

Expanding into Research Opportunities: Gulf Nuclear Energy Infrastructure Institute (GNEII) in Year 5

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Introduction & Background

Foundational Pillars

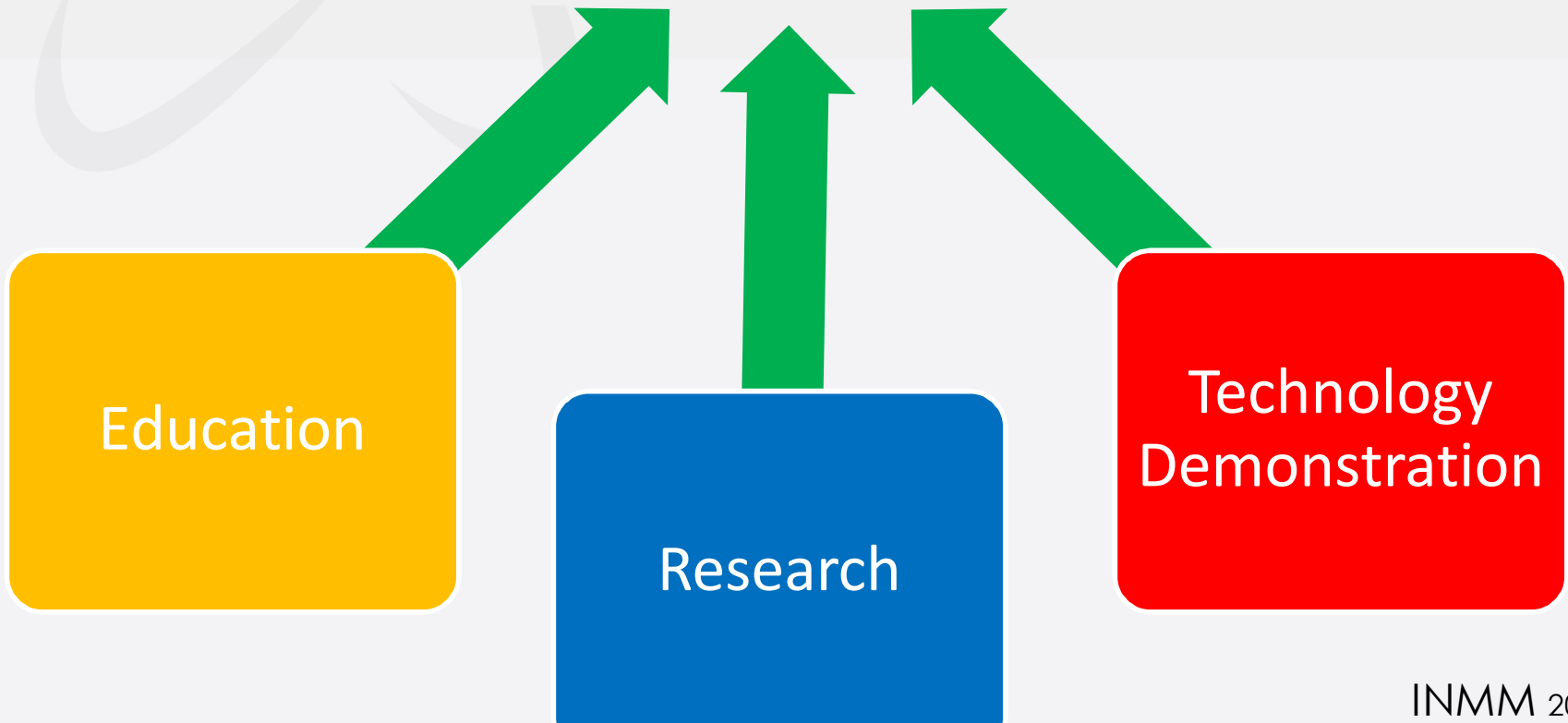
Research: Origins & Growth

Transition & Sustainability

Summary

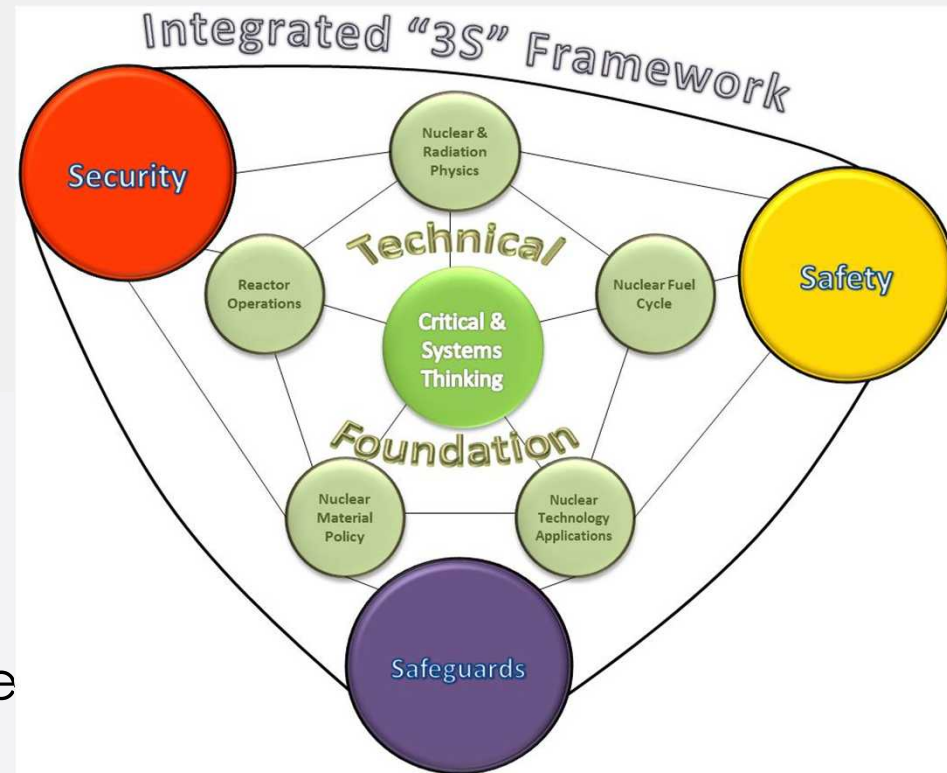
- GNEII is:
 - A Gulf/Middle east regional human resource development capability
 - Hosted at Khalifa University, Abu Dhabi, UAE
 - A strategic partnership
 - Between UAE (Khalifa, CICPA, ENEC, FANR) & U.S. (SNL, TAMU, DOE/NNSA, DOS/PNS) stakeholders
 - An educational & research entity
 - Beyond traditional training courses
 - A leader in '3S' & emergent nuclear energy infrastructure knowledge

- GNEII's Mission:
 - to develop a responsible nuclear energy culture and institutionalize key safety, safeguards, security, and nonproliferation norms in the future decision-makers of Gulf-region nuclear energy programs through professional development
- GNEII's Vision:
 - 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, safeguards and safety priorities
- Established in 2011, 5 years of operation



- Pillar #1: **Education**

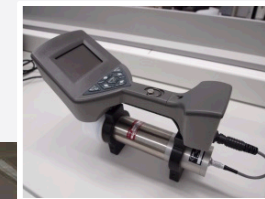
- Fundamentals Course
- Depth & breadth in novel curriculum
- Topics include:
 - Wk#1: Critical & Systems Thinking; & Intro to 3S
 - Wk#2: Nuclear & Reactor Physics
 - WK#3: Nuclear Power Plant Operations & Systems
 - WK #4: Nuclear Fuel Cycle & Nonproliferation Policy
 - WK#5-#6: Nuclear Safeguards
 - WK#8-#9: Nuclear Security
 - WK#10-#11: Nuclear Safety
 - WK#7, #12-#14: Capstone



- Pillar #II:
Technology Demonstration
 - Leverage Khalifa University Nuclear Engineering Department Capabilities
 - Provides opportunities for:
 - Practical exercises
 - Hands-on instruction
 - Real-life scenario simulations



