

Texas Instruments

Enabling Innovative

«Green» technologies

November 4th 2010

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Integrated Circuit Impact on Tomorrow...

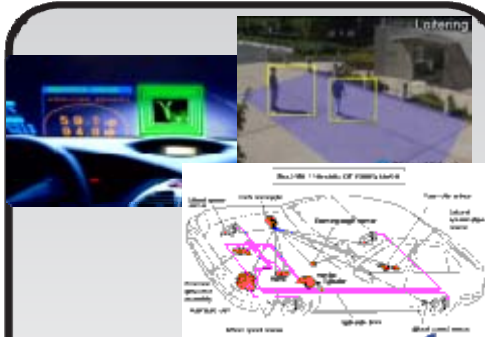
Healthcare revolution



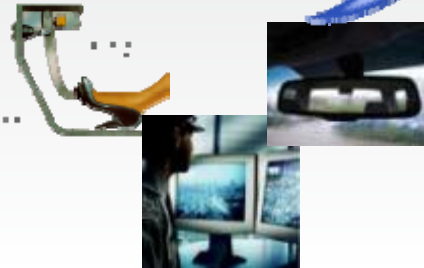
Healthcare transformed



Safety & Security revolution



Safety and Security transformed



Green revolution



Energy Generation, Distribution & Use transformed



TI along the Energy Chain : Make it !

Use It

Conversion



Lighting

Motors



Consumption



Appliances



Power Supplies
& Zero stand-by



Transportation



HVAC



Self-Powered Systems



Energy Harvesting

Move It



Real-Time
Monitoring

Transmission
& Distribution



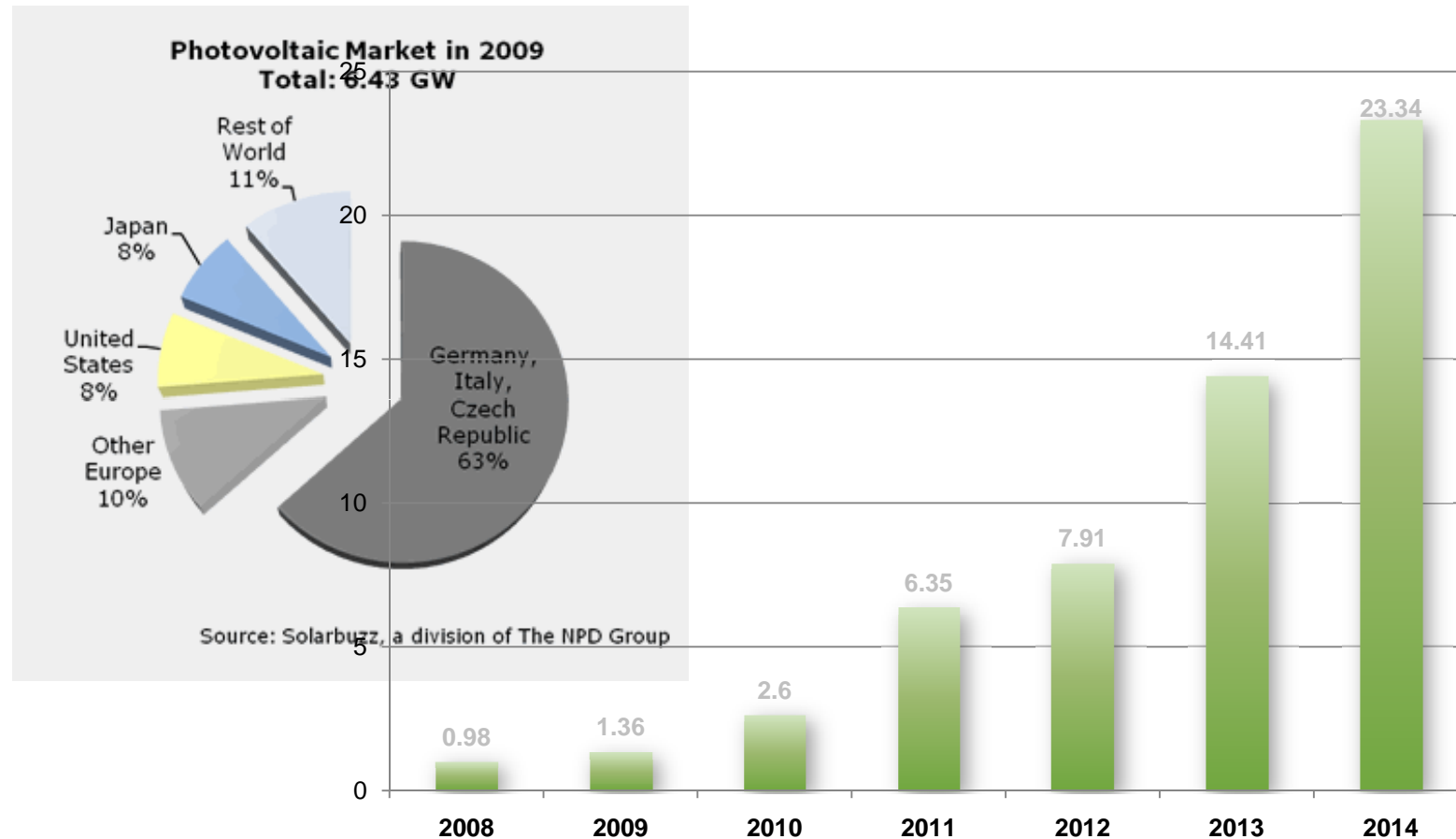
Smart Meters
2-Way Comm.
Price Signaling
Demand Response
Supply Response

