DOE-NE's University Programs

John Gilligan
NEUP Director

Marsha Lambregts
NEUP Program Manager

NEAC June 9, 2009

CAES
Center for Advanced Energy Studies

NEUP

Goals – *Integrated Leading Edge R&D, Increased High Quality Workforce*

Purpose – *Provide peer-reviewed funding to Universities for R&D contracts, and grants for Infrastructure, Fellowships and Scholarships*

Time Scale - R&D example

NEUP formed/staffed – Nov. 08-Jan. 09

R&D Solicitation FOA – Dec. 08

Pre-proposals due – Jan. 09

Full Proposals due – March 09

Reviews due – April 09

Awards announced, reviews returned – May 09

Structural Overview:

- DOE-NE R&D Programs will allocate up to 20% of their appropriated funding to universities through this new NEUP
- Center for Advanced Energy Studies (CAES) administers the NEUP
  - INL administrative staff will be used to avoid conflicts of interest
  - The NEUP Director will be a university representative
- Annual solicitations (earlier in following FY's):
  - Research & Development (R&D)
  - Capabilities, Infrastructure & Equipment
  - Scholarships & Fellowships
- Contracts will replace Grants and Cooperative Agreements for R&D
  - University work assignments through the NE R&D Program structure
- Grants and Cooperative Agreements through DOE-ID for Capabilities, Infrastructure & Equipment and Fellowships and Scholarships

NEUP Staff

- Director: Dr. John Gilligan (1/2 time), NCSU, Professor, Former Vice Chancellor
- Relationship Manager/Program Manager: Dr. Marsha Lambregts
- Communications/Outreach Coordinator: Ms. Kortny Rolston
- Review Coordinator: Ms. Cindie Jensen
- Support Team:
  - •Dr. Ray Grosshans
  - •Mr. Bryon Curnutt
  - •Dr. Andrew Klein
  - •Ms. Jamie Hansen
  - •Mr. Oren Hester
  - •Dr. Harold Blackman

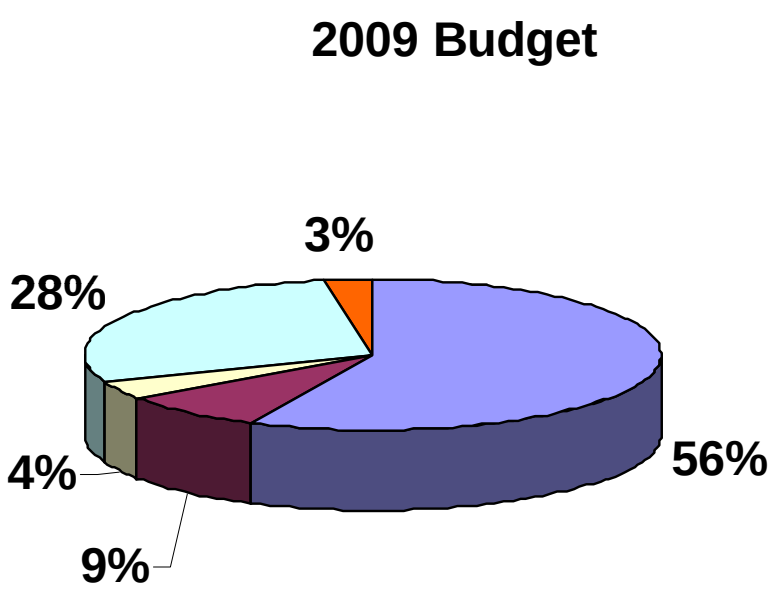
Key Reports related to Nuclear University Programs

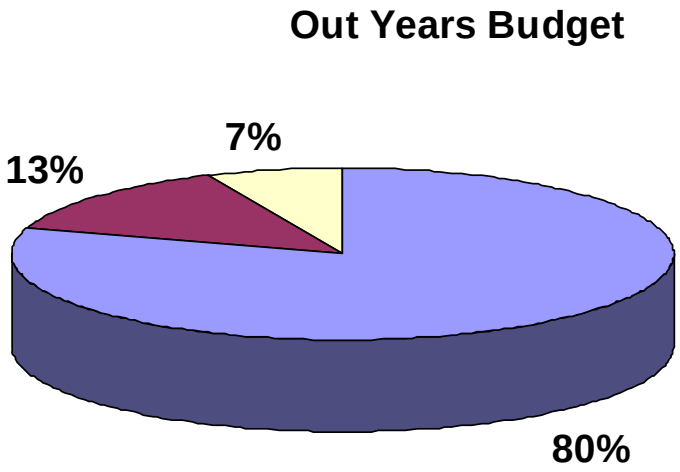
- NEAC Report, November 2008
- DOE, Facilities for the Future of Nuclear Energy Research, November 2008
- NAS, Review of DOE Nuclear Energy Research and Development Program, 2008
- Battelle, Nuclear Energy for the Future, July 2008
- APS, Readiness of the US Nuclear Workforce for the 21st Century Challenges, June 2008
- ANS, Nuclear's Human Element, Feb. 2007

2009 Funding Breakdown

- Total Funding $64.7M
  - NERI Mortgages: $19.9M
  - R&D Subcontracts: $39.9M
    - AFCI: $14.9M
    - GEN IV: $25M
  - Infrastructure Grants: ~$6M
  - Scholarships and Fellowships: $2-3M
    - 70 $5000 1 year Scholarships
    - 16 $150,000 3 year Fellowships

Profile for NEUP Budget





($2M for Administration held ~constant in out years)

R&D Solicitation and Selection

- Assumed $13M new funding in six program areas
- Funding provided at $43M (about 20% of NE R&D) in two program areas
- Merit review based on peer assessments in semi-blind format, reviews returned to PIs
- Selections based on merit review

R&D Program Overview

- 433 pre-applications
- 221 requested full proposals
- 216 submitted proposals
- 71 recommended proposals

