



The Gulf Nuclear Energy Infrastructure Institute (GNEII): Two Years On

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*Sandia National Laboratories**



Conference on
Nuclear Training and
Education 2013

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Presentation Overview

- Background
- The Institute
 - History
 - Educational Philosophy
 - Systems Approach and Integrated 3S
 - GNEI's Pillars
 - Education, Research, Technical Capability
- Recent Milestones & Progress
- Indigenization & Expansion



Why GNEII?

GNEII Addresses a Need

- Regional Nuclear Infrastructure Development
 - GNEII is a sustainable mechanism for developing responsible a nuclear energy program and infrastructure.
- GNEII builds indigenous human resources
 - GNEII couples an Integrated 3S Systems Approach with nuclear energy infrastructure needs
 - Education, Research, Technical capacity



GNEII is ...

Regionally based

- Institution to develop human-resource capability
- Future nuclear program decision makers

An Education & Development Institute

- Nuclear-energy infrastructure plus integrated safeguards, safety, and security (3S)
- Regional context

A Strategic effort

- Integrated 3S culture for a responsible national nuclear-energy program
- Educate mid-level managers and regulators on the basics of nuclear power

GNEII is not intended to train nuclear engineers or operators



GNEII is a Strategic Partnership

•UAE Partners

- Sponsorship & implementation
 - Khalifa University of Science, Technology & Research
- Support from
 - Federal Authority for Nuclear Regulation (FANR)
 - Emirates Nuclear Energy Corporation (ENEC)
 - Critical National Infrastructure Authority (CNIA)

