Influencing Technology Development and Adoption

Market Pull vs. Technology Push

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Imagination at work.

GE …a heritage of innovation

1892	330,000	$150	1
FOUNDED	EMPLOYEES WORLDWIDE	BILLION IN ANNUAL REVENUE	COMPANY IN DOW JONES INDEX ORIGINALLY LISTED IN 1896

GE today

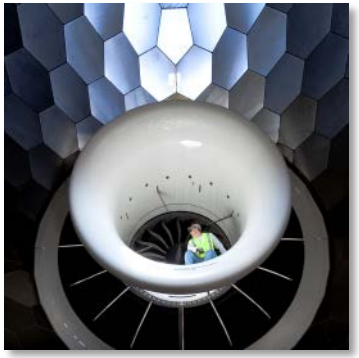
Power & Water

Energy Management

Oil & Gas

GE Capital

Healthcare



Aviation

Transportation

Home & Business Solutions

Broad portfolio - aligned for growth

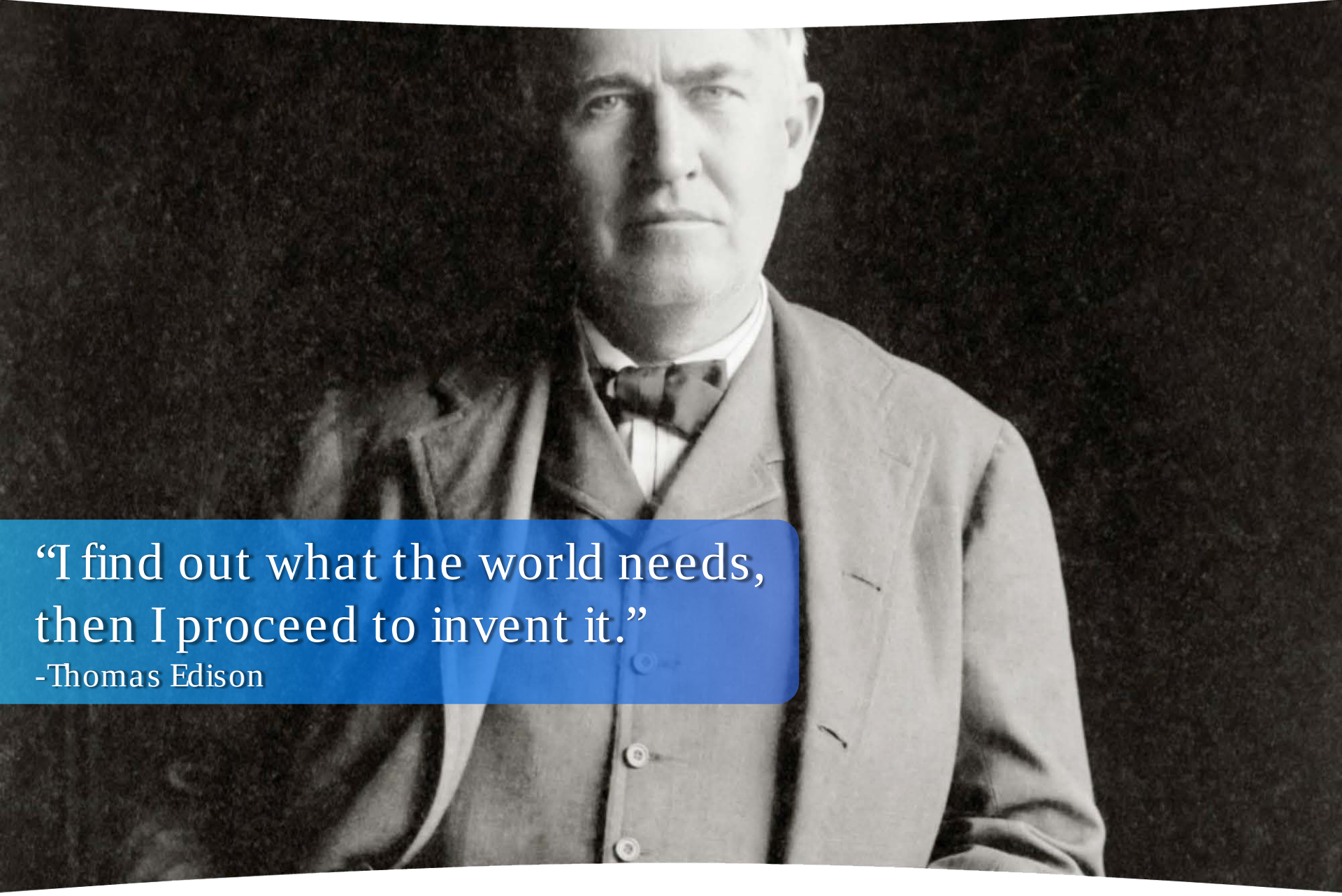
GE Water & Process Technologies

Chemical & Monitoring Solutions

- Cooling Chemistries
- Boiler Chemistries
- Wastewater Chemistries
- Fuel Oil Treatment
- Hydrocarbon Process Chemistries
- Industrial Process Chemistries
- Knowledge Management & Monitoring Solutions

Engineered Systems

- Ultrafiltration/Membrane Bioreactor
- Mobile Water Solutions
- Water Outsourcing
- Thermal/Zero Liquid Discharge
- Reverse Osmosis/Electrolytic Systems
- Filters & Membranes
- Advanced Biological Metals Removal (ABMet)
- Analytical Instruments


“I find out what the world needs, then I proceed to invent it.”
-Thomas Edison

GE Global Research

The cornerstone of GE's commitment to technology

Working to improve the world by pushing the limits of science and technology for our customers

