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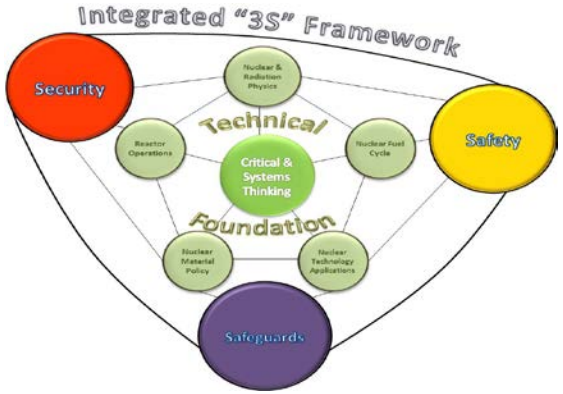

The Gulf Nuclear Energy Infrastructure Institute (GNEII) After Three Years

INMM 54th Annual Meeting
Desert Springs, California
July 17, 2013

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Khalifa University of Science, Technology and Research, Abu Dhabi, UAE
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Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Outline

- Why GNEII?
- The Institute: What is GNEII?
- History
- Educational Philosophy
- GNEII's Three Pillars
  - Education, Research, Technical Capability
- 2014 Plans and Schedule
- Indigenization & Expansion

Why GNEII?

- **GNEII Addresses a Need**
  - **Regional Nuclear Infrastructure Development**
    - **GNEII is a sustainable mechanism for developing a responsible 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 and 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) Nuclear Security Science and Policy Institute

History

- Initial Discussions
- International Consultations
- Regional Scoping Trip

2009

2010 -2011

- Letter of Intent
- Memorandum of Understanding
- GNEII Pilot Course
- International Conferences

