

VA Governor's Energy Conference
October 2010

Datta Godbole

**Efficient & Secure
Smart Grid**

Honeywell



**Air Traffic
Modernization**



Biofuels



Green Buildings



Reduced Emissions

Nearly 50% of Honeywell's product portfolio is linked to energy efficiency. The U.S. could reduce its energy consumption 20 – 25% by immediately and comprehensively adopting existing Honeywell technologies.



Fuel Efficiency



Industrial Process Efficiency



**Energy Efficiency,
Demand Response & Smart Grid**

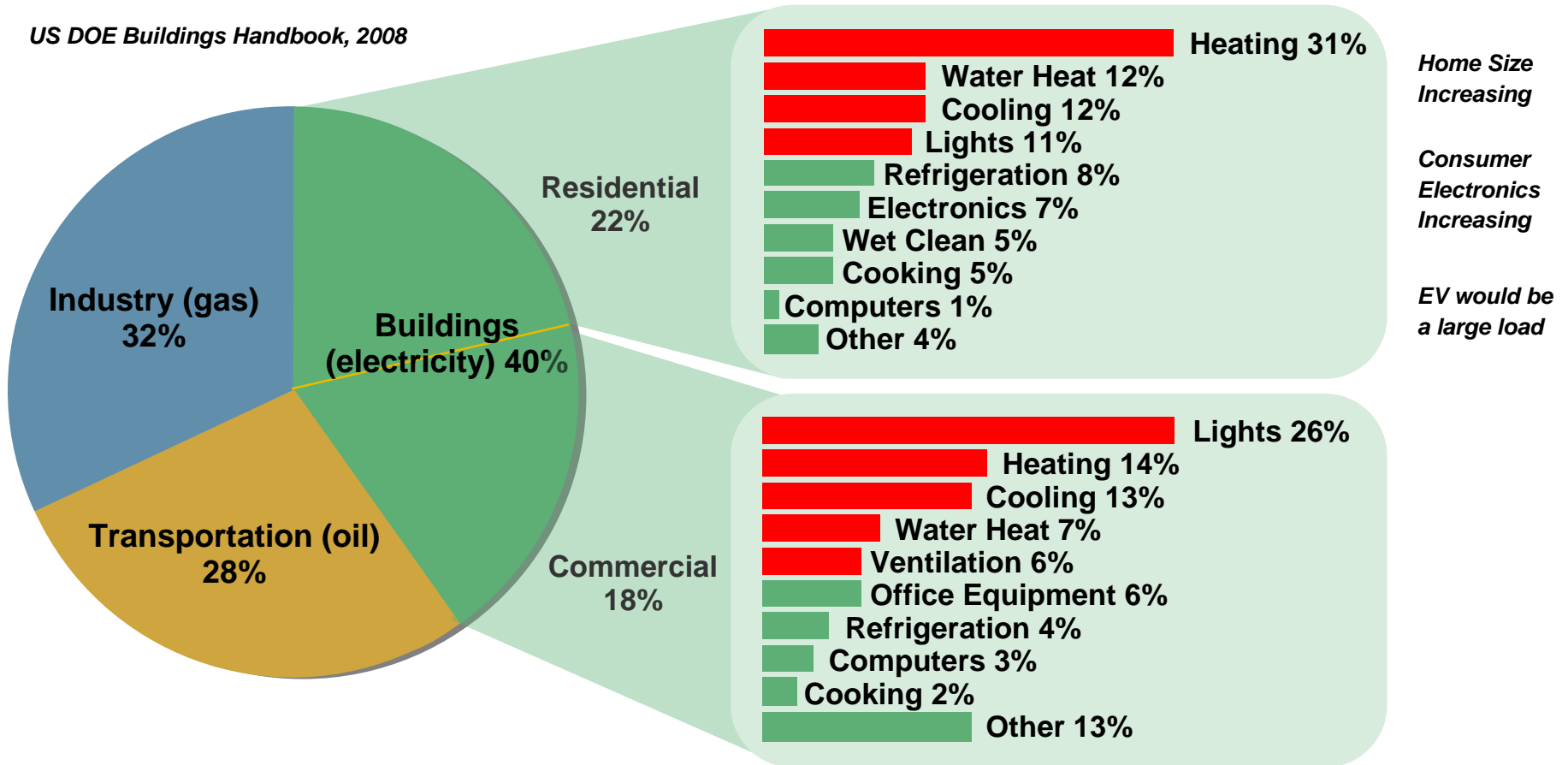


**Energy
Performance Contracts**

Creating sustainable jobs today using existing technology and infrastructure

U.S. Energy Consumption (all sources)

