

# Smart Grid and Consumers

<https://marketpublishers.com/r/SD09C0AD76CEN.html>

Date: July 2010

Pages: 192

Price: US\$ 3,500.00 (Single User License)

ID: SD09C0AD76CEN

## Abstracts

The zone of interaction between the smart grid and the consumer has been characterized as “the great unknown.” Yet ready or not—with the smart grid rapidly taking shape, a rush of companies swarming the market, state mandates kicking into effect, and actual deployments being built out—the smart grid is now poised to plunge headlong into this largely unexplored land of consumer demand. Yet so far, despite optimistic reconnaissance gathered from pilot projects and other preliminary tests, real-world expeditions into the new consumer frontier have met with a host of problems—from cost overruns to consumer resistance. So perhaps at this point it would be prudent to step back and reassess this terra incognita.

The smart grid is currently conservatively valued at just over \$20 billion in the United States and over \$70 billion globally. Yet only about 10% of this amount is accounted for by consumer applications—mostly smart meters. The smart grid will only truly achieve its goals if it establishes positive two-way communications between utilities and consumers. This means that residential applications and services must necessarily gain significantly in share before the smart grid can realize its visionary promise.

This study presents a wealth of insights into smart grid/consumer dynamics. It examines the issues involved in building positive two-way communications interactions, and the intrinsic negative resistance that can be expected. With a focus on residential applications and services, it provides an in-depth analysis of advanced metering infrastructure, smart meters, demand response, dynamic pricing, home energy management systems, home area networks, smart appliances, popular communications platforms, and futuristic technologies. The competitive situation is also discussed, showing how giants like Cisco, Duke Energy, and Google are entering a fledgling field so far dominated by relatively recent startups, such as Enernoc, Control4, and a flock of other companies. Other areas covered in this study include product and marketing trends, recent smart grid deployments, and consumer surveys regarding smart grid

acceptance.

## Contents

### CHAPTER 1: EXECUTIVE SUMMARY

#### Introduction

Need for This Study  
The Smart Grid: Three Major Sectors  
Applications/Software Sector Focus of Study  
Eight A/S Categories  
Smart Meters  
Advanced Metering Infrastructure (AMI)  
Demand Response  
Dynamic Pricing and Time-of-Use Pricing  
Home Energy Management Systems  
EIDs  
HANs  
Smart Appliances  
Electric Vehicles

#### Consumer Issues

Consumer Issues: Costs/Savings  
Consumer Issues: Smart Meters  
An Obvious Response  
Education and Customer Relations  
Consumer Issues: Privacy  
Consumer Issues: Safety/Health  
Consumer Issues: Distributed Generation  
Consumer Issues: PHEVs  
Consumer Issues: Marketer Momentum

#### Appliance and Software (A/S) Marketers

Marketers: Smart Meters  
Marketers: Advanced Metering Infrastructure  
Marketers: Demand Response  
Marketers: Home Energy Management Systems  
Table 1-1: Selected List of HEMS Marketers

Marketers: Home Area Networks  
Marketers: Smart Appliances

## **Applications/Software Trends**

Projected Number of U.S. Smart Meter Installations  
Projected Number of World Smart Meter Installations  
Communications Network Trends  
Residential Demand Response Likely to Grow  
Dynamic Pricing Trends  
HEMS Trends  
Compelling, Engaging EIDs  
HAN Trends  
Vast HAN Possibilities  
Table 1-2: Selected List of HAN Applications by Category  
Category  
Applications  
Media Possibilities  
Global Giants Enter HAN  
Smart Appliances: AHAM Definitions  
Appliance Giants Forging Ahead  
Fuel Cell Trends  
Electric Vehicle Trends  
Vehicle to Grid (V2G)  
EV Charging Infrastructure

## **Consumer Surveys**

Little Consumer Awareness of Smart Grid  
Bright Spot: Consumer Concerns over Energy Costs

## **Market Size and Projections**

Overall Smart Grid: Size and Projections  
Table 1-3: Overall Smart Grid Market: Size and Projections, 2009-2014 (in billion \$)  
Category Size/Projections: Smart Meters  
Table 1-4: Smart Meter Category: Size and Projections, 2009-2014 (in billion \$)