Make It



Distributed (Local)
Renewable (Clean)
Conventional (Fossil)

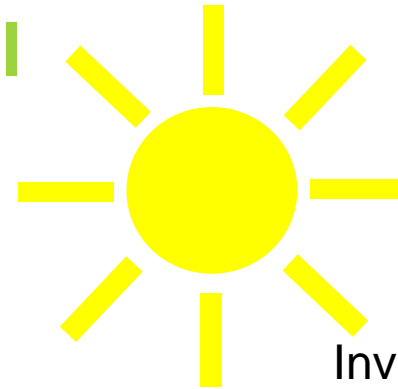
Solar Market – Solar Demand



iSuppli Corp: global solar inverter Shipment (Millions of unit – Sept 2010)

Make It

Enabling your residential Solar Applications



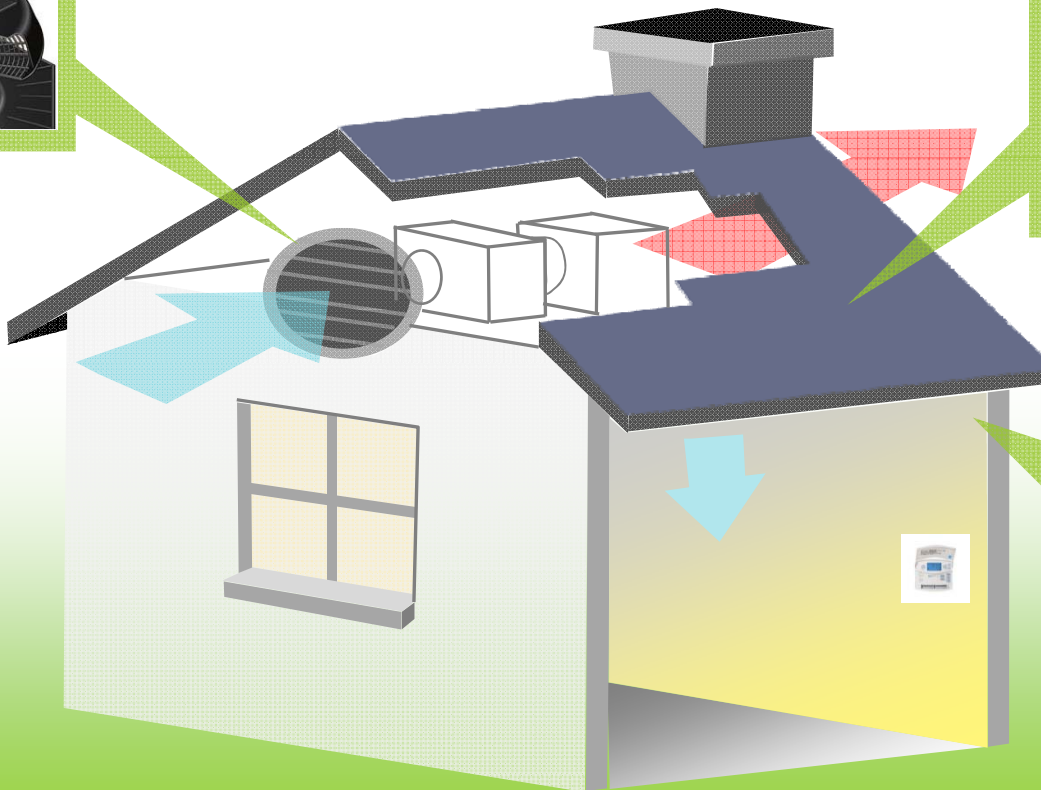
Solar roof Ventilation



Inverters



Solar Garden lamp



Solar Smoke/PIR
detectors, intelligent
Sensors

Solar Energy Systems Lab

The Lab



- Lab officially generating power since OCT09
- 2 high voltages benches
 - 2 3kW grid-tie inverters
 - 16 215W Solar Modules on Lab roof
- Power and communication for monitoring

Solar Lab Focus



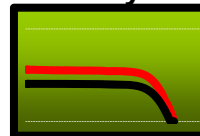
