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Regulatory Information Conference (RIC) 2020

Worldwide Advances in Equipment Qualification

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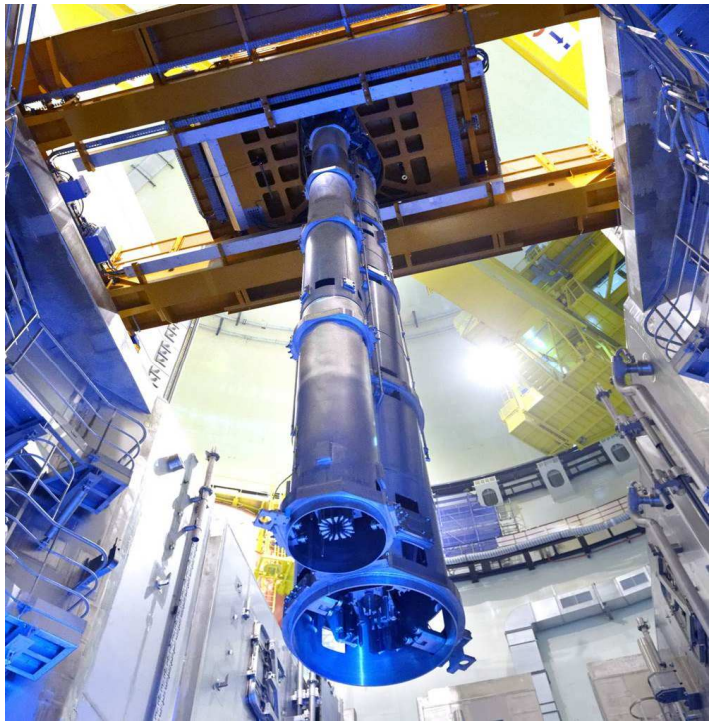
Framatome Global Overview



For 60 years, Framatome's teams have been involved in developing safe and competitive nuclear power worldwide by:

- designing nuclear power plants
- supplying nuclear steam supply systems
- designing and manufacturing components and fuel assemblies
- integrating automation systems
- and servicing all types of nuclear reactors

- **Original Equipment Manufacturer of 92 nuclear power plants**
- **14,000 employees serving more than 380 reactors worldwide**