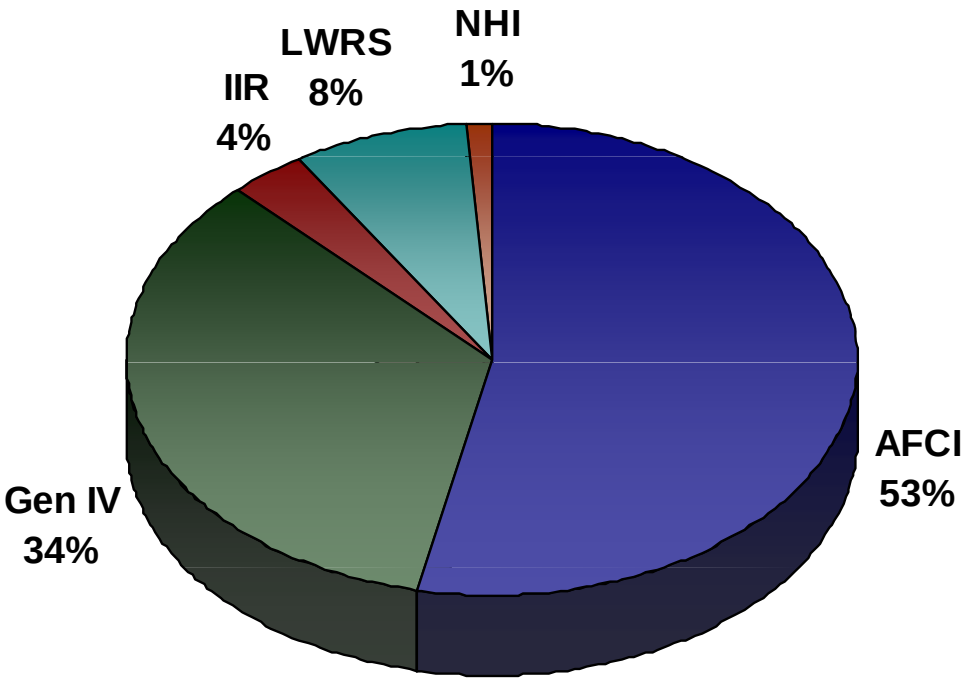
	AFCI	Gen IV	LWRS	NHI	IIR	Total
Received	110	68	21	6	11	**216**
# Selected (% Selected)	22 (20%)	39 (57%)	1 (5%)	0 (0%)	9 (100%)	**71 (33%)**
Selected $ (M)*	$14.87	$24.21	$0.4	$0	$4.45	**$43.93**

*Reflects allocated funding.

Proposed Budgets for Received Proposals

- **The total proposed budget for the received projects is $126,593,537.**

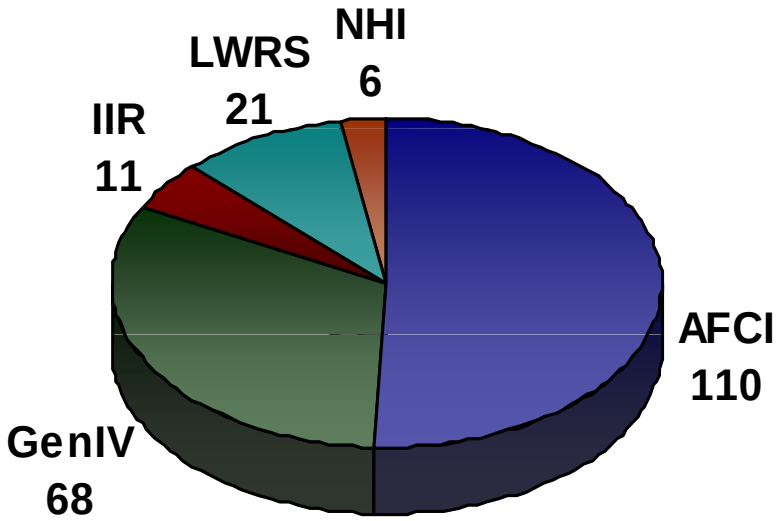
Initiative	Proposed Budget	
AFCI	$	67,344,350
Gen IV	$	43,848,430
IIR	$	4,263,765
LWRS	$	9,736,992
NHI	$	1,400,000
Grand Total	$	126,593,537



Proposals Received

(216 Total)

- Proposals were submitted by 54 lead universities
- 41 additional organizations collaborated
  - 13 Universities
  - 9 National Laboratories
  - 12 Industry
  - 7 Foreign Institutions
- These organizations represent
  - 33 U.S. states
  - 6 Foreign Countries
  - 3 Minority Institutions



Review and Selection Process

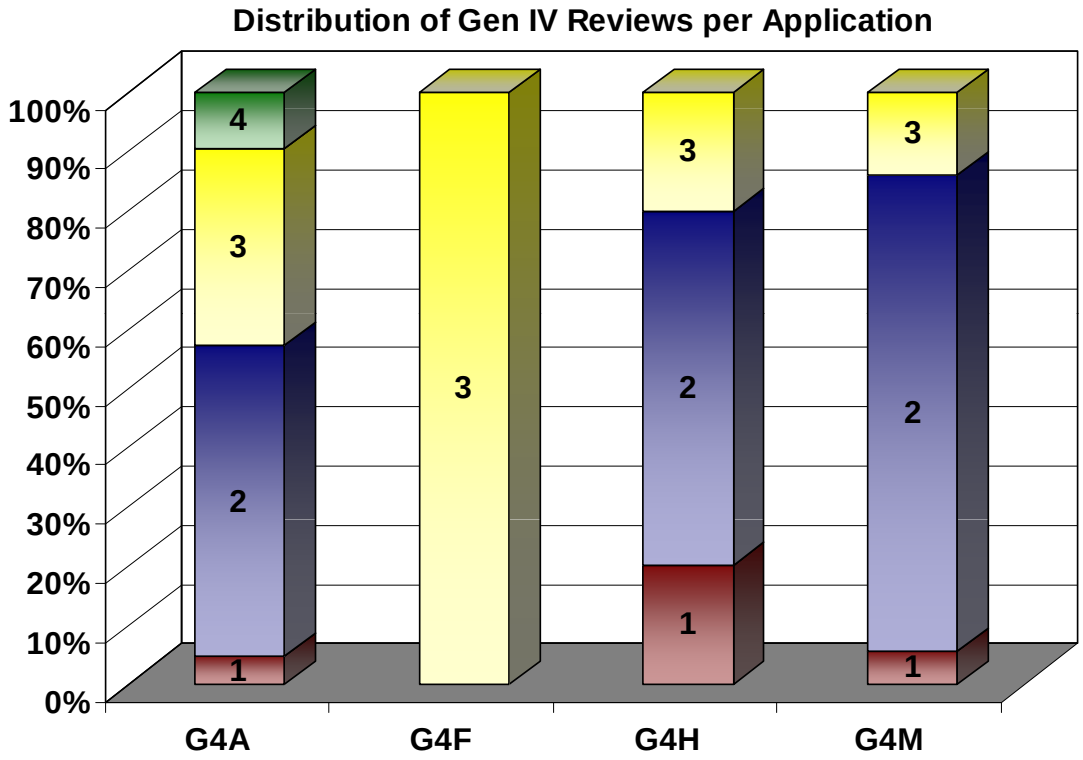
- NEUP followed a 3-step selection process
  - Semi-Blind Merit Review
    - Goal to achieve mix of reviewers for each application (lab, university, industry, other)
  - Proposal Selection
    - Selections were based on merit review scores and available funding in task
  - Balancing Review (if necessary)
    - Participation by minority institutions
    - Geographic distribution
    - Funding limits per proposal (Only an upper bound of $1.5M/proposal was used)