Market-focused R&D

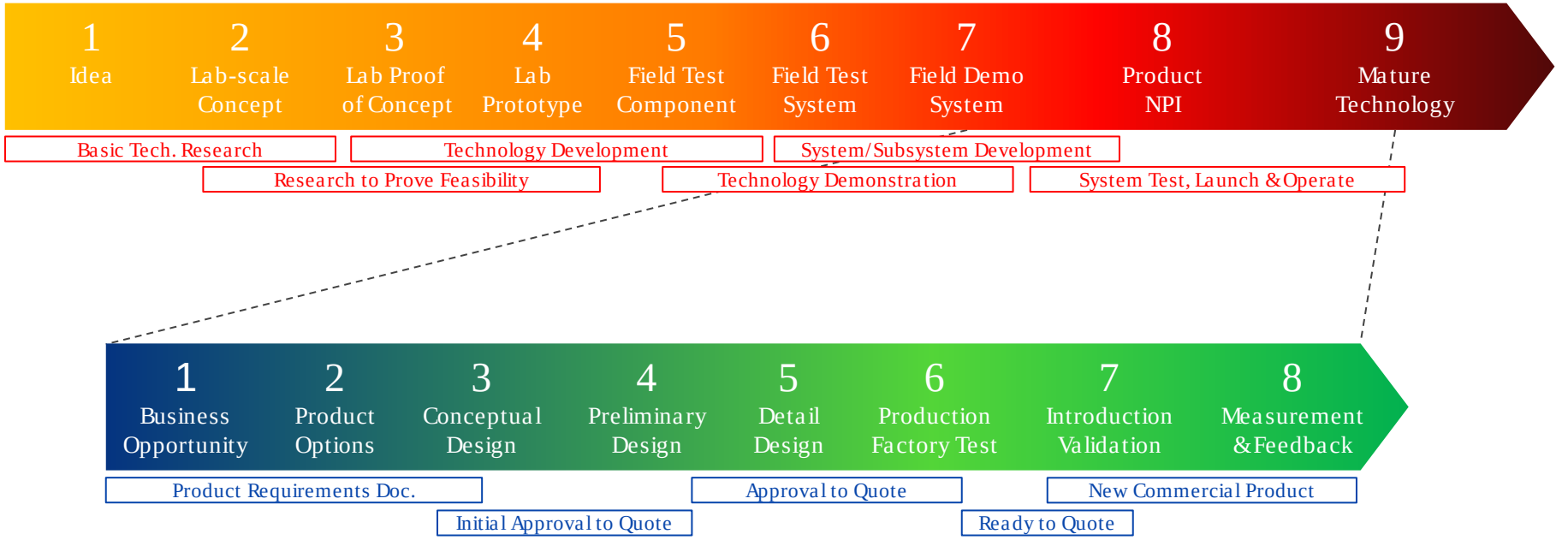
Global reach and connectivity

40,000 technologists across GE

Technology development &deployment stages

Technology Readiness Level

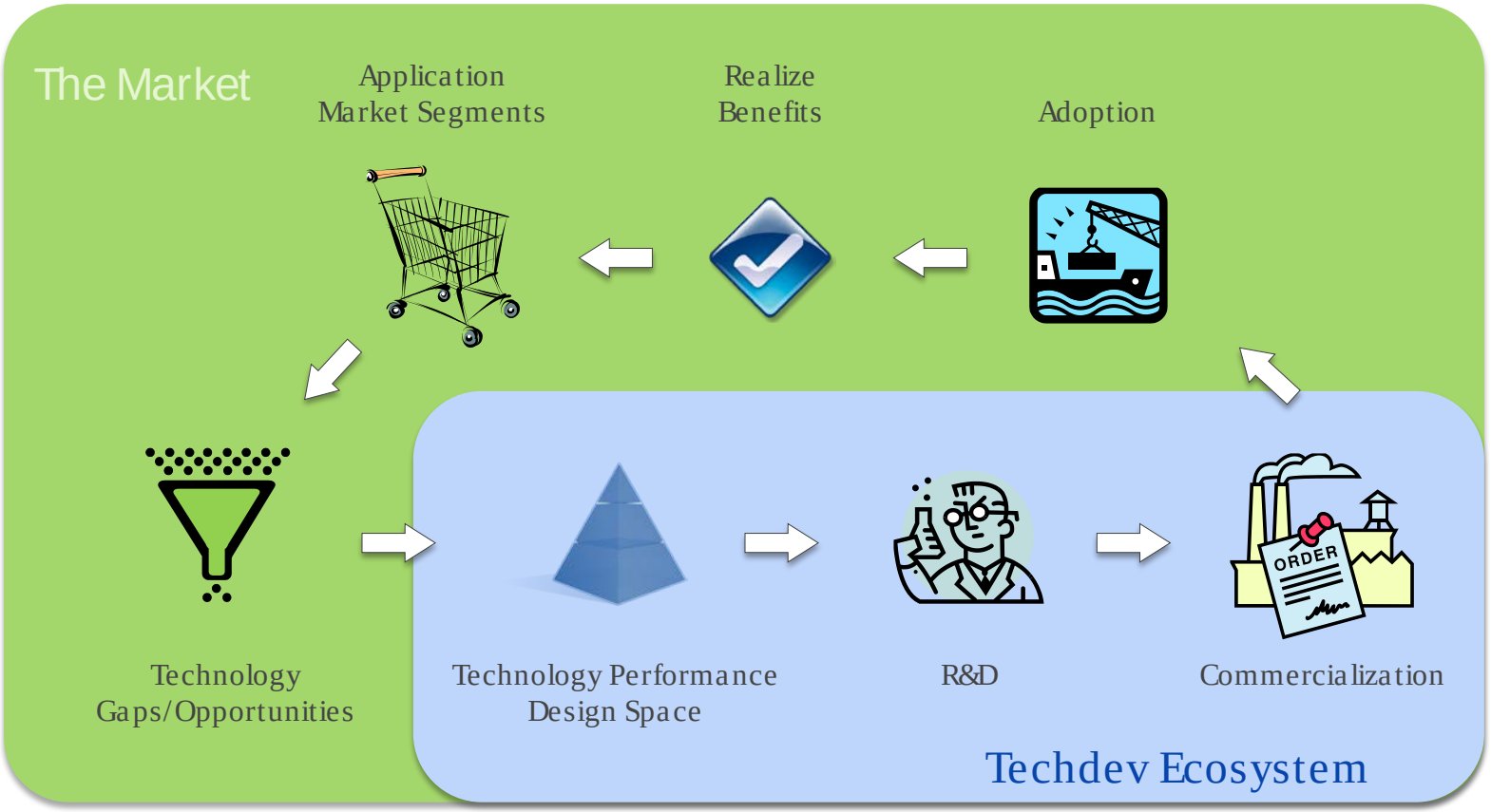
Global Research see's the world through this NTI lens



New Product Introduction Toll Gates

Product Line businesses see the world through this NPI lens

The Uncertain Struggle
Investing in technology to realize benefits from its use



Developing technology for a specialized application without market pull is like pushing a rope…