- Fundamentals Course
- International Conferences
- GNEII Symposium

2012 -2013

Educational Philosophy

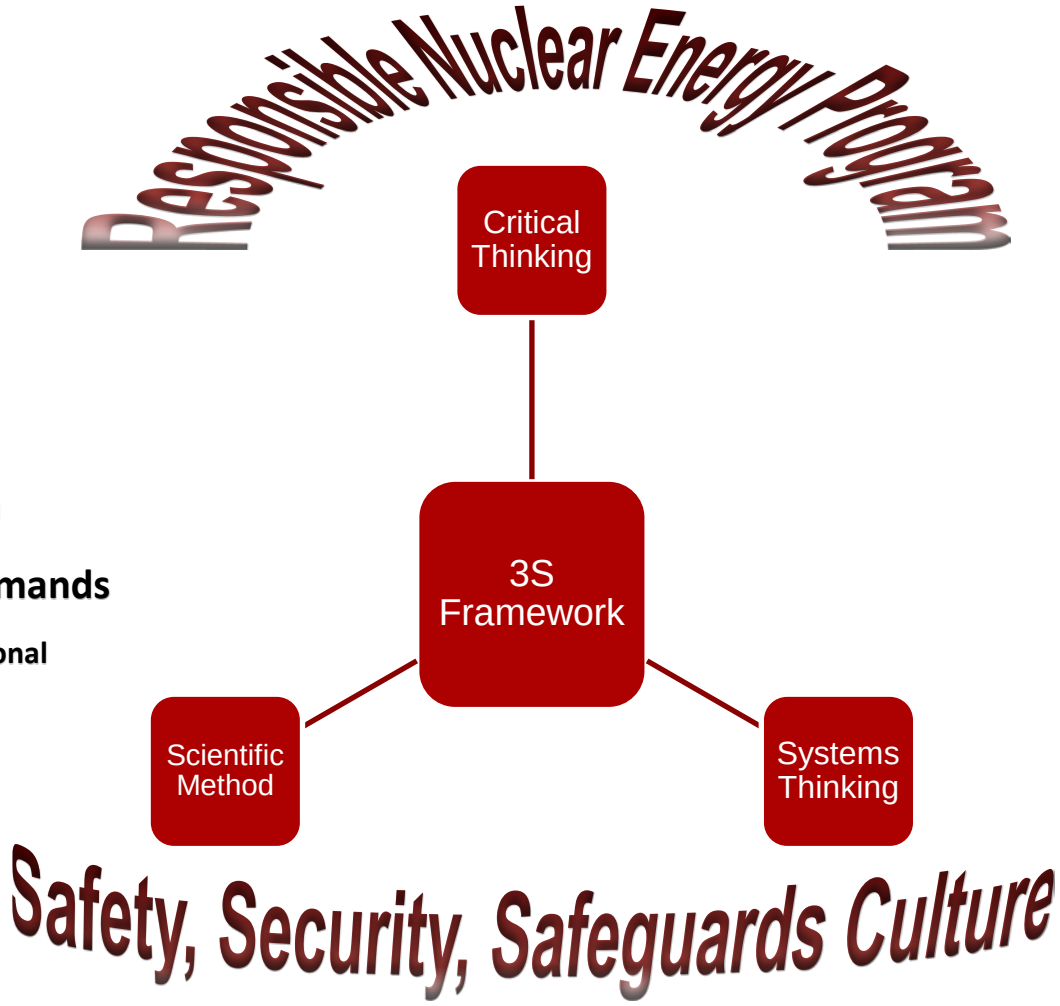
Safety, Security, Safeguards Culture

