



A 3S Framework for Development of the Gulf Nuclear Energy Infrastructure Institute (GNEII)

Technical Workshop on Topical Issues on Infrastructure Development:
Managing the Development of a National Infrastructure for Nuclear Power Plants

International Atomic Energy Agency
Vienna, Austria
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Overview



- Background
- Institute's Description
- Integrated 3S Framework
- Pilot Course 2011
- Upcoming Activities
- Next Steps

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 responsible nuclear energy culture in future program decision-makers

*****Not** intended to train nuclear engineers or operators, intended instead to educate and prepare future leaders of region's nuclear energy programs

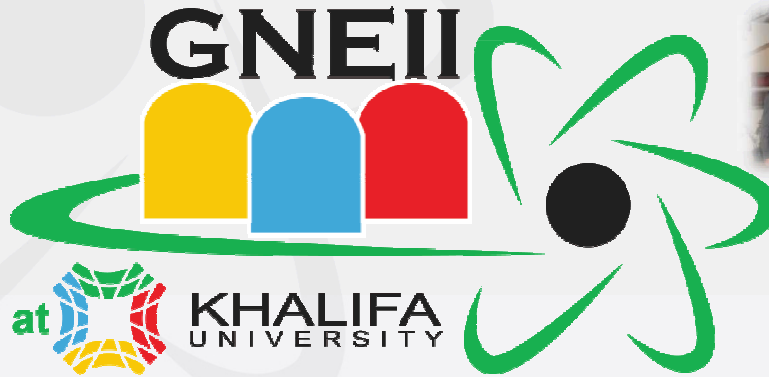
History



USG Initiates Project:
January 2009



International Consultations:
August 2009



Regional Consultations:
November 2009



Pilot Course Begins:
20 Feb. 2011



Mission: GNEII seeks to develop a responsible nuclear energy culture and institutionalize key safety, safeguards, security, and nonproliferation norms in the future decision-makers of Middle East region nuclear energy programs through professional development and training.