Review and Selection Process

- Semi-blind merit review process
  - Reviewers initially provided project narrative that excluded identifying information
  - Team capabilities and budget available after submitting first three responses
  - Final two questions based on detailed capabilities and budget files
  - Initial evaluation responses could not be modified once detailed information revealed

Merit Reviews

- Goal of 3 reviews per application
  - 146 had three reviews
  - 44 had two reviews
  - 4 had one review
  - 5 had four reviews
- All with fewer than 3 reviews were in Gen IV (except one in AFW)
- Incomplete reviews were deleted to support Selection Board meetings, resulting in the applications with one evaluation

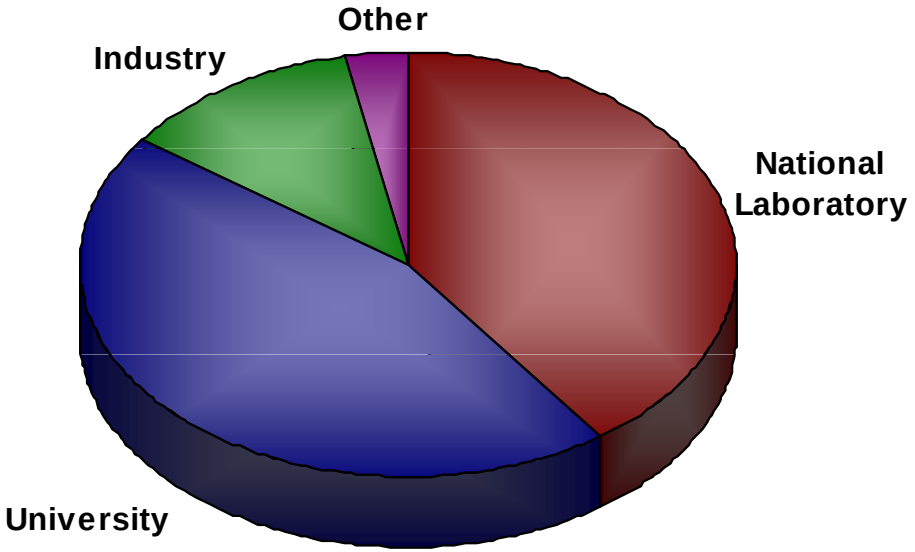


Merit Reviews

- 169 applications had at least two types of reviewers represented
- 15 had only national lab reviewers
- 13 only university reviewers
- 2 only industry reviewers

Merit Reviewers

- 267 individuals recruited as merit reviewers
  - 107 from national laboratories
  - 120 university professors
  - 32 from industry
  - 8 DOE and NRC
- Reviewers drawn from about 98 different organizations, including
  - 11 national laboratories
  - 57 universities
- Reviewers evaluated up to 5 proposals, performing an average of 2 each
- 550 total evaluations conducted



Selection Review Board

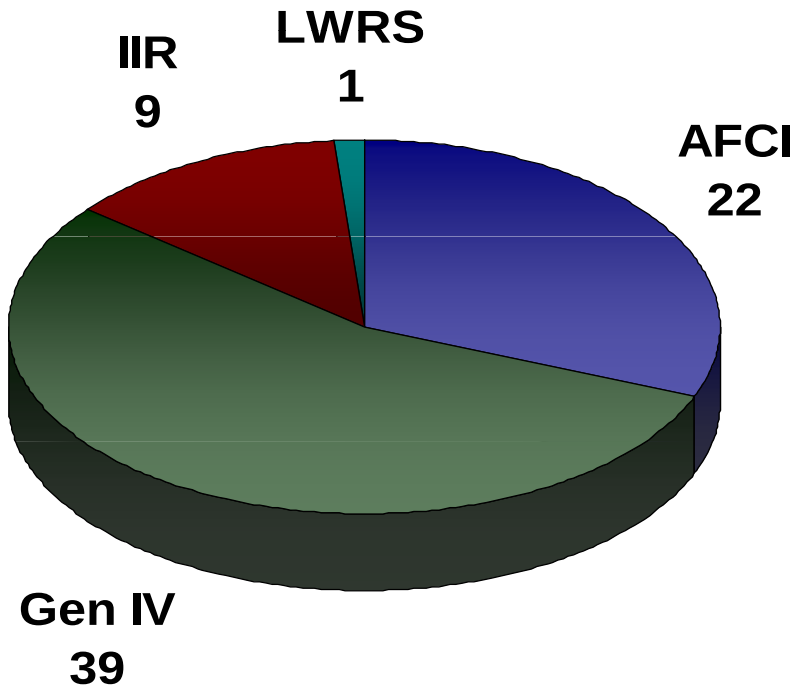
- Selection Board comprised of laboratory and DOE-NE leads for each area, chaired by NEUP
  - Considered merit review results for each application, addressing one work-scope at a time
  - Statistically significant deviations automatically flagged for more detailed examination
  - Except for outliers, selections within a given work code expected to parallel numeric merit scores