Integrated 3S Framework

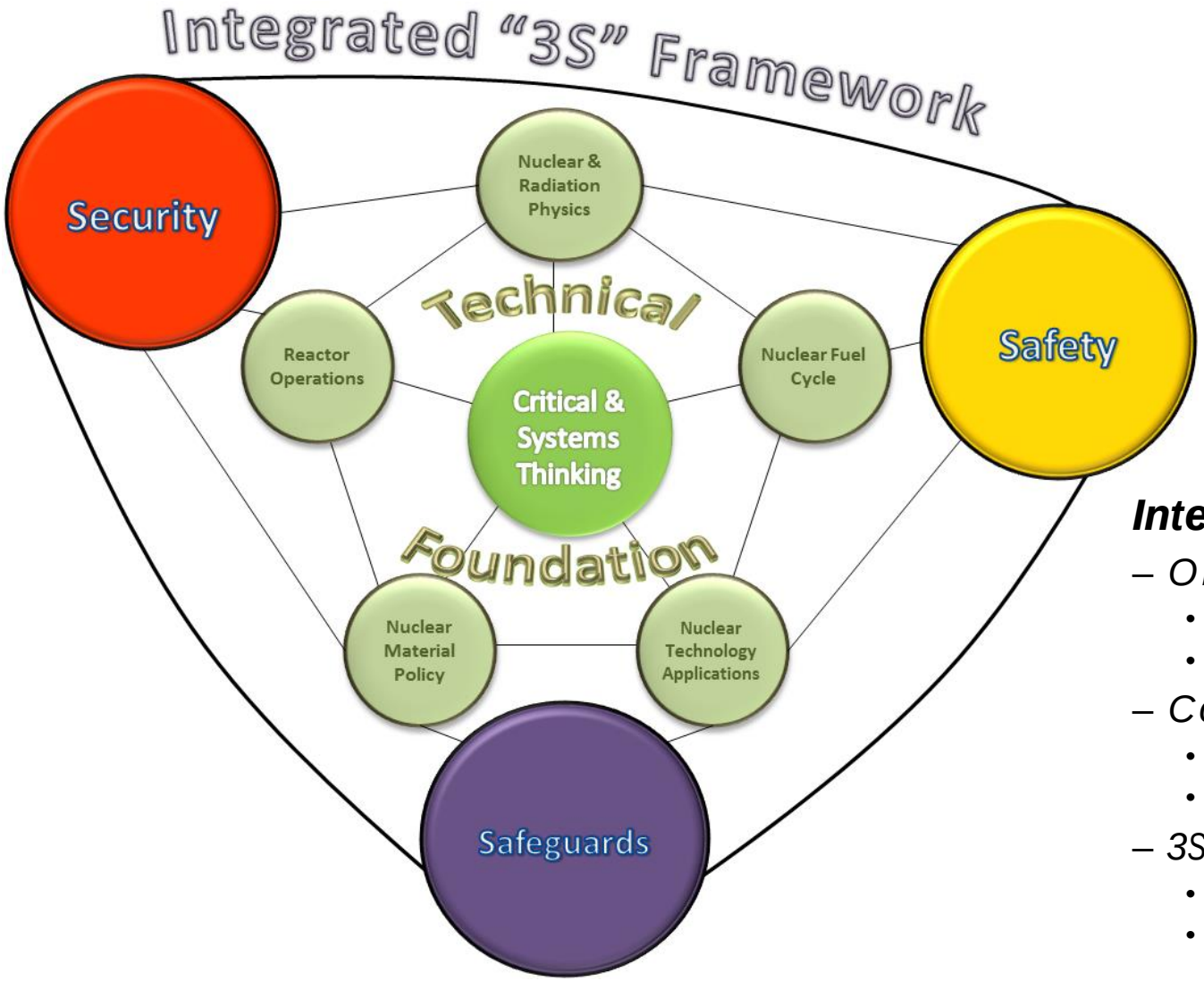
- **Critical Thinking**
- **Scientific Method**
- **Systems Thinking & Approach**

