U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Nuclear Education and Human Resources in United States

Samson Lee, Division of License Renewal

International Workshop on Nuclear Research and Education for Maintenance and Ageing Management of Light Water Reactors
University of Tokyo, Japan
July 23, 2008

Outline

- Nuclear workforce and education statistics
- NRC grant program
- NRC workforce planning

Nuclear Renaissance

- 104 operating nuclear plants, generating 20% of nation's electricity
- 34 expected new reactor plant applications (July 2008)

Reactor Type	Units
AP1000 (Westinghouse)	14
EPR (AREVA)	7
ABWR & ESBWR (GE)	8
USAPWR (Mitsubishi)	2
To Be Announced	3
Total	**34**

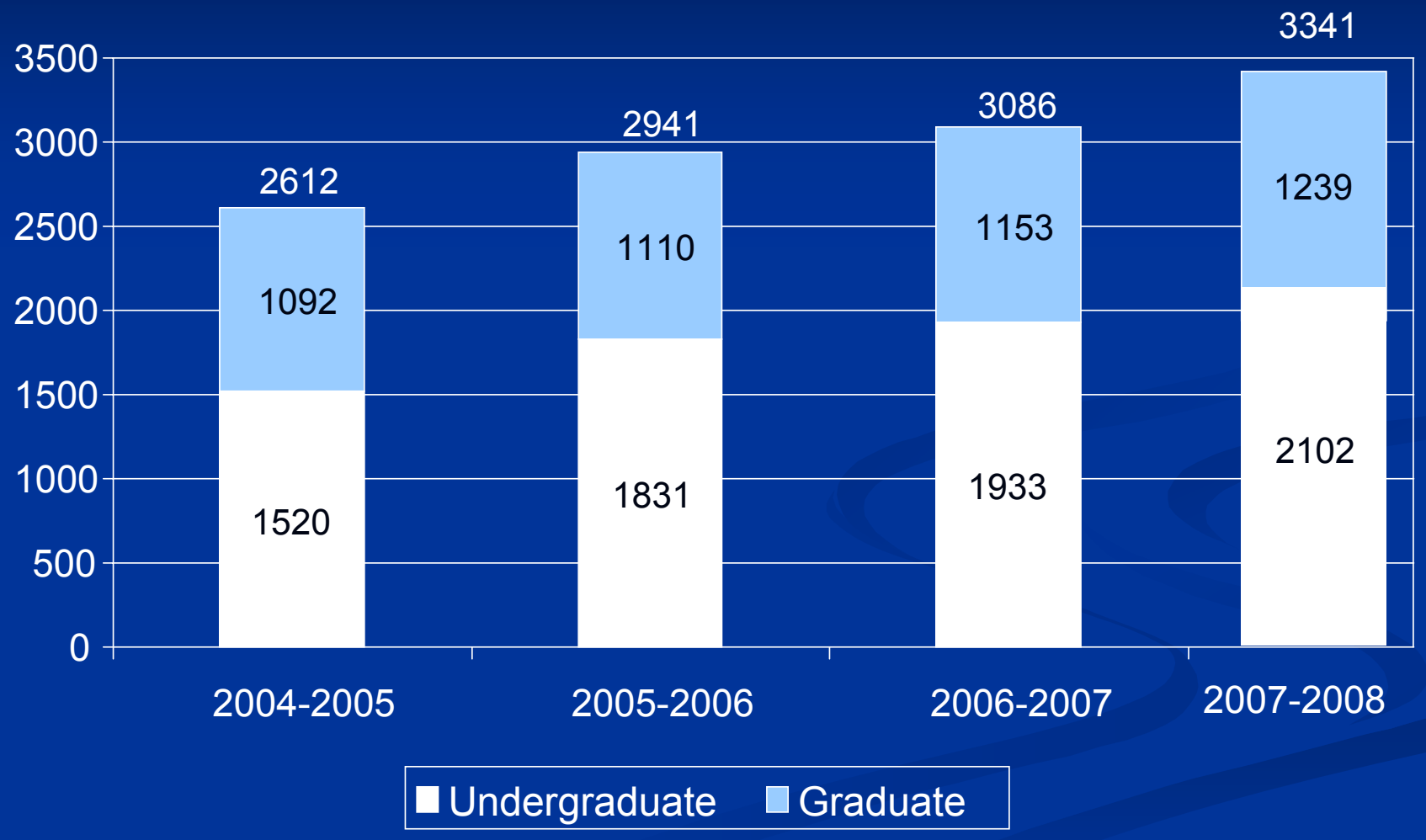
Nuclear Industry Workforce

- Aging workforce
  - 35% retirement eligible in 5 years
- Entry-level workers needed
  - 90,000 engineers, operators, technicians in 10 years
- Critical skills
  - Engineering (digital instrumentation & control, materials, risk & reliability)
  - Construction specialties (structural, welding, concrete)
  - Health physics
  - Administrative and information technology (cyber security, contract acquisition)

