

Gulf Nuclear Energy Infrastructure Institute (GNEII):

Overview & Status Update



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Overview

- Gulf Nuclear Energy Infrastructure Institute (GNEII)
 - Background
 - Recent Milestones
 - Pilot Course
 - Status Update
 - Next Steps

Background

- Why?
 - Need for a regional, sustainable mechanism for responsible nuclear energy infrastructure development
- What?
 - Institutional, indigenous capability coupling nuclear safety, security, and safeguards (3S) with nuclear energy infrastructure development

Background

- How?
 - Strategic Partnership
 - US Partners
 - Under the sponsorship of:
 - » DOE/NNSA/NGSI – International Nuclear Safeguards and Engagement Program (NA241/INSEP)
 - » DOS/CTR – Partnership for Nuclear Security (CTR/PNS)
 - Implemented by:
 - » Sandia National Laboratories (SNL)
 - » Texas A&M University (TAMU)
 - UAE Partners
 - Under the sponsorship of and implemented by:
 - » Khalifa University of Science, Technology & Research
 - With support from:
 - » The Federal Authority for Nuclear Regulation (FANR)
 - » The Emirates Nuclear Energy Corporation (ENEC)
 - » Critical National Infrastructure Authority (CNIA)



Background

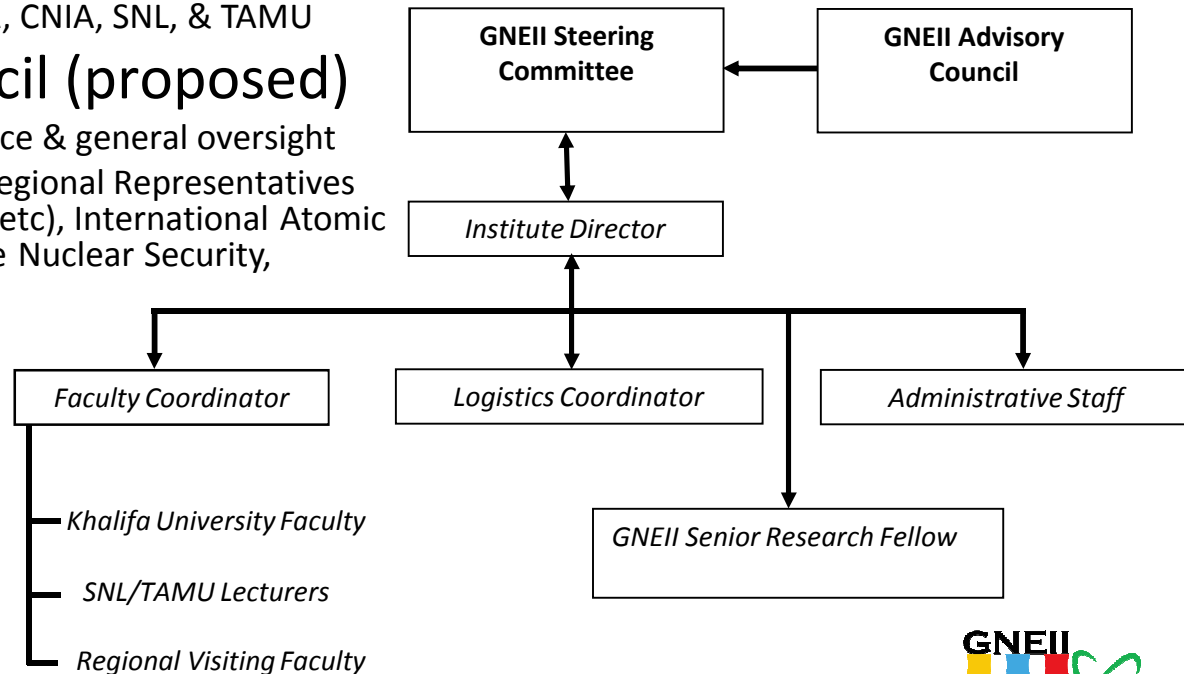
GNEII is designed to be

- 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 a nuclear energy safety and security culture in future program decision-makers
- **Not** intended to train nuclear engineers or operators, intended instead to educate and prepare future leaders of Gulf nuclear energy programs