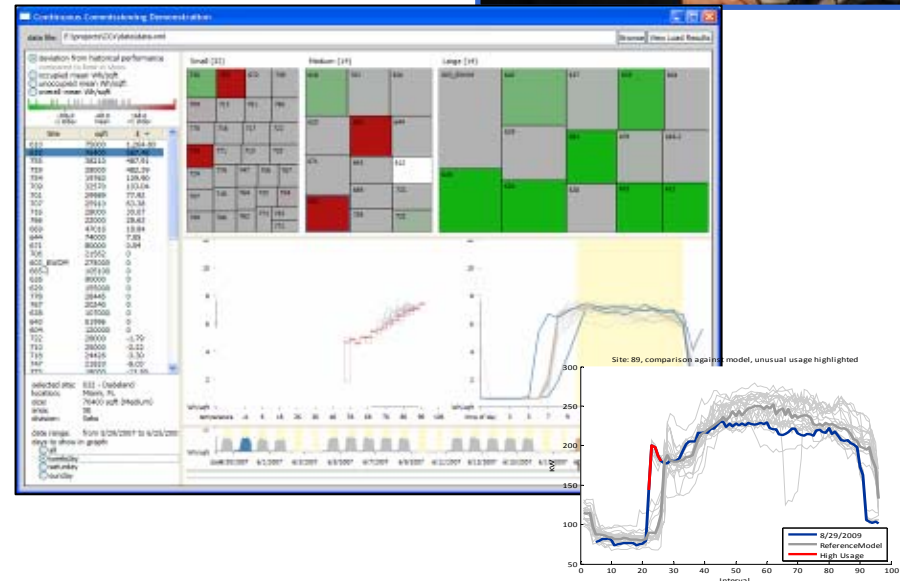
US DOE Buildings Handbook, 2008



Building automation can control 66% of energy in homes and buildings

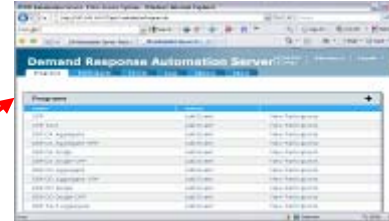
Novar Remote Energy Management Service

- **Example: Honeywell's Novar** keeps energy consumption and costs low for multi-site businesses and reduces peak loads for utilities
 - Novar currently manages 6 gigawatts of load
- **Top Novar multi-site customers**
 - Walmart, Office Depot, Home Depot, Lowes
- **Typical results**
 - 20-25% energy efficiency
 - 10-20% peak load reduction
- **Analysis & Feedback**
 - Comparison between buildings
 - Comparison to baseline and model
 - Root cause analysis
 - Specific suggestions
 - Results in behavior change



Secure cloud-based energy management using existing communications infrastructure

Automated DR for Commercial/industrial customers



Honeywell

- Project Implementation
- Operating Center
- Reporting



Honeywell (Akuacom)

DR Automation System [openADR protocol over Broadband (IP)]

- Event Control / acknowledgements
- Information Dashboards

- CPP Tariff Creation
- System Planning
- Event Notification
- Incentive Payment
- Regulatory Reporting

Tridium JACE (Interoperability)

- Integration with Existing BAS
- Customer Dashboard



Honeywell



700 SCE Customers (80 MW – AutoDR)

- > 200KW
- Program Participation Agreement
- DR Specific BMS Programming Changes (automation)
- Individual Event Participation