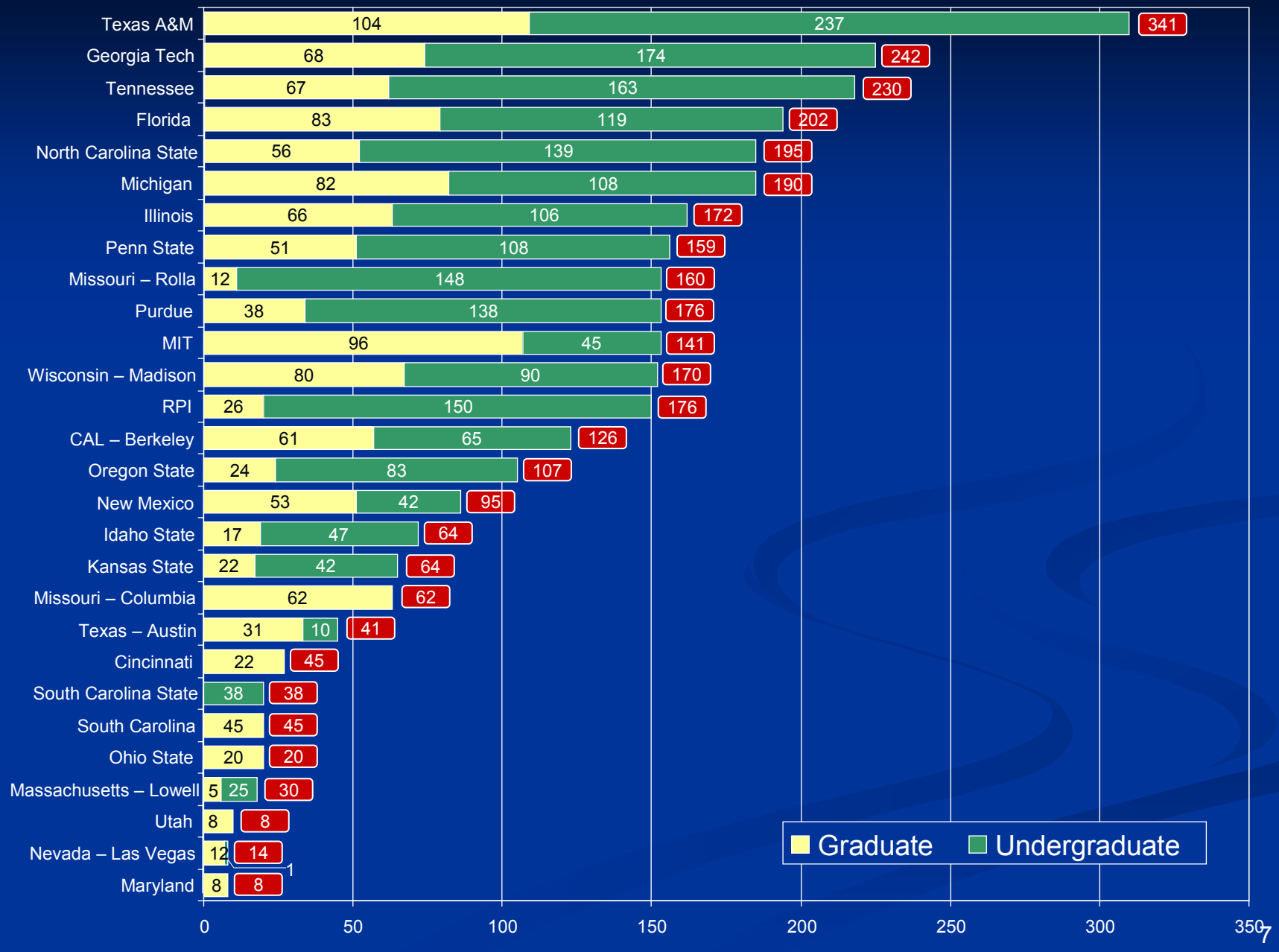
Nuclear Education Historical Overview

- University research reactors
  - 66 to 26
- Nuclear engineering student population
  - 1,800 to 600 to 3,300
- University nuclear engineering programs
  - 50 to 25 to 30

Recent Nuclear Engineering Enrollment Trends (2004-2008)