Selection Review Board

- Final selection review performed by NEUP with the initiative Directors
  - Considered initial selection recommendations across the entire NEUP program
  - Addressed additional balancing criteria

Proposals Selected

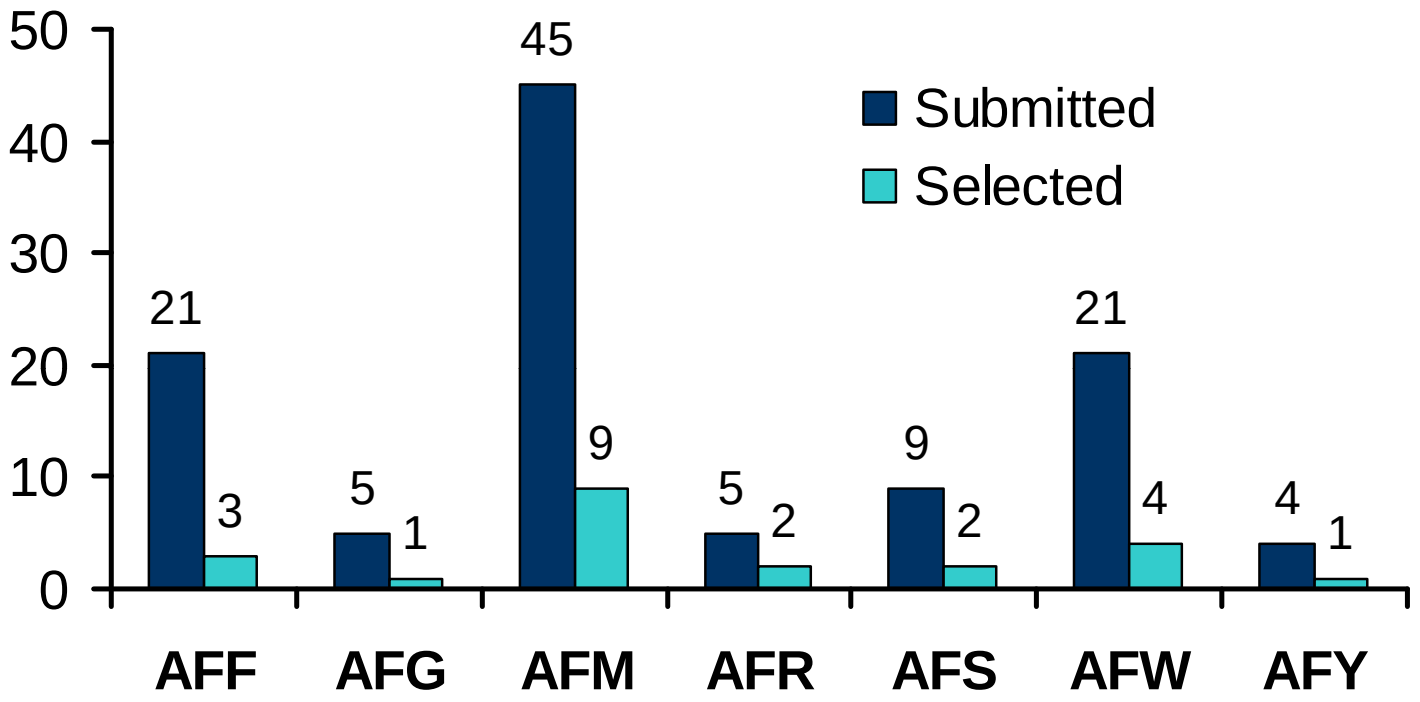
- NEUP selected a total of 71 proposals in AFCI, Gen IV, IIR, and LWRS



Selected Proposal Demographics

- Selected proposals are comprised of 31 lead universities
- 26 additional organizations are collaborating
  - 10 Universities
  - 7 National Laboratories
  - 4 Industry
  - 5 Foreign Institutions
- All participating organizations represent
  - 28 U.S. states
  - 5 Foreign Countries
  - 1 Minority Institution