- Maximum power from every module
- Better monitoring and safety
- Reduce cost for module electronics
- Enable Ultra-high reliability

Our Projects

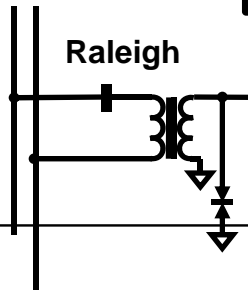
Velocipede



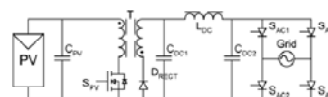
Huffy



Raleigh



Schwinn



- Micro-Converter with MPPT
- Micro-Inverter
- Solar module performance
- Communication protocols

Solar DC Applications multiplying lets Enable a “quality” next generation



New range of innovative DC Solar Chargers enabling easier life and energy savings:

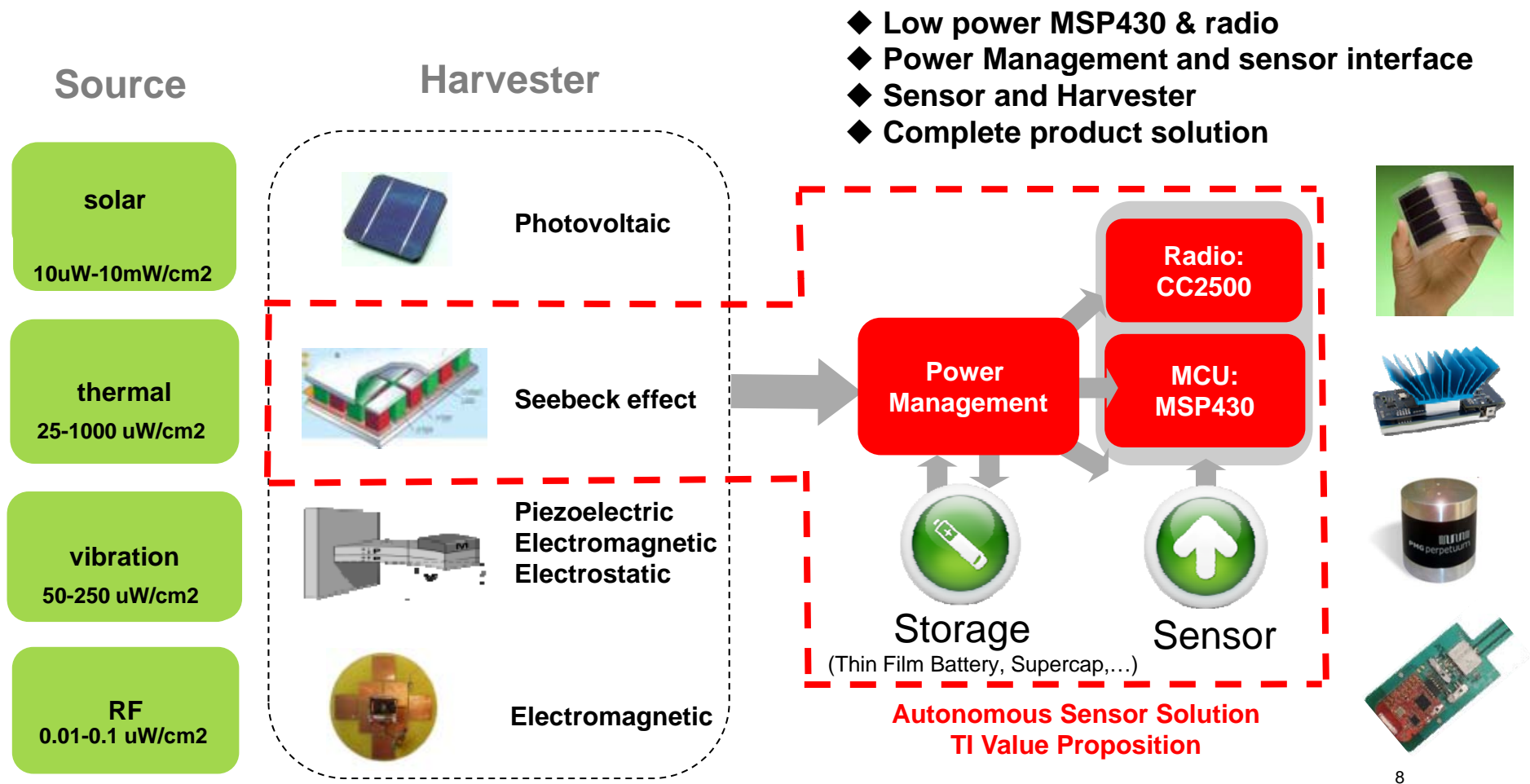
Improves efficiency vs using panel as current source : Reduced panel size, more W/\$...

