



Alternative Power for Mobile Devices

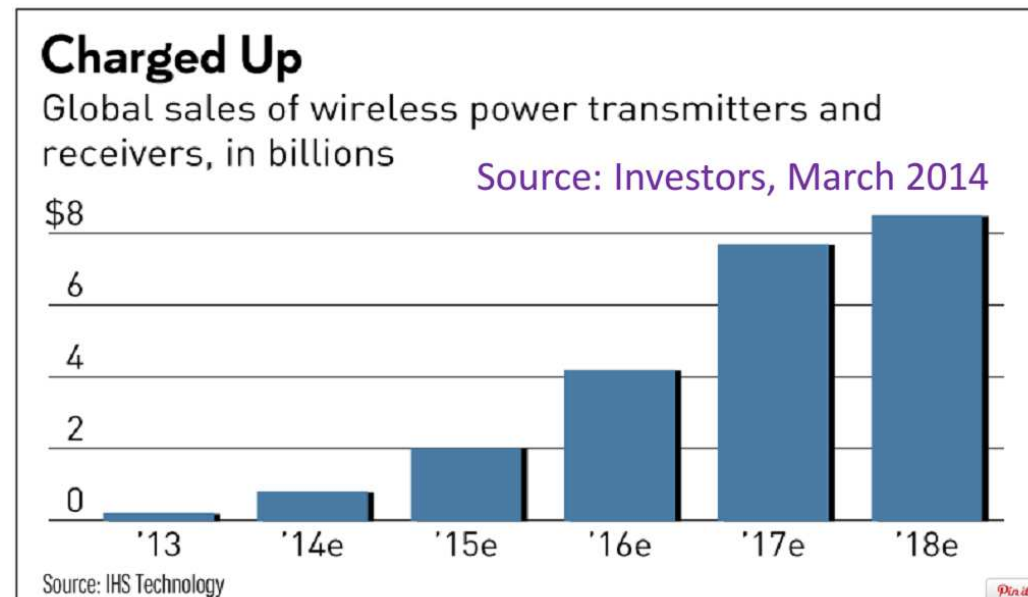
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Outline

- Motivation – Wireless Power Transfer
- Power Demand from Mobile Device
- Ambient Harvested Energy
- Opportunity & Challenge

Market Forecast on Wireless Power



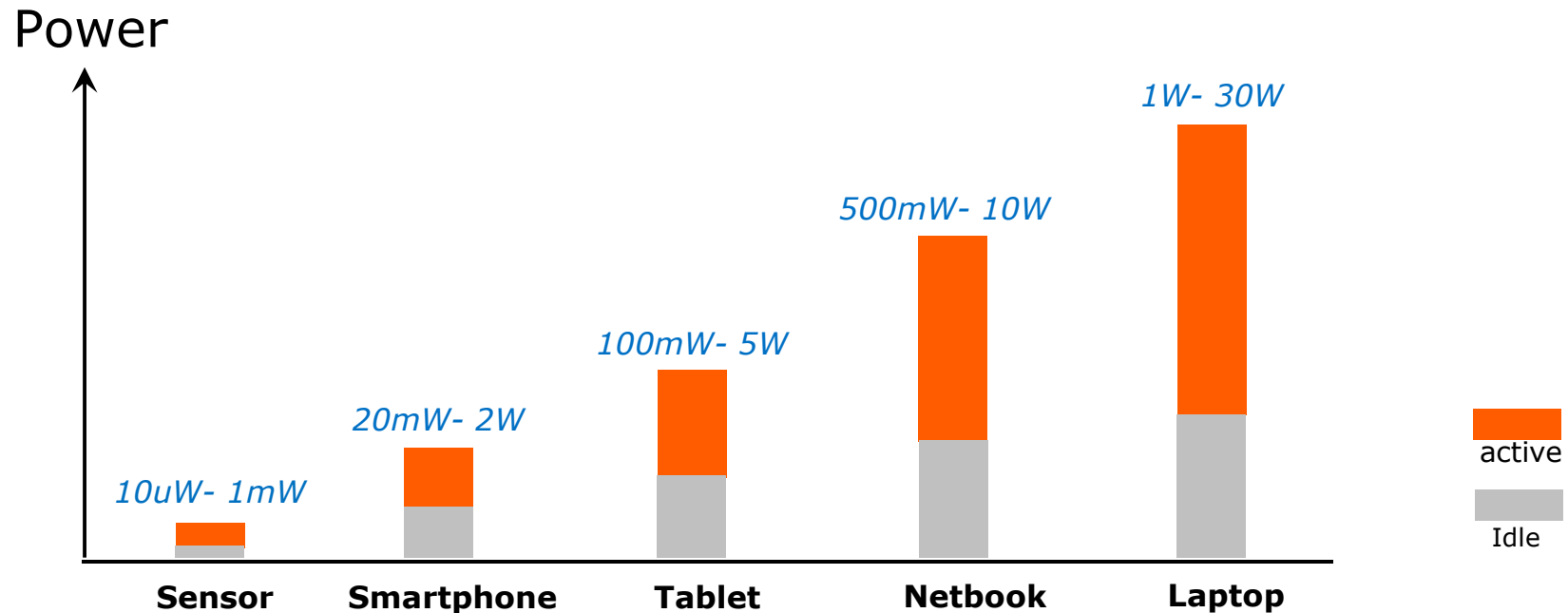
Wireless Power

- Transfer energy from one device to another device without physical contact

Usage Case

- Desirable feature for Smartphone, Tablet, Laptop and PC
- Useful capability for Wearable
- Necessary core for IoT devices

