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The Nuclear Power Institute at Texas A&M University – A Comprehensive and Integrated Approach to Workforce Development and Training for the Nuclear Industry

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TEXAS A&M UNIVERSITY

TEES | TEXAS A&M ENGINEERING EXPERIMENT STATION

Background

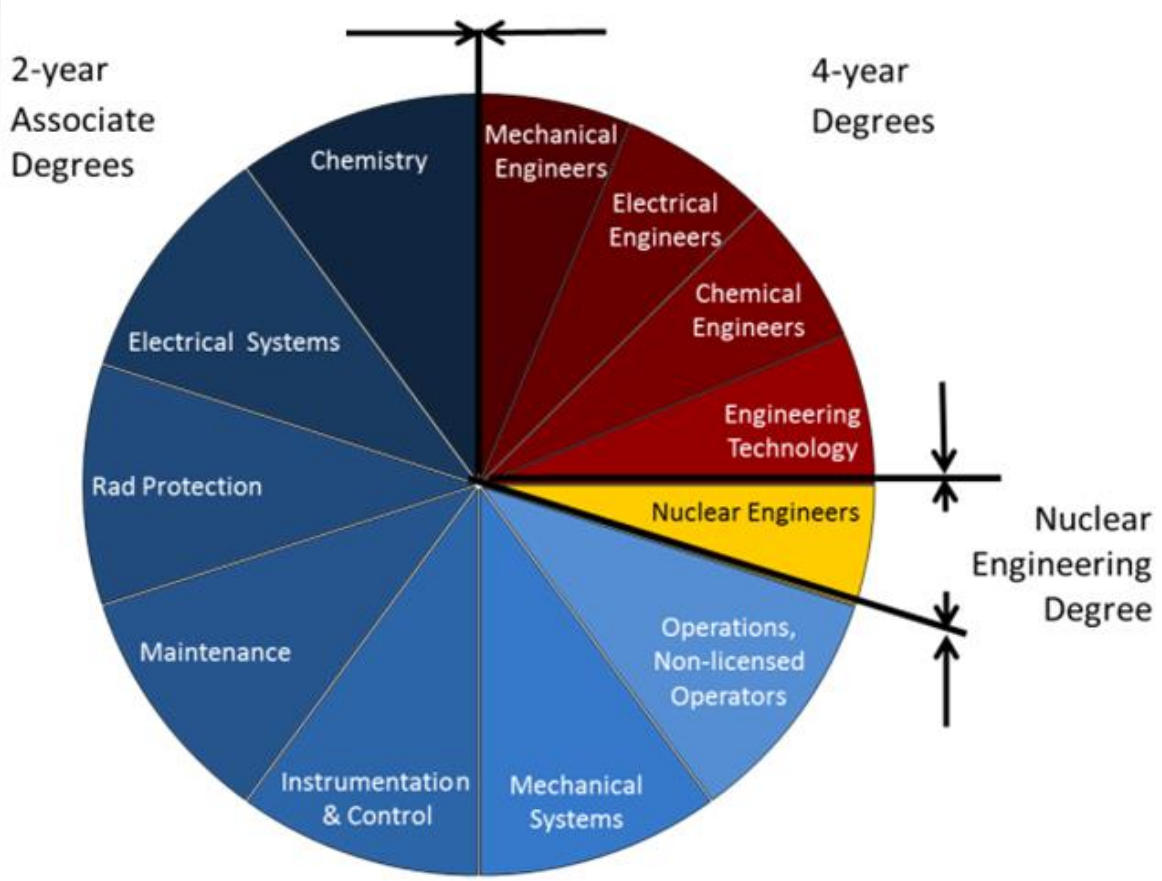
- Workforce is a pressing need for utilities, due to impending retirements and potential new construction projects.
- In 2007, the Texas A&M University System was approached by the nuclear utilities in Texas with a request for collaboration on workforce development for the nuclear industry.
- The request was for some new approaches on human resource development for the technical workforce.
- Why Texas A&M?

Department of Nuclear Engineering at Texas A&M University

- *Largest department* of nuclear engineering in the U.S.
- Only university in the country with *two nuclear reactors*
- Exceptional facilities
- Distinguished faculty

- Robust, well funded research program
- Recognized on national and international levels
- Website: ***nuclear.tamu.edu***

Broader Needs for the Nuclear Workforce
The "Other than Nuclear" Challenge



The "U.S. Model" for the workforce at a nuclear power plant.

