GE Energy

Power Market Overview

Carnegie Mellon University
Pittsburgh, PA
November 10, 2005
A Changing World …

- Growing Population & Energy Density
- Fuel Sourcing Complexity
- Increasing Environmental Requirements
- Escalating Security Concerns
- Technology & Talent Globalization
- Heightened Investor Demands

Everyone Under Pressure
What We’re Hearing from Our Customers

Environment is a Key Issue

• We’ll be living in a carbon constrained world

• Renewables can be part of the solution … but only part

• Nuclear … needed and becoming more likely in US

• Grid congestion still a major issue

• Permitting remains a major challenge

• Technology needs to address requirements cost-effectively
Topics

• Global outlook
• US market assessment
  – Capacity additions and reserve margin
  – Trends in fuel pricing
  – Renewed interest in coal
  – Renewables
  – Energy prices
• Energy Policy Act of 2005
• Technology Solutions
Growth Market Perspective

GDP Growth -
% (2005-2009)

US: 3%
Middle East: 5%
China: 8%
India: 7%
Russia: 5%

World GDP led by China, India, Middle East & Russia

World GDP Average 3.3%
Power Gen Landscape - Current

North America

1,000

Western Europe

660

Af/ME

210

India

120

Eastern Europe

430

China

340

Asia

520

Latin America

195

World ’04 Total Installed Base: 3,470 GW
U.S. Capacity Additions and Reserve Margins

Sources: EIA; NERC ES&D; BaseCase from Platts, a unit of the McGraw-Hill Companies, Inc.; GE Energy analy:
U.S. Reserve Margin by Region

Reserve Margins
- > 22%
- 18% - 22%
- 15% - 18%
- < 15%

Sources: EIA; NERC ES&D; BaseCase from Platts, a unit of the McGraw-Hill Companies, Inc.; GE Energy anal
Oil and Natural Gas Prices

Oil Prices

- WTI Spot
- WTI NYMEX Futures

Gas Prices

- Henry Hub
- Henry Hub NYMEX Futures

Source: EIA WTI Spot Prices; NYMEX Future Prices October 14, 2005

Source: PowerDat from Platts, a unit of the McGraw-Hill Companies; NYMEX Future Prices October 14, 2005
Coal Prices

Average Weekly Coal Commodity Spot Prices
Business Weeks Ended Sept 23, 2005

Coal Commodities by Region:
- Central Appalachia (CAP)
  - Big Sandy/Kanawha 12,500 Btu, 12
  - Northern Appalachia: 12,000 Btu, 5.0 lb SO2/MMBtu
  - Illinois Basin: 11,800 Btu, 5.0 lb SO2/MMBtu
  - Powder River Basin: 8,800 Btu, 0.8 lb SO2/MMBtu
  - Uinta Basin in Colo.: 11,700 Btu, 0.8 lb SO2/MMBtu

Sources: EIA Coal News and Markets Week of Sept 23; CoalDat from Platts, a unit of the McGraw-Hill Companies, Inc.
Expanding LNG ... Key to Meeting Demand

- Approved terminals and expansions total 19
- Additional 21 terminals + proposed
- Energy Policy Act of 2005 designates FERC as lead agency for siting LNG

Source: FERC
Coal Interest Grows

Map created with Powermap from Platts, a division of the McGraw-Hill Companies
Source: NewGen database from Platts; GE Energy analysis

<table>
<thead>
<tr>
<th>Status</th>
<th>MW</th>
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<tbody>
<tr>
<td>Under Const</td>
<td>5,387</td>
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<tr>
<td>Advan Develop</td>
<td>8,823</td>
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<td>Early Develop</td>
<td>18,330</td>
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<tr>
<td>On Hold</td>
<td>23,854</td>
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<tr>
<td>Proposed</td>
<td>30,908</td>
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<tr>
<td><strong>Grand Total</strong></td>
<td><strong>87,303</strong></td>
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State Renewable Portfolio Standards (RPS)

Drivers

- Continued pressure to reduce emissions
- Drive toward sustainable energy production
- Renewable Portfolio Standards (RPS) and economic incentives

Note: Standards expressed as total renewable energy generation as a percent of covered companies' retail sales.
Wind Plant Development

<table>
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<th>MW</th>
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<tr>
<td>Advan Develop</td>
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<tr>
<td>Early Develop</td>
<td>15,215</td>
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<tr>
<td>On Hold</td>
<td>7,767</td>
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<tr>
<td>Proposed</td>
<td>10,524</td>
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<td><strong>Grand Total</strong></td>
<td><strong>40,049</strong></td>
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Peak Period Energy Prices

- Energy prices strongly correlated to natural gas price
- Analysis based on $ 6.3 / MMBtu