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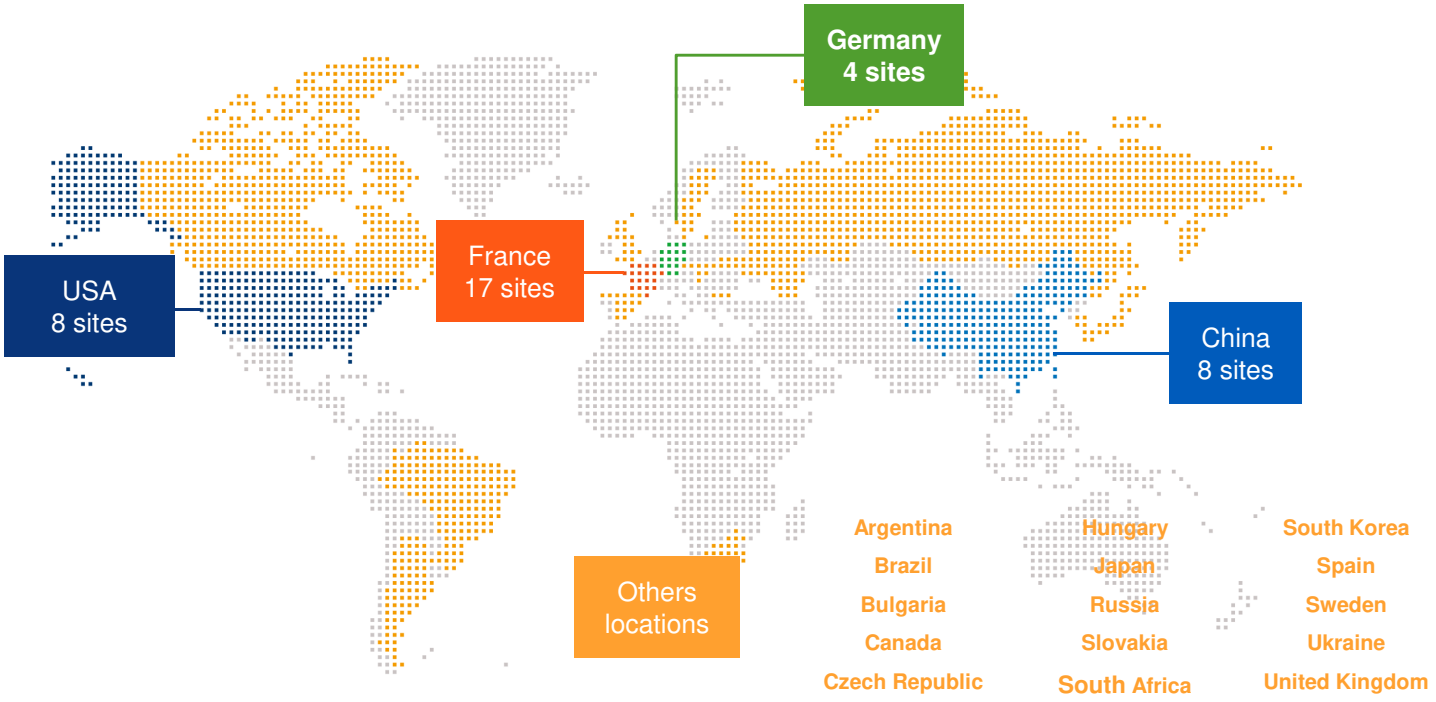
Framatome Global Overview



14 000 employees working on more than 250 reactors worldwide at 53 locations in 20 countries

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State of the Market

North America

- ~60% of U.S. nuclear fleet expected to apply for Second License Renewal (SLR), major refurbishments in Canada
- Small Modular Reactor (SMR) and advanced reactor technology potential

Globally

- Mixed bag of contraction and growth

Technology & Initiatives

- 50.69 impact on installed base
- Accident Tolerant Fuel
- Passive safety systems in new designs

Commercial Grade Dedication (CGD) & Equipment Qualification (EQ) programs will still be critical going forward

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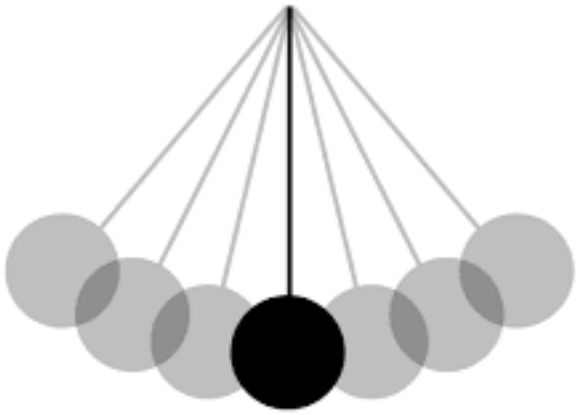
Global Challenges | A Supplier's Perspective

"State of the Original Equipment Manufacturer (OEM)"



""Reasonable Assurance Pendulum

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Global Challenges | A Supplier's Perspective

The "State of the OEM"

- History of the OEM – quality program changes, M&As, technological advances, and obsolete parts
- Difficulty in getting and meeting acceptance criteria due to deviation of designs over time
- Challenges with design information and Intellectual Property access
- Difficulty and increased effort and cost of **maintaining original EQ during the CGD acceptance process**

CGD is increasingly important and challenging with today's "State of the OEM"