AFCI



AFF – AFCI Fuels

AFG – AFCI Regulatory & Safety

AFM – AFCI Modeling & Simulation

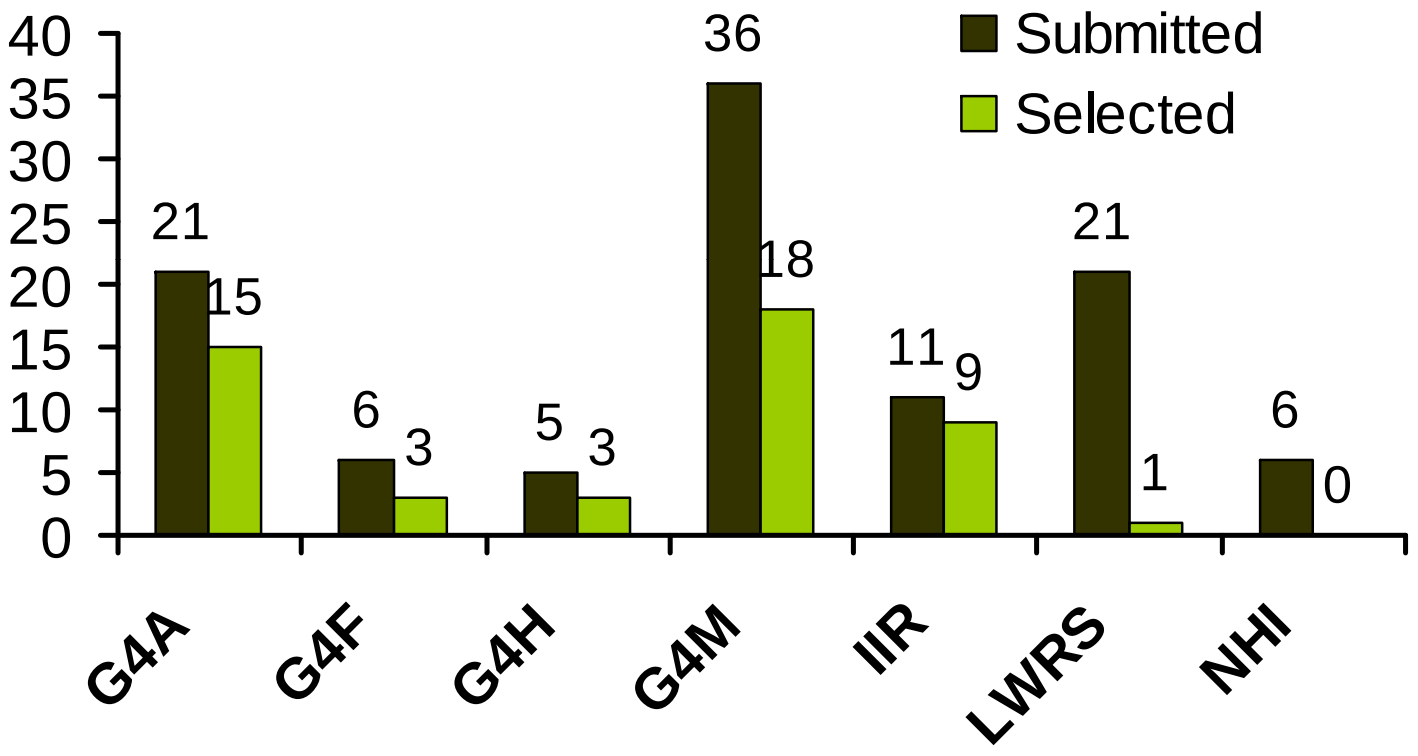
AFR – AFCI Reactors

AFS – AFCI Safeguards

AFW – AFCI Separations & Waste Forms

AFY – AFCI Systems Analysis

Gen IV, IIR, LWRS, NHI



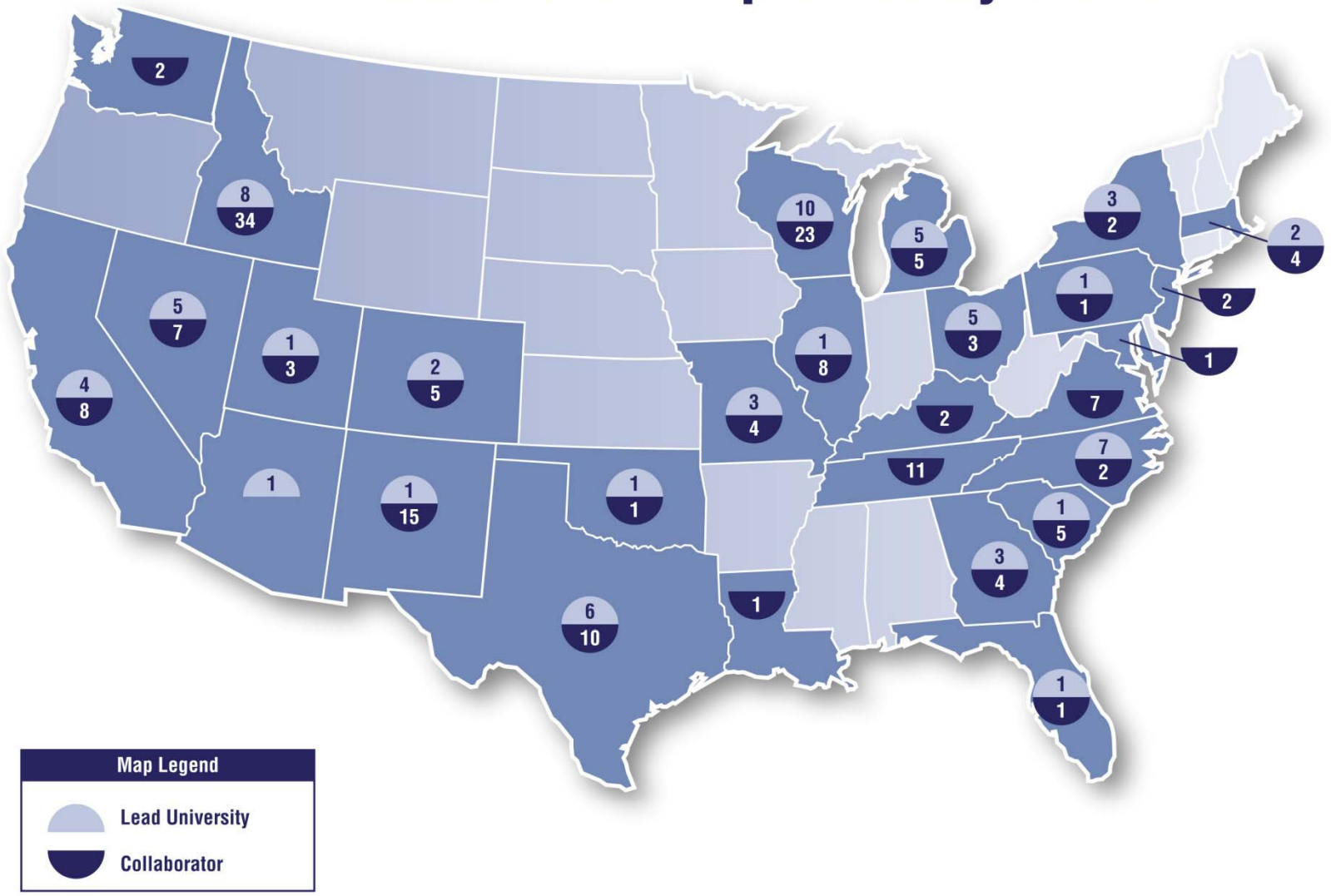
G4A – Gen IV Materials (NGNP)

G4F – Gen IV Fuels (NGNP)

G4H – Gen IV Heat Transport (NGNP)

G4M – Gen IV Methods (NGNP)

