Network for Earthquake Engineering Research: A Model for Offshore Wind Energy Research?
NEES will be a collaboratory, i.e., an integrated experimental, computational, communications, and curated repository system, developed to support collaboration in earthquake engineering research and education. Through NEES, the earthquake engineering community will be catalyzed to utilize its advanced experimental capabilities to test and validate more complex and comprehensive analytical and computer numerical models that will improve the seismic design and performance of our Nation’s civil and mechanical systems.
## Network for Earthquake Engineering Simulation (NEES)

### Construction ($82 M)$:
- NEES Consortium, Inc.
- NEESgrid Cyberinfrastructure
- 15 NEES Equipment Sites

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### Maintenance & Operations by NEESInc

### NSF-Funded NEES Research (NEESR)

### Education, Outreach & Training

### International Partnerships
Network for Earthquake Engineering Simulation (NEES)

Broad Range of National Testing Facilities and Equipment Resources
Network for Earthquake Engineering Simulation (NEES)

Large Shake Table at the University of California San Diego
MDOF Shake Tables at the State University of New York at Buffalo
Geotechnical Centrifuge at the University of California Davis
Network for Earthquake Engineering Simulation (NEES)

Lifelines Test Facility at Cornell
Network for Earthquake Engineering Simulation (NEES)

Tsunami Wave Basin at Oregon State University
Network for Earthquake Engineering Simulation (NEES)

Mobile Structural Identification/Assessment Equipment UCLA
Network for Earthquake Engineering Simulation (NEES)

Univ. of Illinois Component Test Facility for System-Level Studies
Some Things are Too Big to Test at Reasonable Scale in Labs
Network for Earthquake Engineering Simulation (NEES)

Univ. of Illinois Component Test Facility for System-Level Studies
Network for Earthquake Engineering Simulation (NEES)

Univ. of Illinois Component Test Facility for System-Level Studies
Network for Earthquake Engineering Simulation (NEES)

Impact Assessment

Site Response

Hybrid Simulation

Instrumentation

System-Level Testing Advances Regional-Level Assessments
Network for Earthquake Engineering Simulation (NEES)
NSF states intent to “play a leadership role”

- NSF will play a leadership role in the development and support of a comprehensive cyberinfrastructure essential to 21st century advances in science and engineering research and education.
- NSF is the only agency within the U.S. government that funds research and education across all disciplines of science and engineering. ... Thus, it is strategically placed to leverage, coordinate and transition cyberinfrastructure advances in one field to all fields of research.

From NSF Cyberinfrastructure Vision for the 21st Century Discovery
Network for Earthquake Engineering Simulation (NEES)

Cyberinfrastructure is a First-Class Tool for Science & Engineering
Special Elements of NEES

- Size of Financial Investment (> $400 million in 14 yrs)
- First Major Research Equipment Grant in Engineering
- Distributed Networked Facilities
- Real Time Sharing of Experimental and Computational Data
- Integration of Computational and Analytical Research
- Sophisticated Protocols and Visualization Tools for Data
- Created Open Repository of Dense Test Data
- Focus on Development and Validation of Numerical Models
- Multi-Disciplinary
- Supported Transformation to Fully-Probabilistic Approach to Design and Assessment, and of Performance-Based Design
- Inspired Other Countries/Regions to Do Similar
World Forum on Collaborative Research in Earthquake Engineering

1st Phase

Myongji University
Real Time Hybrid Testing Facility for Multi-DOF Structural Systems

Chonbuk National University
Wind Tunnel Facility for Large Scale Long Structures

Yosu University
Ocean Environment Simulation Facility

KAIST
Dynamic Geo-Centrifuge Facility

Keimyung University
Large Scale Testing Facility for New Advanced Construction Materials

Pusan National University
Multi-Support Excitation Facility for Earthquake Simulations
Importance of EE in the Europe and in EU programs

16 shaking tables
6 reaction walls
8 centrifuges

(From CASCADE 2005)