

Smart Grids

Rob Lamneck, Vice President, Strategic Alliances, ESCO Technologies



We are facing a global energy problem – rising demand, and thus rising costs

- ▶ Global energy use is expected to triple over the next 40 years, driven in part by growth in emerging markets
- ▶ Widening gap between available supply and needed demand: for example, the US exported 8% of total coal production, up from 5% the previous year, to meet growth in global demand
- ▶ Net result is higher energy prices

Our electricity power grid is “the largest machine in the world” – an interconnected system of power plants, substations, wires and transmission lines.

- ▶ It is also outdated since it was designed to serve an “analog” world
 - ▶ 100+ year old technology and processes still in use today
- ▶ It is inflexible and inefficient - incapable of handling growing future energy needs.
 - ▶ Higher load demands are resulting in grid congestion, service reliability problems and power disturbances in the system

Several issues are driving the need for change and innovation:

- ▶ Aging utility assets
 - ▶ 60 year-old infrastructure
 - ▶ 70% of transmission lines are at least 25 years old
- ▶ Minimal investment in R&D
 - ▶ Annual investment in transmission facilities has been declining since 1975
 - ▶ Utility companies face multi-million dollar backlog of deferred maintenance on existing infrastructure
- ▶ Utility industry slow to change
 - ▶ Most work and processes are done manually
 - ▶ An aging workforce will retire in the coming years, taking industry knowledge with them
- ▶ The vulnerability of our system has been tested:
 - ▶ California Energy Crisis (2000-2001), Hurricane Katrina (2005), Northeast Blackout (2003). (The NE blackout was simply caused by tree branches getting caught on a sagging power line, with 50 million people losing power)
 - ▶ Power quality disturbances and outages resulting in annual economic losses of \$180 Billion
- ▶ Regulatory conflicts
 - ▶ Lack of consensus and common vision among various stakeholders –legislators, regulators, utilities, environmental agencies
 - ▶ Lack of incentives to stimulate innovation
 - ▶ Utilities rewarded to *not* take risks or initiate progressive action
 - ▶ Environmental stewardship not a business priority
 - ▶ Revenue and profitability have historically been tied to increasing energy use, not improving efficiencies

Smart grids

- ▶ What they are: an intelligent network of communications and computing technology designed to deliver highly reliable, flexible, automated, environmentally-friendly energy
- ▶ The cornerstone of smart grids is providing real-time two-way information to both utility provider and consumer, to allow them to respond to changes on the power grid system.

Smart meters are the first step toward modernizing the grid

- ▶ They are replacing our familiar electromechanical “dial” meter with 2-way communications. They work like a computer server, as a real-time information hub.

Smart meter deployments are gaining traction in the marketplace.

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- ▶ Nearly 20 million meters are in the planning, testing, or deployment stages in 2008, up from 3 million contracted in 2005.
- ▶ ESCO expects “more robust expansion” in 2009

Smart grids should not be defined by their technological components, but by what they can do. Applications include:

- ▶ Remote (wireless) meter reading
- ▶ Real-time (hourly) price information
 - ▶ Time of use, critical peak pricing
- ▶ Customer outage detection and restoration
- ▶ Demand-side management
 - ▶ Automatic power reduction during peak period use
 - ▶ Load control and balancing
- ▶ Equipment failure forecasting and diagnostics
- ▶ Energy profiling and analysis

Smart grid implementation is a global opportunity:

- ▶ Europe is ahead of the US by 2-3 years
 - ▶ Higher R&D spending and investment
 - ▶ Greater environmental conscience to clean/green tech
- ▶ Emerging markets are less burdened by an existing system
 - ▶ Greenfield opportunities for deploying new, intelligent infrastructure
- ▶ In North America,
 - ▶ California, Texas, and Canada are early adopters
 - ▶ Duke Energy is among a few “progressive” utility companies

Smart grid benefits to utilities:

- ▶ Enhanced revenues
 - ▶ Added services, such as real-time based pricing
- ▶ Operations reliability
 - ▶ Fewer service disruptions
 - ▶ Faster outage detection and restoration
- ▶ Cost reductions
 - ▶ Fewer service calls
 - ▶ Remote connections replacing on-site visits
- ▶ Better customer service
 - ▶ Providing real-time information
 - ▶ Quicker diagnosis of service disruptions
 - ▶ Reduced customer calls

Smart grids are aimed at improving energy conservation

- ▶ Consumer advocacy and regulatory mandates have grown in recent years, increasing public awareness
- ▶ Smart grids will inform and empower the consumer with regard to energy use choices
 - ▶ In-home displays, remote access using cell phone or internet, and “smart” appliances will bring the smart meter into the home
 - ▶ These devices give homeowners control over energy decisions and the ability to customize electricity usage to individual needs

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- ▶ Real-time billing, pricing, and consumption data provide immediate energy management feedback
- ▶ Net-metering – an option by which consumers can sell *back to the grid* electricity that is under-utilized at higher-priced peak periods or generated by renewable energy sources
- ▶ Just a 5% increase in conservation could yield \$3-4 Billion in annual savings

ESCO Technologies

- ▶ Founded in 1990
- ▶ \$550 Million in sales
- ▶ Integrated solutions for electric, gas, and water markets
 - ▶ Advanced 2-way metering communications systems using RF (radio frequency) or PLC (power line) technologies
 - ▶ Data analytics software, device management & diagnostic services