Selected Proposals by State



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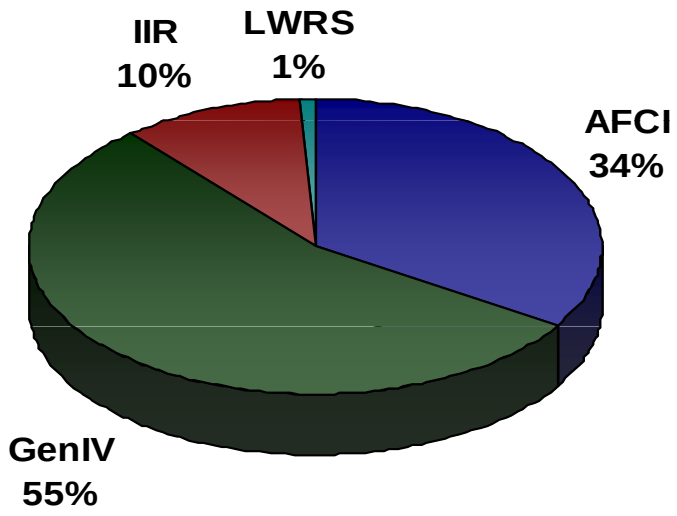
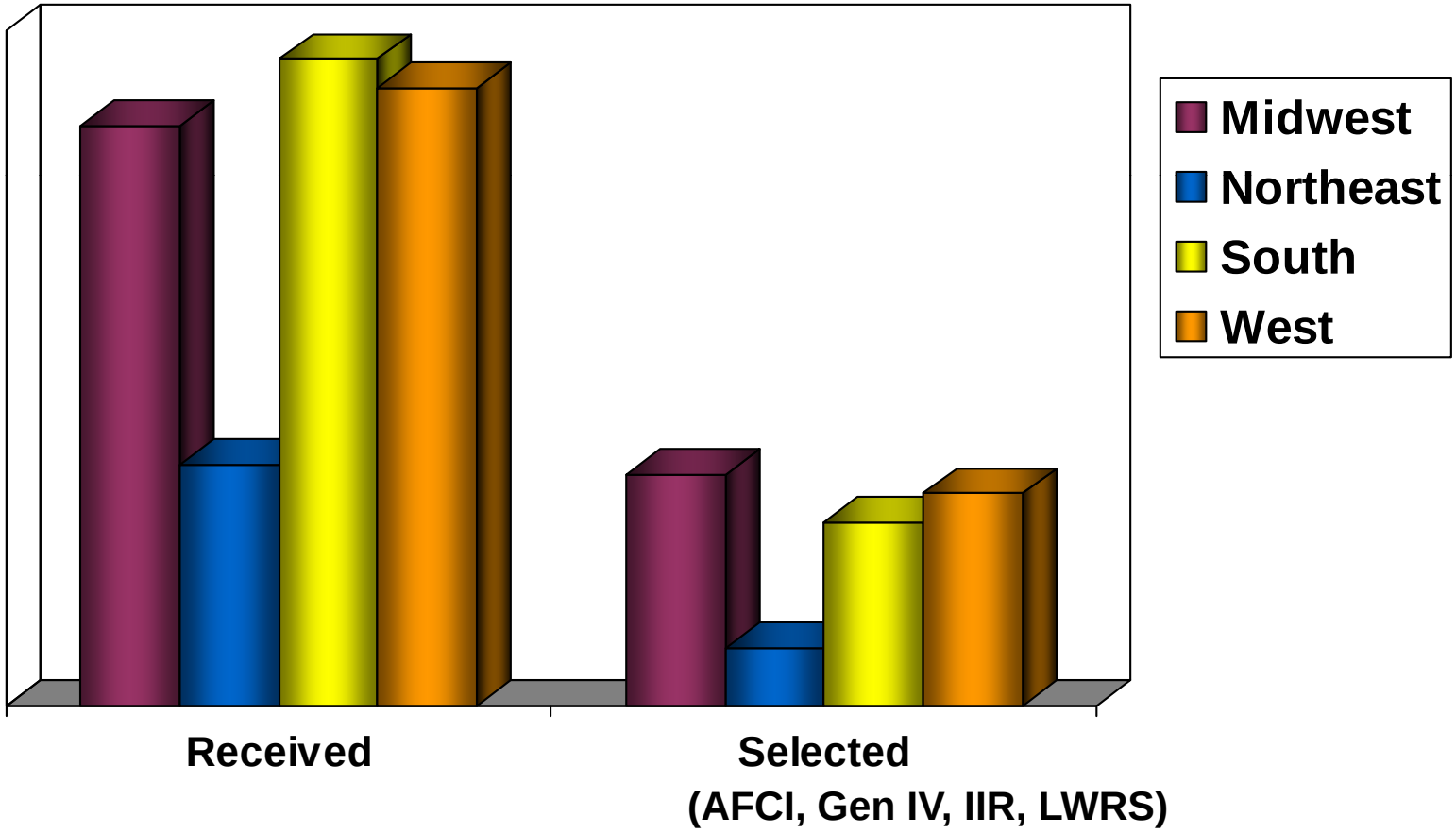
Funding for Selected Proposals

Initiative	No. Selected	Approved Funding for Selected Proposals
AFCI	22	$14,869,990
Gen IV	39	$24,209,549
IIR	9	$4,450,000
LWRS*	1	$400,000
NHI*	0	($370,000)
Total	**71**	**$43,929,539**



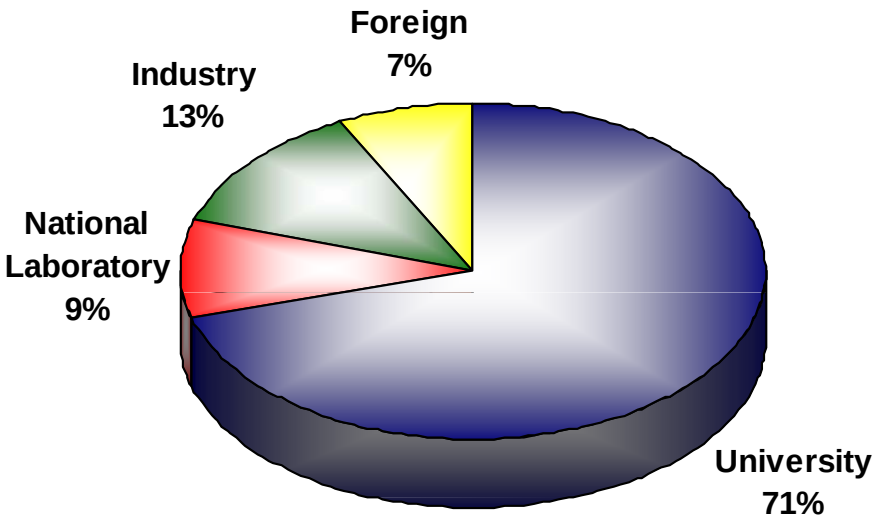
***Five NHI proposals and two additional LWRS proposals are favorable for selection if funding becomes available**.