- Intelligent Battery Management :
 - better battery aging,
 - higher charge density,
 - better security.
 - temperature compensation

Cold Start in low light conditions extending usage range (incl. indoor)

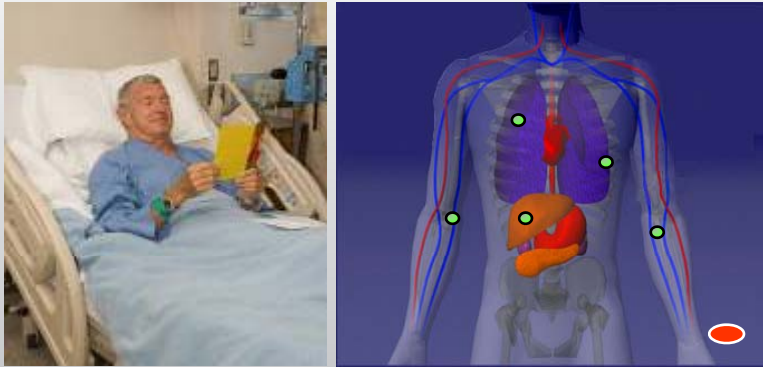
Alleviates the complexity to get the system to work from solar panel.

Energy Harvesting from different sources



Self-powered systems enabled with energy harvesting & ultra-low power ICs

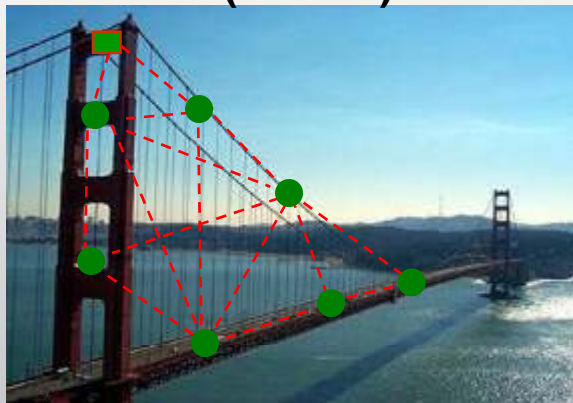
**Remote patient monitoring
(body heat)**