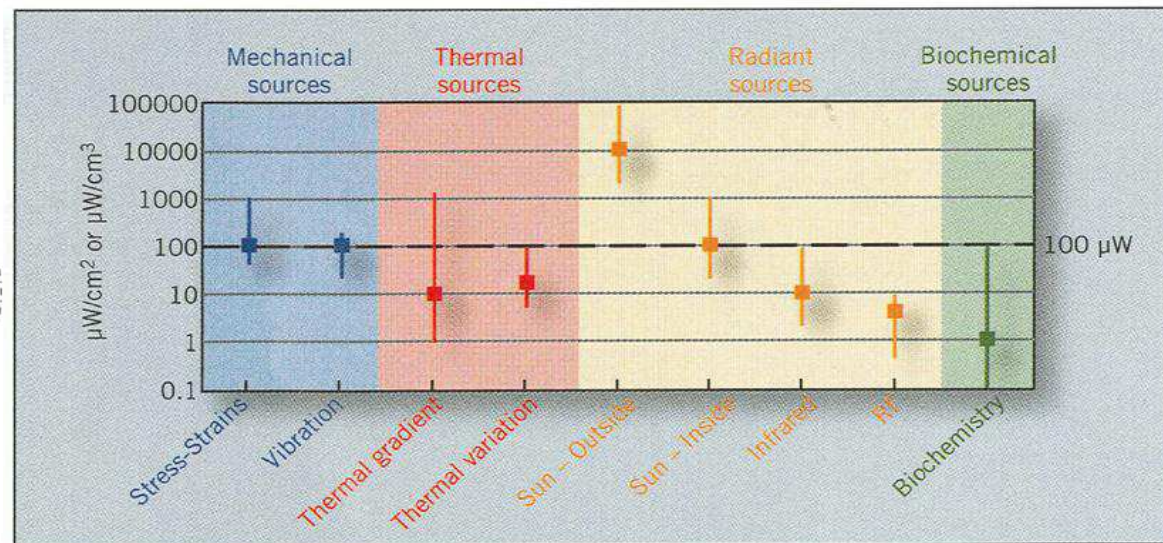
Power Demand of Mobile Devices



Variable Power Demands Lead to Different Solutions

Power Available from Energy Harvesting

Alternative Power Source



A comparison of ambient energy sources (before conversion). (Source: CEA-Leti).

- Photovoltaic Energy Harvesting Has the Highest Power Density (2~3 orders bigger)
- Rest of Energy Harvesters Are with Power Density ~ 100 uW/cm² or Less.

Moving in the Direction

Wireless Charging Bowl
for Wearable Devices



Wireless Charging Table
for Phone and PC



Solar Powering Classroom



Example: Solar Charging for 2-in-1 Tablet

- ✓ Directly powered by 10W-rated solar panel
- ✓ One hour charging for 1.5hrs Tablet running
- ✓ Charging the battery during the system running
- ✓ Dual-power input compliant (Adaptor, Solar panel)

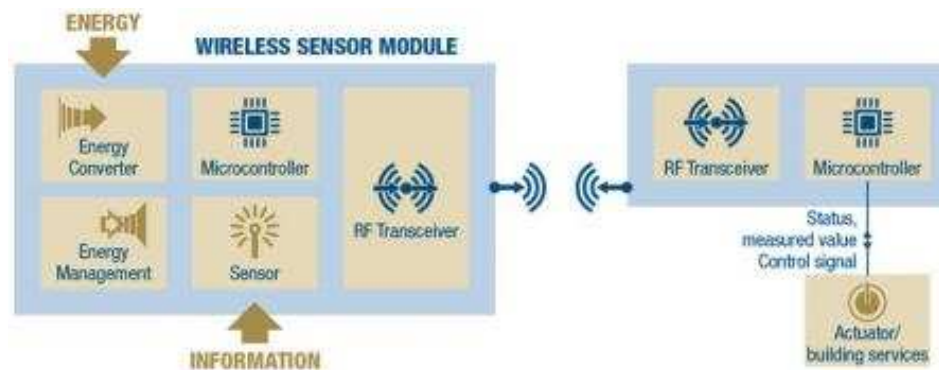
Charging Time

Item	Tablet to 80% (hour)	Tablet to 100% (hour)	Tablet +dock to 100% (hour)
Tablet battery 28Wh, dock battery 15Wh	4.6	6	7.9
Tablet battery 31Wh, dock battery 15Wh	4.9	6.3	8.3



Opportunity and Challenge

- Energy Self-sustainable Device or Mini-system
 - Smart sensor nodes for IoT & Wearable
 - Multi-source Energy Harvesting generation & PM (uW~mW)
 - Integrated solution - transducer, wireless Tx/Rx, storage, processor, packaging



Opportunity and Challenge ('Cont.)

- Wireless Charging for Mobile Platform
 - Usage model and user experience
 - Power transfer efficiency vs. distance
 - Standard, safety, regulation.....

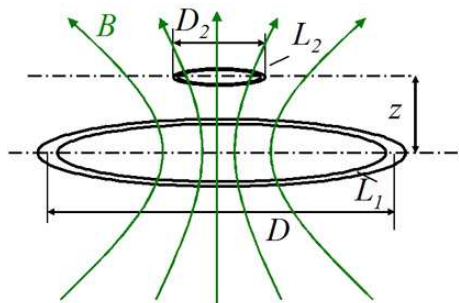


Figure 1 Typical arrangement of an inductively coupled power transfer system

