Competitiveness of Depwater Technology

Re-shaping

October 30, 2017

GE and BHGE Proprietary Information

Main Drivers

1. Understanding the Ecosystem;
2. From Corporate to Business Level;
3. Revolutionary thinking

1. Understanding the Ecosystem :

Baker Hughes-GE, The fullstream Company

October 30, 2017

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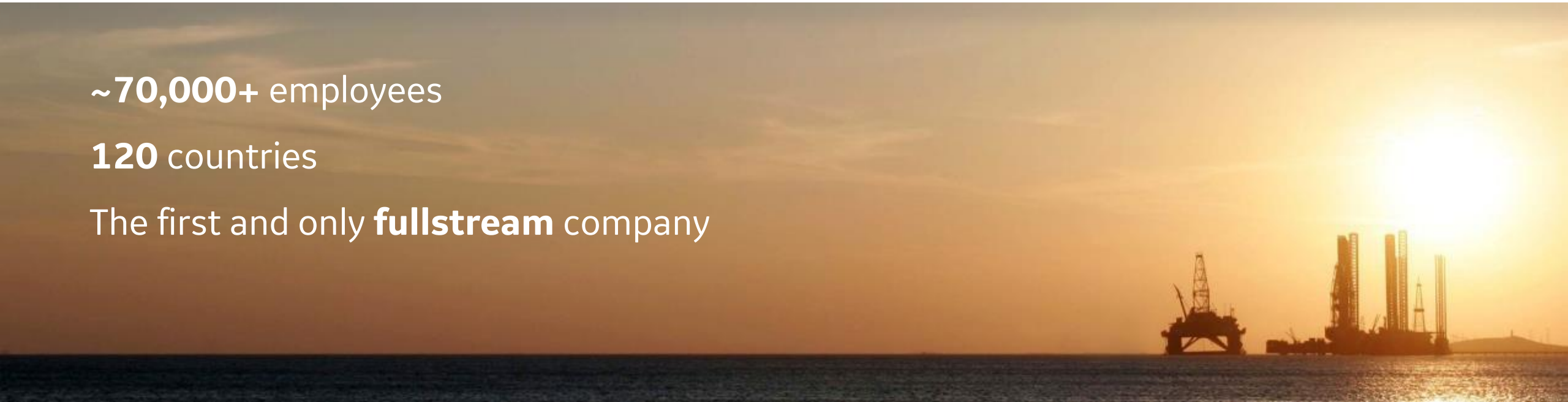
BAKER HUGHES + GE Oil & Gas = BAKER HUGHES a GE company



~70,000+ employees

120 countries

The first and only **fullstream** company

Fullstream

Rely on cutting-edge technology, digital solutions, and expert service across every segment

Upstream

- Evaluation
- Drilling
- Completion
- Production & optimization

Midstream

- Pipeline & storage
- LNG

Downstream

- Refinery
- Petrochemical & fertilizer
- Industrial power & processing

Digital

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2. Empowerment at Business Level