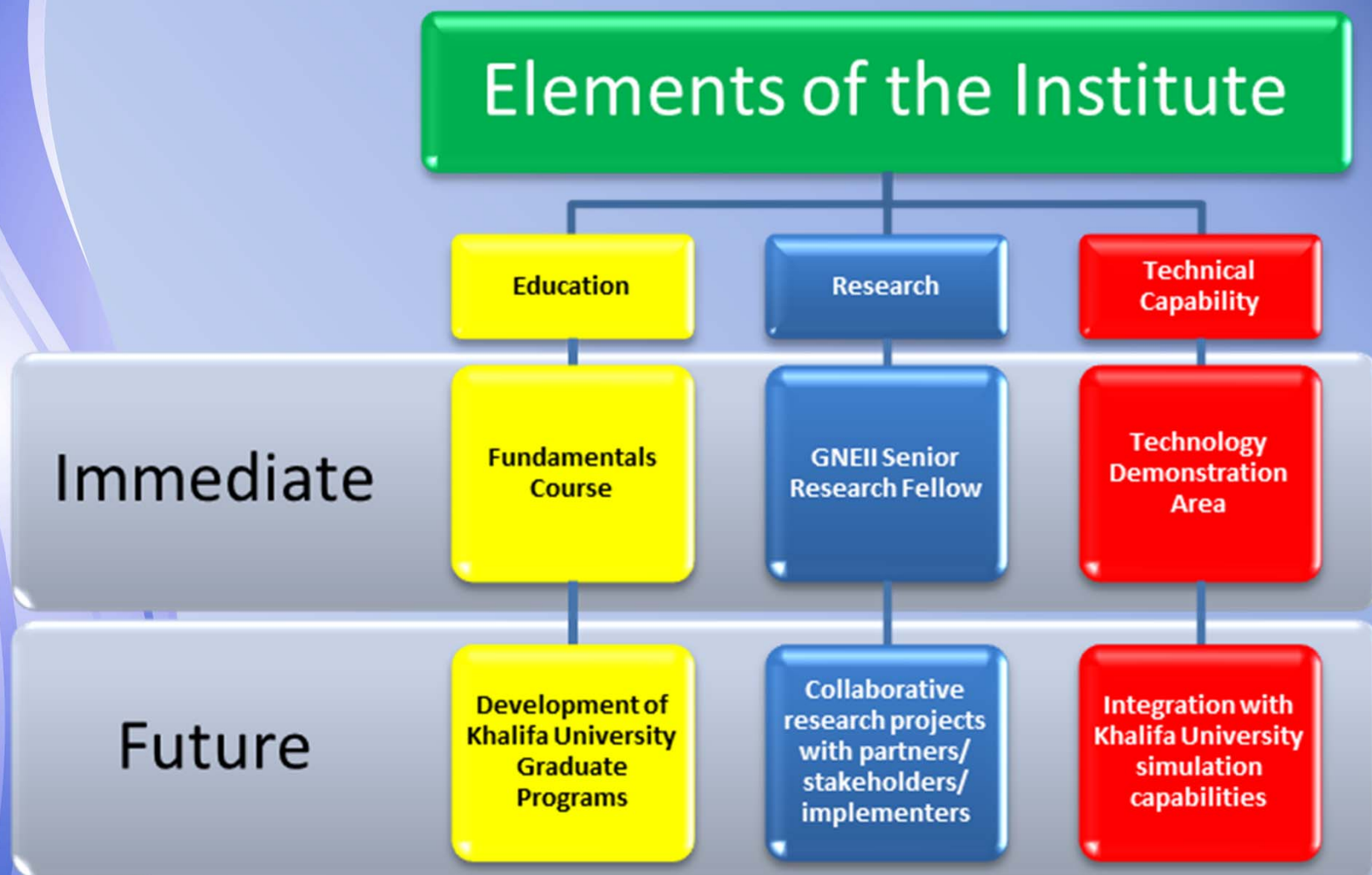


US Partners

- Sponsorship
 - DOE/NNSA - International Nuclear Safeguards and Engagement Program (INSEP)
 - DOS/CTR - Partnership for Nuclear Security (PNS)
- Implementation
 - Sandia National Laboratories (SNL)
 - Texas A&M University (TAMU)



The Institute



History



- Initial Conceptual Discussions

Spring/Summer 2009



Fall 2009

- International Consultations & Gulf/Middle East Regional Scoping Trip



- Letter of Intent Signed

March 2010



2011

- Memorandum of Understanding (February)
- GNEII Pilot Course (Spring)
- 1st Steering Committee Meeting (Fall)
- International Conferences