Proposals by Region (Lead University)

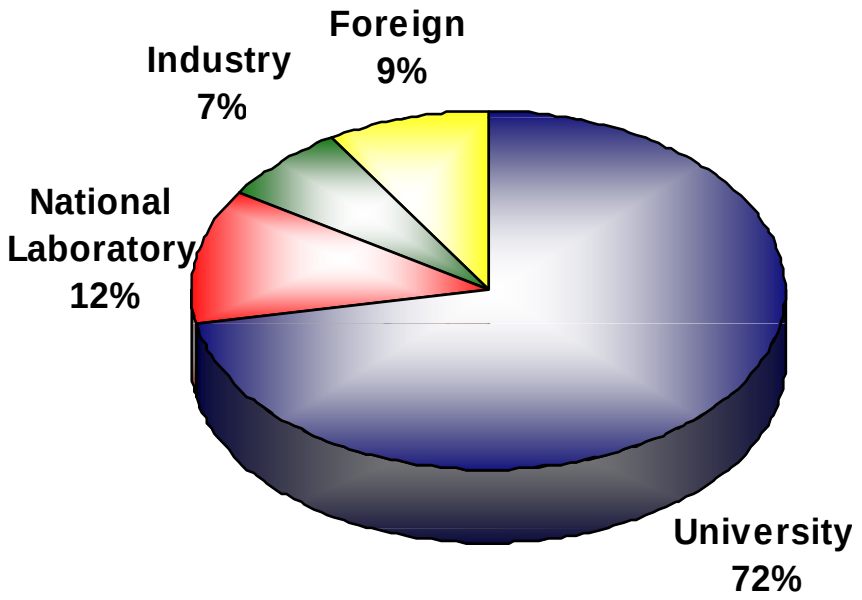


Organizational Involvement

Applications Received



Selected



Proposal Success Rates

- Overall – Awards/Submissions – 33%
- NUC-Idaho Universities – 38%
- Top 8 Universities(non NUC-Idaho) – 41%
- Universities with Nucl Engr – 35%
- Of 54 submitting lead Universities, 31 received funding

Fellowship & Scholarship Solicitation

- Process:
  - A collaborative effort between CAES and DOE-ID to allow awarding of grants
  - “Financial Assistance Funding Opportunity Announcement” (FOA) from DOE-ID issued April 2nd
  - FOA issued for university participation, a separate request for students to apply was Released April 22th
  - University must have a Cooperative Agreement with DOE-ID for students to be able to receive fellowships and scholarships
  - Cooperative Agreements with universities issued by DOE-ID
  - Deadline for Student Applications – May 22
  - FOA Submission Deadline – May 4th.
  - Award announcements – June 15 at ANS meeting

Scholarships and Fellowships-FOA

- DOE-ID issued a Funding Opportunity Announcement for Universities and Colleges with courses or programs in NE Science and Engineering to provide documentation of their programs and agree to accept Scholarships and/or Fellowships through NEUP
  - They were not to charge overhead
  - Must have a documented current program
  - Essentially a pass/fail decision
  - 54 applications
  - Panel Review
    - Kenny Osborne, DOE-ID
    - Ingrid Milton, DOE-HQ
    - Marsha Lambregts, NEUP

Scholarships and Fellowships- Cooperative Agreements

No.	Name of College or University	No.	Name of College or University
1	Boise State University	20	University of Colorado
2	Clemson	21	University of Florida
3	Colorado School of Mines	22	University of Idaho
4	Georgia Technical University	23	University of Illinois
5	Idaho State University	24	University of Maryland
6	Illinois Institute of Technology	25	University of Michigan
7	Kansas State University	26	University of Missouri, Columbia
8	Marion Francis University	27	University of Nevada, Las Vegas
9	Massachusetts Institute of Technology	28	University of New Mexico
10	Missouri University Science & Technology	29	University of Pittsburgh
11	North Carolina State University	30	University of South Carolina
12	Northwestern University	31	University of Tennessee
13	Ohio State University	32	University of Texas, Arlington
14	Oregon State University	33	University of Texas, Austin
15	Pennsylvania State University	34	University of Washington
16	Purdue University	35	University of Wisconsin
17	Rensselaer Polytechnic Institute	36	Virginia Polytechnical Institute and State University
18	Texas A&M University/Texas Engineering Experiment Station	37	Washington State University
19	University of California, Berkeley	38	Wilberforce University

Scholarship and Fellowship - RFA

- NEUP requested applications for Scholarship and Fellowship applicants
  - Scholarship applicants requirements:
    - US Citizen
    - Beyond first year in college
    - Enrolled in FOA accepted College or University
    - Field of study of interest to NE
  - Fellowship Applicants Requirements:
    - US Citizen
    - Enrolled in FOA accepted College or University
    - Field of study of interest to NE

Scholarship and Fellowship

Review Panel:

- Dr. John Gilligan, NEUP Director (NE)
- Dr. Andrew Klein, INL (NE)
- Dr. Marsha Lambregts, NEUP (Chemist)
- Ingrid Milton, DOE-HQ
- Kenny Osborne, DOE-ID

Scholarships - Review

- From the RFA: *"What is the intellectual merit of the proposed activity? How does it further the goals of the Nuclear Energy University Program?"*
  - To evaluate the intellectual merit criterion, panelists considered: 1) the strength of the academic record, 2) references, 3) ACT or SAT scores, and 4) the appropriateness of the choice of institution relative to the proposed plan for education.

Quotes from Applications

- “I can honestly cite Star Trek as a major reason that I got into engineering in the first place.”
- “I was able to convince most of the class that nuclear energy is not that bad of an idea with only the 9 minutes I had at my disposal.”
- “What a dream come true for me if I could work at a nuclear power plant close to home”
- “Most students don’t spend their summers writing nuclear power reports for their mother…”

Fellowships - Review

- **From the RFA**:
  - *What is the intellectual merit of the proposed activity?*
    - To evaluate the intellectual merit criterion, panelists will consider: the strength of the academic record, the proposed plan of research, the description of previous research experience, references, Graduate Record Examinations (GRE) General and Subject Tests scores, and the appropriateness of the choice of institution relative to the proposed plan for graduate education and research.
  - *What are the broader impacts of the proposed activity?*
    - To help panelists evaluate the broader impacts criterion, applicants should provide characteristics of their background, including personal, professional, and educational experiences, to indicate their potential to fulfill the broader impacts criterion.