From a global R&D Network to a dedicated Task Force for technology management

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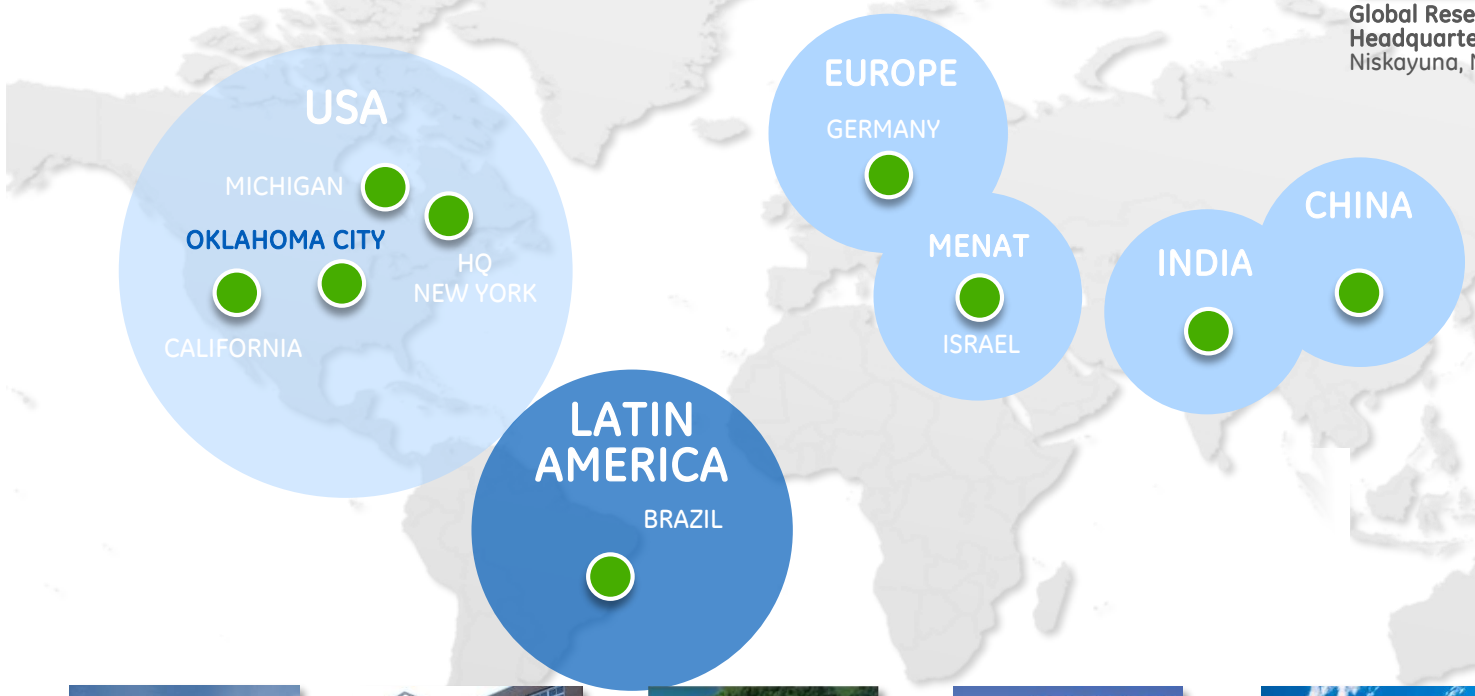
Corporate Research Network … driving innovation Worldwide for all Business units (*)

Global Research Headquarters
Niskayuna, NY

Welch Technology Center
Bangalore, India

China Technology Center
Shanghai, China



(*) GE's Business Units :

