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Smart Grid: Impacts on Electric Power Supply and Demand

2010 Energy Conference: Short-Term Stresses, Long-Term Change

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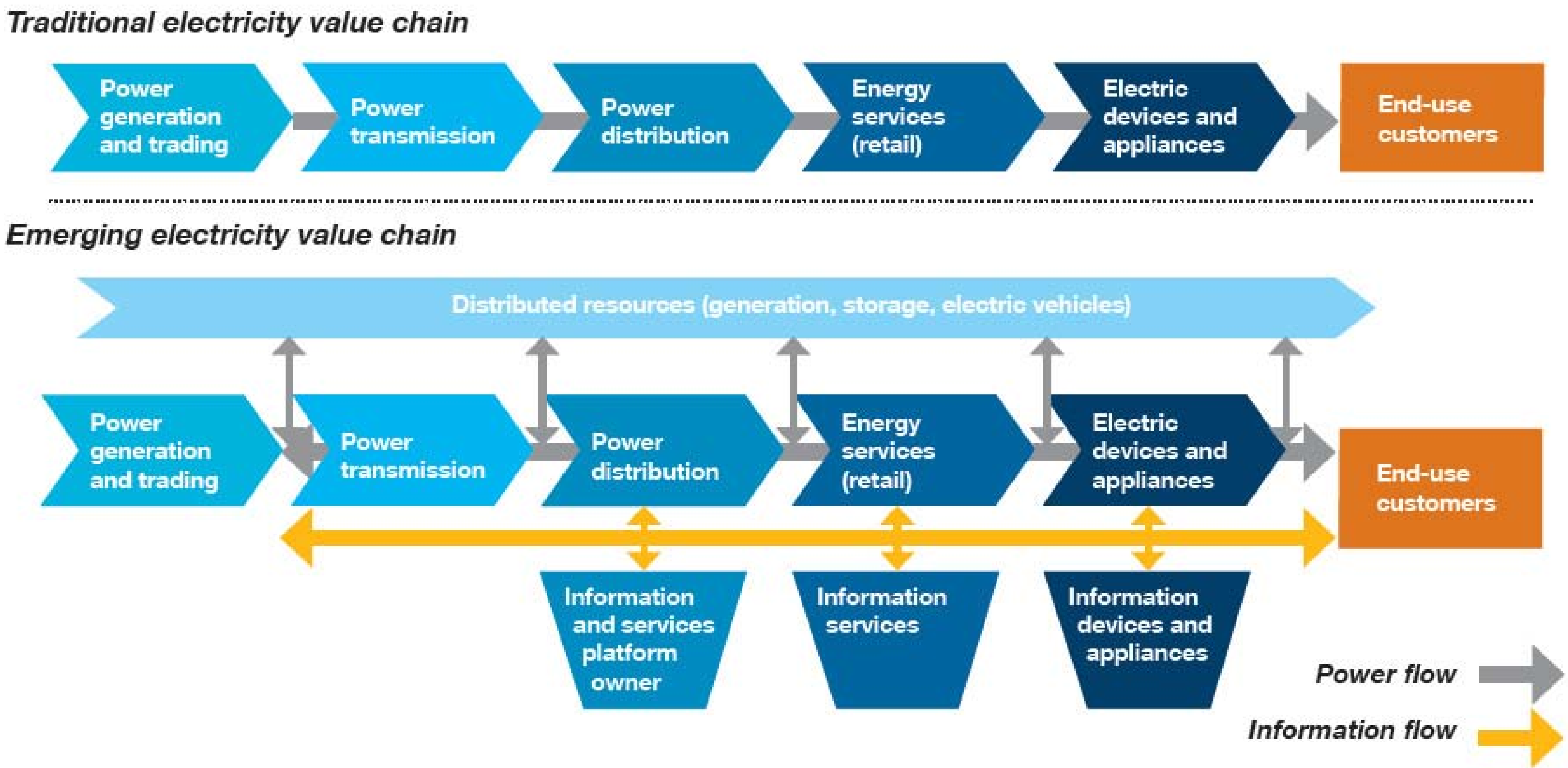
Discussion Topics

- The Business Model will Evolve
- The Consumer Value Model will Transform
- A New Energy Consumer will Emerge
- Customers Segmentation will be Done in a Different Manner
- Information and Data Sources will Change

