-to-Market

- **Up to Class 0.2 Metrology**

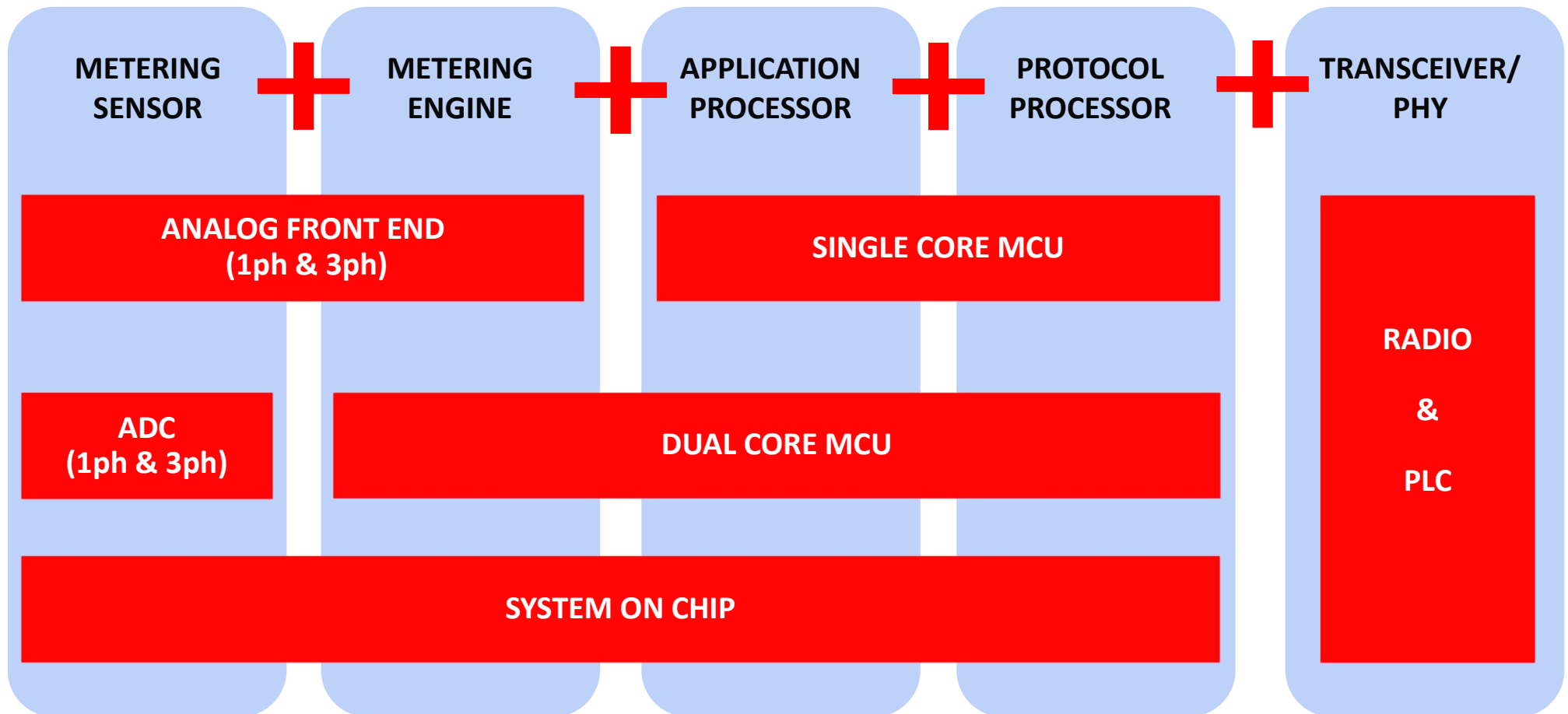
- Residential, Commercial and Industrial
- ANSI, IEC Measurement libraries

- **Communication**

- Certified **PRIME** and **G3-PLC** Libraries
- WiSun PHY: 802.15.4g all modes
- G3-PLC and PRIME PLC/RF Hybrid solutions supported



Smart Energy Platform



System on Chip for Smart e-Metering

- System-on-chip with **integrated metrology AFE / external poly-phase AFE**
- Single, dual and poly-phase metering applications
- Residential, commercial, and industrial metering applications
- **Best in class metrology**
 - Exceed class 0.2 accuracy standards
 - IEC 62052-11, 62053-22/23
 - ANSI C12.1, C12.20
 - Ultra Low Voltage Reference Drift
 - 3000:1 Dynamic range
 - Leading security features