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www.nuclearpowerinstitute.org

- The Nuclear Power Institute (NPI) is a unique statewide partnership led by the Texas A&M Engineering Experiment Station and headquartered at Texas A&M University. NPI is a *partnership* of
  - *industry,*
  - *universities,*
  - *two-year technical and community colleges,*
  - *high/secondary schools and junior highs,*
  - *students and teachers,*
  - *communities,*
  - *stakeholders,*
  - *elected leaders,*
  - *state, federal, and international agencies*
- The NPI focus is on *preparing the workforce* for the nuclear industry and *building public understanding and acceptance* of nuclear energy

Structure of the Programs

1. Partnership with universities for distance delivery programs focused on engineers in disciplines other than nuclear
2. New associate degree programs at two-year community and technical colleges to prepare graduates to go into training for technician positions
3. Outreach to high school and junior high students, teachers and communities with information about the nuclear industry and encourage interest in STEM fields for post-secondary studies

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Engineers Certificate Program

Partner Universities

- Mech Engr
- Elec Engr
- Chem Engr
- Civil Engr
- Engr Physics
- Engr Technology

+

NPI Nuclear Power Technology Certificate

- Fundamentals
- Systems – BWR/PWR
- Operations
- Human Performance
- Plus potential new courses

Outcome

Graduates with *Academic Backgrounds, Credentials* and *Hiring Advantages* for Jobs at Nuclear Power Plants

Approach: Distance delivery of courses based on industry input and needs.
http://nuclearpowerinstitutecourses.org

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Engineers System Engineering Initiative

Engage undergraduate engineering students in *interdisciplinary* & *multilevel* *team* projects sponsored by government / industry to:

- Problems defined by industry partners
- Visit to nuclear power plants
- Work with industry mentors
- Enhance the engineering education of students through real world experiences
- A new educational approach through “externships”

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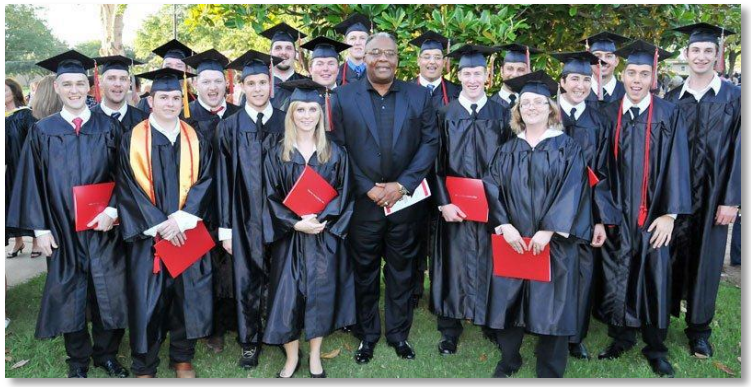
Technologist / Technician Programs

- *Partner* with 2-year community or technical colleges
- Graduates receive an associate's degree in nuclear power plant technology.

  Specialties:
  - *Electrical and Electronic Systems*
  - *Digital Instrumentation and Control*
  - *Radiation Protection*
  - *Non-licensed operations*

- Curriculum includes courses in *mathematics, science and engineering systems*
- *Strong preparation* to enter into training programs at nuclear power plants
- National Uniform Curriculum Project – in 39 community colleges in the U.S.



Outreach Programs

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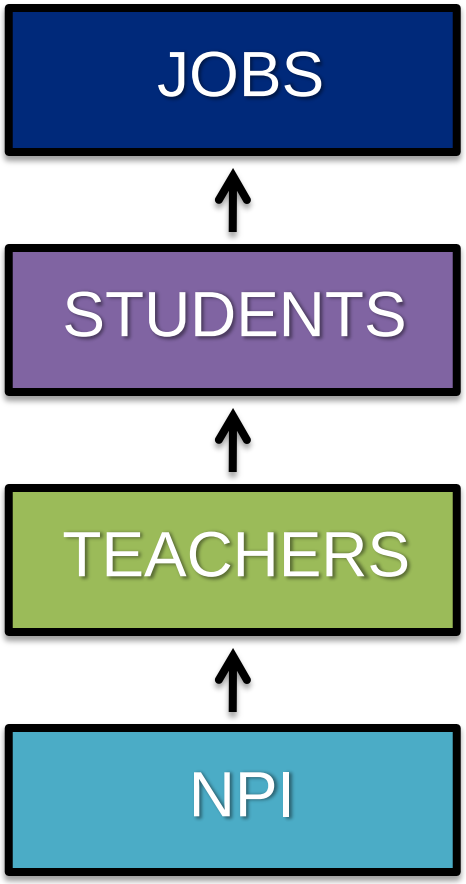
Teacher Programs