U.S. DEPARTMENT OF
ENERGY

2009 Recovery Act Selection

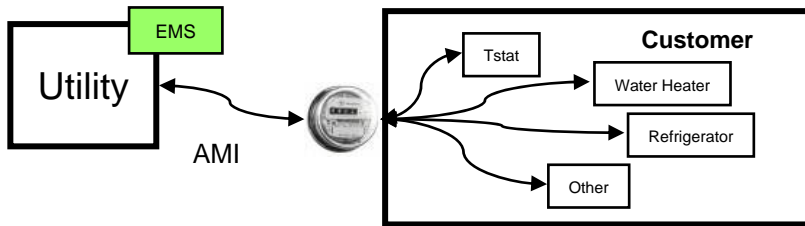
- Category 2: Customer Systems
- Recovery Act Funding Awarded: \$11,384,363
- Total Project Size: \$22,76,8726

2009 Recovery Act Selection

- Similar projects with Cities of Tallahassee and Quincy in Florida

Emerging Smart-Grid Architectures

Expanded Demand Response



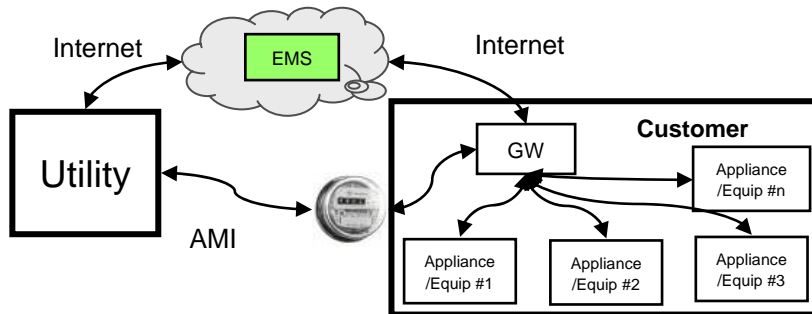
Market Fit

- ✓ Residential
- ✗ Commercial
- ✗ Industrial

Characteristics

- Smart Appliances
- Prices to Devices

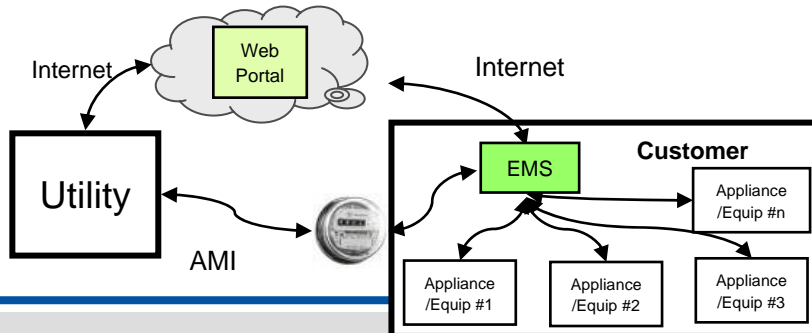
Cloud-Based EMS



- ✓ Residential
- ✗ Commercial
- ✗ Industrial

- All information aggregated in the cloud (Requires High Bandwidth)
- Energy management from the cloud (Introduces Time Delays)