Peak Period is 5x16 hours per week
Monday-Friday 7 am- 11 pm
Arrows denote transmission constraints

Map created with PowerMap from Platts, a unit of the McGraw-Hill Companies
Electric Regions with Pricing Nodes On-Peak Prices ($/MWh)

Energy Policy Act of 2005

Power Gen
- Wind: PTC Extended through Dec. 31, 2007 @ 1.9-cents per kWh (adjusted for inflation)
- IGCC: 20% investment tax credit
- IGCC: Authorizes a $1.8 billion clean coal demonstration program at DOE
- IGCC: Authorizes DOE 80% loan guarantees for advanced technology projects
- IGCC: Authorizes a loan guarantee and a demonstration project for ‘western’ coals

Nuclear
- PTC @ 1.8-cents per kWh for new ESBWR and ABWR plants
- Extends Price Anderson liability through 2025
- Provides Risk Insurance for new ESBWR and ABWR – up to $500MM for the first 2 and up to $250MM for the next 4 plants
- Authorizes DOE 80% loan guarantees for advanced technology projects
- Authorizes the Next Generation Nuclear Plant Project
Energy Policy Act of 2005

**T&D & Services**
- Sets Mandatory Grid Reliability Standards
- Gives x-mission siting authority to FERC if states delay approval in ‘corridors of national interest’
- Provides 7-year recovery on new pollution control equipment installed on coal plants
- Provides favorable tax treatment for existing refinery and new transmission investments
- Requires FERC to provide incentive pricing for new transmission investment

**Oil and Gas**
- Favorable tax treatment for investments in refineries, NG distribution and gathering lines
- Designates FERC as the lead agency for LNG siting

**Miscellaneous**
- Repeals the Public Utility Holding Company Act (PUHCA)
- Creates a Climate Change Technology Program @ DOE
- Encourages states to establish net metering and smart metering requirements
- Extends Day-Light Savings Time by one month
- Residential and commercial PV investment tax credit
Observations

• National surplus persists until 2008; pockets of need emerge by 2006
• High gas and oil prices:
  – Increase CC start-stop cycles
  – Encourage LNG
  – Encourage new coal power plants
• Wind is an attractive option to fulfill Renewable goals
• Energy bill:
  – Stimulate fuel diversity and technology innovation
  – Spur investment in infrastructure modernization
Technology Solutions
Technology Solutions … Today

• **H System™** … 60% combined cycle efficiency platform, 10,000+ operating hours at Baglan Bay

• **LMS100®** … aero derivative gas turbine launched … 46% simple cycle efficiency

• **Wind** … 3,300+ 1.5 MW units worldwide, offshore growth

• **Gas Reciprocating Engines** … 5,000+ MW installed worldwide … multiple fuels (bio-gas, landfill gas, coal mine gas)
Technology Solutions … Today

• **Nuclear** … fuel / plant performance optimization … building advanced reactors in Asia

• **Environmental Services** … Hg & NOx reduction and control … fine filtration for particulate matter

• **Asset Optimization Services** … expanding to plant-wide condition monitoring and control

• **T&D** … help utilities better manage assets, improve reliability while reducing costs

• **Grid Decongestion** … use technology to maximize transmission line capacity & optimize grid capability
Technology Solutions … Tomorrow

- **(IGCC) “Cleaner Coal”** … COE parity with pulverized coal with launch plant, CAPEX parity/lower COE with mature product

- **Nuclear** … U.S. next-gen units (ESBWR) driven by DOE 2010 program & U.S.Energy bill. Global growth in Asia and emerging areas

- **Solar** … cost of energy from 30¢/kWhr to 10¢ by 2010. Grid connected or stand alone

- **Solid Oxide Fuel Cells** … 5 MW, 65% + efficiency, available in 2010+
Our Global Customers Want….

- Lower Environmental Impacts, including reduced GHG emissions
- Higher Efficiency
- Fuel Flexibility
- Greater Operating Flexibility
- Lower O&M Costs
We’ve Responded with a Massive Growth Spend

### New Product Investment

<table>
<thead>
<tr>
<th>Year</th>
<th>'98</th>
<th>'05</th>
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<tbody>
<tr>
<td>Growth</td>
<td>+3X</td>
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### New Product/Service Launches

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<thead>
<tr>
<th>Year</th>
<th>'98</th>
<th>'05</th>
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<tbody>
<tr>
<td>Products</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Services</td>
<td>300+</td>
<td>20</td>
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#### Products and Services

- **3.6MW Wind Turbine**
- **LMS100® Aeroderivative**
- **Cleaner Coal IGCC**
- **H System™ Combined Cycle**
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Hamid Elahi

Thank You