MOU Signed:
20 Feb. 2011



LOI Signed:
16 March 2010

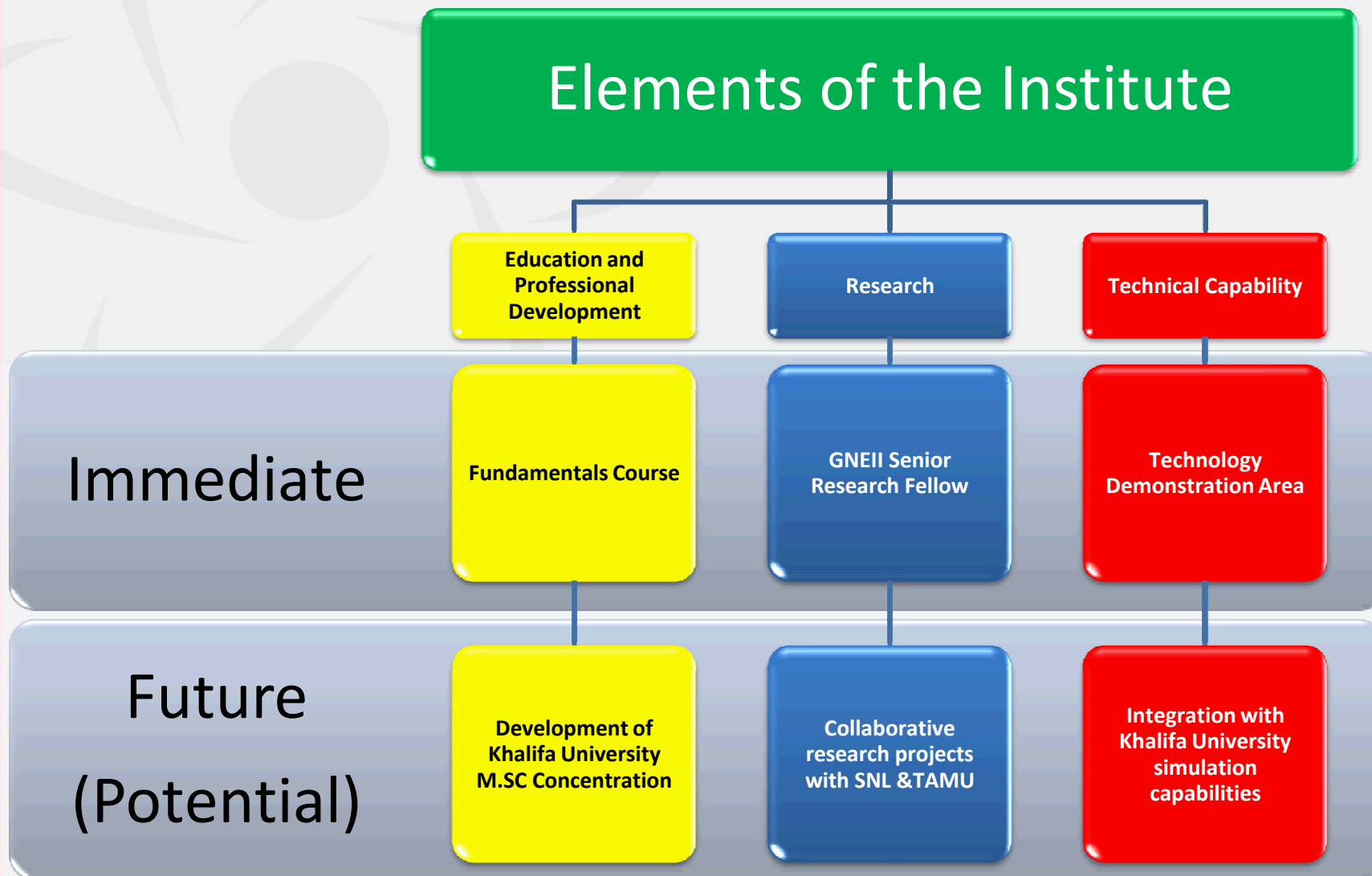


Strategic Partnership

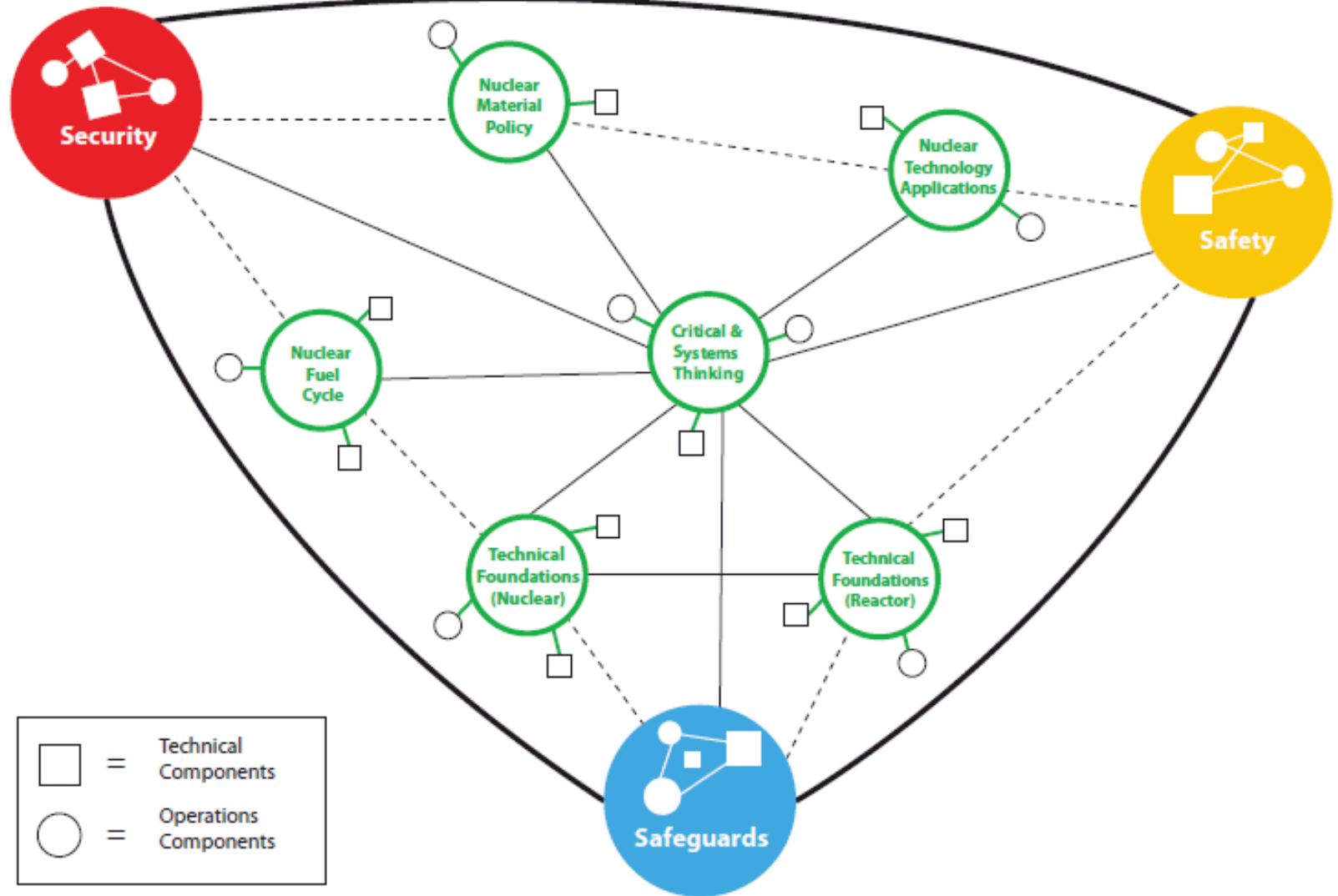


- UAE Partners
 - Under the sponsorship of and implemented by:
 - Khalifa University of Science, Technology & Research
 - With support from:
 - The Federal Authority for Nuclear Regulation (FANR)
 - The Emirates Nuclear Energy Corporation (ENEC)
 - Critical National Infrastructure Authority (CNIA)
- 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)