**Industrial wireless sensor network
(light, motion, RF)**



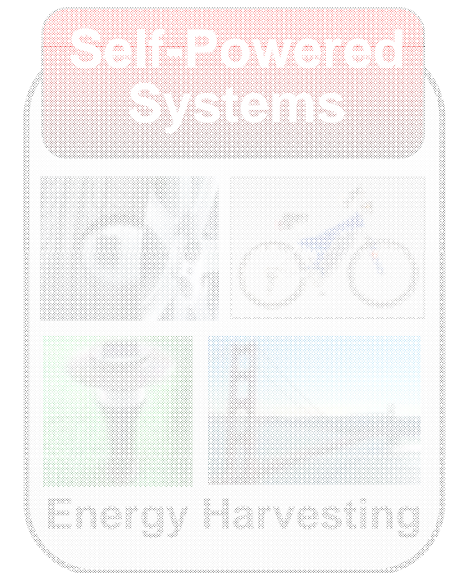
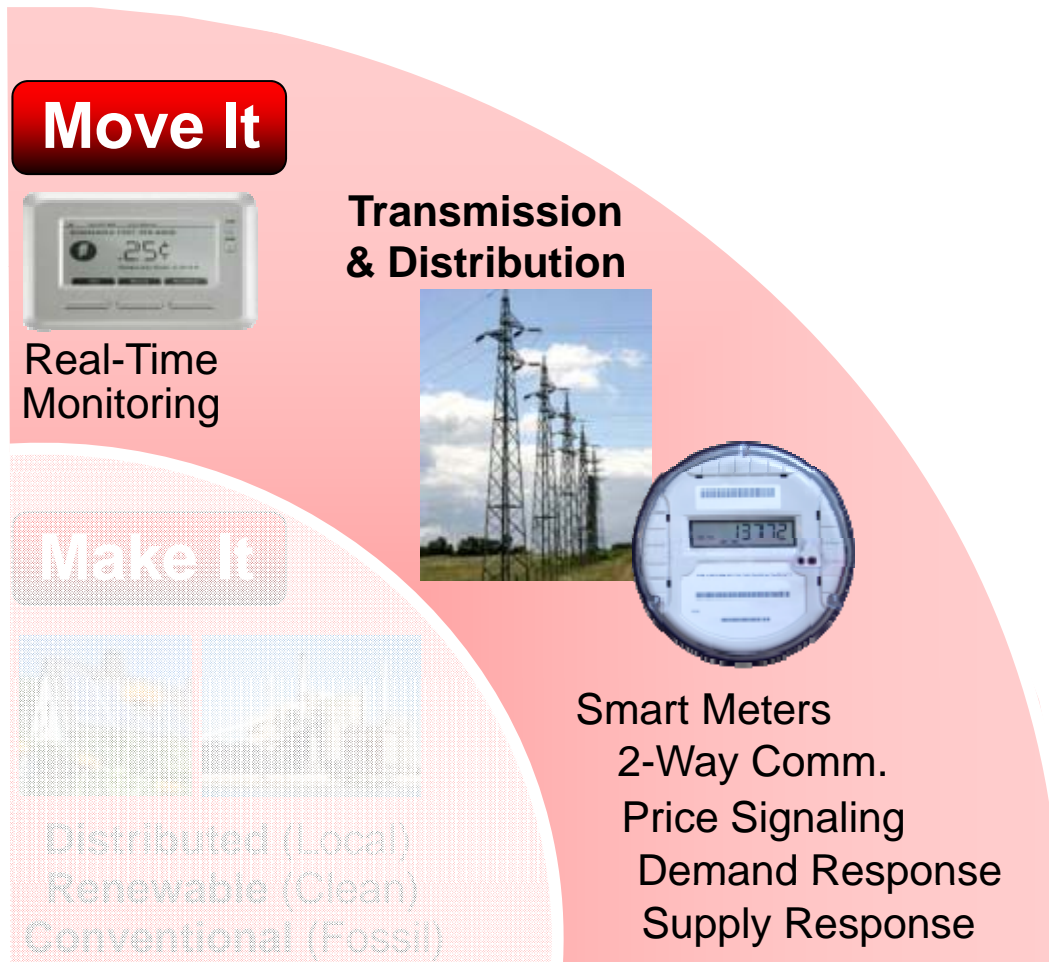
**Structural monitoring
(motion)**



**Consumer wireless sensor networks
(light, motion)**



TI along the Energy Chain: move it !



TI along the Energy Chain: use it !