Aviation, Healthcare, O&G, Transportation, Water and Energy Management

Global Research Europe
Munich, Germany

Advanced Manufacturing Center
Detroit, MI

Brazil Technology Center
Rio de Janeiro, Brazil

Software CoE
San Ramon, CA

Israel Technology Center
Tirat Carmel, Israel

O&G Tech Center
Oklahoma

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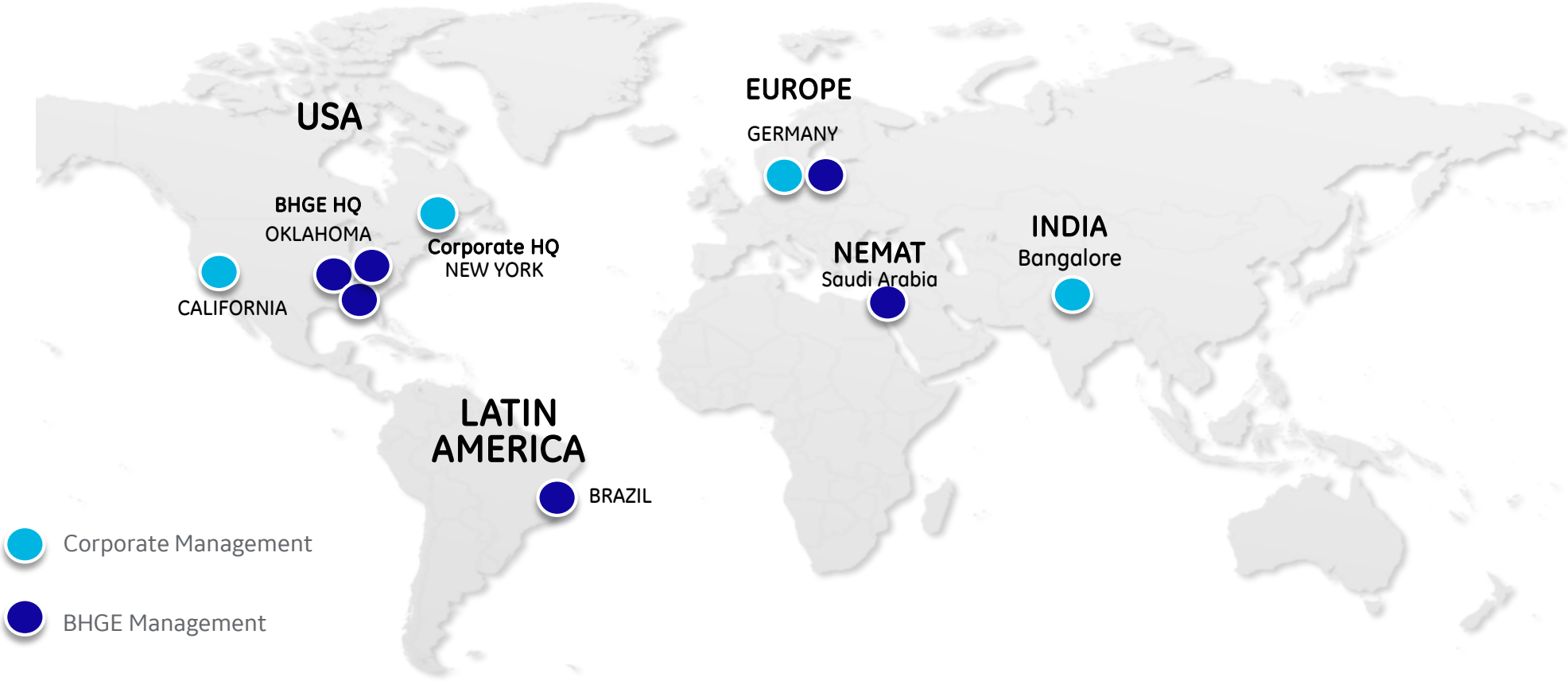
BHGE More Close to the Customers

Corporate research centers for horizontal basic research in Niskayuna and Bangalore, and vertical Technology for O&G lead by BHGE in strategic regions



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BHGE Technology Centers

Center for Technology Innovation (CTI) , USA

- Completions and Wellbore Intervention
- Material Research & Testing
- Nanotechnology Research

Houston Technology Center (HTC), USA

- Wireline Services, Drilling and Completion Fluids
- Formation Evaluation
- Cased Hole Logging
- Product Development

Celle Technology Center (CTC), Germany

- Drilling Services
- Product Development and Manufacturing
- Rotary Steerable
- LWD / MWD
- Motors
- High Reliability Electronics / Hybrids

Dhahran Research & Technology Center, (DRTC), Saudi Arabia

- Fluids and Cementing
- Geoscience
- Materials - Corrosion & Scale

Oil & Gas Technology Center (OGTC), USA

- Production Solutions
- Well Construction
- Reservoir Performance
- Integrated Geoscience & Engineering