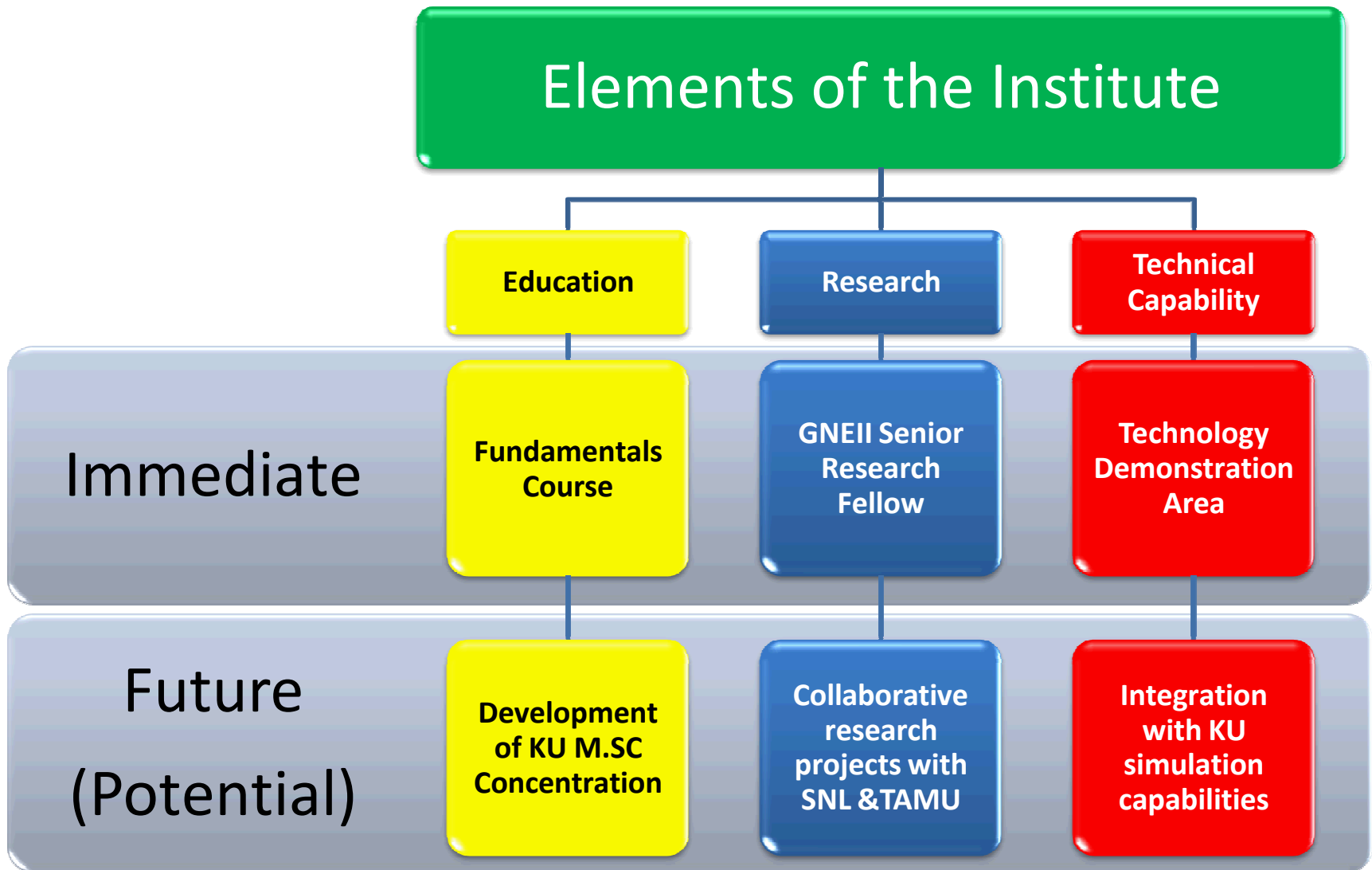
Background

Management & Operation

- **Institute Staff**
 - Responsible for daily operation & management
 - Director & local staff from Khalifa University
- **Steering Committee**
 - Responsible for setting goals & policies
 - Khalifa University, ENEC, FANR, CNIA, SNL, & TAMU
- **GNEII Advisory Council (proposed)**
 - Responsible for providing advice & general oversight
 - Arab Atomic Energy Agency, Regional Representatives (Qatar, Jordan, Kuwait, Egypt, etc), International Atomic Energy Agency, World Institute Nuclear Security, NNSA/NA24, State, etc



Background



Background

GNEII

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:
Introduction to
Application

Week 11
Nuclear Security:
Physical
Protection System
Design,
Implementation &
Evaluation