The emerging value chain will allow consumers to have a different relationship with their energy providers



This new business model is enabled by a new business infrastructure that is instrumented, interconnected, and intelligent

Intelligent

6. Presentation
- Customer Portals, Mobile Devices and In-Premise Devices

5. Analytics
- Customer Analytics, , Operations & Workforce Analytics

4. Applications
- Outage Management Systems
- Distribution Management Systems
- Geographic Information Systems
- Customer Information Systems
- Meter Data Management Systems
- Work Management Systems

Interconnected

3. System Integration Platform
- Application & Data Integration
- Computing Infrastructure
- Systems Management

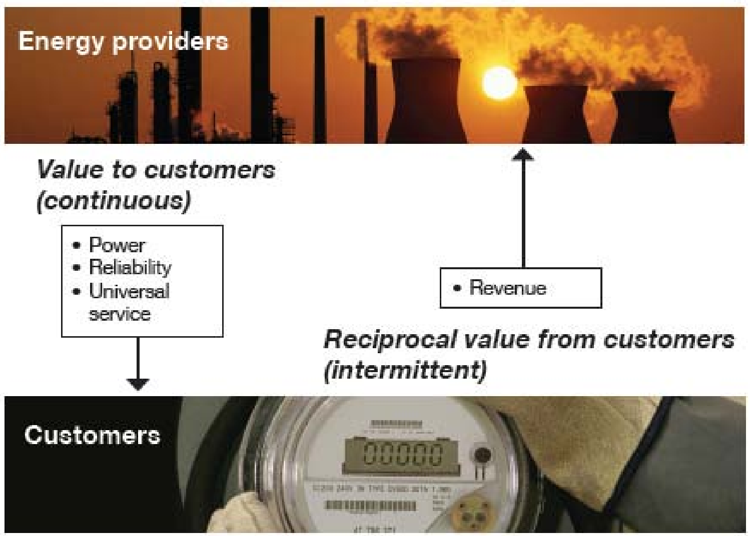
2. Integrated Communication Networks
- Extranet, Office Network
- Backhaul
- Access Network
- Neighborhood Network
- Home Area Network

Instrumented

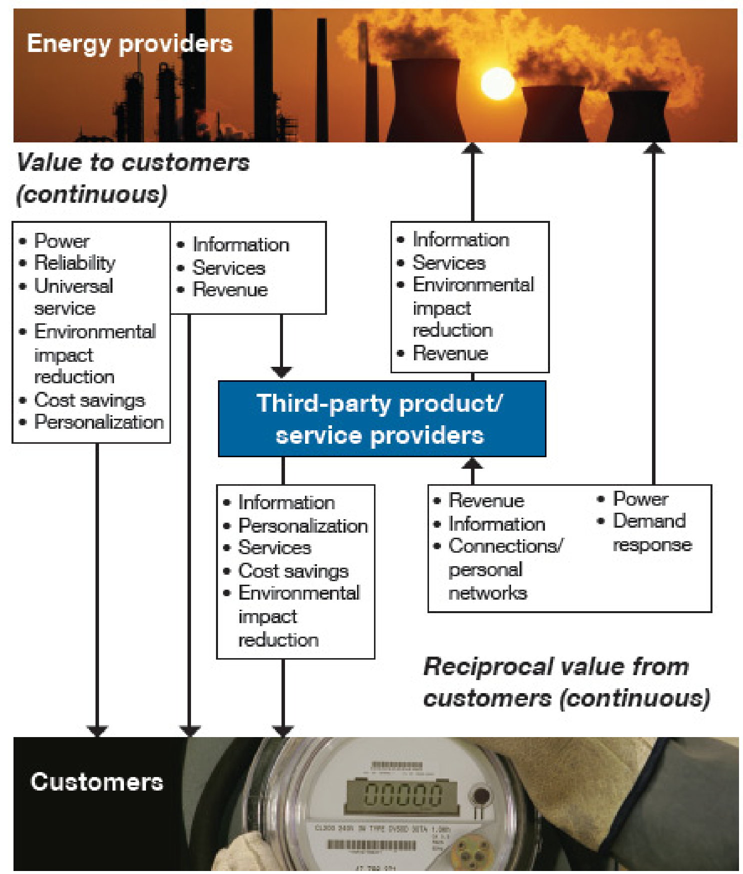
1. Smart, Connected Devices
- Distributed Resources
- Smart Meters
- Mobile Devices
- Smart appliances
- Smart thermostats
- Substation and Grid Devices

A *value model* describes the combination of values provided to a customer, and reciprocal values provided by the customer

Traditional Industry Value Model



Emerging Industry Value Model



At the same time customers are becoming more demanding, they actually have much more to offer in reciprocal value to utilities.