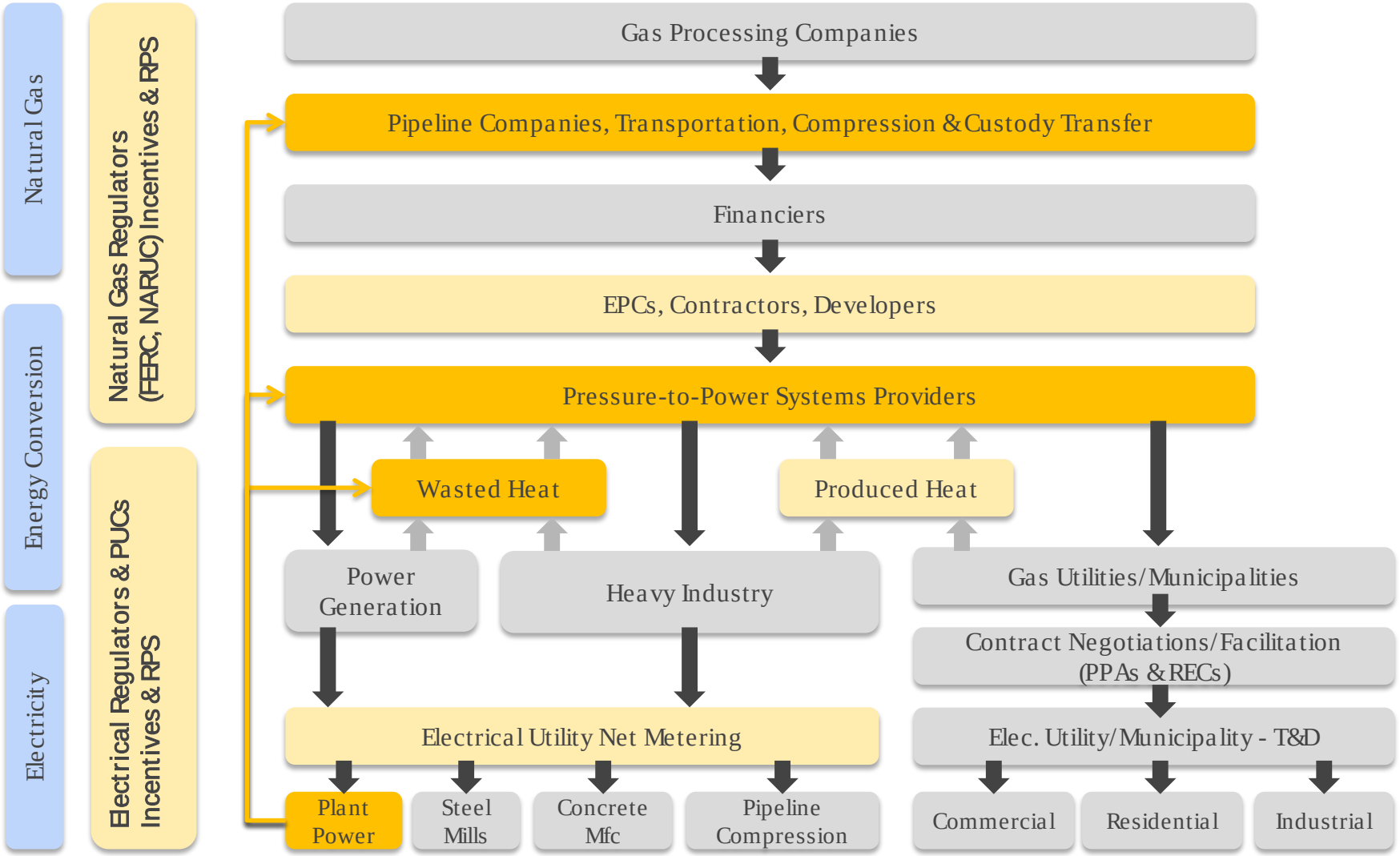
You can do it, but

You risk developing technologies that just sit on the shelf and are never used

A few simple concepts

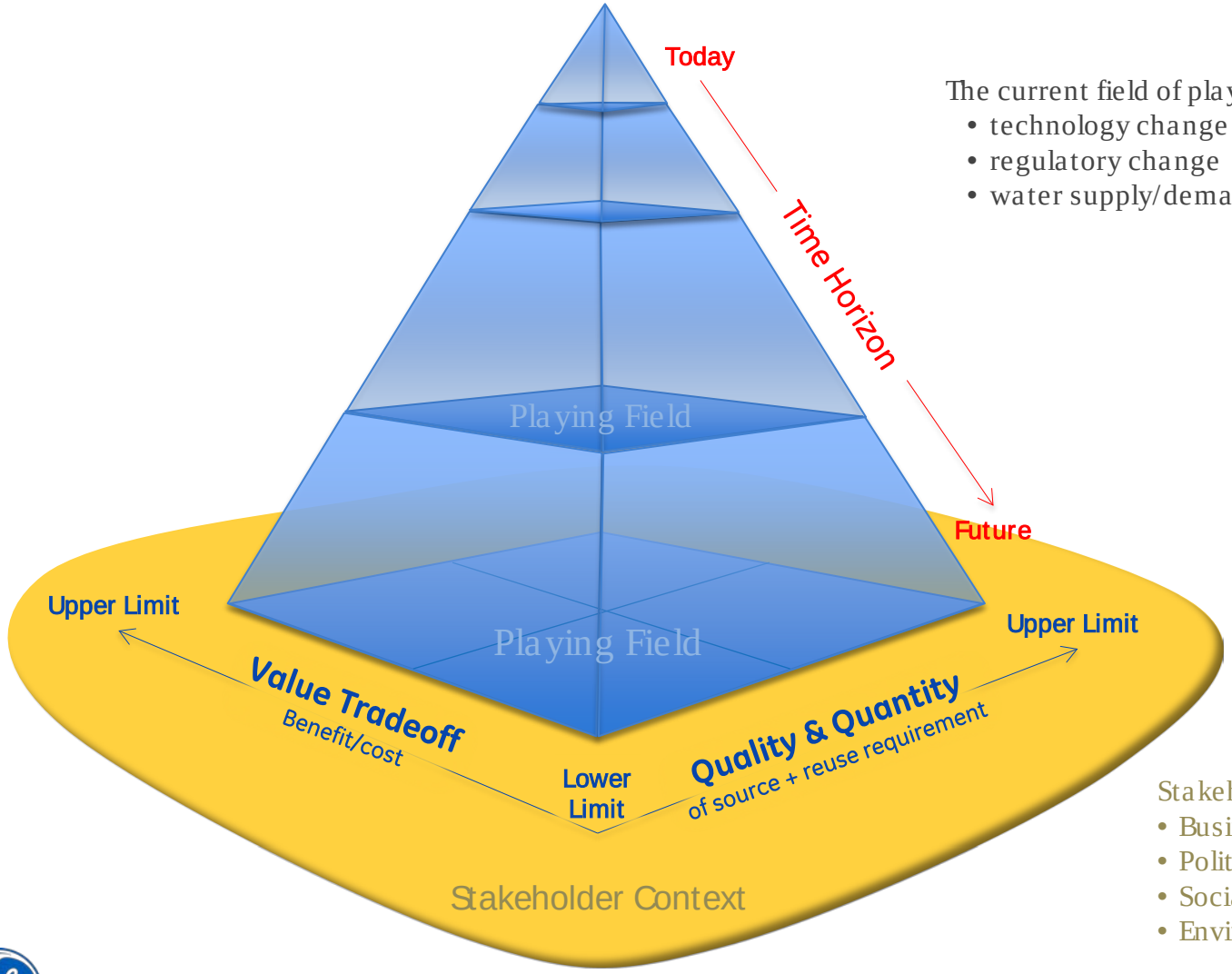
- Develop deep market understanding
- Establish the technology performance design space
- Collaborate with end users to develop solutions
- De-risk both technology development &adoption

Develop deep market understanding



Evolving "Pressure to Power" market ecosystem

Each water reuse market represents a unique technology performance "design space"