## **CHAPTER 2: INTRODUCTION**

Need for This Study

Two Key Terms Described and Defined

Description: Smart Grid

Smart Grid vs. Dumb Grid

Table 2-1: Smart Grid Benefits: Positive and Negative

Smart Grid Still in Its Infancy

Definition: Consumer (Residential Focus)

Figure 2-1: Number of Electrical Accounts by Consumer Class (in Millions)

Average Residential Electrical Consumption

Table 2-2: Average Residential Electrical Consumption and Pricing, 2008

Two Other Important Terms

Electric Utilities

Distributed Generation (DG)

The Smart Grid: Three Major Sectors

Applications/Software Sector Focus of Study

Three-Sector Interactions

Grid Infrastructure

Three-Tier System

Four North American Power Interconnections

NERC

FERC

ISOs and RTOs

Grid Infrastructure Problems and SG Solutions

Transmission Problems

Maintenance Problems

Efficiency Problems

Interconnection Problems

Peaker Plant Problems

Information and Communications Technology (ICT)

Overview

Information Technology

Hardware

Software

Grid Visualization Hardware and Software

Multiple Resolution Views

Layered Information

User-Specific Views

Analytical/Decision Software

- Engineering Analysis Software
- Mapping Software
- Distribution Management Software
- Storage Management Software
- Meter Data Management Software
- Outage Management Software
- Renewable Energy Management Software
- Security Management Software
- Communications Technology
- Communications Platforms
  - Power Line Communications
  - Broadband Over Power Lines
  - ZigBee
  - RF Mesh Networks
  - WiMax
  - Z-Wave
- Comparison of Communications Platforms
  - Table 2-3: Selected Smart Grid Communication Technologies
- Smart Sensors
- Applications and Software
- Eight A/S Categories
- Smart Meters
- Advanced Metering Infrastructure (AMI)
- Demand Response
  - Interruptible Tariffs
  - Direct Load Control (DLC)
  - Manual and Automatic DR Programs
- Dynamic Pricing and Time-of-Use Pricing
- Home Energy Management Systems
  - EIDs
  - HANs
  - Smart Appliances
  - Electric Vehicles

## **CHAPTER 3: CONSUMER ISSUES**

### **Overview**

Into the Unknown Zone

*Smart Grid and Consumers*

The Land of Consumer Demand  
The Smart Grid Is Utility-Oriented  
Debunking the Internet Analogy  
Business Relation with Utilities  
Popular Appeal Necessary for Success  
Utility Benefits

- Greater Reliability
- Reduced Overhead/Administrative Costs
- Fewer Customer Service Issues

Consumer Benefits

- Personal Empowerment
- Increase Intelligence
- Advance Civilization
- “Saving” Benefits
- Saving the Environment
- Saving the Grid
- Saving Money

Skeptics on Consumer Benefits  
Countering the Skeptics?

### **Consumer Issues: Costs/Savings**

Overview

- Minimal Money Savings
- Expensive Equipment
- Utilities Pass-Along Costs
- Future Savings?

### **Consumer Issues: Smart Meters**

Overview

- Backlash in California
- Reverberations
- First-Stage Consumer Burdens
- Smart Meters, Dumb Rollout
- Independent Audits Ordered
- Unaddressed Problems
- Smart Meter Controversy Spreads
- Questions of Accuracy

Sowing Suspicions  
Little Transparency  
No Opt-Out  
Generating Paranoia  
Pushback  
Ambiguities in the Savings Claims  
Savings Not a Straightforward Proposition  
No Visuals, No Savings  
The Off-Peak “Fairy Tale”  
A Look at Time-of-Use Pricing in Canada  
Table 3-1: Sample Utility Bill: Before and After Time-of-Use Pricing (3/09 vs. 3/10)  
Table 3-2: Sample Electricity Use by Time-of-Use Period, March 2010  
Shifting Rationale  
Alarm in the SG Industry  
Fear of Organized Opposition  
TURN’s Smart Meter Critique  
Barreling Ahead into the Unknown Zone  
An Obvious Response  
Resisting an Adversarial Relationship  
Poor Utility Customer Relations  
Reasons for Negative Relations  
Improving Customer Relations  
Educational Efforts  
The Consumer Enlightenment Model  
Table 3-3: Smart Grid Benefits: Positive and Negative  
Utilities Begin to Get the Message  
The Question of Education  
SG Educators Appeal to the Future  
SG Educators Disregard the Current Economy  
Recommendation