Elements of the Institute

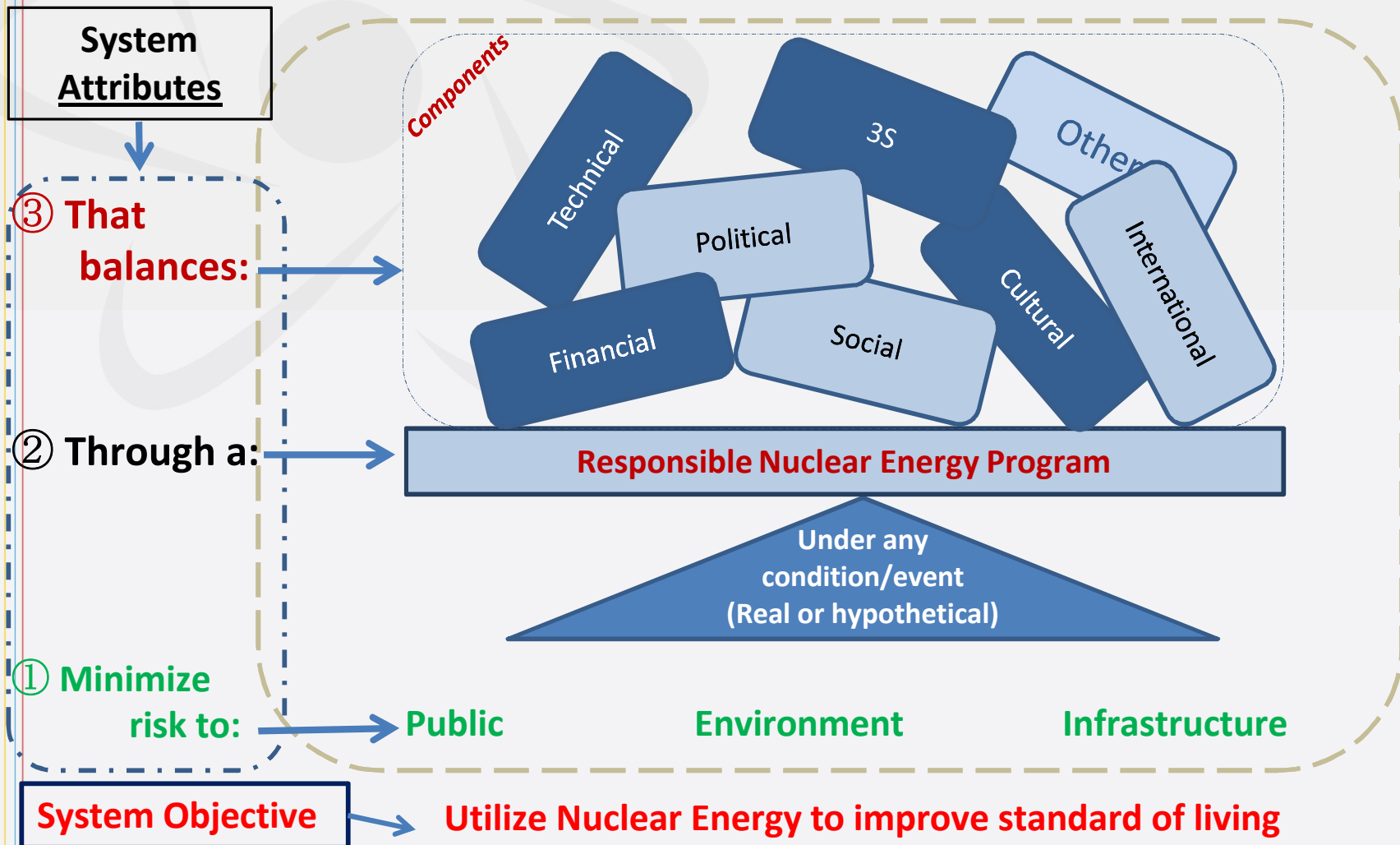


Integrated 3S Interactions