Rio de Janeiro, Brazil

- **Low Cost Subsea Systems**
- **Solutions to the PreSalt and P&A**

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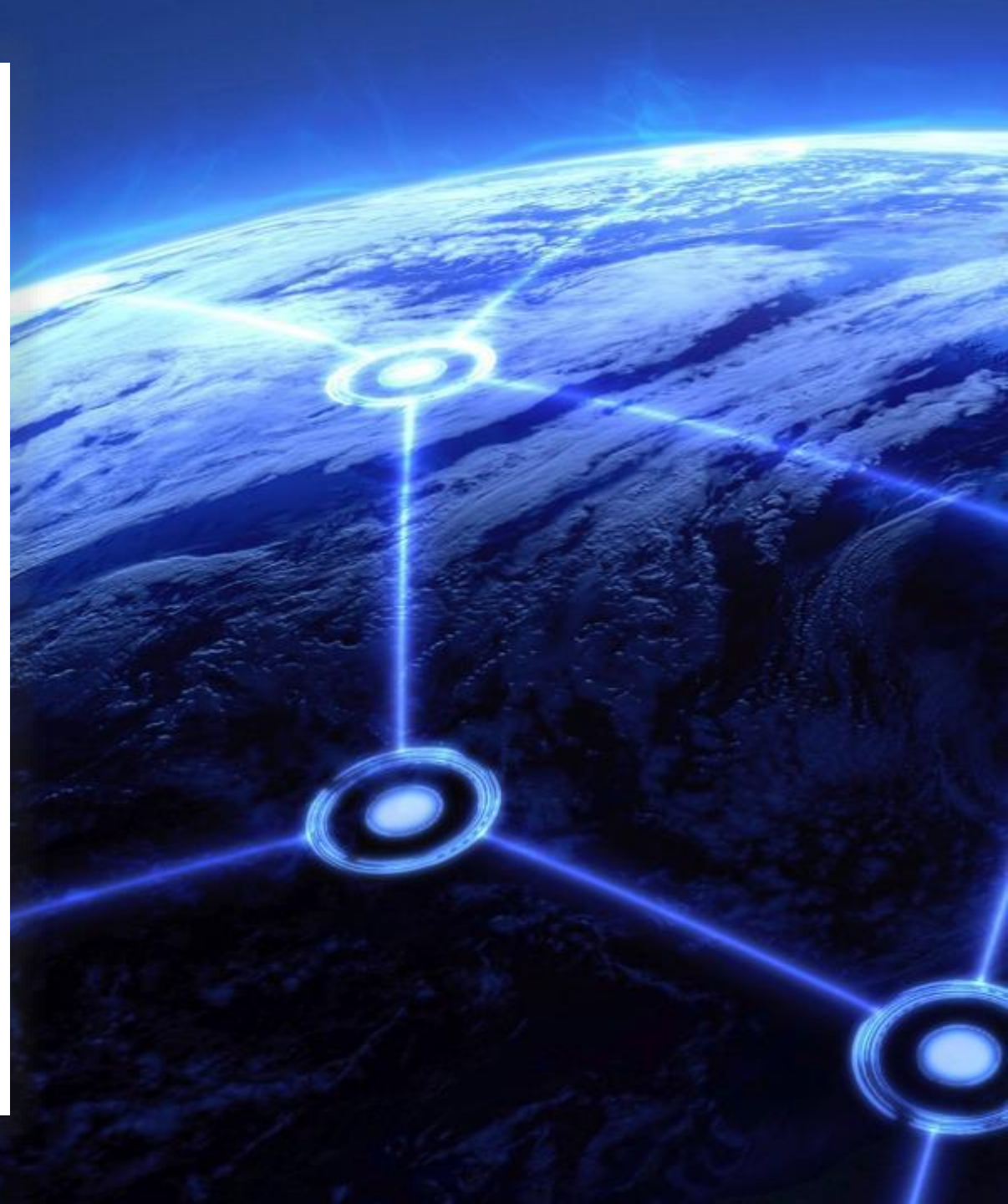
Global & local

Get access to the latest, most effective technology and solutions no matter where you are working.

Count on consistent, high-quality service wherever you are.

Draw on local expertise for help navigating new markets and accelerating the local learning curve.

