

# Key Issues for the Global Supply Chain IFNEC Conference on Customer Dialogue



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# World Nuclear Association

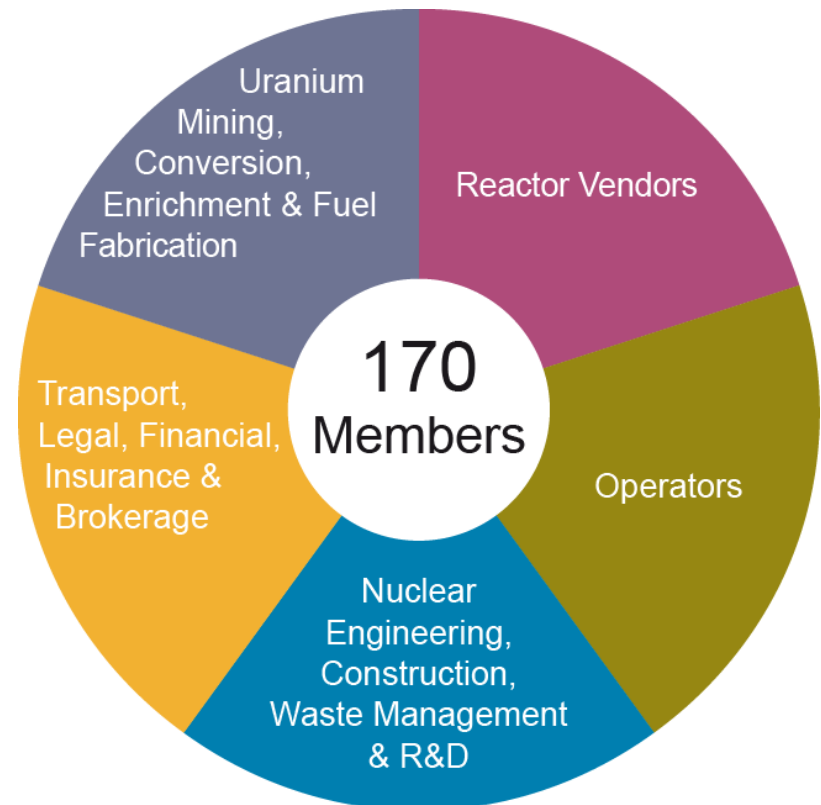
The World Nuclear Association represents and supports the nuclear energy industry and its people and enterprises. Its mission is to promote a wider understanding of nuclear energy, to develop common industry positions and contribute to the energy debate.



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# Supply chain challenges

Some recent new nuclear construction projects have presented supply challenges:

- Erosion of capability at manufacturers. Even qualified suppliers were not delivering fully.
- Companies had too few nuclear-related orders to have made it worthwhile to invest in upgrading their civil nuclear capability.
- Localization calls for know-how transfers and company-to-company collaboration.
- Different total quality management systems have been adopted.
- High cost of enhanced quality control is a deterrent to new entry.

# Vulnerabilities in the nuclear supply chain

- Faulty processes Define 'special processes'
- Faulty procedures Strengthen oversight (including for CFS items)
- Misunderstanding Common vocabulary
- Human performance errors Cascade safety culture attributes

# International production system in aerospace

The aerospace industry is an example of how companies in the supply chain can work together:

**SAE** *International*

Aerospace Quality Management Standard AS 9100 complimenting ISO 9001 with extra requirements.



Provides guidelines and best practice and recognises auditors as having sufficient experience in the industry.



Industry-managed quality control program and performance metrics to drive up product quality and reliability. PRI runs Nadcap.