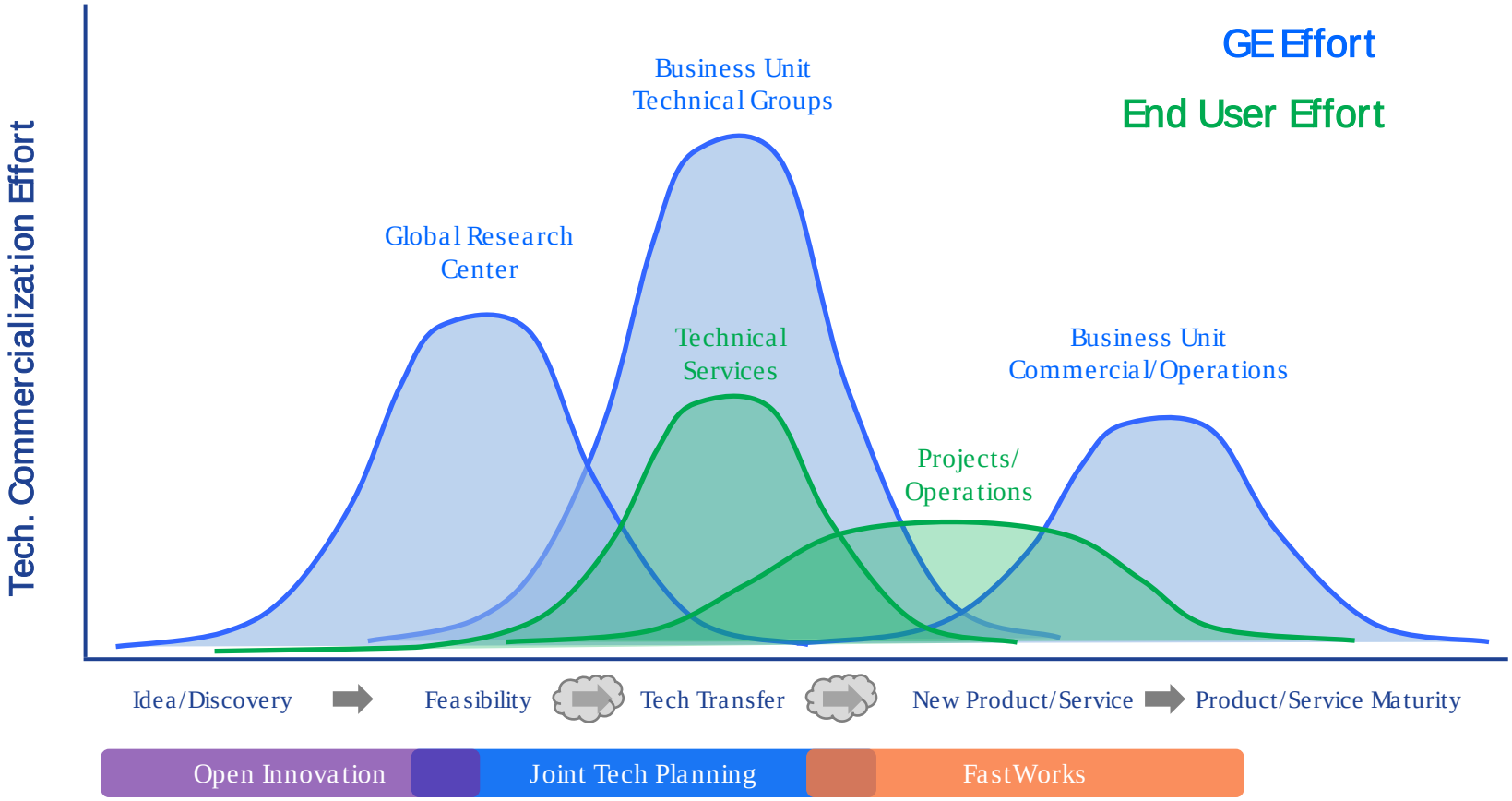
The current field of play can be disrupted by:

- technology change
- regulatory change
- water supply/demand/quality changes

Stakeholder Context:

- Business risk
- Political risk
- Social risk
- Environmental risk

Collaborate with end users to develop solutions



De-risk both technology development &adoption

What end users want from technology providers at each stage to de-risk their business

R&D	Commercialize	Market Adoption
• R&D focused on their gaps • Access to promising tech. • De-risked technology	• Commercialization • Favorable terms • Choice of suppliers	• Early access to new solutions • Fair price for new solutions in a competitive market • On-going investment commitment to improve solution

Return on technology investment from provider's perspective

R&D	Commercialize	Market Adoption
• Voice of customer • Access to data/facilities • Development money	• De-risked market • Order commitments • Voice of customer	• First to market with differentiating technologies • Expand number of early adopters (reference customers) • Fair price for our new solutions

What technology providers want from end users at each stage to de-risk their investment

GE Water & Process Technologies

Water Reuse Examples








Achieving Water Reuse in the USA

Challenge: Expanding population required increased wastewater treatment

Solution: GE's MBR technology to treat wastewater for reuse and safe disposal

Brightwater Plant – Seattle, WA

- Water produced for irrigation , heating &cooling and industrial processing
- Average daily flow of 31 MGD (117,348 m3/day)
- Reduces TSS and BOD discharge to Puget Sound by 1,000,000 lbs (454,000 kg) each year
- Positioned to cost-effectively address future regulations