Week 12
Nuclear Security:
Vulnerability
Assessments for
Nuclear Facilities

Week 1
Critical Thinking,
the Scientific
Method & Systems
Thinking

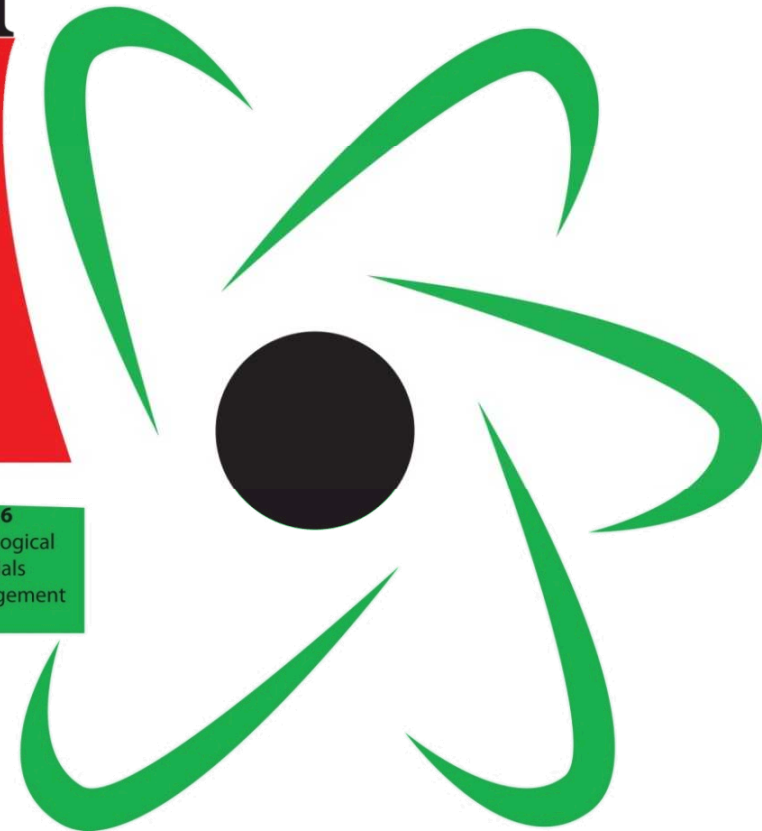
Week 2
Basic Nuclear &
Reactor Physics

Week 3
Nuclear Fuel Cycle:
Front End, Produc-
tion 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



Recent Milestones

- Timeline
 - Summer 2009: Internal SNL discussions
 - Fall 2009: HQ interagency discussions/approvals
 - November 2009: Regional scoping visit (Cairo, Doha, Abu Dhabi)
 - March 2010: Letter of Intent signed
 - 2010:
 - Project development
 - Curriculum development
 - International discussions

Recent Milestones

- June 2010: Named by White House OSTP as “top 5” initiative to support Obama’s “Cairo Initiative”
- February 2011: Memorandum of Understanding Signed
 - Extensive US, UAE, and Middle East media coverage



Fundamentals Pilot Course

- 10 Students from Abu Dhabi
 - 8 males, 2 females
 - FANR, ENEC, CNIA



- Full Module 1: Fundamentals, abbreviated
- Module 2: Capstone



Fundamental Pilot Course

- Pilot Course Completion Ceremony – 19 May 2011
 - 13 weeks of education capped with Student Presentations to VIP audience:
 - *“Integration of Nuclear Safety, Security & Safeguards Systems”*
 - *“Effects of the Environment on Nuclear Power Plant Operations”*



Status Update

- Pilot Course Feedback
 - Lack of graduate credit
 - GNEII Fundamentals Course significantly increased nuclear knowledge/expertise of students
 - FANR, ENEC, and CNIA representatives observed student capstone presentations
 - Request for course to be *extended*
 - From Khalifa University interactions with ENEC, FANR, CNIA
 - Directly from feedback from students
 - Continued interaction GNEII alumni



Status Update

- Lessons Learned - Preliminary Results
 - Curriculum (gaps, topics, order, flow)
 - Recommendations report for the GNEII Steering Committee meeting
 - Path forward for GNEII Fundamentals Course redesign and improvement
 - Plans for independent, 3rd party review of curriculum to ensure consistency with global norms and standards

Status Update

- Unique Challenges
 - Designing a multi-discipline education curriculum
 - Educating students with limited background in nuclear topics
 - Length of the Fundamentals Course
 - Developing the strategic US/UAE partnership that lends GNEII toward indigenization
 - Desired pace of implementation from UAE partners
 - Decision-making for institute direction via GNEII Steering Committee
 - Developing/maintaining regional relevancy (demand-driven)

Next Steps

- Summer 2011: Lessons Learned Discussions with US sponsors
- July 2011: GNEII Steering Committee Meeting
- August 2011: 2nd Curriculum Developers Workshop
- October 2011: GNEII Advisory Council Meeting
- Summer/Fall 2011: Curriculum Redesign
- Oct/Nov 2011: Independent Peer Review
- “Evolutionary Expansion”
 - Develop technical display for GNEII
 - Spring 2012: GNEII Module 1: Fundamentals
 - 2012 GNEII Symposium
 - Introduce GNEII Research Fellow
 - Work with Pilot Course students for INMM paper



Shukran



BACK-UP SLIDES

GNEII/USG Relationship

GNEII

Facilitate and connect with other training opportunities

- Geopolitical/historical issues
- Basic reactor physics
- Laws, norms & regulations
- Nuclear fuel cycle
- Export control

More (potential) in-depth training from US INECP program

More (potential) in-depth training from US NRC/ National Labs

- NPP operations & management
- Reactor safety systems
- Probabilistic risk assessment
- Radiological materials management
- Safety & health physics

More in-depth, technical training from National Labs

More (potential) in-depth training from:
• NA241
• DOS/PNS

- Vulnerability assessments
- Nuclear terrorism
- Physical protection systems
- Safeguards
- Material control & accountability

INSEP – in-depth, specified training in:

- Nuclear regulatory development
- SSAC and AP implementation for UAE's CSA with the IAEA
- Nuclear best practices



Education and Training Compared

EDUCATION

To Think

To do right things

To lead

Long-term impact

Broadly based

TRAINING

To Do

To do things right

To follow

Immediate result

Narrowly focused