Student Programs

Communities and Leaders

NPI Programs for Teachers



Progression of Programs
International Teacher Exchange
Counselors Making Occupational Readiness Exciting (C-MORE)
Science on Saturday (SOS)
Enrichment Experiences in Engineering (E^3)
Teacher Summit
Teacher Workshops
Conference for the Advancement of Science Teaching (CAST)

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Teachers
Enrichment Experiences in Engineering

Enhance lab skills & techniques

Develop curriculum and experiments for the classroom

E3

Practical experience at the nuclear power plant

Experiences with the latest in engineering research

Outreach to Students

- Mentoring by professionals
- Professional development days
- Job interview skills, resume writing skills
- Tours of industry sites to explore career options
- College and employment application assistance
- Community service
- Advice on selection of university or college
- Focus is not just on nuclear but on science, technology, engineering and mathematics (STEM)

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Students

POWER SET

- ***Powerful Opportunities for Women Eager and Ready for Science Engineering and Technology***

- High school/secondary school girls selected to apply for membership
- Educational tools and support to pursue STEM studies and careers

Power GRID

- ***Girls Responding to Industry Demands***

- Extension of POWER SET
- Focus on junior high school girls
- Encourage their participation in math and science through high school

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Students

WIT

- ***Workforce Industry Training***

- Mentoring by industry professionals
- Site visits to local industry partners
- Professional development activities
- Educational visits to universities and community colleges
- Community service events
- Scholarship opportunities

BRT

- ***Boys Resourcing Technology***

- Extension of WIT
- Focus on elementary and junior high boys
- Engage in academic activities
- Stay focused on STEM path

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SOS

Science on Saturday

For students and the community

- Demonstrations and experiments geared to junior high and high school students and to families
- Organized and presented by POWER SET and WIT members
- SOS aims to stimulate scientific inquiry and promotes student interest
- Fourth event held March 21, 2015 at Wharton High School
- Anticipated 300 participants, over 400 took part

