Foci for an Innovation Ecosystem

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Characteristics of the Innovation Ecosystem

- University is key driven by industrial needs
- Faculty involved along the continuum
- A focus on translational research smoothes handoff of Technology

NSF Resources for the innovation Ecosystem

- Grow existing portfolio & strengthen translational phase
- Extend the reach of industry driven initiatives
- Better understand the social dimensions of innovation (SciSIP)

Innovation

- There are numerous innovative definitions of Innovation
- There are multiple elements in the Innovation Process
- For purposes of THIS presentation:

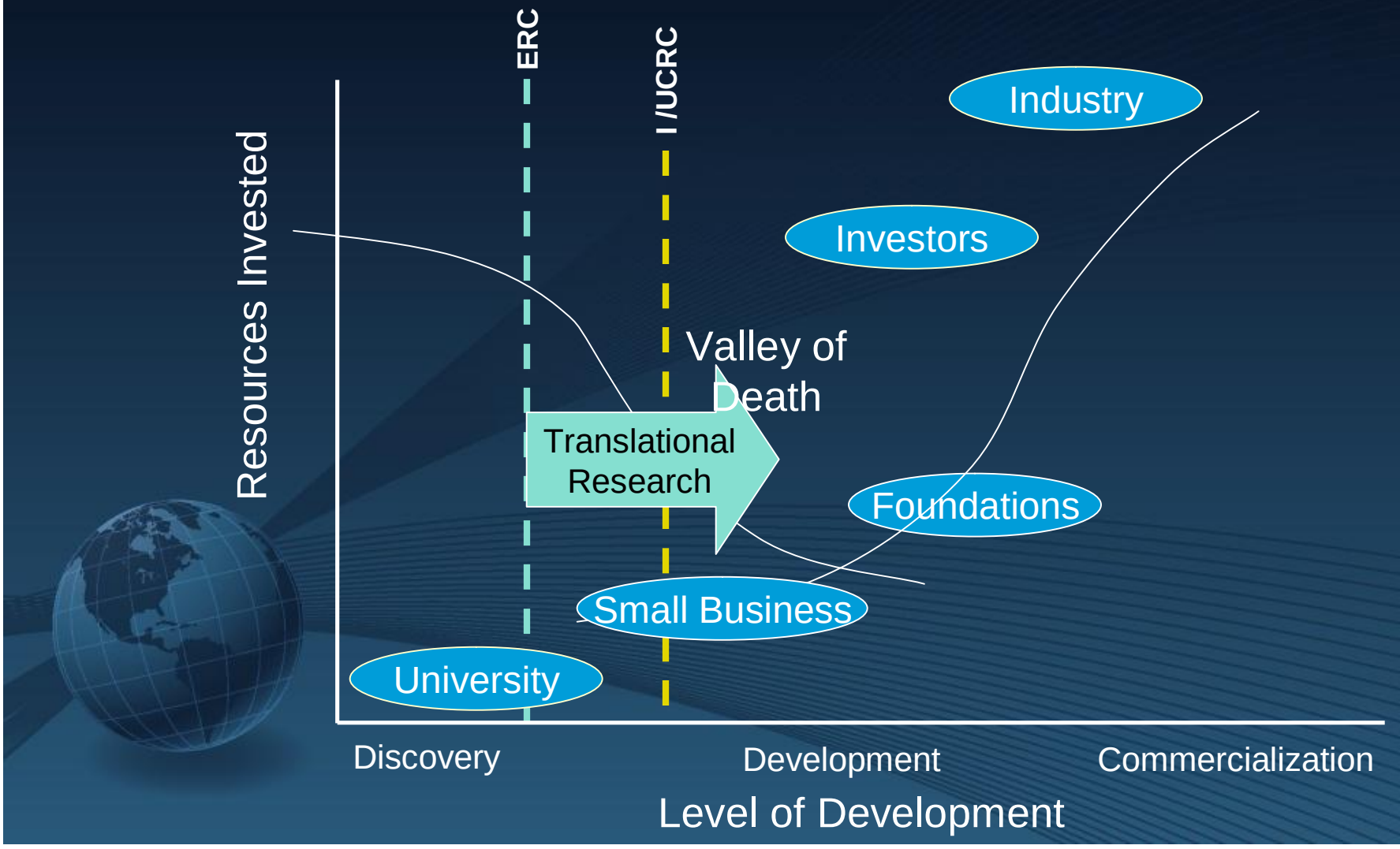
  Focus on **NSF-funded research** that has led to direct, **quantifiable economic benefit** (a product, process, practice, service, social change)