• **Leading security features**

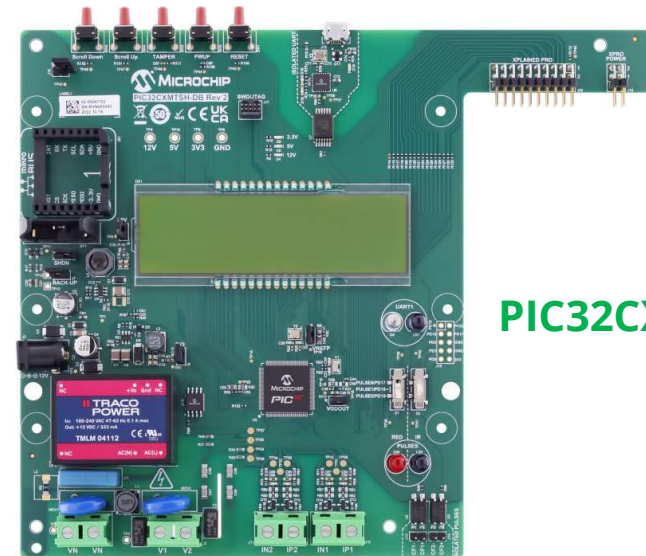
- Secure Boot
- Secure Key storage and transfer
- Cryptographic/Hash HW accelerators
- Classical Public Key Cryptographic Controller (CPKCC)
- TRNG and DRNG



System on Chip for Smart e-Metering

Dual Core MCU with embedded metrology

- **Dual** 32-bit Arm® Cortex®-M4F cores
- **Application/Host Core**
 - Up to 200MHz clock
 - Up to 2Mbytes of Flash
 - Up to 512 Kbytes of SRAM
- **Metrology/Coprocessor Core**
 - Up to 240Mhz clock
- **Embedded metrology Analog Front End**
- **Segmented LCD controller**
- **Advanced Security**



PIC32CXMTSH



System on Chip for Smart Energy Applications

Dual Core MCU

- **Dual 32-bit Arm® Cortex®-M4F cores**
- **Application/Host Core**
 - Up to 200MHz clock
 - Up to 2Mbytes of Flash
 - Up to 512 Kbytes of SRAM
- **Metrology/Coprocessor Core**
 - Up to 240Mhz clock
- **Segmented LCD controller**
- **Advanced Security**



PIC32CXMT C

Single Core MCU

- **32-bit Arm® Cortex®-M4F core**
 - Up to 200MHz clock
 - Up to 2Mbytes of Flash
 - Up to 512 Kbytes of SRAM
- **Segmented LCD controller**
- **Advanced Security**

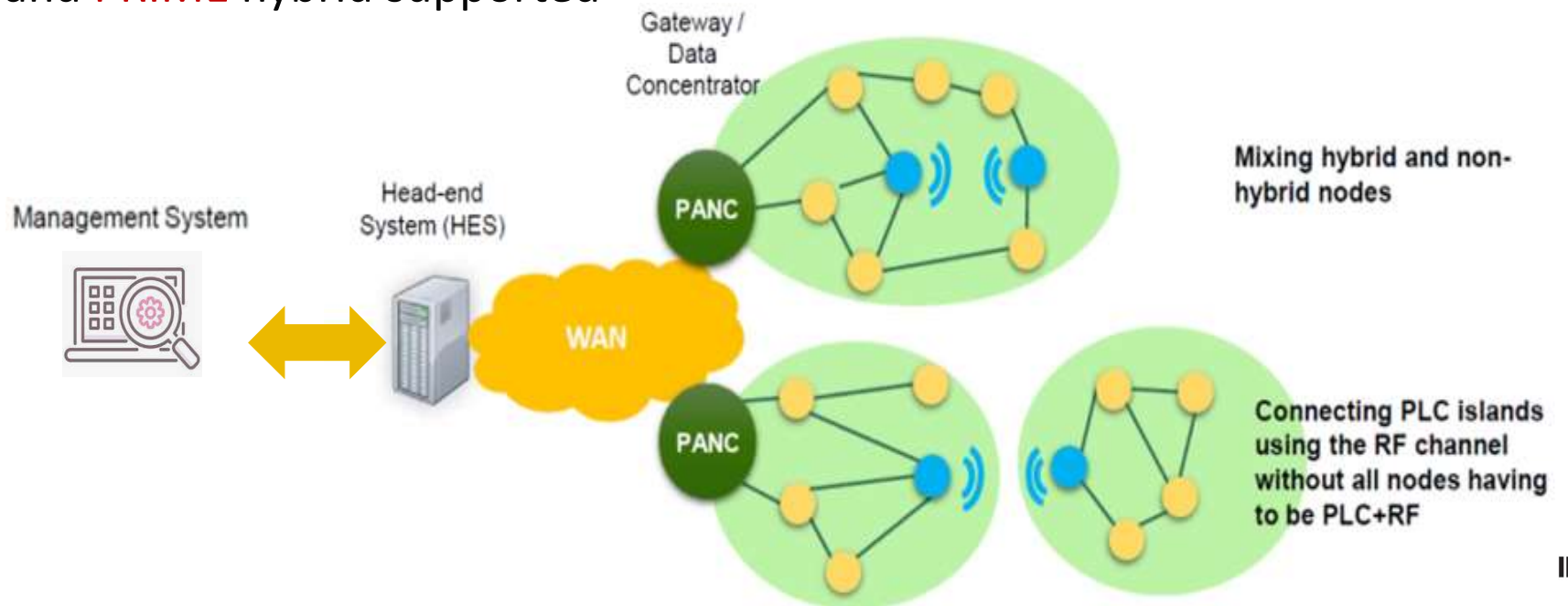


PIC32CXMT G

Smart Energy Hybrid Communications



- **Radio interface – WiSUN-FSK PHY by default**
 - OFDM modulation supported by Microchip enables 4x more robust communications in urban environments
- **PLC interface**
 - G3-PLC hybrid and PRIME hybrid supported