Use It

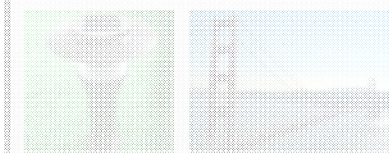
Conversion



Motors



Self-Powered Systems



Energy Harvesting

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Real-Time Monitoring

Transmission & Distribution



Consumption



Appliances



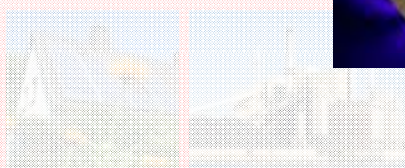
Power Supplies & Zero stand-by



Transportation



Make It



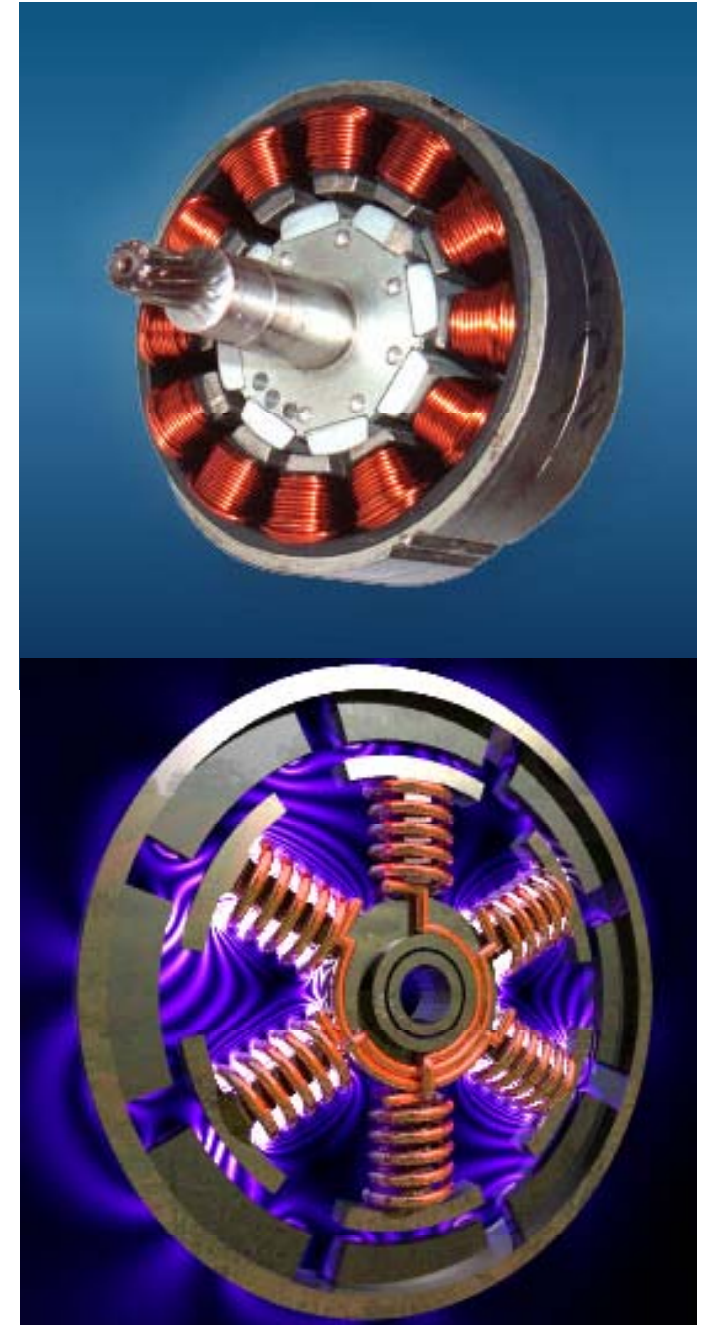
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Use It

TI enabling Advanced Motor control

- **Motors do represent one of the major Energy saving opportunity**
(> 60% energy use in industrial)
- **2010: 2.8B BLDC** motors produced for hard disk drives, pc fans, electric vehicles, and making inroads into appliance and HVAC systems.
- TI is already a major player : HDD, printers,...
- TI is accelerating investments in Motor control full system solutions:
 - Smaller Motors with lighter weight
 - Better efficiency (typically >90%)
 - Reduced problems with heat
 - Higher reliability
 - Electronically controlled (so easy to extend for speed, reverse, motion control)
 - Lower Cost
 - Reduced noise and vibration



Motors are everywhere !