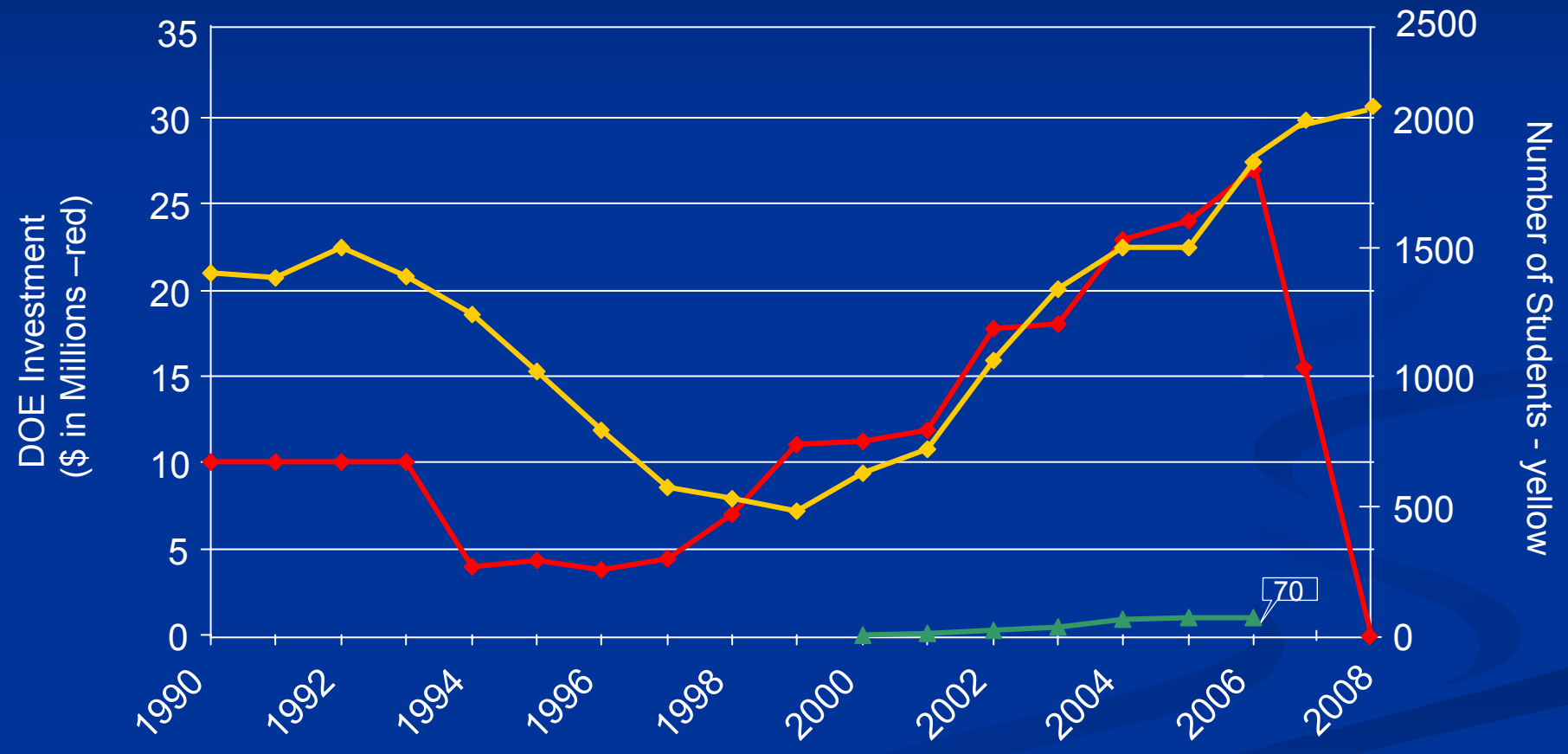


Nuclear Engineering Enrollments
Academic Year 2007-2008



Trends in Undergraduate Enrollment and Department of Energy Investment

(Green represents minorities)



NRC Grant Program

- **Nuclear education infrastructure development**
- **$20 million in Fiscal Year 2008 to:**

… develop a workforce capable of the design, construction, operation, and regulation of nuclear facilities and the safe handling of nuclear materials

… funds are to be used for

undergraduate student scholarships
graduate student fellowships
faculty development
trade schools scholarships
curriculum development

… benefit the nuclear sector broadly rather than solely to benefit the NRC

Educational Support Not Currently Funded by NRC Grants

- **University research reactors support** – fuel/facility upgrades
- **Student internships** in agencies, laboratories, and industry
- **Faculty research grants** for nuclear engineering and science
- **Student exchange - i**nternational component
- **Cooperative programs** - universities, government, industry
- **Pre-college outreach -** teacher workshops, "Harnessed Atom"

Summary of NRC Grant Program and Recommendations

- NRC grant program serves a wide demographic
  - 99 proposals from 49 institutions, representing 24 states and Puerto Rico
- Future considerations:
  - Establish partnerships among schools so that smaller and minority institutions may benefit
  - Broaden areas that qualify for funding
  - Encourage cooperation among universities, private entities (matching grants) and government agencies – local, state and federal
- Seek Congressional language for wider NRC latitude