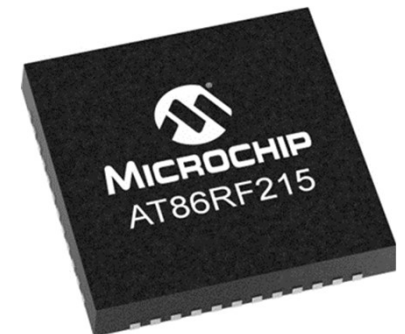
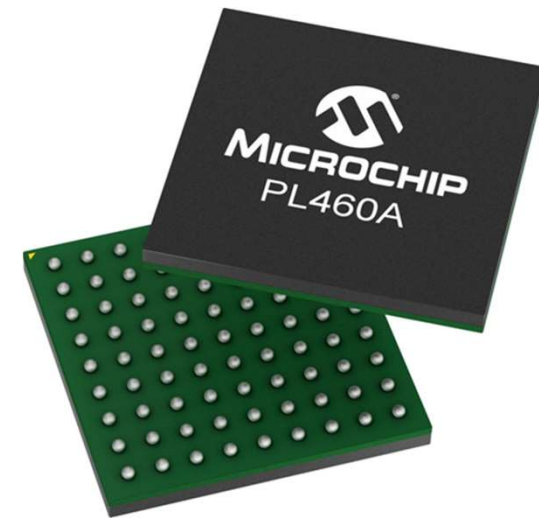
Hybrid Communications - PLC & RF

Narrowband PLC modem for G3-PLC and PRIME

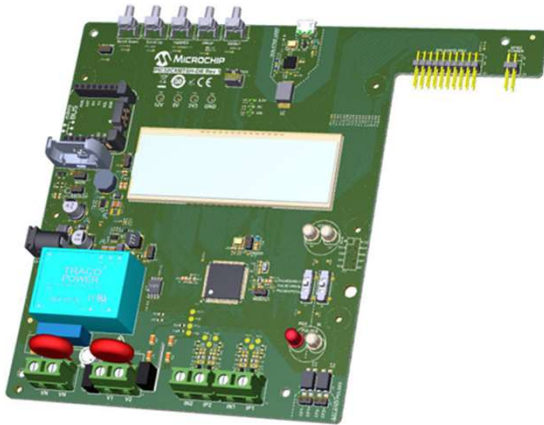
- Embedded Class-D amplifier for high efficiency
- Operates in <500 kHz band
- Secure boot

RF transceiver

- Simultaneous dual-band sub-1GHz/2.4GHz operation
- IEEE 802.15.4g compliant
- SUN FSK & SUN OFDM PHY
- Supports G3-PLC Hybrid, PRIME Hybrid, Wi-SUN PHY, Zigbee PRO and IP



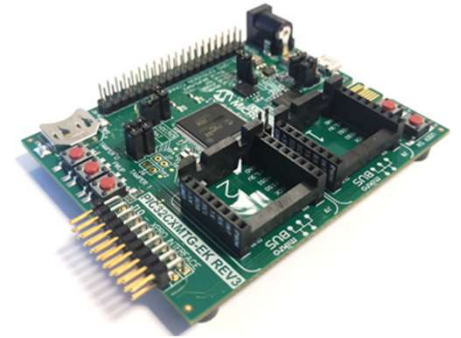
Development Boards



Residential (2 voltages and 2 currents) Smart Meter Demonstration Board



Commercial and Industrial (3 voltages and 4 currents) Smart Meter Demonstration Board



PIC32CXMGT Evaluation Kit with high processing power, embedded security and low-power



Narrowband Power Line Communication (PLC) modem, supporting G3-PLC® and PRIME



Fully integrated dual-band sub-1GHz/2.4GHz radio transceiver

Visit us at microchip.com / Smart Energy

METER DEMO

DLMS/COSEM

TERRANOVA
INNOVATIONS FOR UTILITIES

WiSUN, Zigbee

exegin
TECHNOLOGIES LIMITED

FreeRTOS



SECURITY

CAVP

CERTIFICATION
ECC, AES, TRNG
CPKCL LIB

METROLOGY

IEC & ANSI
DSP LIB

Class 0.2
CT, Rogo, Shunt,
Proprietary

COMMS

PLC & Hybrid
G3, PRIME
WiSUN PHY
Simulator, sniffer

Thank you