A Systems Framework

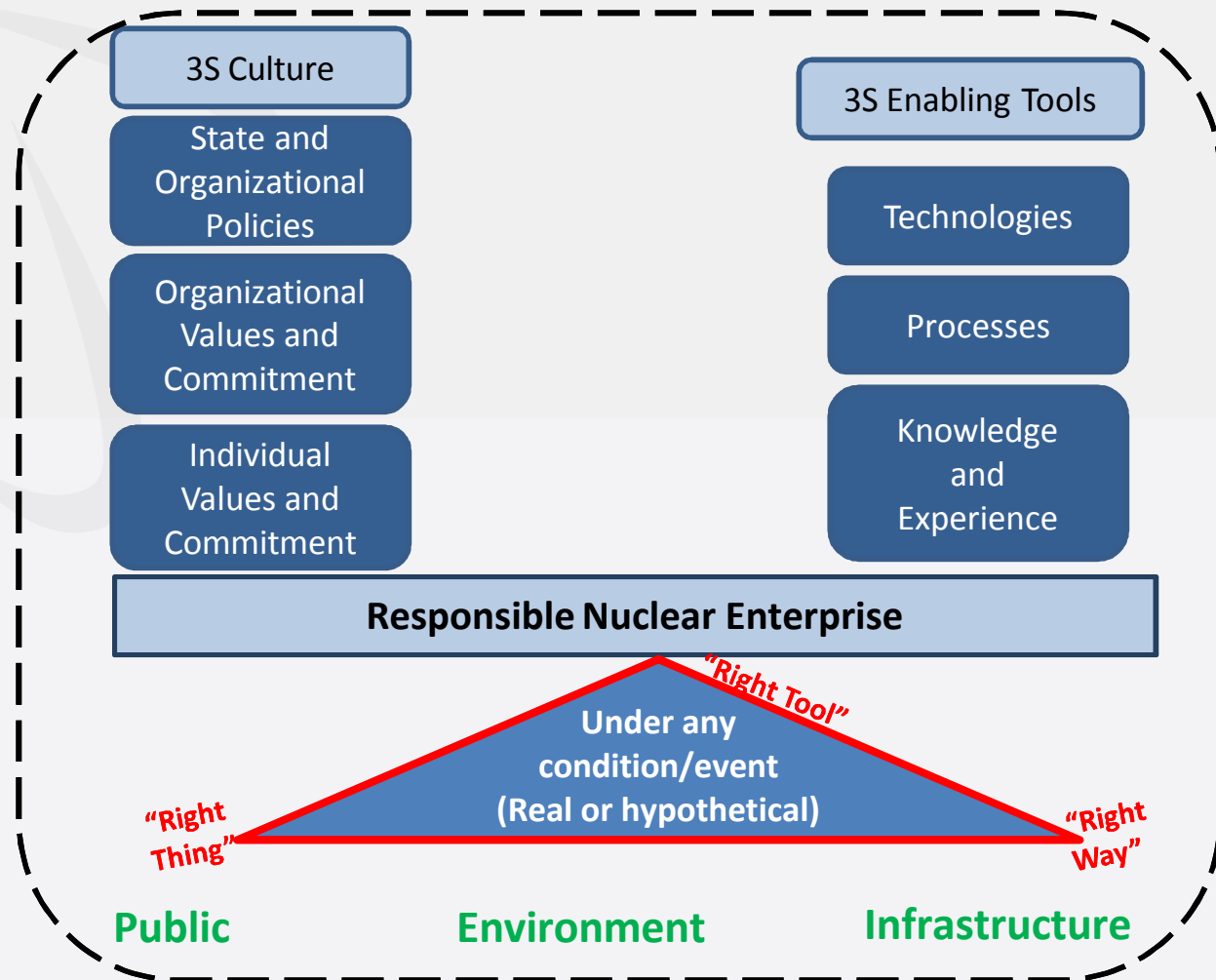
SYSTEM: Responsible Nuclear Energy Program