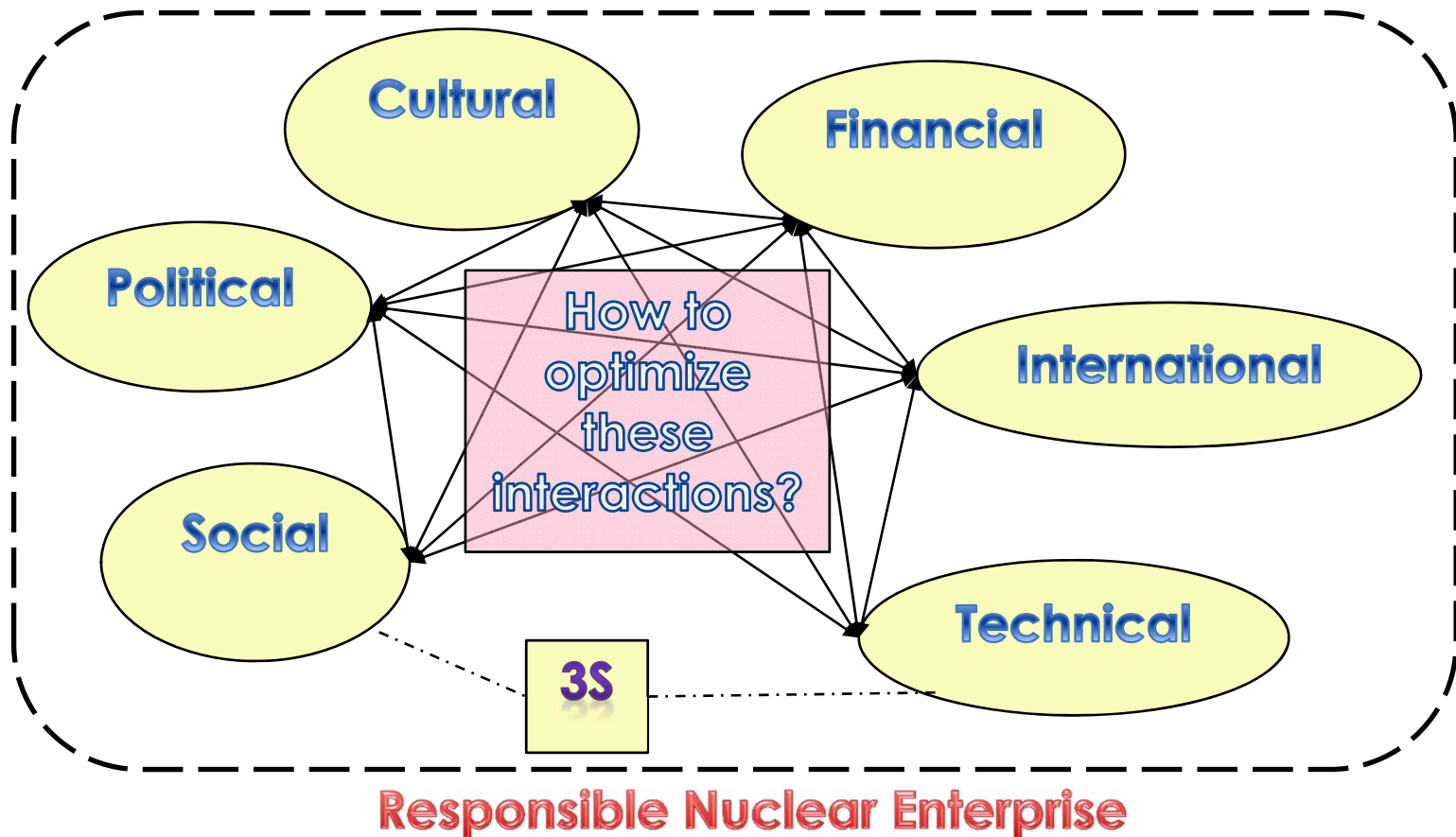


- GNEII Fundamentals Course (4 Modules)
- International Conferences
- GNEII Symposium

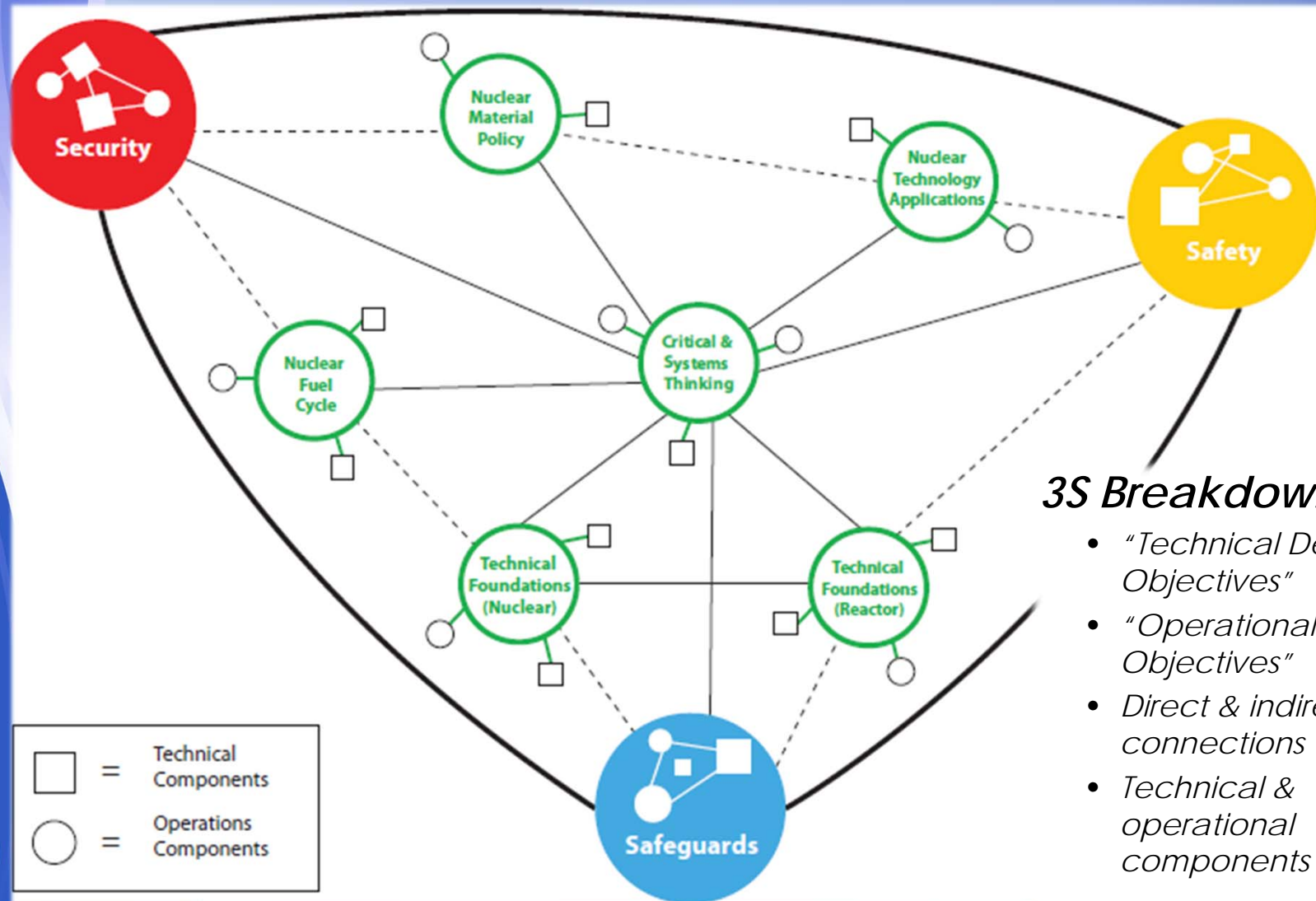
2012

Educational Philosophy

A Systems Approach to the Nuclear Energy Enterprise



Integrated 3S Curriculum



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Education

GNEI Fundamentals Course

Nuclear Energy Technical Foundations

- Critical Thinking, Systems Approach, Physical Foundations, Nuclear Fuel Cycle

Nonproliferation, Safeguards, Safety & Security

- International Nonproliferation Regime, International Safeguards, Safety Culture and Risk Analysis, Physical Protection and Security Culture, 3S Interactions