## **Consumer Issues: Privacy**

Overview

## **Consumer Issues: Safety/Health**

Overview



## **Consumer Issues: Distributed Generation**

Overview

## **Consumer Issues: PHEVs and Fuel Cells**

PHEVs

Fuel Cells

Consumer Issues: Marketer Momentum

## **Miscellaneous Consumer Issues**

Convenience Issues

Entertainment Issues

Customer Service Issues

Energy Efficiency Issues

Employment Issues

## **CHAPTER 4: APPLIANCE AND SOFTWARE (A/S) MARKETERS**

### **Overview**

Number of Marketers

Size of Marketers

Smart Grid Specialists

Corporate Giants

Where Are the Clean/Green Tech Marketers?

Partnerships and Alliances

Marketers: Smart Meters

Table 4-1: Selected List of Smart Meter Marketers

Marketers: Advanced Metering Infrastructure

Table 4-2: Selected List of AMI Marketers

Marketers: Demand Response

Table 4-3: Selected List of Demand Response Marketers

Marketers: Home Energy Management Systems

Table 4-4: Selected List of HEMS Marketers

Marketers: Energy Information Displays

Table 4-5: Selected List of EID Marketers

Marketers: Home Area Networks

Table 4-6: Selected List of HAN Marketers  
Marketers: Smart Appliances

## **Competitive Profiles**

Itron

Table 4-7: Selected List of Itron Partners

Landis+Gyr

Echelon Corp

Silver Spring Networks

Trilliant

EnerNOC

Comverge

GridPoint

Cisco Systems

Google

General Electric

Intel

## **CHAPTER 5: APPLICATIONS/SOFTWARE TRENDS**

### **Trends: Smart Meters**

Projected Number of U.S. Smart Meter Installations

Deployments Planned or in Progress

Table 5-1: Utility Smart Meter Deployments Planned or in Progress, 2010

Projected Number of World Smart Meter Installations

Nations with Advanced Smart Meter Programs

The Ongoing Accuracy Controversy

Open Questions on Communications and Functionality

Greater Speed

Retrofitting AMR Meters

### **Trends: Communications Networks**

Overview

Wired Approaches

Wireless Long-Distance Approaches

Table 5-2: Long Distance Wireless Communications Platforms

Wireless Short-Distance Approaches  
Flexible Communications Options

### **Trends: Demand Response**

DR Statistics

Three Scenarios: 2009-2019

Questioning the Scenarios

Residential DR Likely to Grow

DR Marketers with Residential Programs

DR Marketers Entering Building Management

Trends: TOU Pricing

Trends: Dynamic Pricing

Table 5-3: Dynamic Pricing Pilot Projects and Rate Structures, 2010

### **Trends: HEMS**

Shifting Category Boundaries

Statistics on Energy Information Displays (EIDs)

EIDs and Savings Percentages

Fall-Off in Engagement

Compelling, Engaging EIDs

New EID Products

### **Trends: Home Area Networks (HANs)**

Overview

Logical Endpoint of A/S Development

Vast HAN Possibilities

Table 5-4: Selected List of HAN Applications by Category

Media Possibilities

Global Giants Enter HAN

Table 5-5: Selected Global Marketers Interested in HAN Development

Competition Could Quickly Heat Up

Marketing-Oriented Questions on HAN

Brief Focus: Control4

Brief Focus: 4 Home Control

### **Trends: Smart Appliances**

*Smart Grid and Consumers*

## 2001 Statistics: Energy Use of Home Appliances/Devices

Figure 5-1: Percentage of Electricity Use by Appliance/Device, 2001

## 2009 Statistics: Soaring Home Electronics Energy Use

### Implications

Smart Appliances: AHAM Definitions

Smart Appliances: Inhibiting Factors

Appliance Giants Forging Ahead

Demand Response Capabilities by Appliance

DR Appliance Programs

Smart Appliances: Projections

Brief Focus: GE

Brief Focus: Whirlpool Corp.