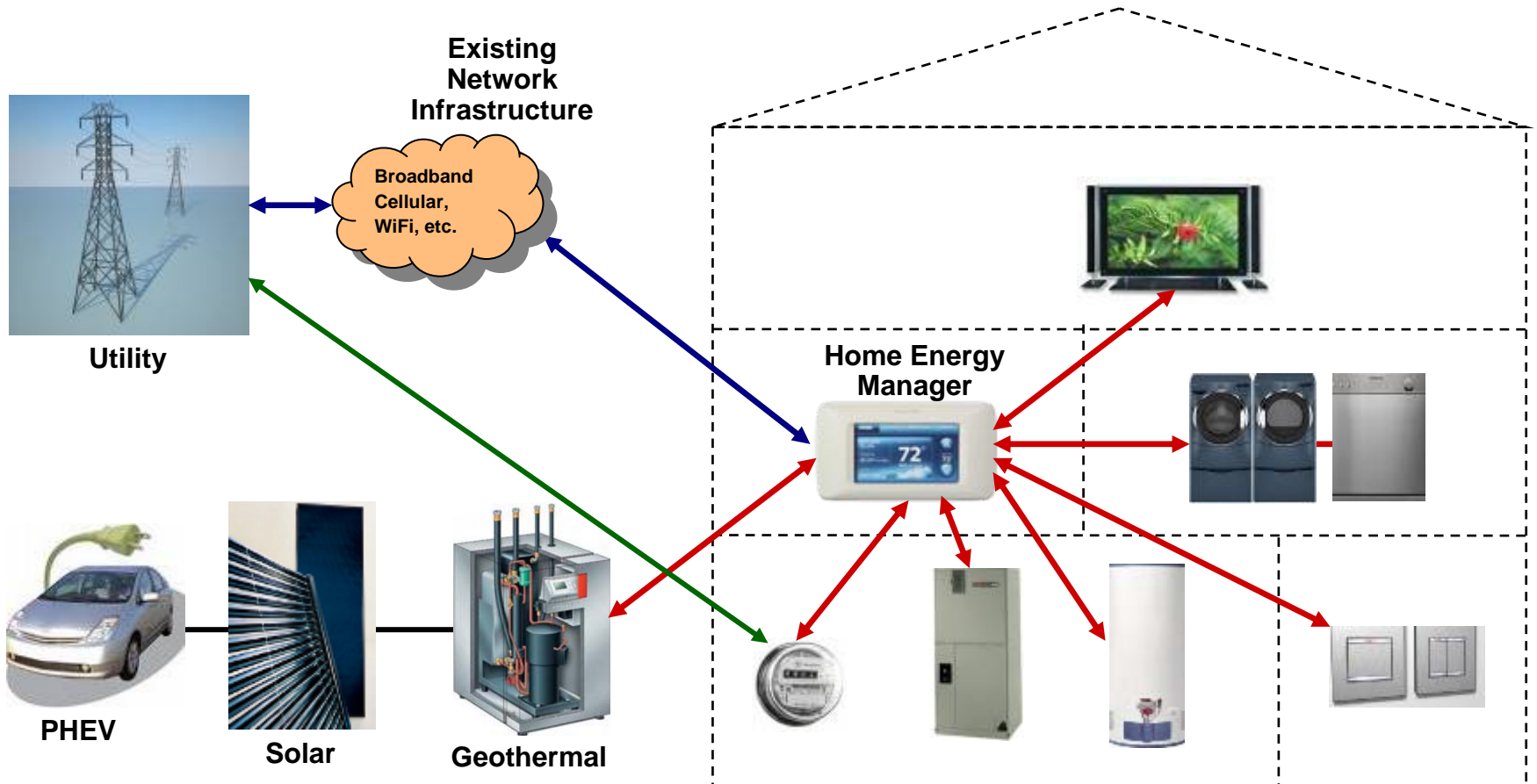
Customer-Based EMS



- ✓ Residential
- ✓ Commercial
- ✓ Industrial

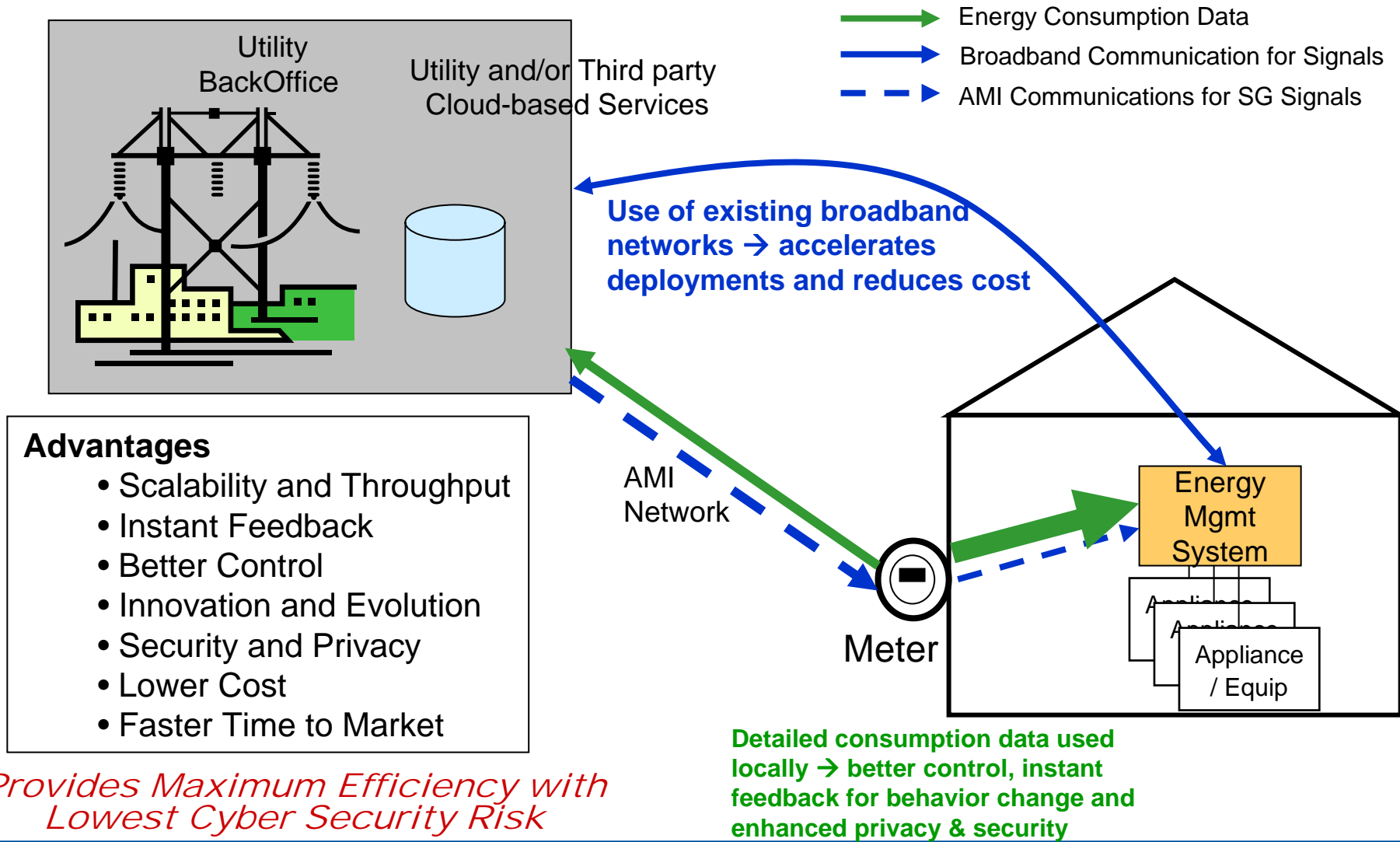
- Detailed Consumption Data used locally
- Single User Interface for consumer to program
- Cloud analytics to look for trends & provide behavioral suggestions

Smart Grid: Residential Perspective



Simple, easy-to-use, secure and efficient solutions using existing infrastructure

Architecture with EMS as HAN Hub



Consumer Centric Principles

Consumers should own and control their detailed consumption data

- utility ownership/access appropriate for data needed for billing or grid reliability

Consumers should have direct meter access to their consumption data

- smart meters can provide real-time or near-real-time access
- third-party access to data at consumers' discretion

Demand management information should be communicated over existing infrastructure where possible

- use of Internet, cellular, pager networks do not require large infrastructure investment

EMS should allow consumers to set energy management actions

- easy to use, context adaptive automation

**EMS based architecture: successfully deployed in C&I, suited for residential
Provides cost-effective solution that is secure and protects data privacy.**

Policy Considerations

- Initial ARRA investment covered smart metering and T&D infrastructure improvements. Additional investment will be needed to create consumer benefits
- Consumer benefits
 - Real-time access to consumption information is critical for behavior modifications
 - Variable electricity rates (TOU/ CPP) will enable behavior modifications
 - Context aware automation will provide maximum benefits to the consumer
- Smart Grid Architecture
 - Establish clear demarcation point between utility and consumer premises
 - Allow for electronic meter reading directly from customer premises
 - Use publicly available infrastructure for utility to consumer communications
- Utility business models
 - Incentivize utilities to promote negawatts rather than build megawatts
 - Encourage use of existing communications infrastructure
 - Demand Response is an essential prerequisite to the widespread use of renewables

Smart grid creates sustainable green jobs