Boeing Energy

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This document does not contain technical data as defined in the International Traffic in Arms Regulations (22 CFR 120.10) or the Export Arms Regulations (15 CFR 779.1).
The Boeing Company

- Customers in 90+ countries
- 159,000 employees
- Technology-development centers worldwide
- 22,000 suppliers and partners globally

Boeing Commercial Airplanes

- 2010 revenues of $31.8B
- 12,000 jetliners are three-quarters of the fleet
- Approximately 70% international sales

Boeing Defense, Space & Security

- 2010 revenues of $31.9B
- Designing, building, and supporting secure network-enabled systems
- Boeing Energy actively engaging Microgrid space

Boeing Connects and Protects
Boeing’s Energy Technology Heritage

**Solar: Photo-Voltaic & Solar Thermal**
- MDAC Stirling Dish: 25KW: 1982-9X
  - Solar Dynamic – Sterling Dish
  - Solar Thermal – Large Scale
- MDAC Solar 1: 10MW: 1982-87
- Rocketdyne Solar 2: 10MW: 1996-99
- SES Teaming Agreement: 2001-11
- SAI Spectrolab CPV: 100KW: 2007-10
- Spectrolab Satellite Solar Photovoltaics (PV)

**Wind**
- DoE MOD-5B: 3.2KW: 1987-1996
- Wind Turbines – Large Scale

**Fuels**
- Coal Gasification: 1976
- Shuttle Fuel Cell Integration
- H2-Fuel Cell Aircraft: 2008
- Biofuels Flights
- Alternative Fuels & Sources

**Interoperability & SCADA**
- ConEd, BPA, Salt River Project, +
- SCADA
- AF B-1 NCO Middleware: 1982
- Revised Middleware to many USG customers
- US Navy update & Army FCS
- SOSCOE
- Interoperability Middleware

**Cyber Security**
- Acquired Argo Systems
- Secure Network Server (SNS) & Secure Monitoring Infrastructure System (SMIS)
- Acquired eXMeritus, Kestral & Narus
- Cyber Security Applications & Integration

Phases of Grid Modernization

- **Reduced Demand**
  - Building Mgt Systems
  - Lighting
  - HVAC
  - Building Improvements
  - Advanced Metering

- **On-site Gen & Storage**
  - Generator Sets
  - Gas Turbines
  - Solar
  - Wind
  - Electric Storage
  - Thermal Storage
  - EV Infrastructure

- **Advanced Controls**
  - Secure Energy Mgt System
    - Balance System
    - Critical Loads
  - Dynamic Demand Response
  - System Optimization for Cost, Carbon, Reliability,…

- **Grid Independence**
  - Automatic Connect and Disconnect
  - Operate Grid Independent for Extended Periods
  - Total Security
    - Physical
    - Cyber
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