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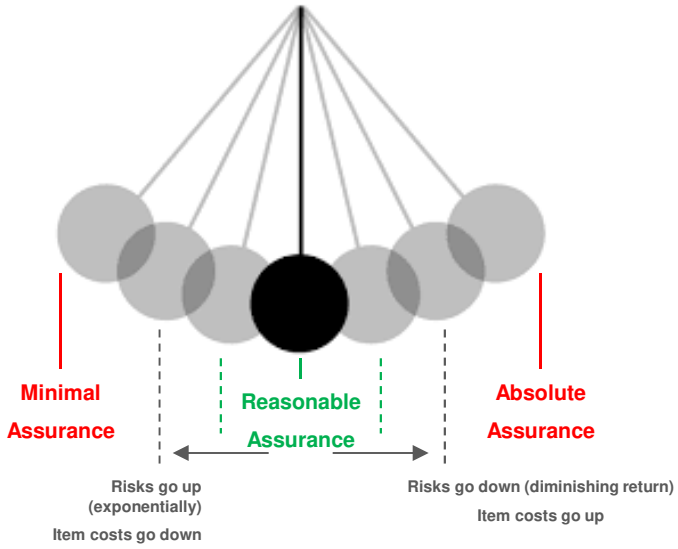
Global Challenges | A Supplier's Perspective



- **The "Reasonable Assurance" pendulum**
- **Key drivers:**
  - Terminology, training, knowledge, experience gaps
  - Regulations, regulatory involvement and positions
- **Key focus areas related to terminology, training, knowledge, and experience gaps:**
  - Dedication (CGD) vs. Qualification (EQ)
  - Like-for-Like vs. Alternative Replacements
  - Maintaining EQ during CGD

Optimize operational risks and costs through global standardization of CGD terms, definitions, and training.

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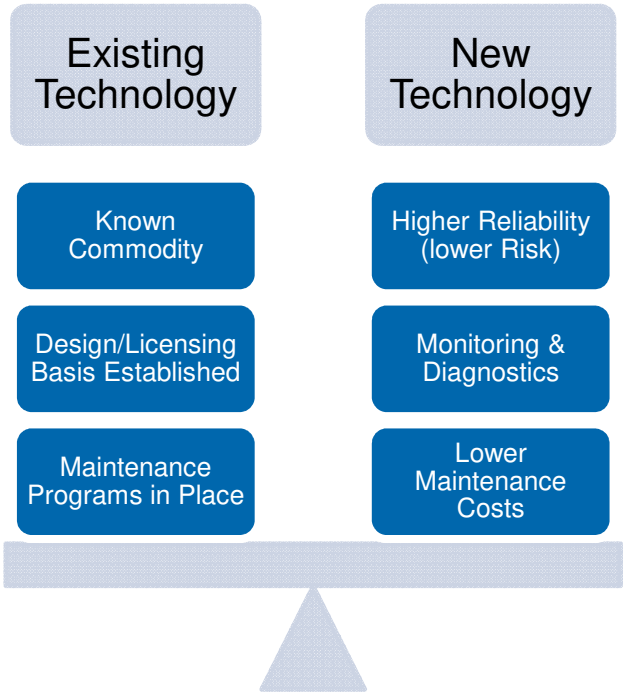
Global Challenges | A Supplier's Perspective



WHAT'S THE COST OF NOT CHANGING?

- **Existing Technology:**
  - CGD/EQ becoming increasingly difficult on dated technology
  - Reliability declining, cost of managing the asset increasing
- **New Technology:**
  - Design advancements generally increase reliability and lower lifecycle costs
  - Digital technology providing opportunity for Monitoring & Diagnostics
  - Rest of general Industry progressing more rapidly (knowledge/resource issue)

There is a tipping point to answer the question, but in order to answer must consider…