## **Trends: Fuel Cells/Other**

### Fuel Cells

#### On the Horizon

Thermoelectric Technologies

Thermoacoustic Technologies

## **Trends: Electric Vehicles**

### Overview

EVs Are Coming

EV Challenges/Opportunities

Major EV Challenge: Load Control

Other Worries

Solution: Off-Peak Charging

Vehicle to Grid (V2G)

EVs Necessitate Dynamic Pricing

EV Problem Areas and Issues

Table 5-6: Electric Vehicles: Problem Areas and Issues

Focus: EV Charging Infrastructure

Two States with Advanced Charging Plans

Charging at Work and Home

Economic Questions about Charging

EV Charging: Companies/Products

Brief Focus: Better Place

## Charging Infrastructure Rollouts

### **Trends: Marketers**

Competitive Marketer Trends

Cooperative Marketer Trends

Fight the Power

Kaleidoscopic Partnering Activity

Table 5-7: Selected Examples of Smart Grid Partnering Activity, 2009/2010

Table 5-8: Selected Trilliant Partners

Alliances and Coalitions

Brief Focus: The Smart Grid Consumer Coalition

Duke Energy: A Contrarian Approach to Collaboration

## **CHAPTER 6: SURVEYS AND DEPLOYMENTS**

### **Consumer Surveys**

Smart Grid? Never Heard of It

Bright Spot: Consumer Concerns over Energy Costs

Attitudes Favorable among the SG-Aware

Surveys on A/S Categories

Smart Meters: Vague Awareness

Demand Response Resistance/Indifference

HEMS: Open to the Idea

Willingness to Pay for HEMS

But Not Nearly Enough

HAN Has Growing Appeal

### **Utilities Surveys**

Oracle Survey Shows Utilities Lagging

GTM Survey on Utilities

Microsoft Survey on Utilities

### **Deployment: SmartGridCity (Boulder, CO)**

Overview: An Ambitious Effort

Phase I

## Phase II

Advancements on the Utility Side

The Next Phase: Consumer Integration

Consumer Services

Most Services Not Yet in Place

Testing Dynamic Pricing

Financial Problems

Legal Problems

Unresolved Financing Questions

## **Deployment: Pecan Street Project (Austin, TX)**

Overview: A Methodical Effort

Origins

Needed: New Business Model

Recommendations Emerge

Most Vexing Problem: Profit from Efficiency

The Distributed Generation Problem

Relevant Recommendations

Seven Parameters

Recommendation: Testing/Pilots/Demos

Recommendation: Promote PEVs

Recommendation: Dynamic Pricing

Recommendation: New Business Model

Recommendation: Flat-Rate System

## **CHAPTER 7: THE SMART GRID MARKET**

Market Size and Projections

Overall Smart Grid: Size and Projections

Table 7-1: Overall Smart Grid Market: Size and Projections, 2009-2014 (in billion \$)

Category Size/Projections: Smart Meters

Table 7-2: Smart Meter Category: Size and Projections, 2009-2014 (in billion \$)

Category Size/Projections: Demand Response

Table 7-3: Demand Response Category: Size and Projections, 2009-2014 (in billion \$)

Segment Size/Projections: In-Home Displays

Table 7-4: In-Home Displays Segment: Size and Projections, 2009-2014 (in billion \$)

Category Size/Projections: Home Area Networks

Table 7-5: Home Area Networks Category: Size and Projections, 2009-2014 (in billion \$)

\$)

Category Size/Projections: Smart Appliances

Table 7-6: Smart Appliance Category: Size and Projections, 2009-2014 (in billion \$)

Category Size/Projections: PHEVs and Fuel Cells

Smart Grid Investment Estimates

## **Factors In Future Growth**

Overview

Imperative to Upgrade the Aging Grid

Sheer Marketer Power

Technology Drivers

Ecological Driver: Climate Change

The Grid and Weather-Related Incidents

Ecological Driver: Resource Limits

Inhibitors: The Economy and Consumer Demand

Political Drivers

Government Stimulus

Regulation

Rule Changes Rewarding Efficiency

## I would like to order

Product name: Smart Grid and Consumers

Product link: <https://marketpublishers.com/r/SD09C0AD76CEN.html>

Price: US\$ 3,500.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/SD09C0AD76CEN.html>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:  
Last name:  
Email:  
Company:  
Address:  
City:  
Zip code:  
Country:  
Tel:  
Fax:  
Your message:

**\*\*All fields are required**

Customer signature \_\_\_\_\_

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <https://marketpublishers.com/docs/terms.html>

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970