Safety, Security, and Safeguards Integration in Nuclear Power Operations

SAND2010-8832P

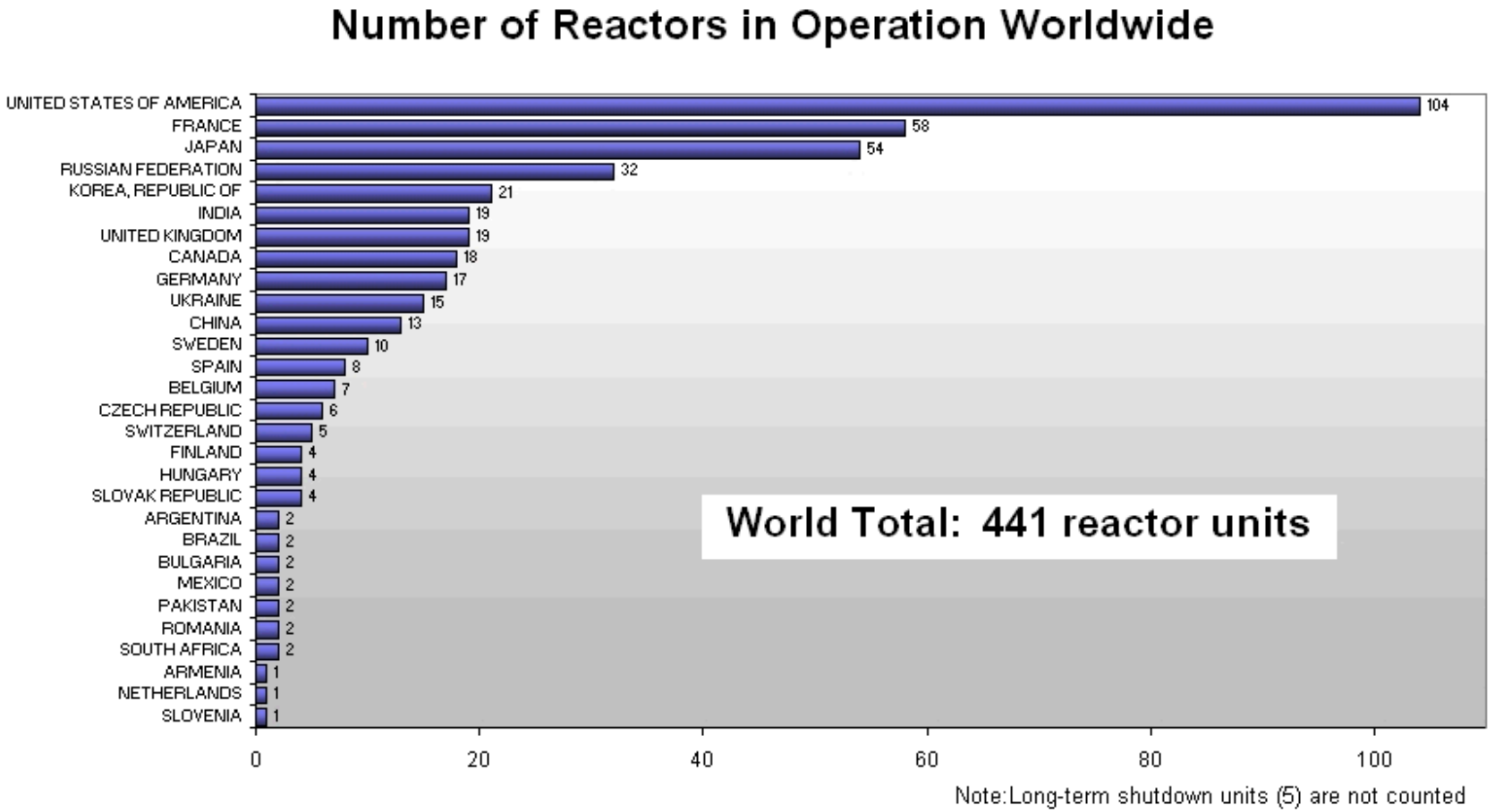
"3S" Culture

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Overview

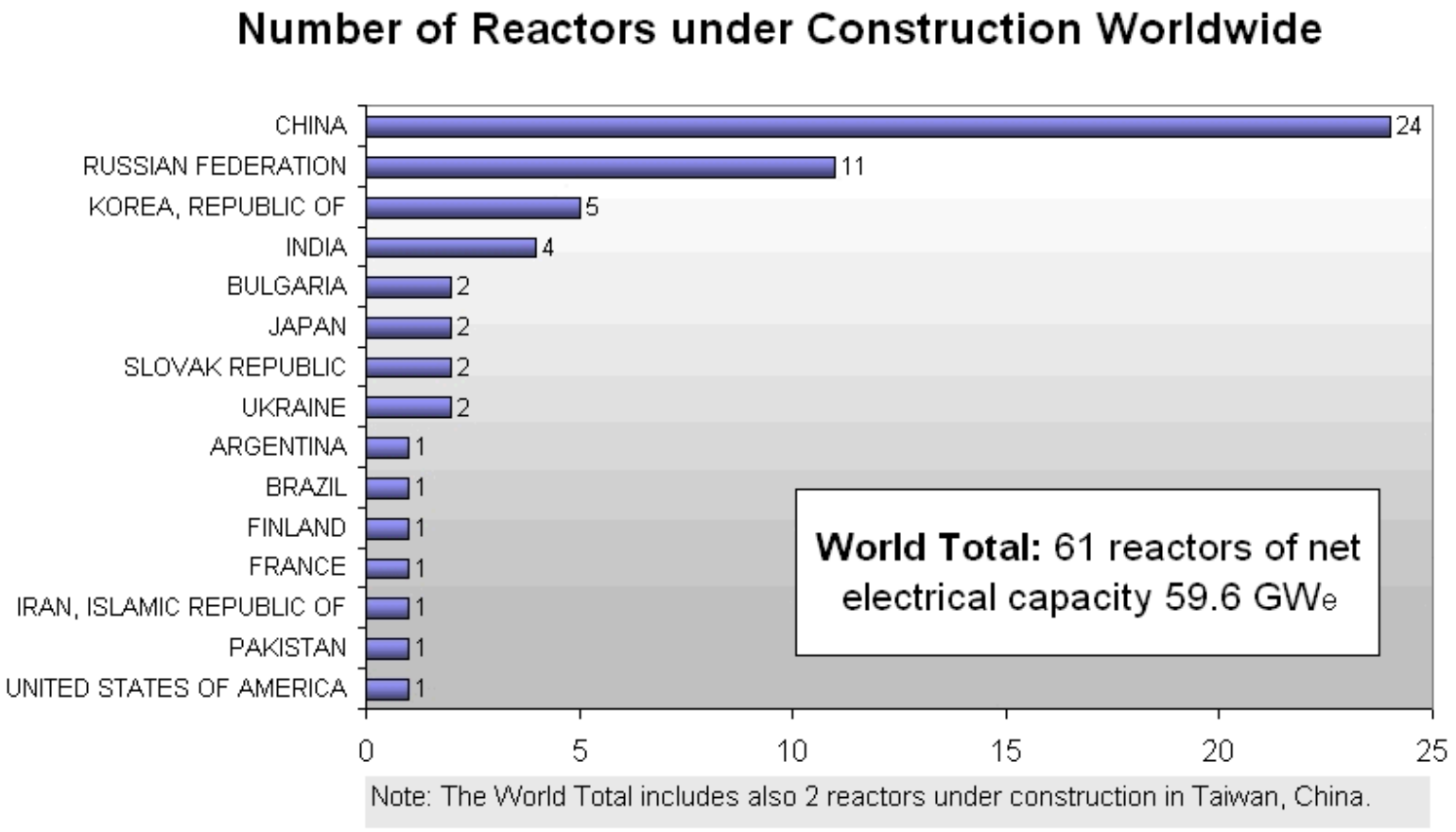
- Increased global energy demands leads to…
- Desire to expand nuclear power program leads to…
- Need to develop safeguards infrastructure accomplished by taking a…
- Holistic approach to integrate “3S” which is the…
- Optimal path forward as a responsible owner for the peaceful use of nuclear energy.

