# **GE Power & Water**

Perspective - GE, GEP&W, Technology Investment
Power Demand Growth - Drivers and Trends
Portfolio of Options - Wind, Nuclear, Solar ...
Essential Technologies - Materials, Aerodynamics ...





Lou J Cerone
Chief Engineering & General
Manager GE Power & Water











## GE's portfolio ... structured for growth

- 8 businesses operating in more than 100 countries ... 125+ years
- >300,000 employees worldwide \$146B in Revenue

Power & Water \$24.7B

\$17B

**Energy** Oil & Gas Management \$7.6B

**Aviation** \$21.9B **Healthcare Transportation Solutions** \$18.2B \$5.9B

Home & **Business** \$8.3B

**GE Capital** \$44.1B



\*After Corporate items and eliminations as they pertain to NBCU 2

## Power & Water portfolio

~\$25B revenue >37,000 employees >120 countries



**Power Gen Products** 



**Power Gen Services** 



**Distributed Power** 



Renewables



Water & Process Technologies



Nuclear



Diverse Technology & Services Solutions ...
Over 1,000 GW installed globally

### Global trends ...

**Population** 



Consumption



**Energy security** 



**Environment** 



... Create big challenges



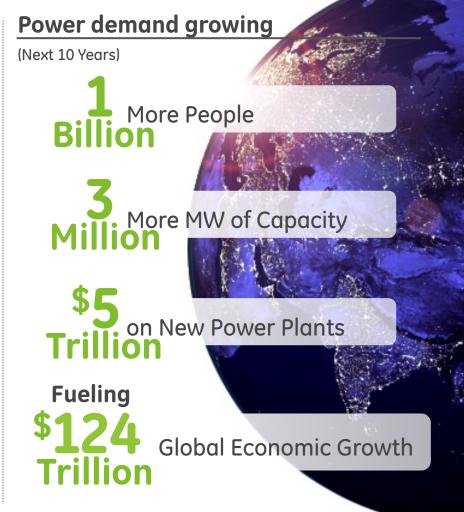
## Powering the world now & for the future



The United States accounts for about 5% of the world's population, but consumes about 21% of the world's energy.

On the other hand...

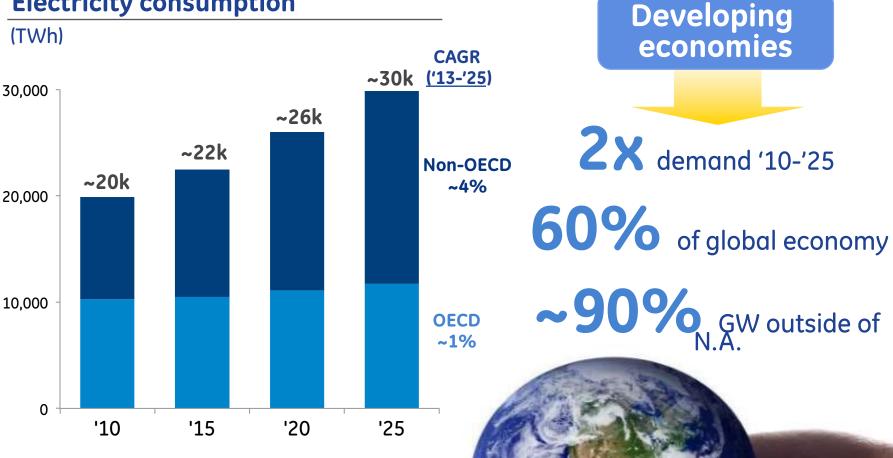
- China accounts for about 20% of the world's population and consumes approximately 17% of the energy.
- India accounts for about 18% of the world's population and consumes just 4% of the energy.