Inreach Programs

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Visitors to Campus

Career Fairs

Support students resumes, jobs

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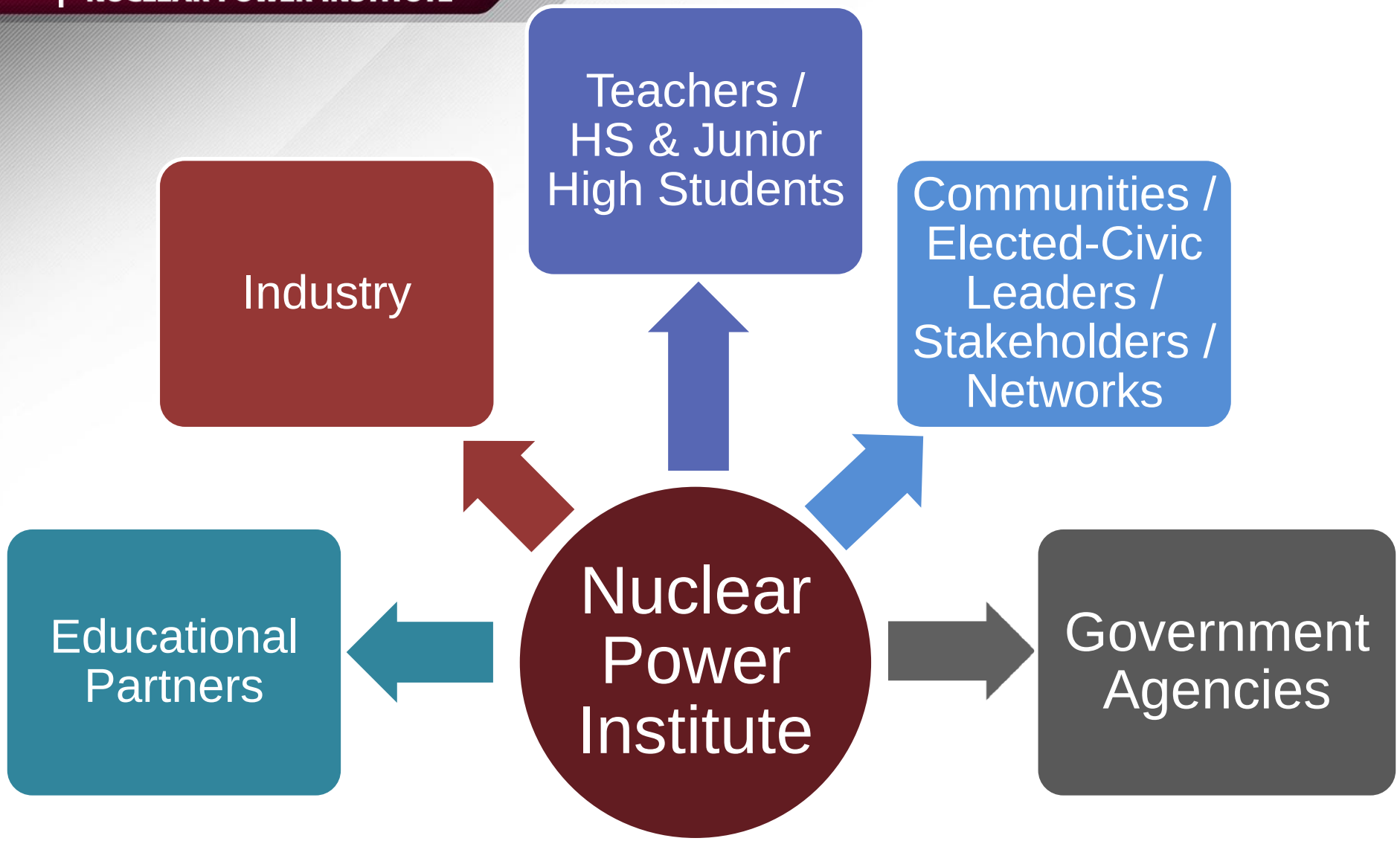

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International Collaboration

- ***Training Programs***
- NPI offers unique, custom designed programs, workshops and experiences for international groups, particularly for “newcomer” countries
- Two to four weeks in length
- 10-30 participants
- Multi-disciplinary groups
- Lecturers by industry, government, legal and finance communities
- Visits to nuclear power plants in Texas, meet with management, research reactor laboratories, “Disaster City” exercise, meet with elected leaders
- Provides countries with a strong basis for pursuing a nuclear power program

A&M Power Plant

A&M Nuclear Science Center

“Disaster City” Emergency Response Exercise

International Collaboration

- ***Training Programs***
- The general areas that can be covered during training are
    a) overview of basic atomic physics and radiation,
    b) overview of the fuel cycle,
    c) radiation safety,
    d) nuclear chain reactions (requirements of a reactor and the basics of operations),
    e) nuclear knowledge development and management,
    f) new build experiences,
    g) overview of the nuclear sectors of the US Government,
    h) development of a national legal framework and the financial aspects of a nuclear power program,
    i) nuclear safety, security and safeguards,
    j) grid requirements and reactor types,
    k) small modular reactors and deployment strategies,
    l) nuclear finance and siting,
    m) decommission and emergency response.
- This list is not comprehensive. Groups can request other topics for inclusion in their training program.

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NPI – A Vibrant and Robust Partnership

- *A comprehensive, integrated approach*
- *Working with industry* on needed programs
- Bringing together the *2-year community colleges and 4-year universities*
- Informing and involving *civic and elected leaders, and stakeholders*
- Developing effective *outreach and recruiting* programs with teachers and students
- Responding to the *key human resource development challenge*
- An *"end-to-end"* program, starting with pre-schoolers through graduate students, teachers and professionals
- Becoming increasingly well recognized nationally and internationally, engaging with the global nuclear community

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Thank you.

Questions?