World Summary



Source: IAEA (Aug. 2010)

World Summary (Cont.)



Source: IAEA (Aug. 2010)

Nuclear Power Program

Entities involved with development:

- Government
- Owner/operator
- Regulator

Nuclear Power Program (Cont.)

- Decide energy strategy
- Commitment
- Develop Infrastructure
- Design
- Construction
- Operations

"3S" in Context

- **Nuclear Safety**

  Operating conditions, prevention of accidents/mitigation of consequences, resulting in the protection of workers, the public, and the environment from undue radiological hazards.

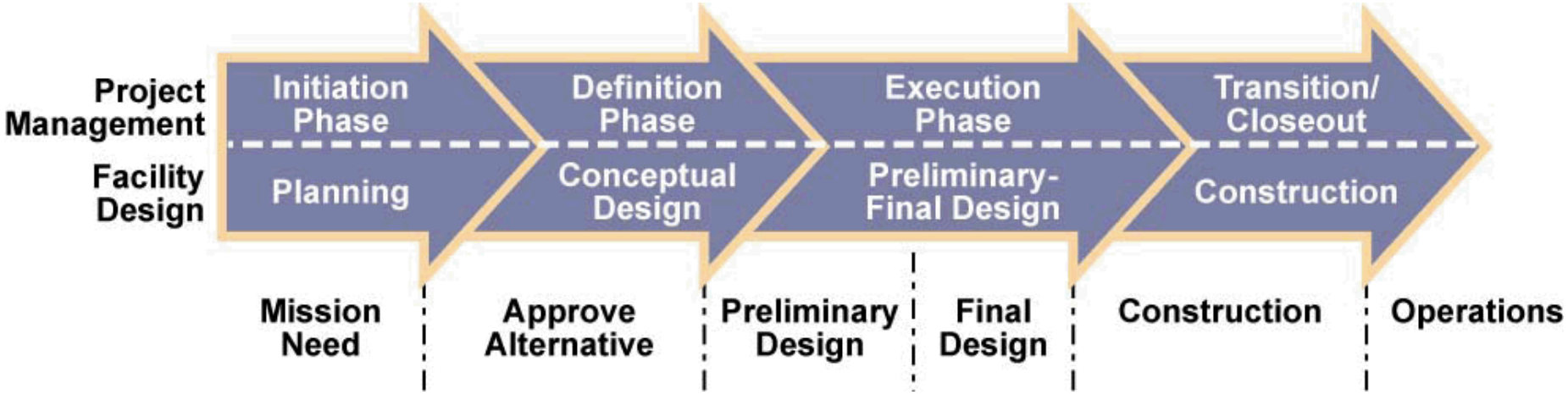
- **Nuclear Security**

  Prevention and detection of, and response to sabotage, unauthorized access, or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.

- **Nuclear Safeguards**

  Prevention and detection, through the use of material control and accountancy, of theft or diversion of special nuclear material from civilian facilities.

Nuclear Power Program
- Phases -



Nuclear Power Program
- Infrastructure -

- National Position
- Nuclear Safety
- Management
- Funding and Financing
- Legislative Framework
- Safeguards
- Regulatory Framework