Fellowship Quotes

- “To educate the public about Nuclear Energy is one of the most important aspects that I enjoy about being a Nuclear Engineer.”
- “I want to do something that not many people can do…this statement defines who I am as a person, I want to do something in life that impacts the world and the way we live.”
- “I think it would be the coolest thing ever to work on a GEN-IV plant and actually see that design go into commercial production!”
- “To be a snowflake in the avalanche”
- “My interest in chemistry was sparked by an early exposure as a child when my grandfather would drive me to school and tell me stories about his days working as a laboratory assistant for Shell Oil”
- “When I told my mother that I was going to school to be a nuclear engineer, she got upset and started crying because she thought I was going to be developing nuclear weapons. She was happier after I explained that I wanted to work on nuclear power plants not weapons, but this also showed me that there were some significant public perception problems with this industry.”

Infrastructure Solicitation (~$6M)

- **Process**
  - A collaborative effort between CAES and DOE-ID to allow awarding of grants
  - “Financial Assistance Funding Opportunity Announcement” (FOA) from DOE-ID mechanism
  - Grants to be issued by DOE-ID
  - FOA released – March 11
  - Submission Deadline – April 15
  - Award announcements – June 15 at ANS meeting

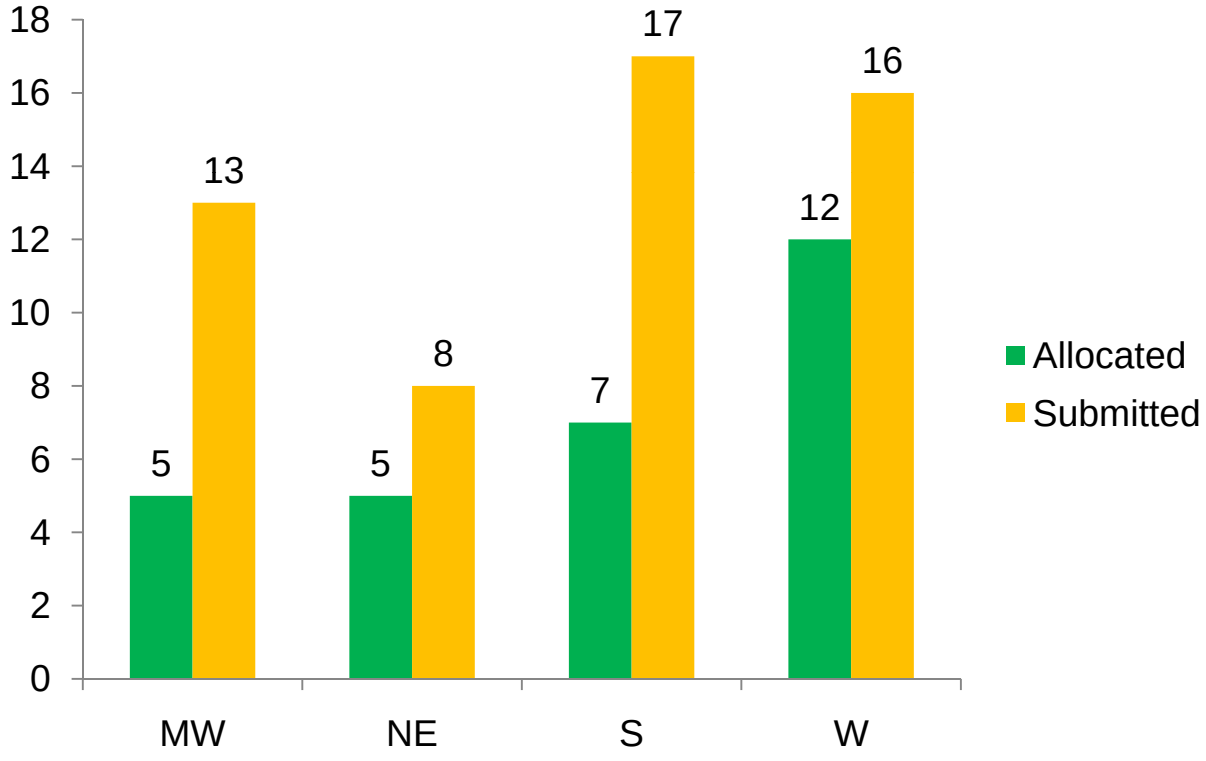
Infrastructure

- 54 Submissions from universities in 32 states requested $12,358,885
- 28 Proposals were chosen by panel review for $6,039,416
- Panel Makeup:
  - Dr. Harold McFarlane, AFCI
  - Dr. Hans Gougar, GEN IV
  - Dr. Marsha Lambregts, NEUP
  - Ingrid Milton, DOE-HQ
  - Kenny Osborne, DOE-ID

Infrastructure

- Review panel rated projects based upon two criteria:
  - overall application merit (including programmatic alignment) and educational aspects (0-6)
  - Utilization (0-4)
- Projects with combined scores of 6.5 or higher were recommended for funding.

Infrastructure-Regional Distribution



NEUP is Implementing an Objective, Fair and Transparent Process and Program

- Open competition for R&D with independent reviews
- Integration of university and laboratory research
- Increased outreach and integration including
  - Town hall styled meetings at Universities
  - Outreach through relevant technical meetings and forums such as ANS, NEDHO, TRTR, HPS, CONTE
  - Integration of NERI and NEUP workshops

"The next generation of nuclear power plants – with the highest standards of safety, efficiency and environmental protection – will require the latest advancements in nuclear science and technology. These research and development university awards will ensure that the United States continues to lead the world in the nuclear field for years to come."

Secretary Chu

Continuous Improvement

- Feedback from survey (in design)
- NEUP Meetings (ANS and Program Review: August 11-14 in Salt Lake City)
- NEUP Advisory Group (in formation)
- Meetings with NEAC, NEDHO, TRTR, others
- Integration with Labs, other agencies, industry