An fun example of Innovative motor control application



Click on video to launch

Use It

Lighting



50X



>5X



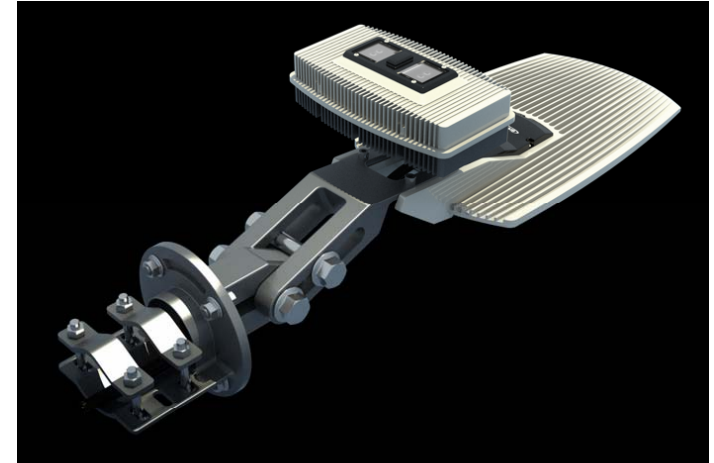
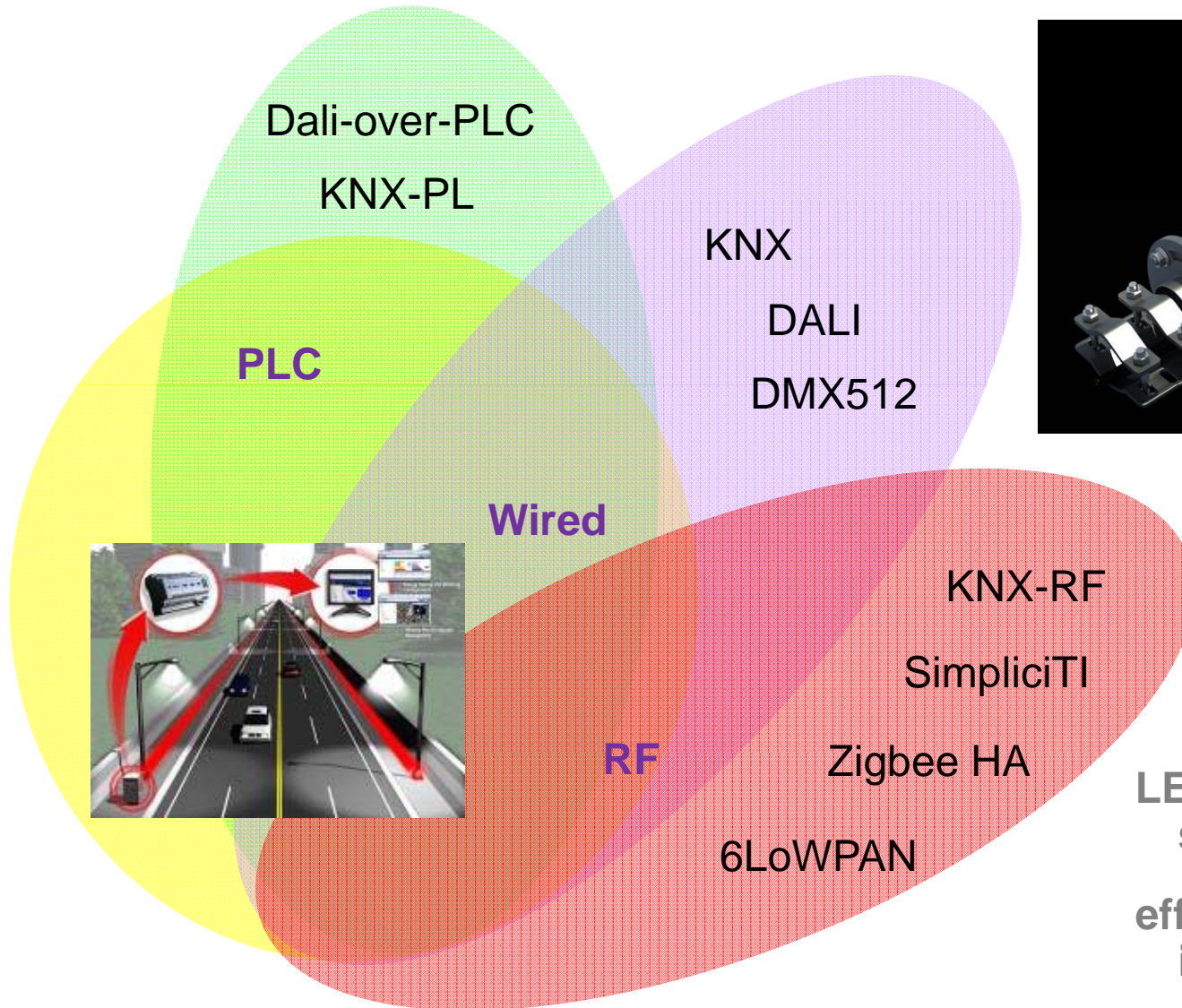
LED

Did you know who filed the first LED patent in 1961 ?