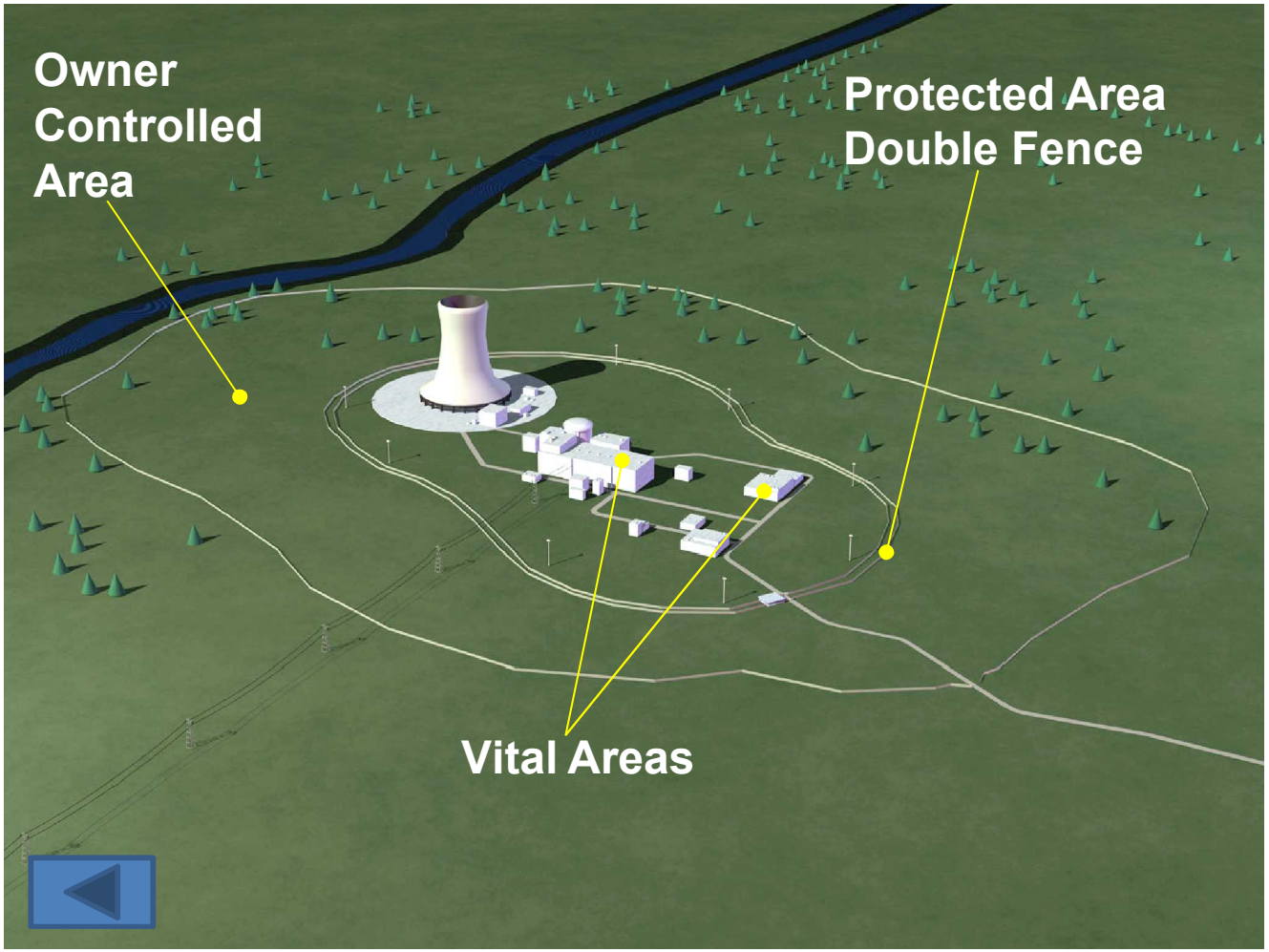
Nuclear Power Program
- Infrastructure (Cont.) -

- Radiation Protection
- Electrical Grid
- Human Resources Development
- Stakeholder Involvement
- Site and Supporting Facilities
- Environmental Protection

Nuclear Power Program
- Infrastructure (Cont.) -

- Emergency Planning
- Security and Physical Protection
- Nuclear Fuel Cycle
- Radioactive Waste
- Industrial Involvement
- Procurement

Security & Physical Protection



Access Control Points

Mission Perspective

Elements work together to provide safe, secure, reliable, and economical electrical energy

Barriers to Integration

- Culture
- Risk Assessment
- Top-down Implementation
- Cost

Culture Comparisons

	Safety	Security	Safeguards
Information Flow	Transparency	Need-to-know	Graded Transparency
Personnel Flow	Ease of Movement	Restricted Movement	Restricted Movement
Threat	Human/Equipment Failure	Deliberate Acts	Deliberate Acts
Implementation	Facility Environment	Facility Environment	Facility Environment
Authority	State	State	IAEA

Tools for Integration

- Structural design
- Access control measures
- Consideration of all hazards
- Material control & accountability
- Management support
- Supervision, Procedures, Training
- Sharing Lessons Learned