Responsible Nuclear Energy Program

- **Balance & Optimize Needs & Demands**
  - **Technical, Social, National, International**



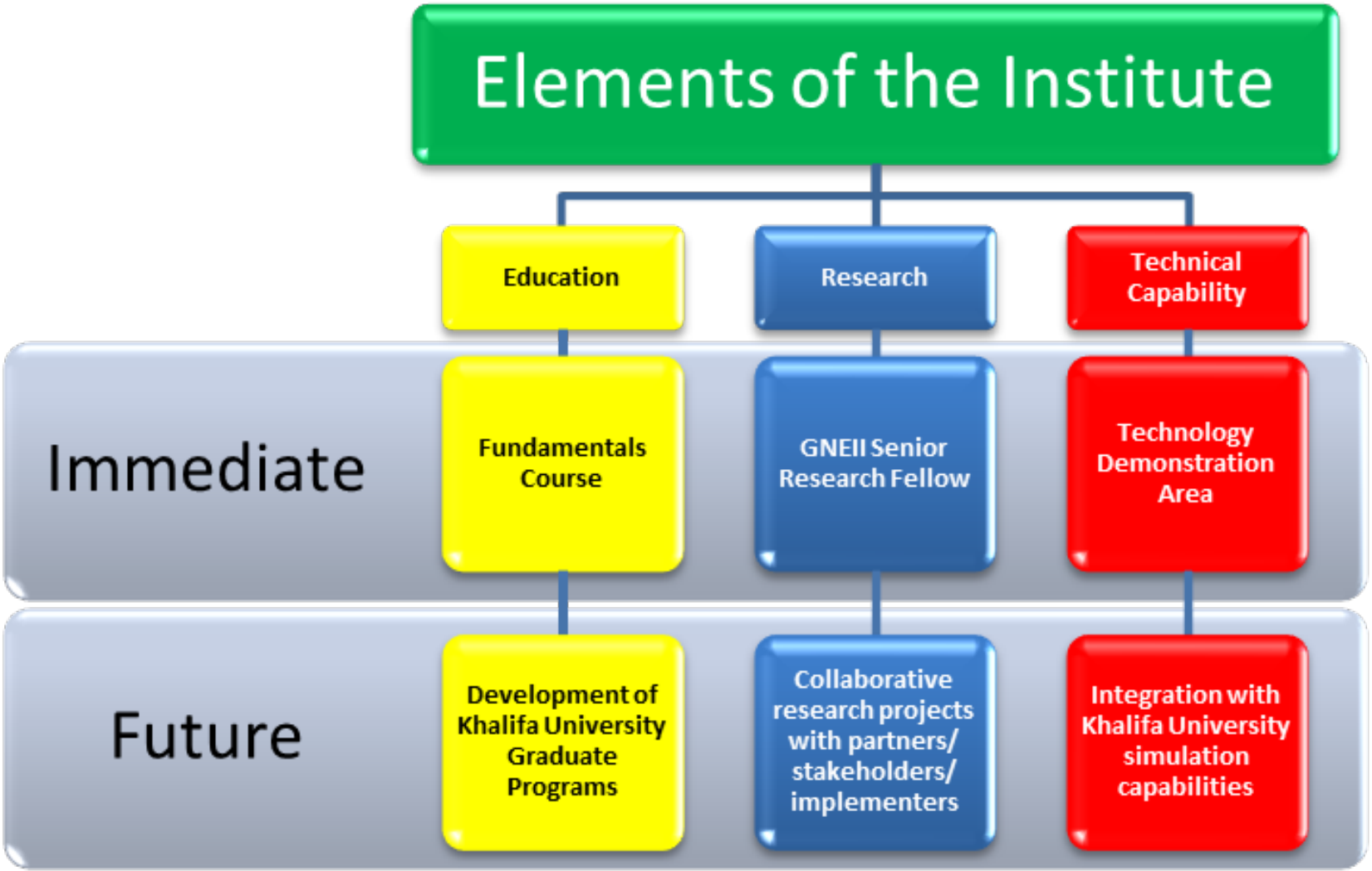
3S Curriculum



Integrated 3S

- *Objectives*
  - *Technical*
  - *Operational*
- *Components*
  - *Technical*
  - *Operational*
- *3S Interactions*
  - *Direct*
  - *Indirect*

GNEII's Three Pillars



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

- **Educational and intellectual foundation for conducting independent research**
- **Bridges GNEII's *Education* and *Research* elements**

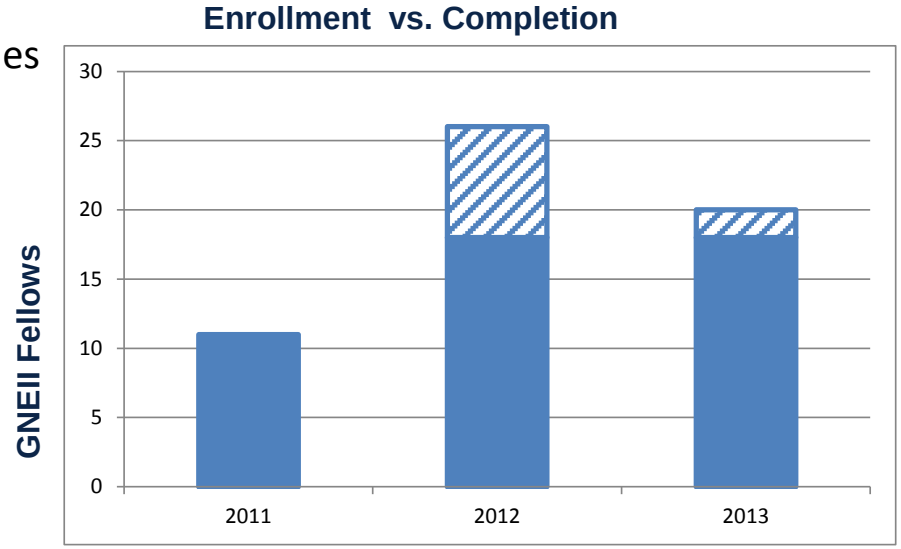
GNEII Fundamentals Course

Enrollment

- 47 GNEII Fellows Graduated since 2011
  - 11 Fellows enrolled in 2011 (Pilot Course)
  - 28 Fellows enrolled in 2012 (Modular Format)
  - 20 Fellows enrolled 2013 (Semester Format)
- Completion exceeds 80% of enrollment
  - Demanding course & curriculum

Regional Participation

- Gulf Cooperation Council (GCC) countries
  - UAE, Saudi Arabia, Kuwait, Qatar
- Jordan (2012)



