

The Gulf Nuclear Energy Infrastructure Institute (GNEII)

A New Approach to Nuclear “3S” Education

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Overview

Gulf Nuclear Energy Infrastructure Institute (GNEII)

- Introduction
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- An Integrated “3S” Approach
- Students & Education Program
- Operation & Management
- Indigenization Plans & Future Expansion
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Introduction

Regional Nuclear Infrastructure Development

- Need
 - A sustainable mechanism for responsible nuclear energy infrastructure development
- Response
 - Institutional, indigenous capability that couples 3S with nuclear energy infrastructure development
- Strategic Partnership
 - UAE Partners
 - Khalifa University of Science, Technology & Research, with Support from:
 - Federal Authority for Nuclear Regulation (FANR)
 - Emirates Nuclear Energy Corporation (ENEC)
 - US Partners
 - Sandia National Laboratories (SNL)
 - Nuclear Security Science & Policy Institute (NSSPI) at Texas A&M University



Concept

GNEII is designed to be

- A regionally based institutional human resource development capability
- Nuclear energy infrastructure (safety, safeguards & security) for development & education in a regional context
- A strategic effort to develop nuclear energy safety and security culture in future program decision-makers



Concept

- **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** through professional development and training
- **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**
- **Goals:**
 - establish GNEII as a **regional educational, training, and research hub** for promoting a nuclear safety, safeguards, and security culture
 - maintain **regional relevancy among participating Middle East states** demonstrated by regular participation by students from regional states and membership on the GNEII Advisory Council by regional state representatives
 - **establish an indigenously sustainable educational institute** by transitioning operational ownership of GNEII to KUSTAR and a majority of educational duties to regional instructors.



An Integrated “3S” Approach

- Integrated “3S” Approach identified by IAEA as important element of nuclear energy’s future development
- No integrated “3S” strategy or formal mechanism currently exists – especially in training & education
- SNL currently pursuing research on an integrated approach:
 - Develop practical, comprehensive, integrated approach
 - Applied to emerging and existent nuclear energy programs
 - Future collaborative research project with Khalifa University



Students & Education Program

- Tangible application of an integrated “3S” approach
- GNEII’s student population criteria
 - Entry to mid-level government (or government-affiliated) officials
 - Possess at least a bachelor’s degree or equivalent work experience
 - Expect to work in a Middle Eastern nuclear energy industry
- Objectives
 - Populate decision-making ranks of regional nuclear energy programs with GNEII graduates conversant in the 3S’s (experts with a 3S sensitivity)



Students & Education Program

- **Module 1: Fundamentals**
 - Traditional, lecture-based education from subject matter experts
- **Module 2: Capstone**
 - Independent student research project analyzing a regional nuclear energy issue
- **Module 3: Practicum**
 - Foreign field experience at nuclear energy facilities
- **Module 4: Thesis**
 - Research that conforms to accepted academic practices related to nuclear energy safety, safeguards, security or nonproliferation



**Module 1:
Fundamentals**

**Module 2:
Capstone**

**Module 3:
Practicum**

**Module 4:
Thesis**

GN601	Week 1 Critical Thinking, the Scientific Method & Systems Thinking	Week 2 Basic Nuclear Reactor Physics	Week 3 Nuclear Fuel Cycle: Front End, Production Cycle, Back End
	Week 4 Nuclear Material Control : History, Policy Issues, Technical Issues	Week 5 Nuclear Power Plant Management and Operations	Week 6 Radiological Materials Management
GN602	Week 7 Nuclear Safety: Reactor Safety Systems	Week 8 Nuclear Safety: Accident Modeling & Emergency Preparedness	Week 9 Nuclear Safeguards: Terminology, technology, Systems & Measurements
	Week 10 Nuclear Safeguards: Export Control, the Fuel Cycle & Sub-State Threats	Week 11 Nuclear Security: Physical Protection System Design, Implementation & Evaluation	Week 12 Nuclear Security: Vulnerability Assessments for Nuclear Facilities
GN603			
GN604			

GN605

Independent student work to identify, structure, and conduct a research project analyzing a regional nuclear energy issue

GN606

Foreign field experience of tours and hands-on exercises at nuclear reactor facilities

GN607

Research that conforms to accepted practices in academic research related to nuclear energy safety, safeguards, security and nonproliferation

