A hand is shown from the left, holding a bright, glowing energy source that radiates light. The background is a deep blue with abstract, glowing white and light blue lines and patterns, suggesting a digital or energy theme. The overall mood is futuristic and empowering.

Empowering Personal Energy Systems

IDF2010
INTEL DEVELOPER FORUM

Slicing the Worldwide Energy Efficiency Opportunity

Drive Computing to Be
More Energy Efficient

2%*
Opportunity

Help the World
to Be More
Energy Efficient

98%
The Big Opportunity

The Impact of Consumers



US Households: 113 Million

US Automobiles: 250 Million

Represent 35% of US Energy
Consumption Portfolio

Personal Energy Systems

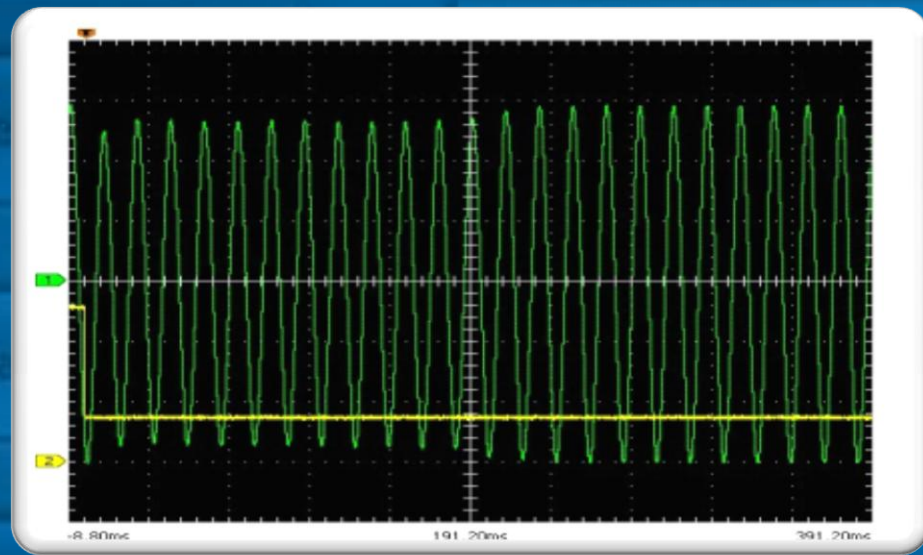
Empowering Savvy Consumers

Self-Sufficient Neighborhoods

Smarter Electric Vehicles

Low-Cost Energy Sensing

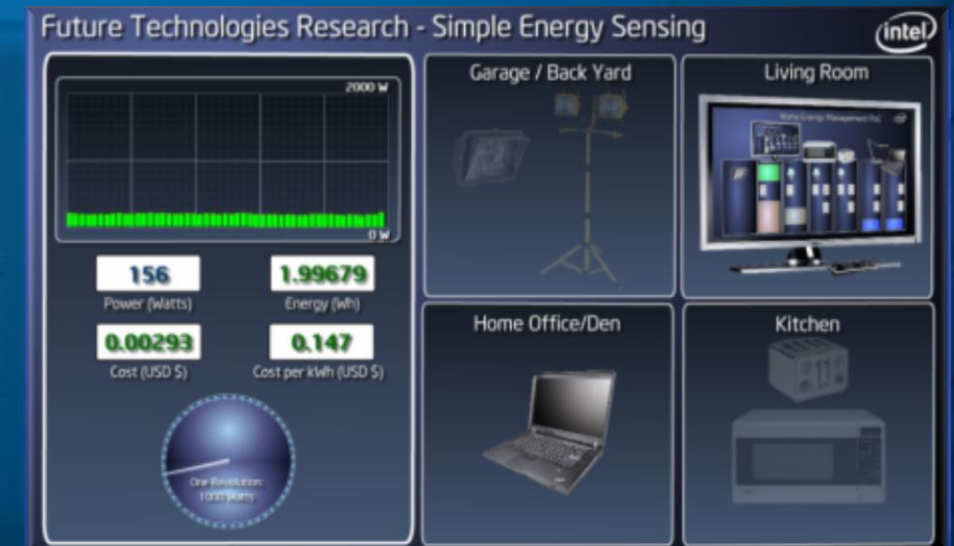
Using Computational Signal Analysis To Extract Load Information



Infer Appliance Operation by Sensing AC Line Signals



Simple, Low-cost Wireless Sensor Anyone Can Install



Compute Detailed Home Energy Consumption from Only One or Two Sensors

Intel's In-Home Display Research

Key Ideas

- Monitoring energy alone is not enough of a motivation for people
- To behave more energy efficiently, people need support
- To keep people engaged the system needs to evolve with them



Do-It-Yourself Renewable Energy



“just work” vision: ability for consumers to purchase, plug & play renewable energy

Standards are critical to make this possible

Intel Labs developing architecture to inform the standards. IETF and IEEE.



Coordinating Electric Vehicle Charging to Reduce Peak Load

- **Challenge:** *Uncoordinated Charging of Electric Vehicles May Require Significant Increase in Peak Power Generation*
- **Intel Labs is developing simulation tools**
 - Learn how to enable car to determine best time for charge (optimal for environment & cost)
- **Estimated Results in Lab:**
 - When using shift charging start time: Charge during neighborhood minimum load: ~41kW peak during EV charging
 - When applying "Personal" Charging Profile: Use minimum power level to complete charge in time required: ~20kW peak during EV charging

Empowering Energy Consumers

- Use technology to inform consumers and change their behavior
- Aggregate millions of small contributions
- Drive a significant change in CO₂ output