Digital Industrial Transformation

Jeff Immelt
Chairman and CEO
GE
The world

ENVIRONMENT

Slow Growth
Volatile
Populism

BUSINESS COMMITMENT

Invest to Win
Accelerate Productivity
Move Quickly
Global trends...Extraordinary times

3B
GROWTH IN GLOBAL POPULATION
BY 2050

65%
GROWTH IN GLOBAL GAS DEMAND
FROM 2010 TO 2040

50%
OF DEMAND FOR NATURAL GAS WILL BE MET BY LNG IMPORTS OR LOCAL PRODUCTION OF UNCONVENTIONAL GAS BY 2040

40+
YEAR AGING INFRASTRUCTURE IN MANY MARKETS

DEMAND FOR ENERGY WILL CONTINUE TO RISE DESPITE CURRENT VOLATILITY
GE today

THE PORTFOLIO: World-class technology businesses

GE STORE: Foundation for world-class performance

DIGITAL INDUSTRIAL: Leading a new productivity revolution

CULTURE OF SIMPLIFICATION: Speed and customer outcomes

VALUABLE: Win in the market, build with investors
What is the benefit from the larger GE organization?
Driving innovation ... delivering at scale

- GE R&D spend
- 50,000 engineers
- 7 Global Research Centers, including the O&G-focused GTC
- 1 Advanced Manufacturing Center
- 13 O&G Technology Solutions Centers
- *FastWorks* approach ... entrepreneurial; poised to pivot

**NEW ENABLING TECHNOLOGIES**
- Physics based models
- Imaging and sensing
- Next-gen compression

**NEW PRODUCT INTRODUCTIONS**
- Validate technologies
- Aviation rigor
- Co-develop w/customers

**LARGE-SCALE CUSTOMER PROJECTS**
- Systems-level thinking
- Rigorous design process
- Integrating the GE Store
Managing through cycles

Aviation (2001-03)
- Sustained R&D investment
- Supported customer solutions
- Lowered cost
- Expanded capability

Power (2004-06)
- Diversified portfolio
- Global investment
- Lowered cost
- Expanded capability

Oil & Gas (2014- )
- Building technical advantage
- Lowering cost
- Improving our capability & team
- Expanding our capability
- Offering customer solutions

-25%  -60%  -50%

Long Term Technical Leadership

Stronger Business for future

GE aspirations
GE technology opportunity

Innovation approach

Subsea & Offshore
- Reduce total system cost
- Increase recovery factor

LNG
- Redesign system architecture
- Extend the digital thread

Onshore & Unconventional
- Develop disruptive technology
- Digitize for outcomes

Automotive
Architecture
Modularization
Molecules that Matter

Outcome: Cost + Cycle + Throughput
Industry must go digital: It’s our turn!

- Industrials have not benefitted from internet investments
- Industrial Internet changes the game … “Power of 1%”
- Opens up a $225B market
Physical + analytical

Physical
Multiple materials in complex systems — hundreds of patents in each product
Operating with high efficiency & durability in extreme conditions

Analytical
1 gas turbine compressor blade monitoring potential: 500 gigabytes per day

Capability of technology is changing
Every industrial company must be a software & analytical company
Digital Industrial framework

1. Smart machines & digital thread
   - GE value chain
   - Customer outcomes
   - Industry ecosystem
   - ... design through installed base

2. "Analytical apps" → customer outcomes
   - Power of 1%
   - Growth
   - Uptime
   - Efficiency
   - Safety
   - Capacity
   - Assets under management
     - # apps
     - # partners
     - $ outcomes

3. Analytical operating platform
   - Predix Platform
   - Cloud-based platform for the Industrial Internet
   - Capabilities for industrial companies
     - Connected assets
     - Industrial data management
     - Monitoring & diagnostics
     - Asset lifecycle
     - Industrial data science
     - Cloud & mobile
     - Predictive maintenance
     - Operations & intelligence
     - ... design through installed base
Impact of unplanned downtime

- Lost production
- Slowed deliveries
- Workforce downtime

Each week a well is out of commission offshore, lost revenue to operators is:

> $3 MM per week

Average annual cost for a mid-sized LNG facility due to unplanned downtime is:

$150 MM

Benefits of Predictive Maintenance

- Maximize production
- Predictable delivery
- Lower maintenance costs
Realtime data + analytics to enhance pipeline integrity and safety

Guarantees uptime of more than 98% for the life of the 22-year deal

Connecting up to 4K offshore wells to optimize production

FLEXIBILITY = MORE EFFICIENT ASSETS AND OPERATIONS
Onshore O&G Solutions

DIGITIZING THE ROCK:
Connectivity to the reservoir – Digital rock physics – Intelligent geological inventories – Sweet spot mapping – At-the-bit sensing – Reservoir and fracture characterization – Reservoir visualization and flow characterization – Reservoir performance optimization and sustainment

SMART IRON:
Downhole sensing – Flexible and reliable artificial lift solutions – AL evaluation, selection, and lifecycle planning – Integrated hybrid AL solutions – Automation – Precision brilliant drilling systems – Predictive production systems – Advanced instrumentation AL systems

INVISIBLE OILFIELD:
Re-thinking hydraulic fracturing (initial, subsequent, and alternative stimulation) – Downhole processing – Downhole/Pipeline power induction – Harvesting natural reservoir energy – Multiphase fluid analysis – Remote operations – Zero discharge – Flexible, mobile, and modular fit-for-purpose water treatment – Secondary and tertiary recovery ecosystems

Yield @ Cost + Ecomagination
Consistency through a tough cycle

Build our team

1. **Customer-centric regions** ... Aligning our footprint to match your needs (manufacturing/services localization); Partnership/collaboration at core

2. **One commercial team** ... making commercial interactions easier with global consistency

3. **Technologically superior product companies** ... Designing, building & delivering market-leading technologies

4. **Lean enabling HQ** ... Driving simplification and sharing best practices globally to enable front-line focus on your results

Focus on solutions

- **Launched new technologies** including small & large scale gas turbine range, high pressure compressor, multiphase flow meter

- **Created GE Digital Solutions** for Oil & Gas with full stream offerings, including LNG, Pipeline and Downstream

- **Industrial Financing** solution for oil and gas infrastructure projects

- **New customer partnerships** Statoil Powering Collaboration, PEMEX MOU, co-creation agreements and CSAs

CUSTOMERS DETERMINE OUR SUCCESS.
WE HAVE TRANSFORMED OUR ORGANIZATIONAL STRUCTURE TO SERVE YOU BETTER.
Leading through cycle

Focus on what you control

Few charts / Few studies / Few consultants

Believe in “Self Help”

Fast, Flexible + Customer focused

Protect the Future
Our path forward

The core of GE is technology
Digital will drive productivity
We are focused on customers
Play for the long term