Source: Jansen, W., W. Steenbakkers, and H. Jagers, New Business Models for the Knowledge Economy, Gower Publishing, 2007; IBM IBV Analysis.

IBM

Our research shows that not all consumers will desire the same level of interaction

Residential and Small Commercial Energy Customers

Decision-Making Initiative Taken: High / Low

Frugal Goal-Seeker (FG)

An energy consumer who is willing to take modest action to address specific goals or needs in energy usage, but is constrained in what they are able to do because disposable income is limited

22%

Energy Stalwart (ES)

An energy consumer who has specific goals or needs in energy usage, and has both the income and desire to act on those needs

21%

Passive Ratepayer (PR)

An energy consumer who is relatively uninvolved with decisions related to energy usage and uninterested in taking or unable to take added responsibility for these decisions

31%

Energy Epicure (EE)

A very high-usage energy consumer relatively unconstrained by budget limits, but with little or no desire for conservation or active involvement in energy control

26%

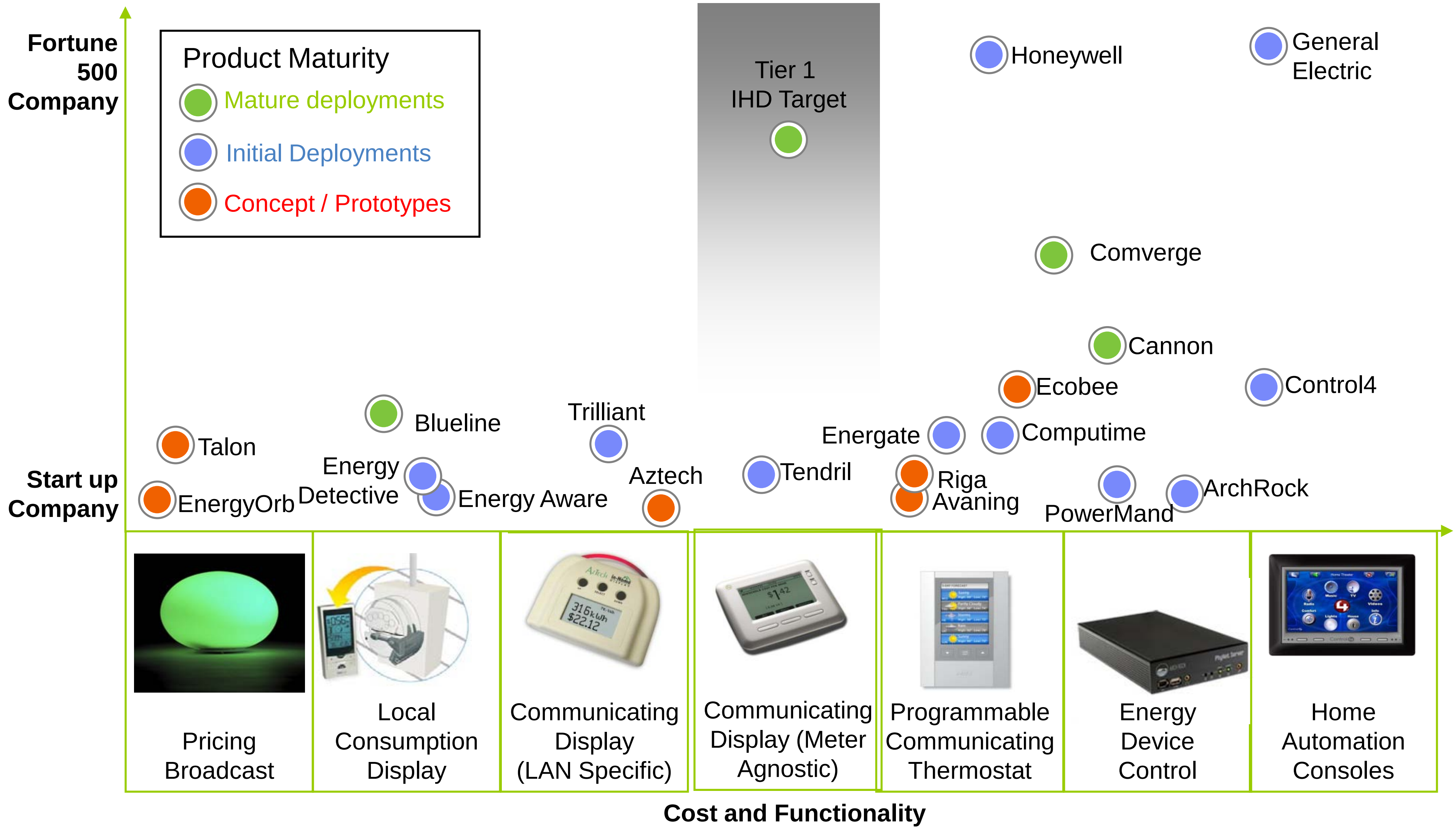
Low — Disposable Income Available for Energy Choices — High