KU Environmental Radiation Measurements Laboratory



KU Radiation Detection and Safeguards Laboratory

Origins & Growth

Research Areas

Integrated 3S
Methodologies

Nuclear
Infrastructure
Development

Gulf/Middle East
Regional
Nuclear
Interactions

Research Methodology

Fundamentals
Capstone

Joint Research

Collaboration
within Khalifa
University

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

2011	Integration of Nuclear Safety, Security & Safeguards
	Effects of the Environmental on Nuclear Power Plant Operations
2012	SBO Roles and Mitigation Plan
	The UAE Export Control Laws
	Project Control of NPP Construction
	Impact of NPP/Desalination on Gulf
	MIMIS on APR1400 Reactor
	APR1400 Liquid Source Terms
	UAE Strategy for HLW Management
	Transportation of Fresh Nuclear Fuel
	Radioactive Dose Pathway Modeling
	Transparency in Nuclear Security
	Emergency Preparedness for NPP
2013	Pyrochemical Reprocessing
	A Qualitative Assessment of Fuel Fabrication Options in the UAE
	The Suitable Mobile Lab for the UAE Condition
	Emergency Preparedness Plan for Radioactive Material
	Safety, Security, and Safeguards Challenges for Building a Final Repository for Spent Fuel in the UAE
	Use of Microfinned Steam Generator Tubes in NPP
	The Role of Management Systems in Protecting the Environment from RNEP
	Filling the Gaps Between Safety and Security
	Emergency Preparedness Plan
2014	Survey of the Current Spent Nuclear Fuel Storage Technologies & Assessing Safety Approaches of Existing Systems for Barakah Nuclear Power Plant (BNPP)
	Development of Recommendations for the Nuclear Security Culture in the UAE
	Evaluation of Security and Safeguards Measures for the Transportation Security in the UAE
	Evaluation of Safeguards and Security Options for the Dry Cask Storage in the UAE
	Synergy between Safeguards and Security at an NPP
	An Initial Radiation Baseline Study of Urban Environment in Abu Dhabi
	Effective Enhancements for Integrated Safety and Security Control Systems in BNPP
2015	Thermal-hydraulic Studies on Design Extension Condition of Prolong Station Black Out with Additional Failures
	Overview of Molten Core – Concrete Interaction (MCCI) and Mitigation Actions
	Needs of Atmospheric Dispersion Models in Emergency Situations
	Investigation on the Sensitivity of UAE Domestic Agricultural Production to Radiological Contamination Following a Hypothetical Severe Nuclear Accident at Barakah NPP
	Evaluation of Threats by Drones to a Nuclear Power Plant
	Evaluation UAE Security Culture – Insider Threat
	Operational Security and Information Protection in the Areas of 3S

Current Efforts

- Primary emphasis on Capstone Projects
 - Opportunity to apply the novel education to a real problem
 - Some submitted, accepted to professional conferences

Categorization & Future

- 5 years of Capstone Projects, good representation across GNEII's Research Framework
- GNEII Visiting Research Fellow in place & performing research (partly influenced by 2015 Capstone Project)
- Goal: regional voices on nuclear matters shared with global nuclear energy community

Core Competency Research Area	2011	2012	2013	2014	2015
Integrated 3S methodologies	1	1	4	4	2
Nuclear infrastructure development	0	6	4	4	4
Gulf/Middle East regional nuclear interactions	1	4	3	1	4

- 3 pillars expanding as part of strategic plan for GNEII
- From the outset, goal has been for GNEII to be self-sufficient
 - MOUs codifies transition from U.S. to UAE implementer set for 2017
 - 1st MOU = agreement to establish GNEII
- Follow-on MOU in negotiation based on peer-to-peer collaboration between GNEII and its original implementers

- GNEII's strong research pillar → sustainability
- Research = path for regional voices to be heard globally
- Research = backbone for future collaborations

Year	# UAE Fellows			# Non-UAE Fellows	Yearly Total	Countries Represented
	ENEC	FANR	CICPA			
2011	4	5	1	0	10	UAE
2012	3	9	2	8	18 (22) ⁱ	UAE, Kuwait, Saudi Arabia, Qatar, Jordan
2013	4	6	3	7	20	UAE, Saudi Arabia, Qatar
2014	6	3	3	0	12	UAE
2015	7	4	5	2	18	UAE, Jordan
TOTAL	24	27	14	17	78	5

ⁱDue to modular structure of the course in 2012 not all international participants were able to finish all required modules because of the travel restrictions.

Thank You

- For more information or to nominate GNEII Fellows, please contact us:

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