Evolving 3S Framework

- Dynamic
 - Based on combining right thing, way and tool in timely manner
- Adaptive
 - Able to easily (and dynamically) find the balance; focuses on integrating necessary components of culture/tools
 - Feedback capable
- Proactive
- Comprehensive understanding across areas of expertise

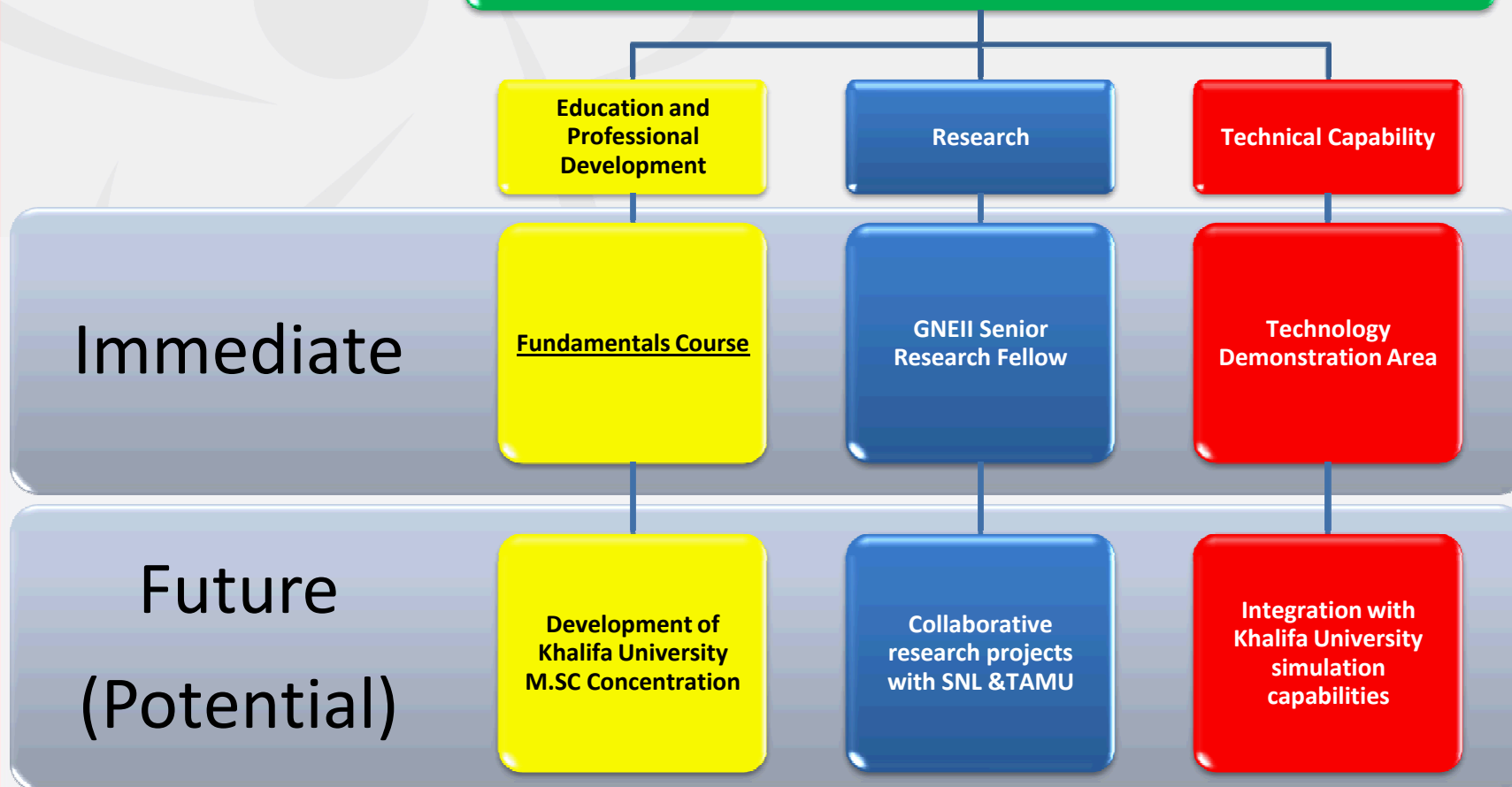
Proposed Model for 3S Framework



Work in progress: Analytical paper by Dr. Ghanbari and Mr. Williams in progress

Elements of the Institute

Elements of the Institute



Pilot Course



- Fundamentals Pilot Course Topics

1. Critical Thinking, Systems Thinking, and the Scientific Method
2. Basic Nuclear and Reactor Physics
3. The Nuclear Fuel Cycle: Front End, Production Cycle, Back End
4. Nuclear Material Control, History, Policy Issues, and Technical Issues
5. Nuclear Power Plant Management and Operations
6. Radiological Materials Management

Nuclear Energy Basics

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7. Nuclear Safety: Reactor Safety Systems
 8. Nuclear Safety: Accident Modeling and Emergency Preparedness
 9. Nuclear Safeguards: Terminology, Technology, Systems, and Measurement
 10. Nuclear Safeguards: Introduction to Application
 11. Nuclear Security: Physical Protection Design, Implementation and Evaluation
 12. Nuclear Security: Vulnerability Assessment for Nuclear Facilities

Safety

Safeguards

Security

13. Capstone Projects

Pilot Course

- February – May 2011
- 10 Students from UAE
 - 8 males, 2 females
 - FANR, ENEC, CNIA
- Full Module 1: Fundamentals, abbreviated Module 2: Capstone



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”*

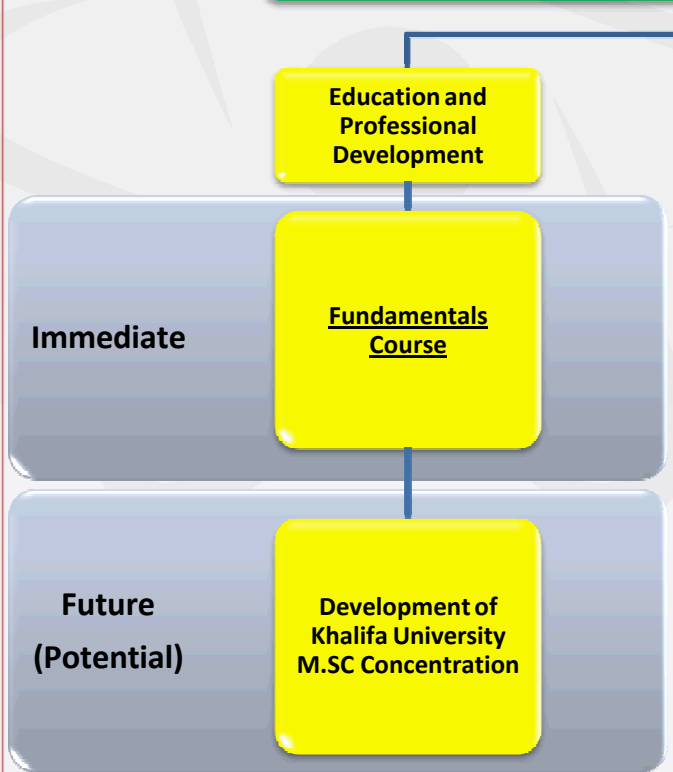


Follow-On Activities



- Summer 2011: Lessons Learned Reviews
- Fall 2011:
 - GNEII Steering Committee Meeting
 - 2nd Curriculum Developers Workshop
 - Curriculum Redesign
- “Evolutionary Expansion”
 - 2012 GNEII Fundamentals Course (Open to the GCC)
 - 2012 GNEII Symposium (Fall 2012)
 - Develop Technical Display and Training Area
 - Develop GNEII Research Framework