Leverage global scale with powerful local impact



Executive Leadership Team

Combining skills and expertise from GE Oil & Gas and Baker Hughes to form an industry-leading team driving global impact

Lorenzo Simonelli
President & CEO

Belgacem Chariag
Chief Global Operations Officer

Maria Claudia Borras
President & CEO, Oilfield Services

Neil Saunders
President & CEO, Oilfield Equipment

Rod Christie
President & CEO, Turbomachinery & Process Solutions

Matthias Heilmann
President & CEO, Digital Solutions

Jody Markopoulos
Chief Engineering and Supply Chain Officer

Derek Mathieson
Chief Marketing and Technology Officer

Brian Worrell
Chief Financial Officer

Jennifer Hartsock
Chief Information Officer

Uwem Ukpong
Chief Integration Officer

Will Marsh
Chief Legal Officer

Harry Elsinga
Chief Human Resources Officer

Nicola Jannis
Chief Business Development Officer

Jack Hinton
Chief Health, Safety and Environment (HSE) Officer

BHGE Technology Center Brazil

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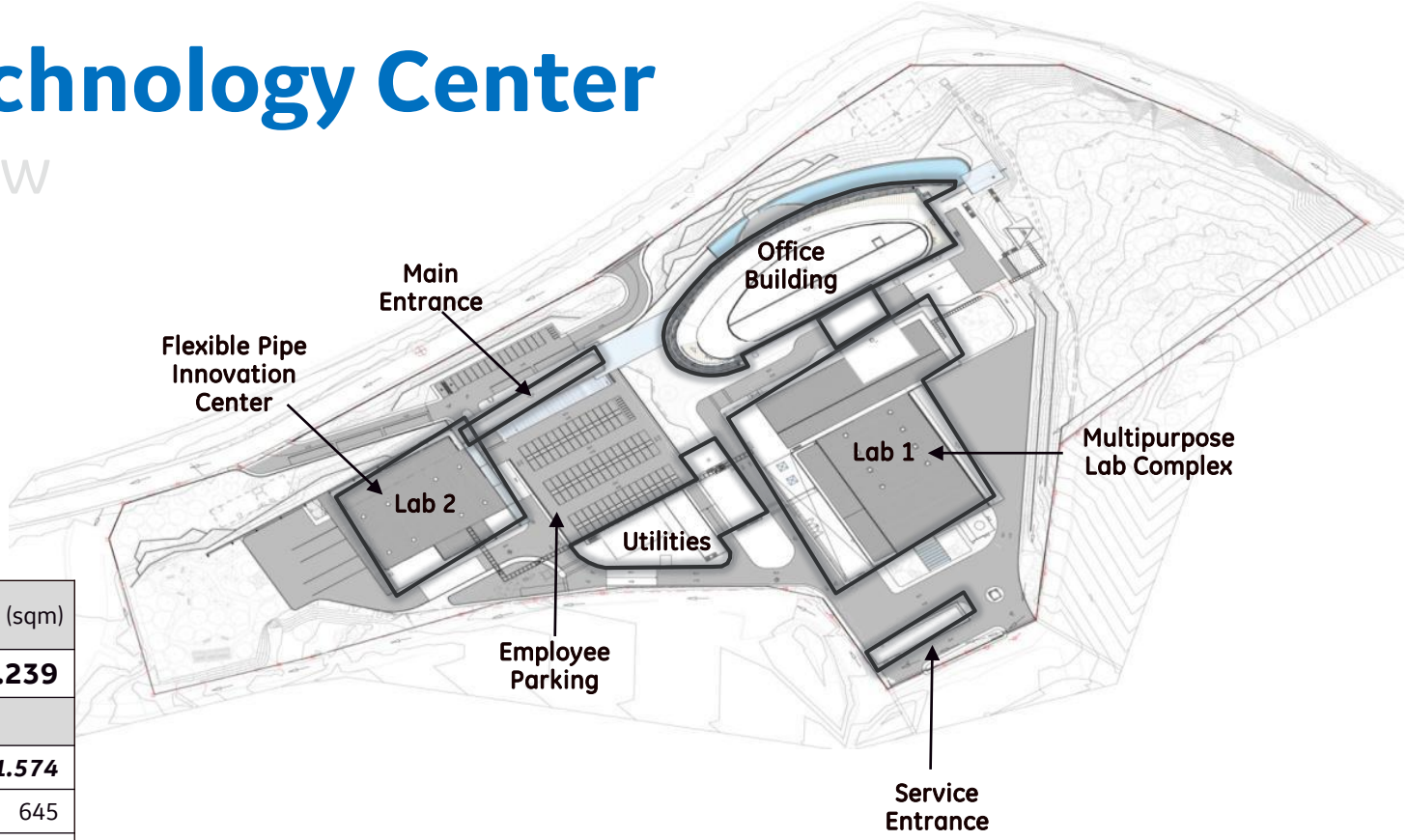
Brazil Technology Center

