



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

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# Presentation Overview

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



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# 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*



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# 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

## Elements of the Institute

Immediate

Future

Education

Research

Technical  
Capability

Fundamentals  
Course

GNEII Senior  
Research Fellow

Technology  
Demonstration  
Area

Development of  
Khalifa University  
Graduate  
Programs

Collaborative  
research projects  
with partners/  
stakeholders/  
implementers

Integration with  
Khalifa University  
simulation  
capabilities

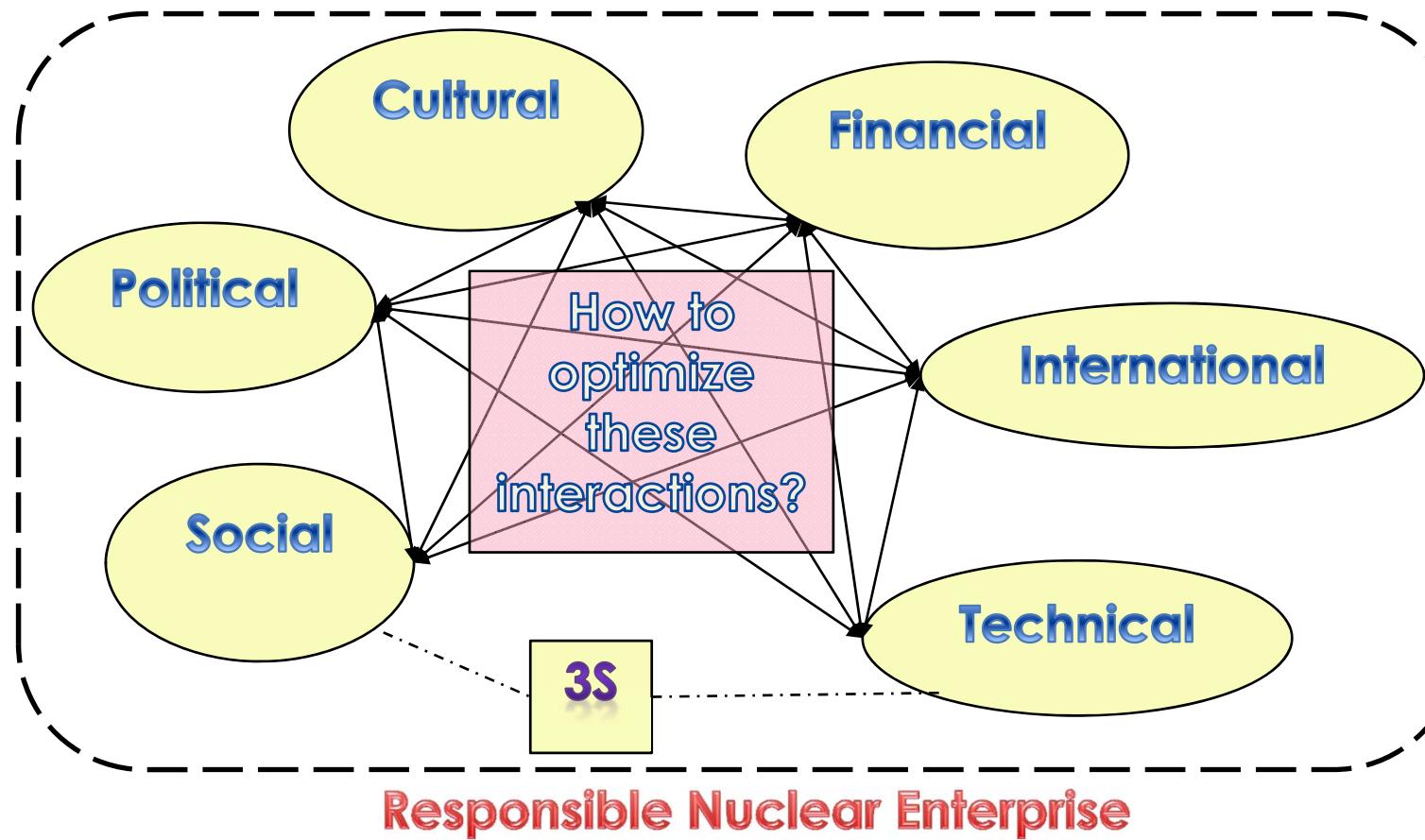


# History

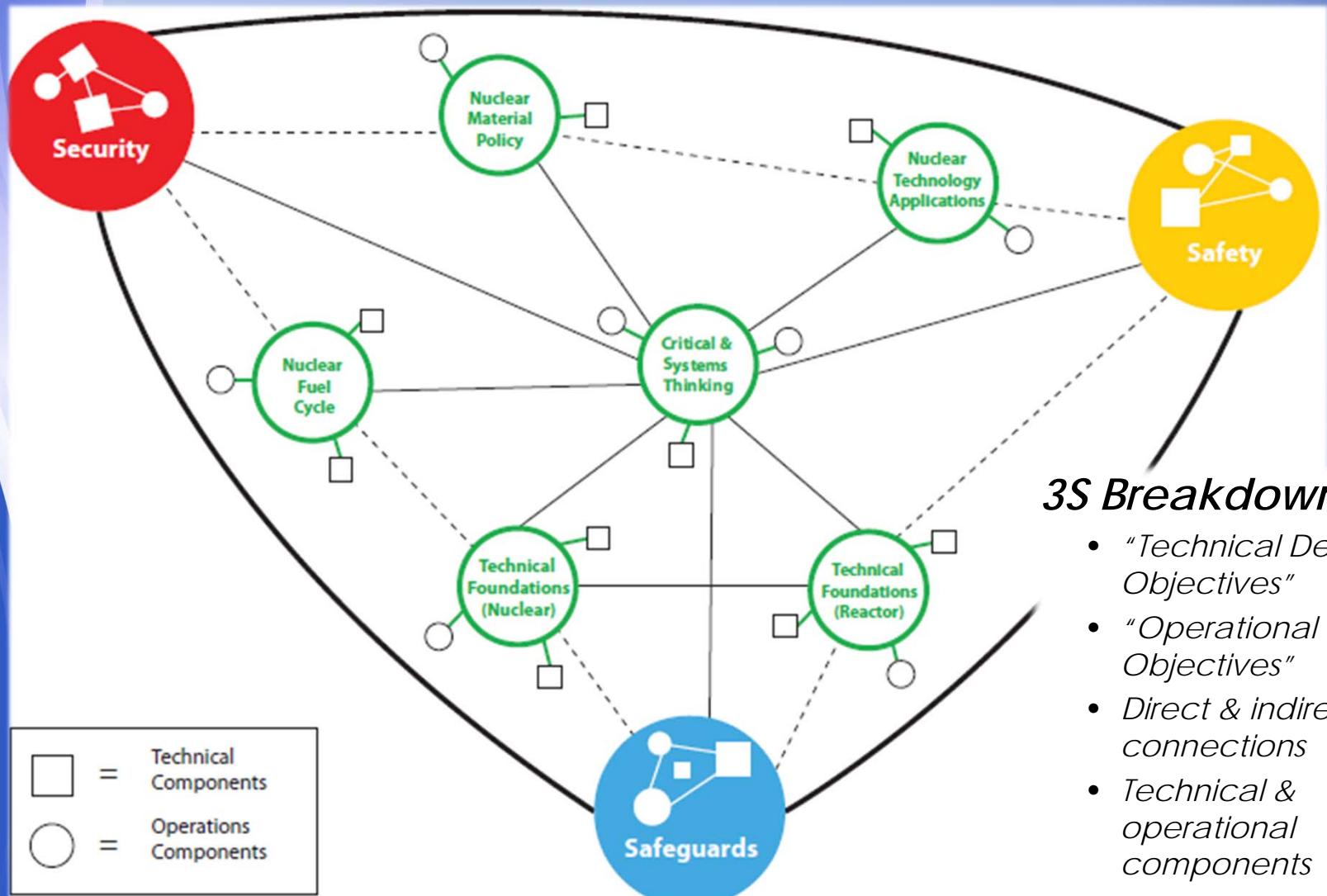


# Educational Philosophy

A Systems Approach to the Nuclear Energy Enterprise



# Integrated 3S Curriculum



# Education

## *GNEII 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 safety and security priorities

### Research Areas

Integrated 3S Methodologies

Nuclear Infrastructure Development

Gulf/Middle East Regional Nuclear Interactions

Fundamentals Capstone

Joint Research

Collaboration with Khalifa University

### Research Methodology

### 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 17<sup>th</sup> - May 16<sup>th</sup>
  - 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 (3<sup>rd</sup> 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



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# Expanding GNEII'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 GNEII 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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# شكراً

*Thank you!*



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