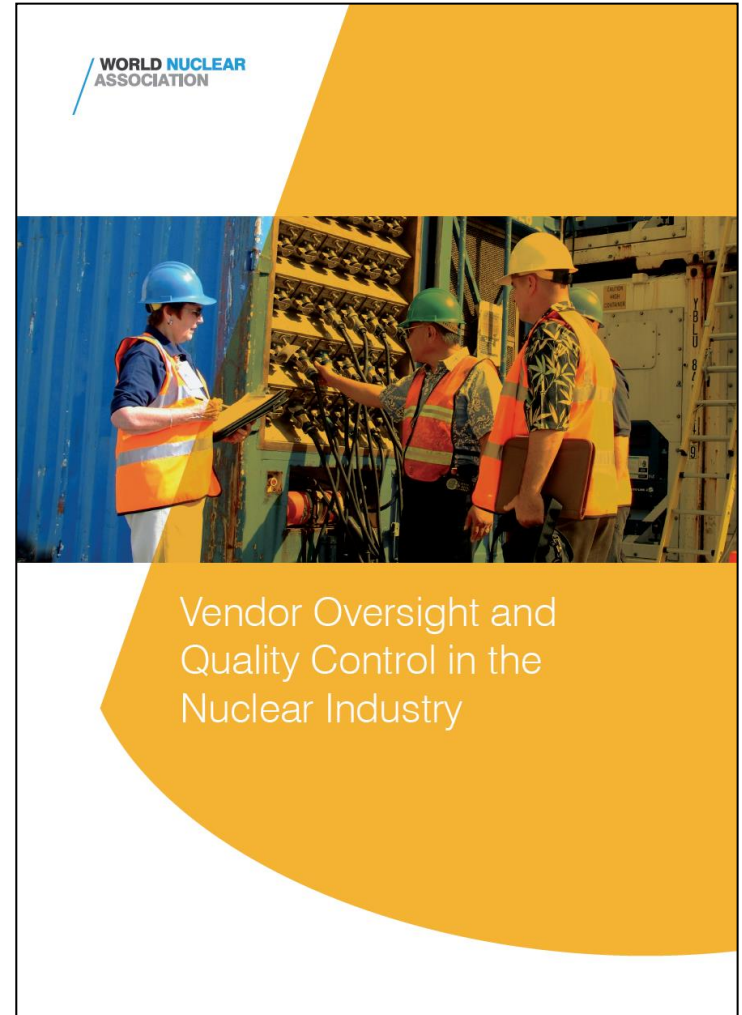


Nadcap was formerly called the National Aerospace & Defence Contractors Accreditation Program.

# Vendor oversight is critical

The nuclear supply chain needs a production system that:

- Defines what has to be done clearly (**planning**);
- Does it right (**quality control**);
- Checks it is being done right (**oversight**);
- Puts right what goes wrong and learns (**improvement**);
- Is committed to excellence (**leadership**).



# ISO 19443: Main requirements

Adds to ISO 9001:

- Quality management program
- Safety culture
- Graded approach/cascading
- CFSI\* management
- Independence of verification
- Competency management
- Project management
- Supplier assessment
- Design control
- Procurement control

Plus auditing standard ISO 17021

Key issues for the global nuclear supply chain  
Greg Kaser, Staff Director – Supply Chain Working Group

\*CFSI: Counterfeit, fraudulent & suspect items



# Key issues for localization

- One-off nuclear power plant projects
  - Investment program for a series of reactor units will incentivize local companies
- Technical barriers to trade limit export potential
  - Export controls need streamlining
  - Harmonized codes & standards
- Workforce and industrial capability
  - Synergy with national development strategy



# Vision: An international market for nuclear power plants

- Fleets of **standardized reactor designs** built in many jurisdictions will reduce the capital cost of nuclear energy
- International **nuclear industry production system** will ensure high quality from competing suppliers based in many different countries
- Nuclear safety regulators should be prepared to take account of the licensing and inspection **undertaken by their peers** elsewhere, leading to lower regulatory costs
- International safety regime will **enhance public confidence** in foreign designs and component imports

# 755,000 jobs in nuclear energy



~240,000 jobs  
58 reactors under  
construction



>250,000 employed  
447 operable units  
662 Mtoe generated  
2,535 TWh (2014)  
+ indirect employment  
in the supply chain



Towards a  
**GREEN economy**

Pathways to Sustainable Development  
and Poverty Eradication

*A Synthesis for Policy Makers*



The renewable energy sector  
employed 5-10 million directly or  
indirectly to produce 1,937 Mtoe of  
energy (of which, 644 Mtoe was in  
power generation or 5,383 TWh)

2014 data from IEA, World Energy Outlook 2016;  
employment estimates by UNPD and IRENA

Thank you:

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