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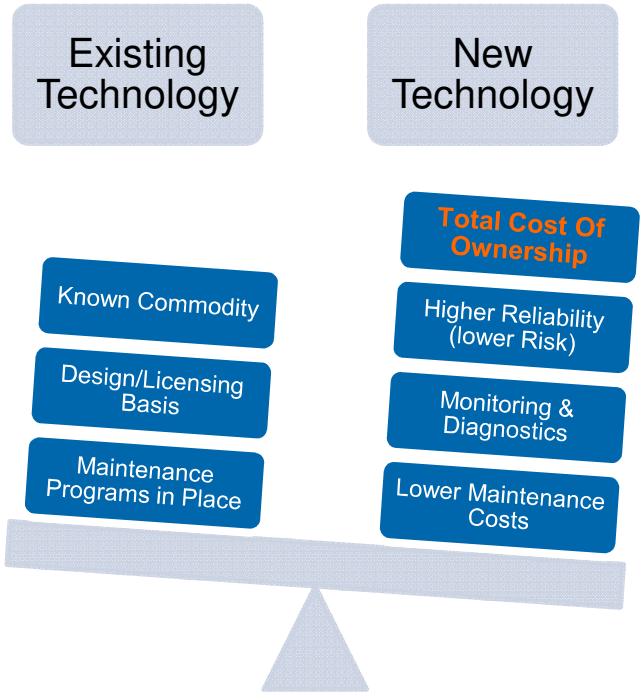
Global Challenges | A Supplier's Perspective



Total Cost of Ownership (TCO) – does it tip the scale?

- **Like-For-Like replacements becoming more challenging and costly to CGD and maintain EQ**
- **Total Cost of Ownership ($'s) includes:**
  - Parts, Training, Maintenance costs
  - Engineering Costs – CGD, equivalencies, etc.
  - Failure/non-quality costs
- **Cost not just dollars, must also consider:**
  - Risk/Equipment Reliability
  - Personnel & Plant Safety
  - Knowledge Management
  - Long-term support – parts, design

Must emphasize TCO approach to better align our state of technology with the future of our market

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Global Challenges | A Supplier's Perspective

Total Cost of Ownership Example

Electro-Mechanical to Numerical (Digital) Relays

Electro-Mechanical Relays:

- Dated Technology
- Obsolescence increasing
- Reliability Decreasing
- Expertise disappearing
- Repair/Refurb costs increasing

Numerical (Digital) Relays:

- Not new technology to general industry
- Simplifies design/footprint
- Reliability Increasing
- Monitoring & Diagnostic ability
- No or little maintenance

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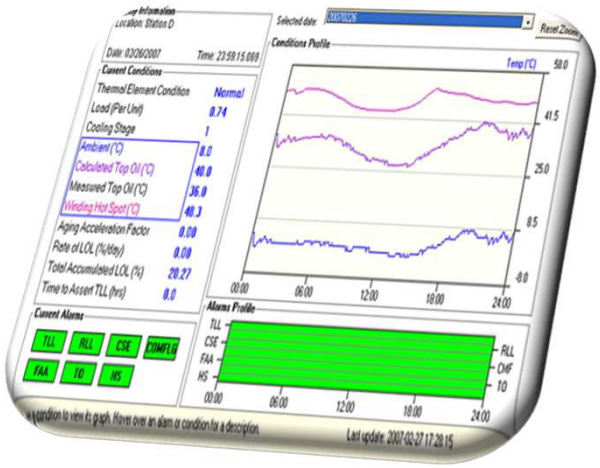
Global Challenges | A Supplier's Perspective



Total Cost of Ownership Example

Electro-Mechanical to Numerical (Digital) Relays

Use cost-effective, data-driven maintenance schedules to drive Asset Management approach:

- Increase asset life
- Make informed decisions
- Maximize engineering resources

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Conclusion

- CGD/EQ will be more critical than ever for the industry going forward given market evolvement and the “state of the OEM”
- Rate of technology advancement must drive consideration of asset management and total cost of ownership approach
- Importance of standardization of regulatory and industry guidance to appropriately achieve reasonable assurance