Water scarcity solutions in Australia

Challenge: Water scarcity prevented plant expansion

Solution: Water reuse solution met demand and enabled expansion

BP Luggage Point, Australia expanding operations

- 14,000 m3/day of reuse water (3.7 MM gal/day)
- Water used for cooling and fire fighting
- Replaced previously potable water application

Harvesting wastewater in Australia

Challenge: Ongoing drought challenged availability of water for golf course

Solution: Sewer mining water reuse plant provides irrigation water

Pennant Hills Golf Club, Australia's first commercial sewer mining water reuse plant

- Conserves 25 million gallons of Australia's fresh water a year
- Advanced MBR produces 172,000 gallons of high quality water per day which is used to irrigate 55 acres
- "We are proud to be the first to embrace this innovative approach. It is bringing us a drought-proof supply of water that minimizes impact on Australia's fresh water reserves."
  —Steve Walker, president, Pennant Hills Golf Club

Creating "NEWater" in Singapore

Challenge: Inadequate supplies of renewable fresh water

Solution: Treat and reuse wastewater effluent for local industry

Bedok NEWater Factory – Singapore

- Transforming wastewater into high quality industrial feedwater and potable water
- The final product is termed "NEWater"
  - Initially used as a feed for the electronics industry, wafer fabrication plants, and commercial building cooling towers
- A growing percentage is released back into local reservoirs for indirect potable reuse applications

GE's own commitment to reduce water use

"Today's ecomagination expands our view from "traditional" sustainable technologies like wind, solar and fuel cells to solutions for heavy industries like mining, unconventional resources, and oil and gas.

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Commitments & Progress

Goals for 2015

1. Double R&D to $15B from 2005-2015
2. Grow 2x GE's revenues
3. Reduce GHG emissions by 25%
4. Reduce GE's energy intensity by 50%
5. Reduce fresh water consumption by 25%

2013 Progress

1. $1.6 billion in R&D in 2013; $12 billion to date
2. $28 billion in revenues 2013
3. GHG emissions reduced 34%
4. Energy intensity reduced 32%
5. Fresh water use reduced 47%

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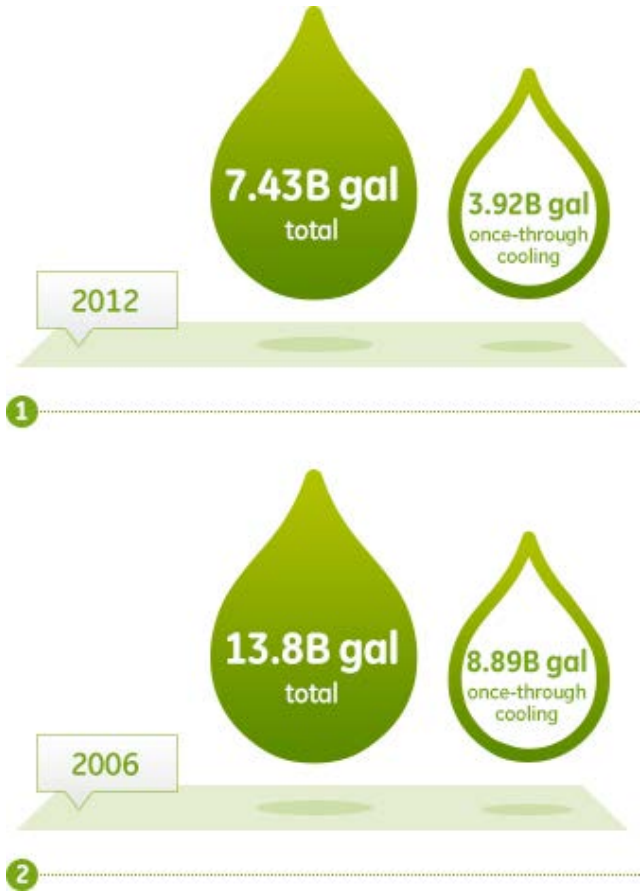
Reduce Water Use and Improve Reuse

- Target GE sites consuming > 15M gal/year accounting for 90% of GE's total water use
- Include water used for potable, process, sanitary and once-through cooling purposes from freshwater sources
- Biggest factors contributed to results:
  - Kaizen Blitz water reduction events
  - Decreases in once-through cooling due to new product installations
- Focusing further efforts on sites in water-scarce regions upgrading to MBRs to increase reuse.

46% Reduction Achieved



Original Baseline

Targeting 25% further reduction by 2015