Site Overview



AREA DESCRIPTION	GROSS AREA (sqm)
SITE PLAN	**42.239**
BUILDING AREAS	
OFFICE BUILDING	***11.574***
BRIDGE BETWEEN OFFICE AND LAB 1	645
LAB 1 (*) – RTC lab	***7.446***
LAB 2 – Flexible Pipes Innovation Center	***2.567***
UTILITIES	617
GATE 1 - MAIN ENTRANCE	177
GATE 2 – DELIVERY	201
TOTAL AREA	**23.227**

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R&D Priorities for O&G

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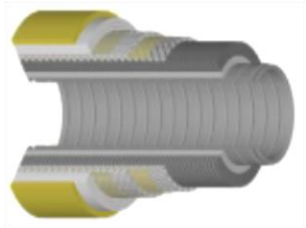
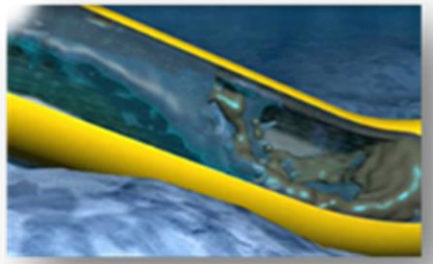
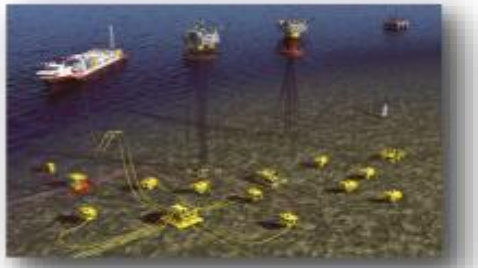
Offshore Oil & Gas Exploration and Production: Core Competencies

	FLEXIBLE RISERS	FLOW ASSURANCE	SEABED PRODUCTION	ADVANCED DRILLING
				
CHALLENGES	• Depth: 3000m • Temp: 130C • Pressure: 10 kpsi • High H_2S & CO_2	• Multi-phase flow • Wax & asphaltene deposition • Heavy oil and Sour Gas	• Depth: 3000m • Tie-backs: 50 – 200km • Multi-phase separation • Boosting & artificial lift	• Depth: 3000m • Pressure: 20 kpsi • Drilling cycle-time • Rig leasing costs
TECHNOLOGIES	• Composite-based layers UDW, Large ID, High Pressure, Sour Fluid • Lifecycle monitoring system • EnhancedManufacturing capabilities : Inline NDT & Repair • Qualification testing	• Wax , asphaltene, & hydrate inhibitors • Multi-phase flow & deposition modeling • Crude oil sample testing & characterization • Advanced Modelling and Simulation	• Downhole & seabed pumps • Multiphase separation • Gas compression • Power generation & delivery • Monitoring & diagnostics • Modelling and Simulation • Rotor Dynamics & CFD • CO2 processing • Plugging & Abondonment	• BOP reliability • Riser & BOP monitoring • Rotating control devices • Full Electric BOP controls • Riserless, Dual-gradient & Managed Pressure Drilling • Early Kick Detection

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3. Revolutionary Thinking

Digital & Physical

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Revolutionary thinking

Digital solutions to create radical efficiencies and achieve a step-change in performance

Reduce time to market by streamlining manufacturing time and supply chain

Get better insights to make smarter decisions

Craft a business model that matches both economic realities and operating environments

The future of the oil and gas industry is happening now. Write a new energy story