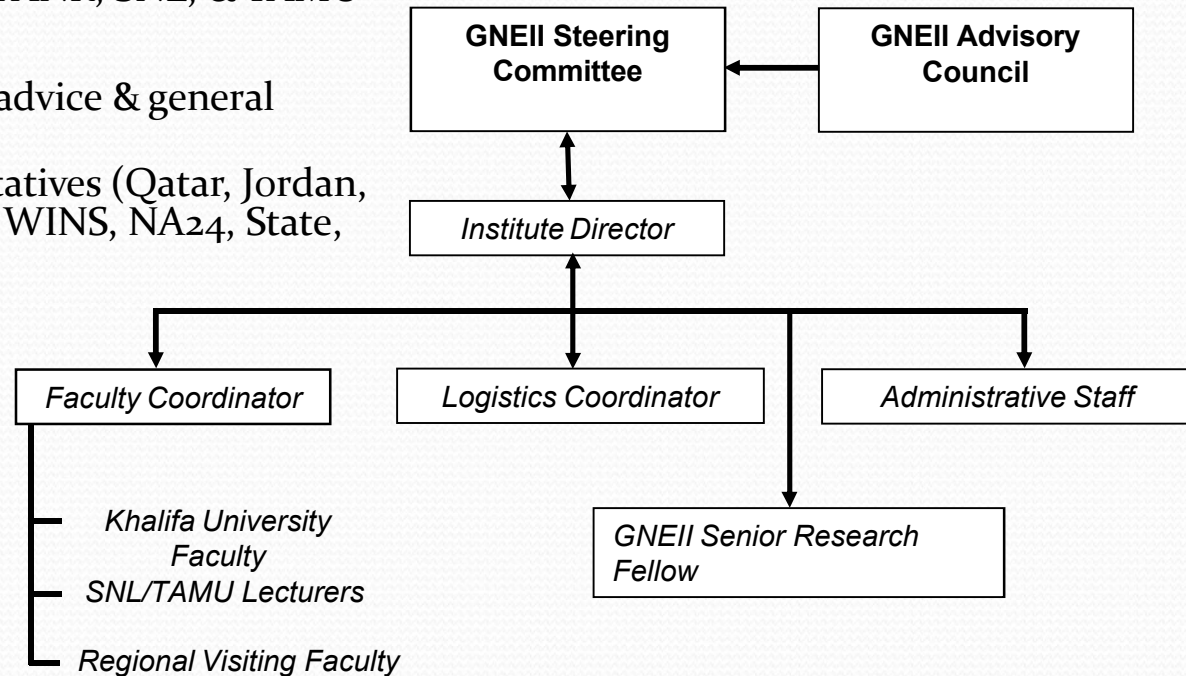
Professional Certification Program (PCP):
"Professional Certificate in Nuclear Safeguards & Security"

Masters Program:
"Masters Program in Nuclear Safeguards & Security"



Operation & Management

- **Institute Staff**
 - Responsible for daily operation & management
 - Director & Local staff from Khalifa University
- **Steering Committee**
 - Responsible for setting goals & policies
 - Khalifa University, ENEC, FANR, SNL, & TAMU
- **GNEII Advisory Council**
 - Responsible for providing advice & general oversight
 - AAEA, Regional Representatives (Qatar, Jordan, Kuwait, Egypt, etc), IAEA, WINS, NA24, State, etc



Indigenization Plans & Future Expansion

- Multi-pronged plan for GNEII to become self-sustaining after 5 years
 - Phase approach for select institute students to become lecturers
 - Train subset of Khalifa University nuclear engineering program faculty
 - Leverage growing UAE relationships with global nuclear energy community
- Regional Participant Expansion Plan
- GNEII's Future Expansion
 - Develop a Master's Degree in Nuclear Safeguards & Security
 - Additional core & elective courses
 - Regional workshops on related topics
 - Development of applied research capabilities



Next Steps

- 20 February 2011 – MOU Signing & Opening Ceremonies
 - Official beginning of GNEII Pilot Course
- February to May 2011 – GNEII Pilot Course
- May 2011 – GAC Advisory Council Meeting
- Summer 2011 – Preparation/Lessons Learned
- Fall 2011 – GNEII Professional Certification Program begins



Conclusions

As an academic endeavor, GNEII is:

- an **integrated approach to 3S education & training**
- a **regional, indigenous capability**
- academically and operationally **modular by design**

As a strategic, multinational project, GNEII's success is from:

- a **strategic partnership** between UAE & US entities
- an emphasis on both **education & training**
- shared vision to **increase human capability development** throughout the Gulf & Middle East region

