



Adding Intelligence to Smart Energy Applications

**USE YOUR
ENERGY SMARTER**



Microchip's Smart Energy Solutions

Smart Energy involves the addition of intelligence in the form of electronics and technology to create cost effective, energy efficient and ecologically responsible generation, distribution and consumption of energy.

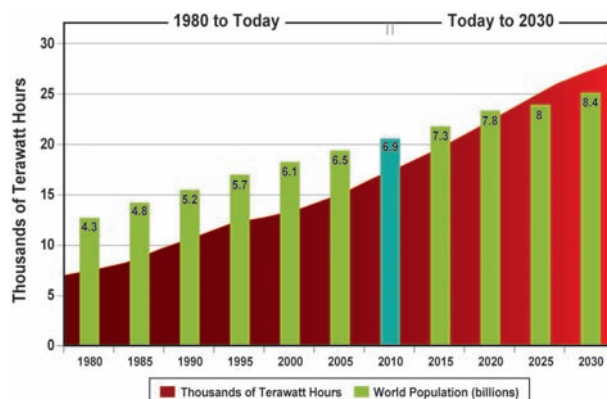
Energy Demand Growth Is Outstripping Energy Supply Growth

Over the last 30 years our demand for energy has grown at over twice the rate at which the population has grown. The rapid growth in global economies, and the resulting growth in standards of living, have created an insatiable growth in the demand for energy. Looking forward to the next 20 years, the growth in demand for energy will further accelerate and is projected to significantly outstrip population growth.

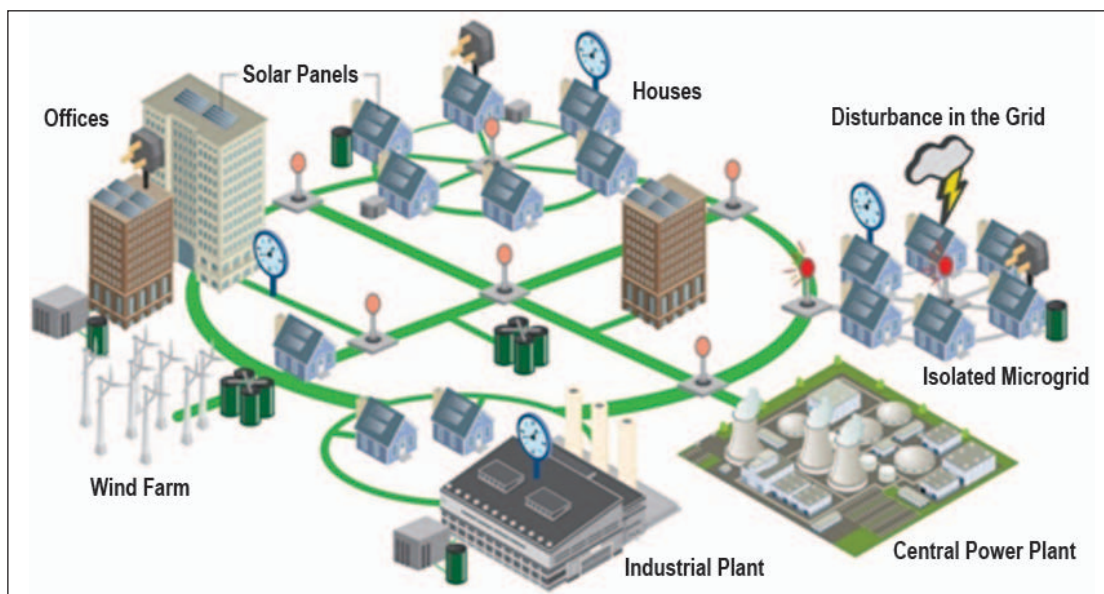
These increased energy needs place further burden on the existing grid infrastructure raising questions on reliability. A majority of the electrical grids around the globe were designed many decades ago and lack the features needed to meet future demand levels.

Embedded Intelligence Solutions Can Help Address The Demand Curve

While generating more energy or increasing consumption efficiencies will help, these are costly and require time to make an impact. One of the near term opportunities is to innovate with embedded technology. All the key ingredients exist today to enable consumer products to measure, communicate and effectively manage energy consumption.



Examples of New Applications



Smart Loads & Appliances

- Coordinate consumption
- Shift energy use to low cost periods

Smart Meters & Gateway Devices

- Communication
- Gateway networks

Smart Grid

- Adds intelligence for real time monitoring and demand response
- Controls seamless integration of alternate energies

Smart Energy Technologies



Display Your Energy Usage: LCD & Graphical Solutions

As energy awareness increases, consumers want to understand their consumption patterns. This is easily accomplished by adding a display powered by a Microchip microcontroller with integrated controllers for graphics or segmented LCDs or an MCU connected to an external graphics controller. Building a user interface is quick and easy using Microchip's free graphics library

Control Your Energy Consumption: mTouch™ Sensing

Adding user controls is easy using capacitive touch technologies. Display-based products can utilize resistive touch screens or projected capacitance overlays for consumer friendly graphical user interfaces.



Use Your Energy Smarter: PIC® Microcontrollers & Memory

Microchip offers cost effective microcontrollers, and EEPROM and serial SRAM memory products. Battery powered applications such as energy measurement nodes benefit from nanoWatt XLP technology's industry leading low standby power.

Communicate Your Energy Usage: Wireless & Wired Connectivity

The ability for smart meters and end-products to share energy usage data and receive time of use events requires robust wired or wireless communications. Microchip offers 802.11, 802.15.4, sub-GHz wireless technology as well as Ethernet and USB. To speed development Microchip offers ZigBee® Pro Smart Energy Profile 1.0, ZigBee, MiWi™ and TCP/IP communication software.



Make Your Motor More Efficient: Advanced Motor Control

Motors account for a large portion of energy consumption in appliance and HVAC applications. Microchip provides the algorithms and tools to increase the efficiency of your motor control applications for brushless DC, permanent magnet synchronous, AC induction and brushed motors.

Measure Your Energy Consumption: Metrology Solutions

Accuracy in energy measurement is critical for utility meters as well as determining energy usage in a particular area of a facility or home. Microchip offers high accuracy energy measurement solutions using high resolution A/D converters, full energy measurement ICs and firmware in reference designs using a variety of PIC microcontrollers.



Add Intelligence When Converting Energy: Intelligent Power Supplies

Considering all consumer products have a power supply that converts power line energy to a useable form, an efficiency improvement makes an impact to overall energy consumption. Microchip's family of dsPIC® digital signal controllers provide the processing power and algorithms required for dynamic adjustment of control loops and predictive control algorithms.



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