# Growth centers are shifting

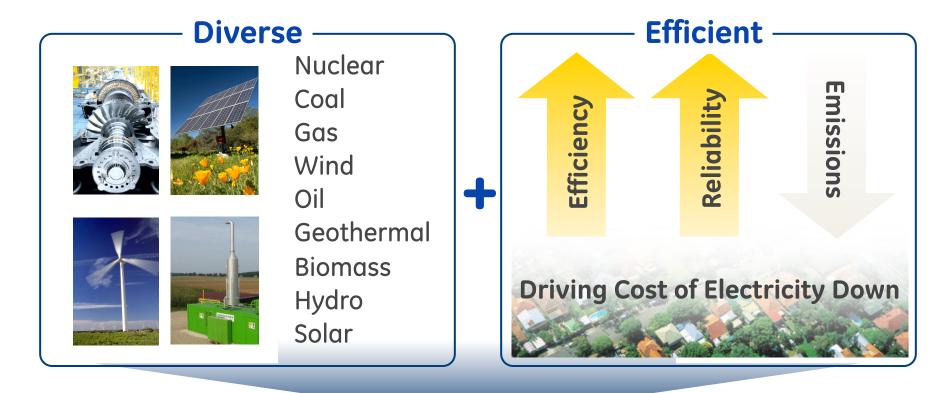




Non-OECD will account for +60% of global electricity consumption by 2025



# Meeting big challenges ... with big solutions



Affordable, reliable & environmentally responsible



# Trends shaping the landscape are regional ...

Gas Networks



Mainstream Renewables



Decentralized Power



Brilliant Machines



Talent
Development



The outcome for lower COE and improved standard of living are same



## Technology investment

#### 2X new patent filings



**Programs** spend

#### 300 new launches



R&D investment ... Focused on Cost of Electricity Reduction

# Required Essential Technologies

Validation... Reliability & Availability

Advanced Controls... Sensors with onboard algorythms

Systems Integration... Optimization

Combustion... LES modelling and testing

Manufacturing Technology... Castings, 3D printing, rapid prototyping

Materials... Superalloys, Ceramic Matrix Composite, Coatings

Heat Transfer... Shaped cooling holes, steam cooled, pulsed cooling

Aerodynamics... Predictive Component and System Efficiencies

1970 1980 1990 2000 2010 2020



# GE is looking for...

#### World class experts in:

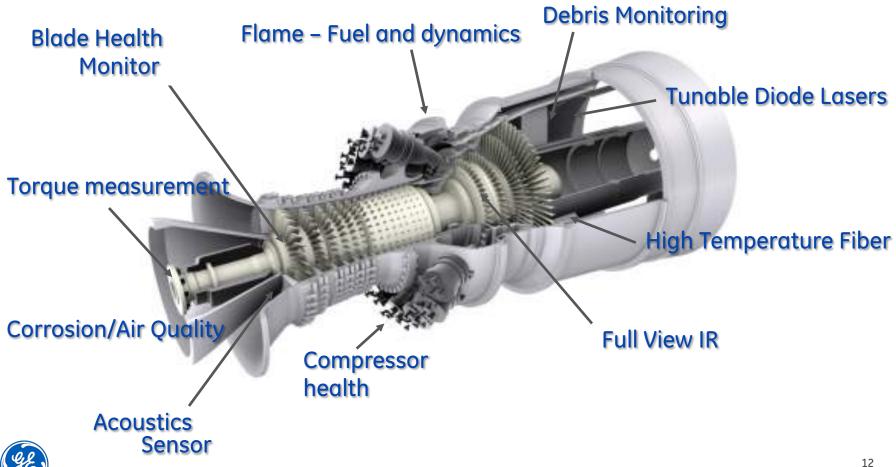
- -High temperature materials and coatings
- -Combustion modeling
- -Nanotechnology
- -Heat transfer
- -Systems engineering
- -Mechanical design and analysis
- -Fuels
- -Aerodynamics
- -Nuclear engineering
- -Signal processing



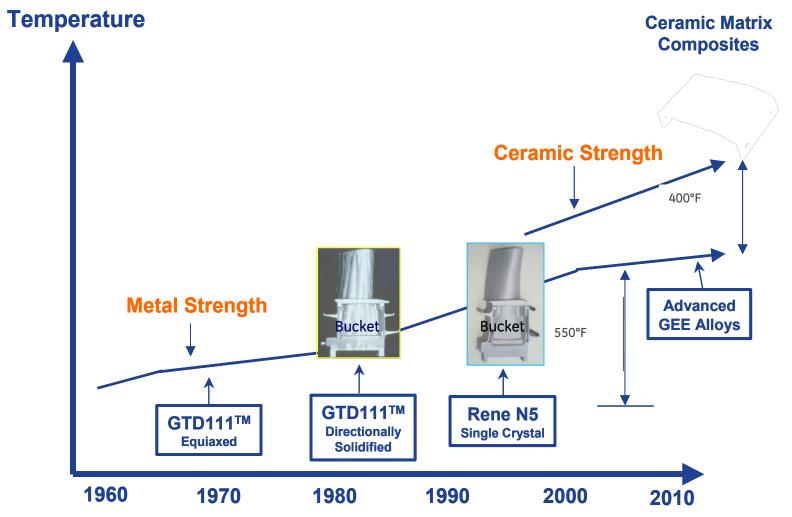


## Sensors and algorithms to maximize GTC

- Performance: Enables component & system to approach entitlement
- Reliability: drives condition based maintenance & catastrophic failure prevention
- Health: provides more precise parts life consumption calculations



## CMCs: 2+% combined cycle efficiency





# Power & Water Strategy

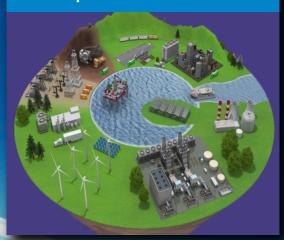
Differentiated products & services



**Leading** cost position



**Expand** in power vertical



**Customer-focused culture** 