  - Consult with educational institutions, laboratories, and industry for novel ideas and approaches

NRC's Human Capital Goal

"Sustain the technical competence of the NRC's workforce and enhance its effectiveness in achieving the mission."

NRC is the Best Place to Work in Federal Government (2006 Federal Human Capital Survey)

Managing Human Capital at NRC

- Recruiting and retention
  - 80 recruiting events a year
  - Recruitment and retention incentives
  - Nuclear Safety Professional Development Program for recent college graduates
- Process improvement
  - Hiring process streamline - "Lean Six Sigma"
  - Records system modernization
- Knowledge management
  - Senior leadership Steering Committee
  - Mentoring program
  - "Communities of Practice"

Training and Development at NRC

- Individual performance
  - Comprehensive, competency-based, integrated
  - Documented training and qualification plans
  - Individual Development Plan to guide activities
  - Graduate Fellowship Program
- Training effectiveness and efficiency
  - Strategic Workforce Planning and Learning Management System tools to identify and plan needs
  - Partnership with stakeholders
  - Information Technology to facilitate training
  - Training evaluation

Leadership Development at NRC

- Succession planning
  - Leadership Academy
  - Senior Executive Service Candidate Development Program
  - Leadership Potential Program
  - Team Leader Development Program

NRC's Comprehensive Diversity Management Plan

Vision statement:

"NRC is an agency where all employees are valued and have an equal chance to succeed, thereby increasing organizational capacity to achieve the agency's mission."