Did you know who was #1 LED Driver supplier in 2009 ?

Solid state lighting is dramatically more efficient than conventional lighting,

Beyond LED Bulbs...full Lighting Systems

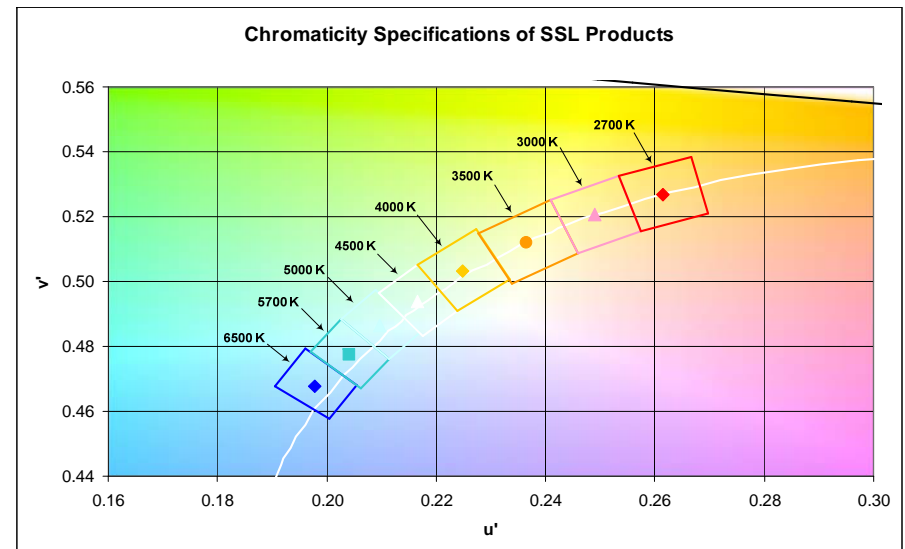
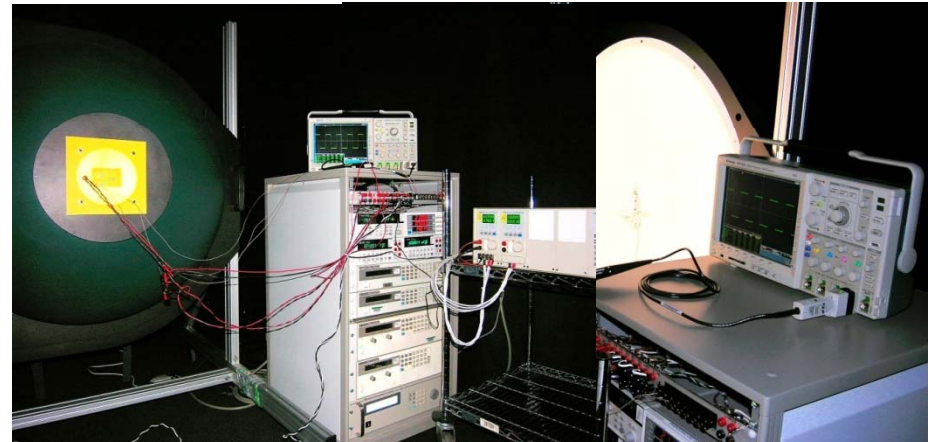


LED demand to be driven smartly:

efficiency & lifetime increase when dimmed

TI Lighting Lab : Bridging the technological barriers between LED vendors, thermal, optical and electronic experts.

- **Small Luminaires & LEDs**
 - Integrating Sphere & Spectroradiometer
 - Color, CCT, Lumens, Efficacy
 - Spectral Radiance
 - NIST traceability
- **Large Luminaire**
 - Color, Lux, spatial distribution
- **Automation**
 - Hardware via USB/GPIB interface
 - Software via TI proprietary GUI
 - Electrical/Photometric measurement
- **Data Plotting**
 - CIE 1931/1976 chromaticity
 - Spectral data
 - C78.377 CCT bins & vendor specific binning



Summary

Innovative Solutions for **each stage** of the Make-Move-Use chain

Broad portfolio to offer **full system** solutions

Dedicated Experts for each market

TI will definitely be a key enabler of the “**Green revolution**” ... with YOU !