Innovation

- Engineering Research Centers
- Industry/University Cooperative Research Centers
- Partnerships for Innovation
- Small Business Innovation Research/Small Business Technology Transfer

The leaves of *Artemisia annua*, the sweet wormwood tree, are the source of artemisinin. *Credit: Lawrence Berkeley National Laboratory*

The Innovation Spectrum



Innovation Through Translational Research

Translational Research

- Is interdisciplinary by nature
- Involves a team
- Relies on partnerships
- Results in clear benefit to society

NSF Programs for Translational Research

- Science and Technology Centers (STC)
- Engineering Research Centers (ERC)
- Materials Research Science and Engineering Centers (MRSEC)
- Grant Opportunities for Academic Liaison with Industry (GOALI)
- Industry/University Cooperative Research Centers (I/UCRC)
- Partnerships for Innovation (PFI)
- Small Business Technology Transfer (STTR)
- Small Business Innovation Research (SBIR)
- Nanoscale Science and Engineering Center (NSEC)
- Nanoscale Interdisciplinary Research Teams (NIRT)
- Emerging Frontiers of Research and Innovation (EFRI)
- Other ENG programs

Some Concrete Examples

- SBIR/STTR – Individual awards
- ERC's & IUCRC's
- MRSEC's
- STC's
-

Arkansas SBIR/STTR Experience 2007-2009

- 20 Awards
- 12/20 SBIR
- 8/20 STTR
- Funding - $ 4.25 Million
- 15 Awards in Fayetteville

PFI Star

PFI: Commercialization of Advanced Composites in Offshore Wind Energy

Highlight ID: 20402, Version: AC/GPA

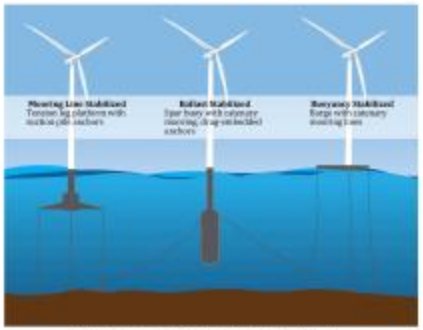


Figure 1: Floating Turbines Concepts

Credit: (Butterfield et al., 2005)

Image Provided by:
christopher.boynton@umit.maine.edu

Floating deepwater wind farms placed 10+ nmi offshore can play a critical role in reaching the DOE 20% goal, as they overcome viewshed issues that have delayed or prevented son nearshore projects, place energy generation closer to major US population centers on the east and west coasts, allow access to a more powerful Class 6 and 7 wind resource, and, over time, reduce wind energy costs by reducing transmission costs from remote land sites and by simplifying deployment and maintenance logistics. Deepwater wind is the dominant U.S. ocean energy resource, representing a potential of nearly 3,100 TW-h/year, comparec to a U.S. electricity use of nearly 3,500 TW-h/year.

To accelerate the development and deployment of floating offshore wind turbine platforms, UMaine's interdisciplinary research center - AEWC Advanced Structures and Composites Center - will lead an Innovation Team. This team will focus on the development of a scale-model test program that will accomplish the following objectives: (a) experimentally validate the National Renewable Energy Laboratory (NREL) computer loading models, and (b) refine and demonstrate new composite technology. The Innovation Team will fabricate a partial-scale floating wind turbine platform using RFCS, and will test this platform in a wave tank. Test data will be compared to NREL model outputs, and if necessary the models will be revised. The validated computer load models will then be in the public domain, which should significantly accelerate the development of floating offshore wind turbine platforms i Maine and elsewhere.

Primary Strategic Outcome Goal: Discovery

Engineering

Secondary Strategic Outcome Goals:

Does this highlight represent potentially transformative research? *If so, please explain why. For more information, see Report to Congress: Transformative Research at the National Science Foundation, April 16, 2007 and Important Notice 130: Transformative Research*

Yes

Core Key Features of Centers

- Culture that joins research, education and innovation
- Develop a diverse, globally competitive workforce
- Produce creative and innovative practitioners to lead teams
- Leverage NSF funds to support industry relevant research
- Partnership with industry to speed implementation & Tech Transfer

Summary of NSF Centers

	ERC	I/UCRC	MRSEC	STC
LEAD	23	53	31	17
PARTNERS	50	135	19 groups	63

I/UCRC for Engineering Logistics and Distribution (CELDi)