Capstone Research

- Independent research projects on integrated 3S issues for nuclear power programs



Research

GNEII Research Fellow

- Lead GNEII Researcher
- Mentor to GNEII Fellows
- Develops the GNEII Research Framework
- Past Research Fellow (2012) Dr. B.K. Kim
 - Korean Atomic Energy Research Institute, ROK-SSAC, IAEA/TC & SAGSI



Mission & Vision

MISSION: to develop a responsible nuclear energy culture and institutionalize key safety, security, and nonproliferation norms in the future decision-makers of Gulf-region nuclear energy programs

VISION: to provide the Gulf, and surrounding region, with a continual source of indigenous nuclear energy professionals with whom the global community can effectively collaborate to achieve broader nuclear energy security and safety priorities

Research Areas

Integrated 3S Methodologies

Nuclear Infrastructure Development

Gulf/Middle East Regional Nuclear Interactions

Research Methodology

Fundamentals Capstone

Joint Research

Collaboration with Khalifa University

Research Goal

Provide the Gulf - and surrounding region - an avenue through which the global nuclear community can effectively collaborate to achieve broader nuclear energy safety, security and safeguards priorities

Technical Capability

Technology Demonstration Area

- Hands-on equipment
 - Radiation monitors, detectors, etc.
- “3S Laboratory”



Nuclear Engineering Dept. at Khalifa University

- Radiation Sciences Lab
- Reactor Analysis & Simulation Lab
- Environmental Radiation Lab

Environmental Radiation Lab



Reactor Analysis, Design and Instrumentation Controls Lab



Radiation Sciences Lab

GNEII's Second Year – 2012

Enrollment

- 26 Fellows enrolled
 - Nearly triple 2011 inaugural enrollment of 11 UAE Fellows

Regional Participation

- Four Gulf Cooperation Council (GCC) countries
 - UAE, Saudi Arabia, Kuwait, and Qatar
- Jordan

GNEII experienced dramatic growth in 2012



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Year Three

2013 Plans & Schedule

- ***GNEII Fundamentals Course***
 - February 17th - May 16th
 - 12 week course, plus one-week mid-semester break
 - 5 weeks *Technical Foundation*
 - 6 weeks Integrated 3S
 - 2 weeks each of focused safeguards, safety, and security
 - 1 week dedicated Capstone (with additional Capstone throughout)
- ***GNEII Symposium (3rd Annual)***
 - May 19-20
 - GNEII Fellows' Capstone presentations
- ***Technical Demonstration Area***
 - New radiation-measurement equipment
- ***Research Component***
 - Papers & conference presentations
 - ANS, INMM



Indigenization & Expansion

GNEII to be a self-sustaining 5 years after implementation

- Khalifa University Nuclear Engineering faculty as GNEII Instructors
 - Increase integration with Nuclear Engineering and Civil and International Security Departments at Khalifa University
- Guest lecturer program
 - WINS, IAEA, MESIS
 - Select GNEII graduates
 - Leverage UAE relationships with global nuclear energy community.

Regional Expansion

- Qualified participants from Gulf Cooperation Council (GCC) Countries
 - UAE (2011 - 2013)
 - Saudi Arabia (2012 & 2013)
 - Qatar (2012 & 2013)
 - Kuwait (2012 & 2013)
 - Oman (2013)
- Other regional participants
 - Jordan (2012 & 2013)
 - Morocco (2013?)
 - Other countries as appropriate and demand dictates



Expanding GNEI's Mission & Scope

- Additional core & elective courses
 - Education opportunities beyond the *Fundamentals Course*
- New Nuclear Engineering Master's Degree Theme
 - *Nuclear Safeguards & Security*
 - *New supporting electives*
 - *Fuel Cycle & Materials*
 - Formerly *Fuel Cycle & Security*
 - *Reactor Design & Analysis*
- Expand applied research capabilities
 - Integrate GNEI expertise with Khalifa University's research capabilities
 - Nuclear Engineering and Civil & Infrastructure Security
- Regional workshops on Integrated 3S and related topics
 - Future outreach and distance learning within the region

Measured Expansion for Sustainability



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Thank you!



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