Sample Size = 5084

Two factors will determine the nature of the interface between utilities and consumers in the future:

1. The degree to which consumers **take initiative in decision-making** in their energy supply and usage toward meeting specific goals
2. The consumers' **disposable income available for energy choices** in supply and conservation

In home technology will be one way to manage these differences



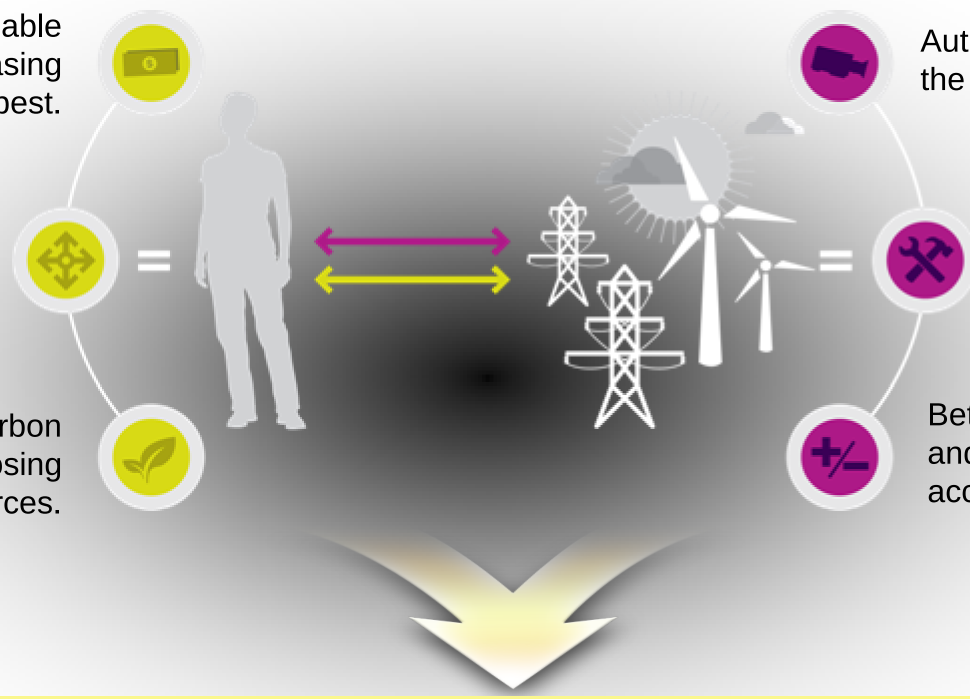
Overall, these new capabilities redefine the relationship between utilities and end-users and provide new sources of information and data

CONSUMERS

Take advantage of variable pricing by purchasing electricity when it's cheapest.

Generate their own electricity and sell it back to the grid.

Decrease carbon emissions by choosing clean electricity sources.



UTILITIES

Automatically monitor the health of the grid.

Remotely sense damage to grid assets and dispatch repair crews.

Better predict demand and manage supply accordingly.

Participatory Network

A wide variety of grid and network technology evolve to enable shared responsibility, and consumers' strong interest in specific goals creates new markets (virtual and physical) and new product demands, which balances benefits more equally between the consumers and utilities

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Questions