- Collaboration between Univ. of Arkansas and Sam's Club
- Created an Excel-based simulator to replicate the functionality of the Sam's Club inventory and logistics software
- Resulted in more than 4% reduction in inventory costs in categories where applied

Sam's Club

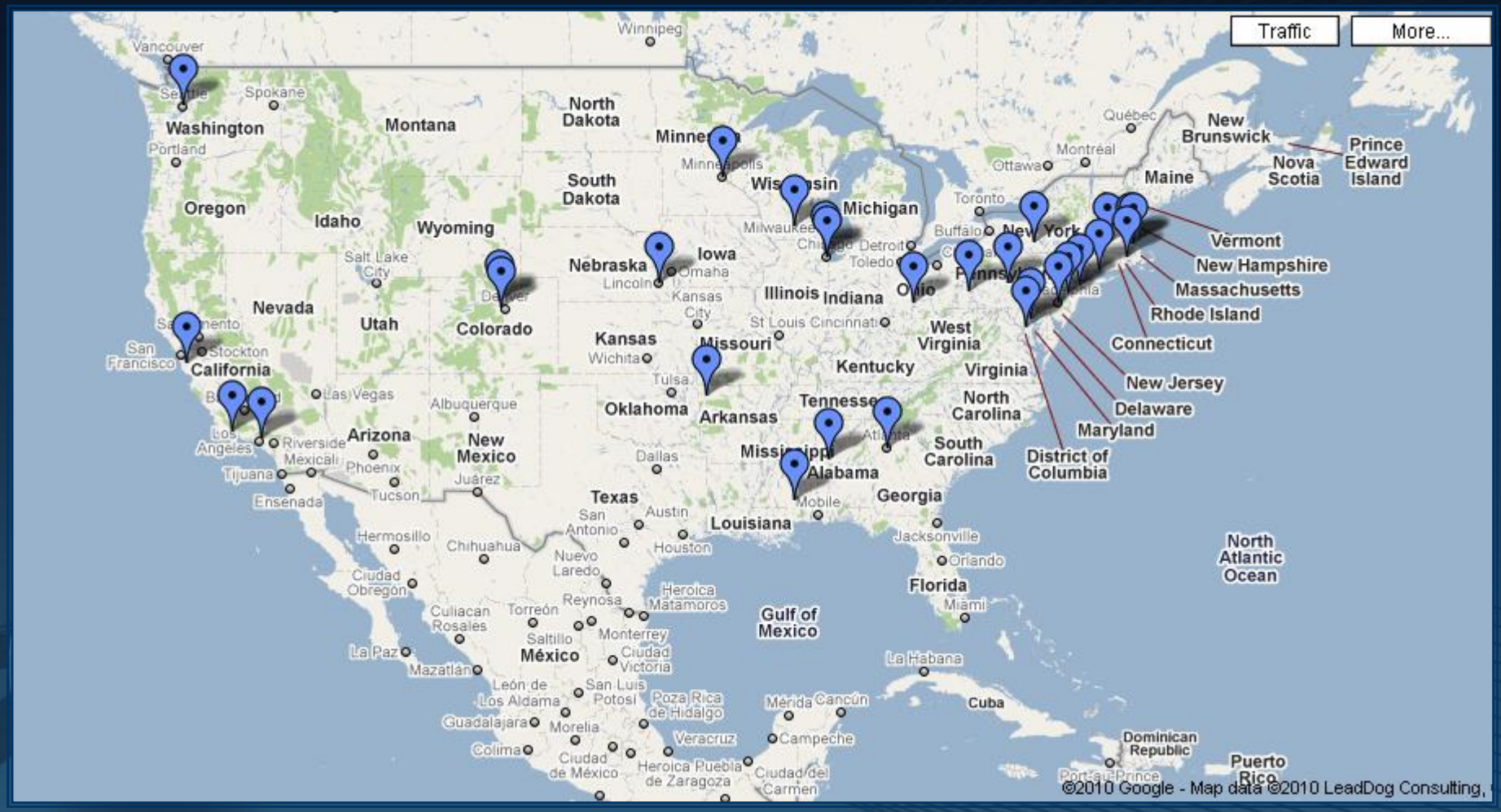
Sam's Club: When complete, cost savings from inventory reductions could be as much as **$70M annually**.