Elements of the Institute



Module I: Nuclear Energy Technical Foundations

February 19 to February 23
 February 26 to March 1
 March 4 to March 8
 March 11 to March 15

Week #1 – Critical & Systems Thinking, The Scientific Method
Week #2 – Technical Foundations I
Week #3 – Technical Foundations II
Week #4 – The Nuclear Fuel Cycle

Module II: Nuclear Energy Nonproliferation & Safeguards

April 15 to April 19
 April 22 to April 26
 April 20 to May 3
 May 6 to May 10

Week #5 – Nuclear Technology Applications
Week #6 – Nuclear Materials Control, History & Policy
Week #7 – Nuclear Safeguards: Technical Design & Objectives
Week #8 – Nuclear Safeguards: Operations Objectives

Module III: Nuclear Energy Security & Safety

June 10 to June 14
 June 17 to June 21
 June 24 to June 28
 July 1 to July 5

Week #9 – Nuclear Security: Technical Design & Objectives
Week #10 – Nuclear Security: Operations Objectives
Week #11 – Nuclear Safety: Technical Design & Objectives
Week #12 – Nuclear Safety: Operations Objectives

Module IV: Capstone

Early Fall Academic Semester 2012
 (after the Eid al Fitr Holiday)

Week #13 – Capstone Introduction
Week #14 – Capstone Research
Week #15 – Capstone Research
Week #16 – Capstone Presentation

2012 Institute Activities

Elements of the Institute



– Inaugural GNEII Research Fellow:

• **Dr. BK Kim**



– 30 years at Korean Atomic Energy Research Institute

- Establish national safeguards system (SSAC)
- Member of SAGSI

– 7 years at International Atomic Energy Agency

- (Dept of Technical Cooperation)

– Development of GNEII Research Framework

Research Areas

Integrated 3S Methodologies

Nuclear Infrastructure Development

Gulf/Middle East Regional Nuclear Interactions

Research Methodology

Fundamentals Capstone

Joint Research

Collaboration with Khalifa University

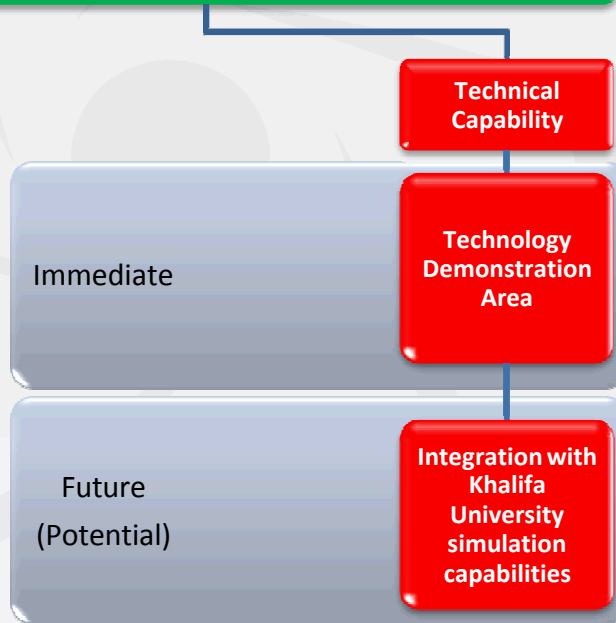
Research Goals

GNEII Published Paper Series

Global Leader in GNEII Research Areas

2012 Institute Activities

Elements of the Institute



- Development of Initial Technology Demonstration Area
 - Creation of “GNEII Display Board”
 - Procurement of 3S related equipment
 - Establishment of “3S Laboratory” at Khalifa University



Scale Model of APR 1400
Reactor Pressure Vessel

Environmental Radiation Lab



Reactor Analysis, Design and
Instrumentation Controls Lab

Radiation Sciences Lab



- *Website development*
 - *First Webpage (hosted on Khalifa University website):*
 - www.kustar.ac.ae/gneii
 - *Work on creating www.gneii.ac.ae (not live yet) throughout 2012*
- *Alumni engagement (create strong alumni network)*
 - *Planned:*
 - Invitations to 2012 GNEII Completion Ceremony
 - Invitations to speak to 2012 class of students
 - *Proposed:*
 - Special online forum for collaboration
 - Quarterly newsletters
 - Refinement of capstone papers for INMM submission

For More Information or to Nominate GNEII Fellows, please contact:

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