Smart/Intelligent Grid Development and Deployment in Thailand (Smart Thai)

“Smart Grid: Policy, Services and Applications”

Alignment of Consumer and Utility Interests
Enabling Competition and Consumer Choice

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Alignment of Consumer and Utility Interests

Enabling Competition and Consumer Choice
What Makes a Grid “Smart”?  

Smart Grid =  

**AMI** + **HAN** + **EE** + **DR** + **DER** + **PHEV** + **DMS** + **EMS**

Impacts the Customer

### Component Definitions

- **AMI** = Automated Metering Infrastructure
- **HAN** = Home Area Network
- **EE** = Energy Efficiency
- **DR** = Demand Response
- **DER** = Distributed Energy Resources
- **PHEV** = Plug-in Hybrid Electric Vehicles
- **DMS** = Distribution Management System
- **EMS** = Energy Management System

Enables, requires or includes products, services and pricing
## What does smart grid offer to customers?

### Utility Side

<table>
<thead>
<tr>
<th>Enablers:</th>
<th>Smart Meters</th>
<th>Communication Networks</th>
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</thead>
<tbody>
<tr>
<td><strong>Signals and Data</strong></td>
<td>Smart meters enable utilities to capture, gather and analyze incremental customer level usage data, creating new product and service opportunities</td>
<td>Communication networks (BPL/wireless) enable utilities to send signals (price, grid capacity, environmental) to a variety of interfaces for automated or manual impact</td>
</tr>
<tr>
<td><strong>Products and Solutions</strong></td>
<td>• Includes passive and automated (demand response) signals based on price, grid capacity or environment as well as data provided through interfaces such as web portals, SMS or in premise devices</td>
<td>• Includes ‘beyond-the-meter’ devices such as two way thermostats, load control devices, home area networks and distributed generation solutions including micro-generation, storage (stationary or EV) and net metering</td>
</tr>
<tr>
<td><strong>Pricing and Packaging</strong></td>
<td>• Includes four types of time-based pricing and packaging that includes a solution set and pricing scheme (e.g., bundling)</td>
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**Enablers:**
- Utility Side
- Customer Side

**Offerings:**
- Smart Meters
- Communication Networks
- Signals and Data
- Products and Solutions
- Pricing and Packaging
Smart Grid Network and Customer Operations

**Behind the Meter…**

- Transmission & Distribution
- Distributed Generation
- Sensors and Communication
- New Connection
- Field Operations and Maintenance
- Grid Operation
- Emergency Response
- New Construction

**Beyond the Meter…**

- Diversion Mgmt Services (Revenue Assurance)
- Customer Segmentation & Analytics
- Customer Solutions Transformation for AMI
- Customer Solutions Transformation for CRM 2.0
- Orga Systems
- Demand Response / AMI Program Marketing
- Customer Advisory Services
- Enterprise Systems (CIS, Demand Response, GIS etc)
- Customer Care and Meter to Cash Operations
- Billing and Exception Management
Uncertainty is the central theme defining the market landscape ‘beyond the meter’.

**Competitive Landscape**

The market ‘beyond the meter’ is attracting attention from a variety of firms across industries with diverse business models and strategic objectives. Lines between partners and competitors are blurry.

**Technology**

Home energy management and micro generation technologies are becoming more economically viable but clear standards and protocols have not been defined.

**End-Customer Demand**

Increasing reliance on technology and automation in the home, as well as an increased focus on energy costs and climate change are stimulating demand, but the ‘killer app’ is yet to emerge.

**Regulatory Framework**

New legislation is being considered that will increase the incentives for utilities work with their customers to manage load growth and cap carbon emissions but long-term regulatory landscape is uncertain.

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Marketplace Context
Framework for Going ‘Beyond the Meter’

Smart Grid fundamentally changes the nature of the customer relationship, moving from a simple supplier-customer construct to a networked ecosystem that brings utilities together with third party product and service providers to deliver device-enabled consumer services

- Device Maker: Designs, builds and distributes in home devices
- Home Service Provider: Performs system design, installation and repair services in the home
- Control Enabler: Develops, enables and maintains the user interfaces that customers need to use devices and services
- Program Provider: Designs, markets and enables customer plans & programs
- Network Provider: Provides and manages connectivity to and between devices
- Data Banker: Stores, secures and manages customer data and mines customer insight data
- Service Integrator: Innovates, builds, provides and manages end-to-end customer experience
Web interfaces are critical to enabling several of the roles in the beyond the meter ecosystem.

<table>
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<th>Role</th>
<th>Web Implications</th>
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<tr>
<td>Service Integrator</td>
<td>Web is a critical touchpoint to enable the integrated customer experience and allow service integrators extract value from customer relationships</td>
</tr>
<tr>
<td>Device Maker</td>
<td>In-home device enablement and control flow largely through web interfaces</td>
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<tr>
<td>Control Enabler</td>
<td>Web control panels and tertiary functionality are core to the overall customer solution and value proposition</td>
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<tr>
<td>Program Provider</td>
<td>Program enablement is contingent on web capability to display and/or trigger response based on signal</td>
</tr>
<tr>
<td>Data Banker</td>
<td>Ownership of web touchpoints and user accounts provides access to unique classes of customer home profile and usage data</td>
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</table>
The beyond-the-meter market will only develop if the regulatory compact changes to increase price volatility and shift risk to the consumer…
Different deployments of smart metering and smart grid infrastructures bring both benefits and challenges to the utility.
## Customer Benefits Defined

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<th>Messaging Detail</th>
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<tr>
<td>Consistency</td>
<td>SG creates a more stable grid, meaning more proactive management of issues to reduce occurrences of power outages and faster resolution when problems do occur.</td>
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<tr>
<td>Conservation</td>
<td>SG gives consumers the technology and information they need to be conserve more effectively by reducing overall consumption, enabling them to ‘raise their hand’ to help manage peak demand and enable the utility to draw more supply from renewable resources.</td>
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<tr>
<td>Cost</td>
<td>SG gives consumers the information they need to better understand and manage energy consumption to help identify ways to save, and provides the technology to help automate their consumption.</td>
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<tr>
<td>Comfort &amp; Convenience</td>
<td>SG makes life easier with new technology that gives consumers unprecedented access and control over home climate and appliances, and enables the utility to provide a higher level of customer service.</td>
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<tr>
<td>Cash</td>
<td>SG gives consumers the ability to monetize their on-site generation by avoiding using grid-generated power or even selling excess power back into the grid.</td>
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<tr>
<td>Coolness</td>
<td>SG puts customers at the center of the city of the future, placing cutting edge home automation and climate control technology in the consumer’s home to connect devices, appliances and the internet together like never before.</td>
</tr>
<tr>
<td>Community</td>
<td>SG provides a common cause that bring the community together to make a difference for the future – starting a legacy of conservation for future generations and laying the foundation for a new age of American economic growth.</td>
</tr>
<tr>
<td>Choice</td>
<td>SG gives customers choice over the sources of energy they consume to empower them to help drive increased overall use of renewable energy in the system.</td>
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