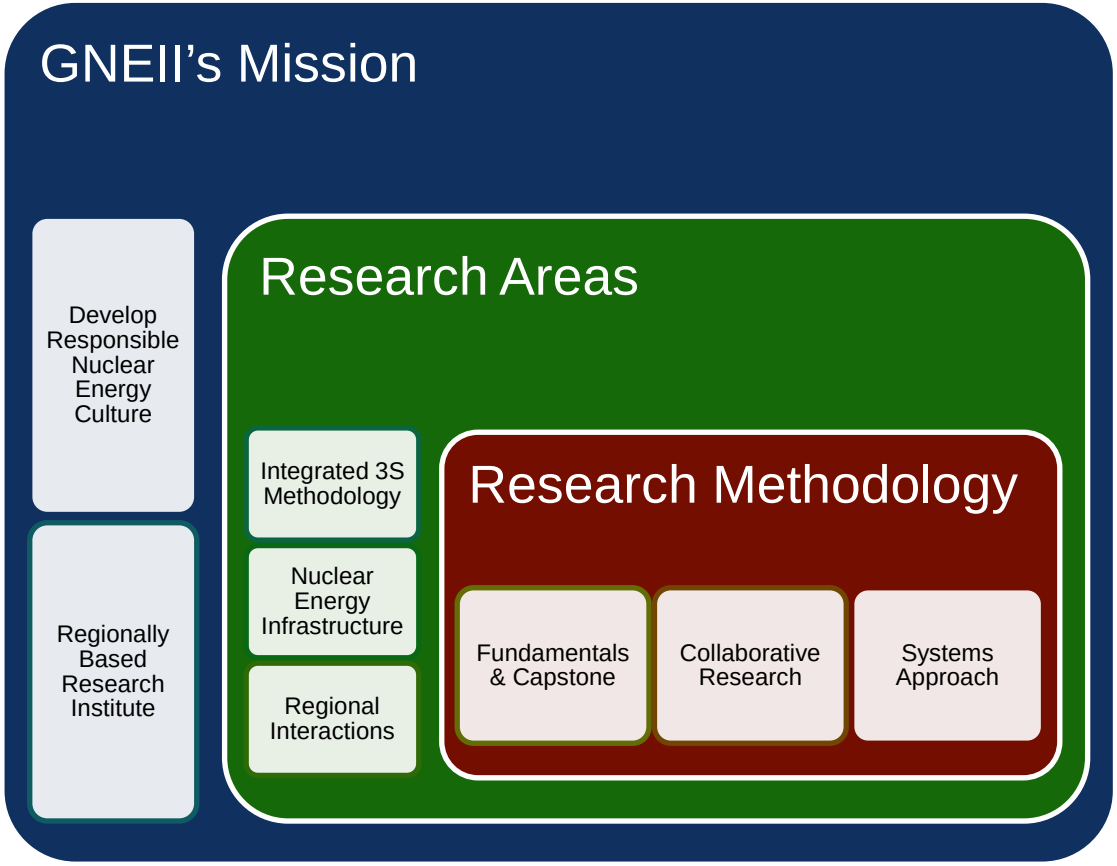
Research

Capstone Research Projects

- Independent Research
- Applied 3S Approach

Collaborative Research

- Stakeholders, Partners, Implementers
- Common Issues & Concerns
- Regional Perspectives



Technical Capability

Technology Demonstration Area

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

Nuclear Engineering at Khalifa University

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

Reactor Analysis, Design and Instrumentation Controls Lab

Environmental Radiation Lab

Radiation Sciences Lab

2014 Plans & Schedule

- ***GNEII Fundamentals Course***
  - February – May 2014
  - 12 week course, plus one-week mid-semester break
    - Four weeks *Technical Foundation*
    - Five weeks "Integrated 3S"
    - Two weeks for Capstone and Symposium Presentations
- ***GNEII Symposium (4th Annual)***
  - May 2014
  - GNEII Fellows' Capstone presentations
- ***Technical Demonstration Area***
  - New radiation-measurement equipment
- ***Research Component***
  - Papers & conference presentations
    - American Nuclear Society (ANS)
    - Institute for Nuclear Materials Management (INMM)

Indigenization & Expansion

A Self-sustaining Institute

- Increase integration with Khalifa University
  - Nuclear Engineering and Civil and International Security Departments
  - Nuclear Engineering faculty as Instructors
- Self-sustaining 5 years after implementation

Gest lecturer program

- WINS, IAEA, MESIS
- Select GNEII graduates
- Leverage UAE relationships with global nuclear energy community.

Regional Expansion

- Gulf Cooperation Council (GCC) Countries
  - UAE (2011 – 2013)
  - Saudi Arabia (2012 & 2013)
  - Qatar (2012 & 2013)
  - Kuwait (2012 & 2013)
- Other regional participants
  - Jordan (2012)
  - Morocco (2014?)
  - Other countries as appropriate and demand dictates

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

Sustainability through Measured Expansion

شكراً

Thank you!

GNEII at KHALIFA UNIVERSITY

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