All Technology Sectors

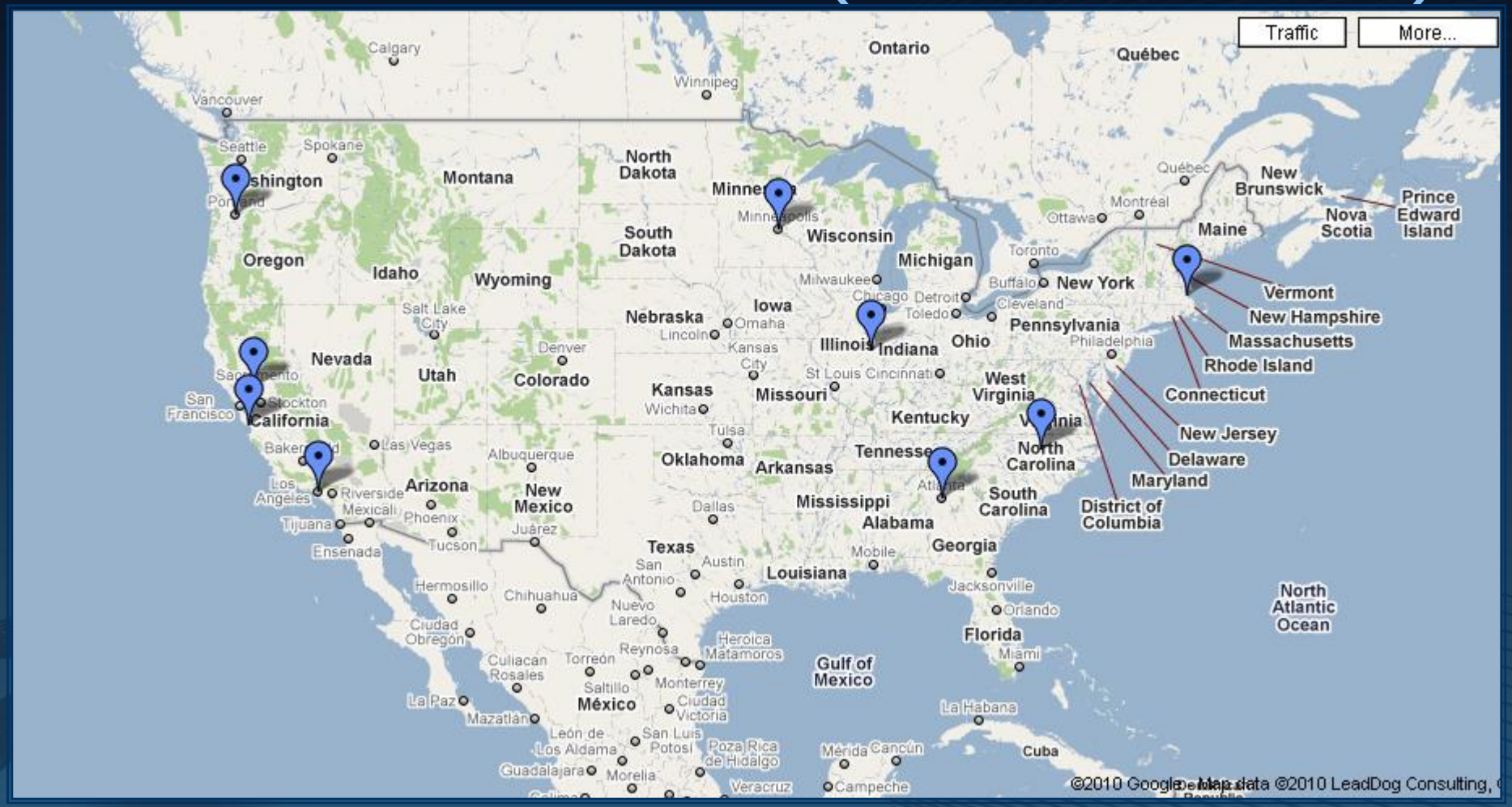
Lead Institution shown

- Advanced Electronics (13)
- Advanced Manufacturing and Fabrication (10)
- Advanced Materials (4)
- Biotechnology, Healthcare and Service (16)
- Energy, Sustainability, and Infrastructure (15)
- Information, Communication, and Computing (10)

MRSECs (Lead Institutions)



Science and Technology Centers (Lead Institution)



Magnetic Resonance Imaging

- STC for Magnetic Resonance Technology for Basic Biological Research at UIUC established in 1991
- PI Paul Lauterbur discovered the possibility of creating a two-dimensional image by producing variations in a magnetic field

Lauterbur was awarded a **Nobel Prize** in 2003 for discoveries leading to magnetic resonance imaging.

ERC, I/UCRC, MRSEC, STC (Lead Institutions)

Educate to Innovate

Thank you