



THE OHIO STATE UNIVERSITY

DISRUPTING OHIO STATE, THE NATION AND THE WORLD

Framing non-traditional research development
strategies with global impacts

Marty Kress,
Assistant VP for Research



Outline

Context

Case studies

- a. Discovery Themes
- b. Manufacturing Initiatives
- c. Shale Energy Environmental Laboratory
- d. Global Water Initiative

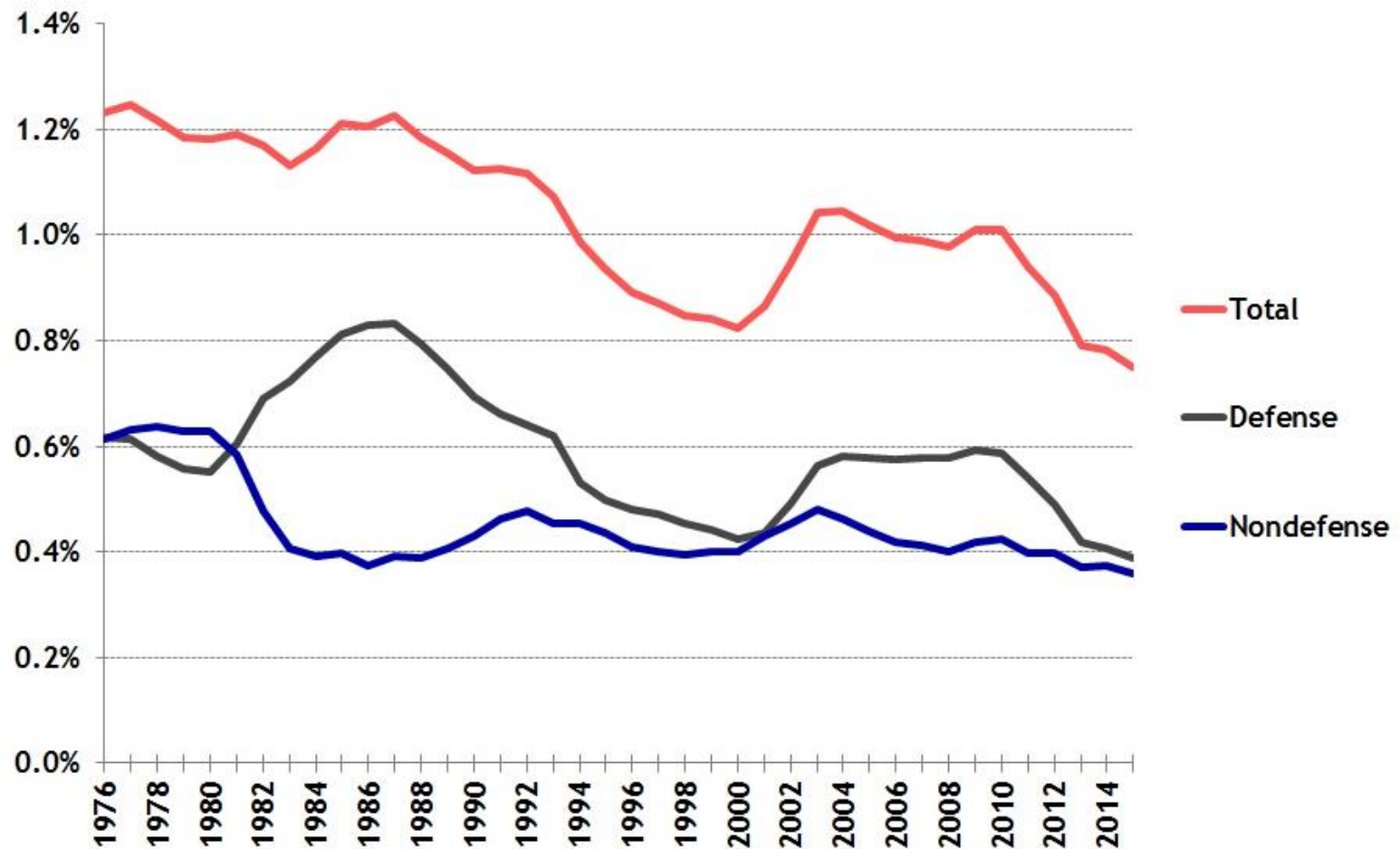
Lessons, victories, wishes



CONTEXT

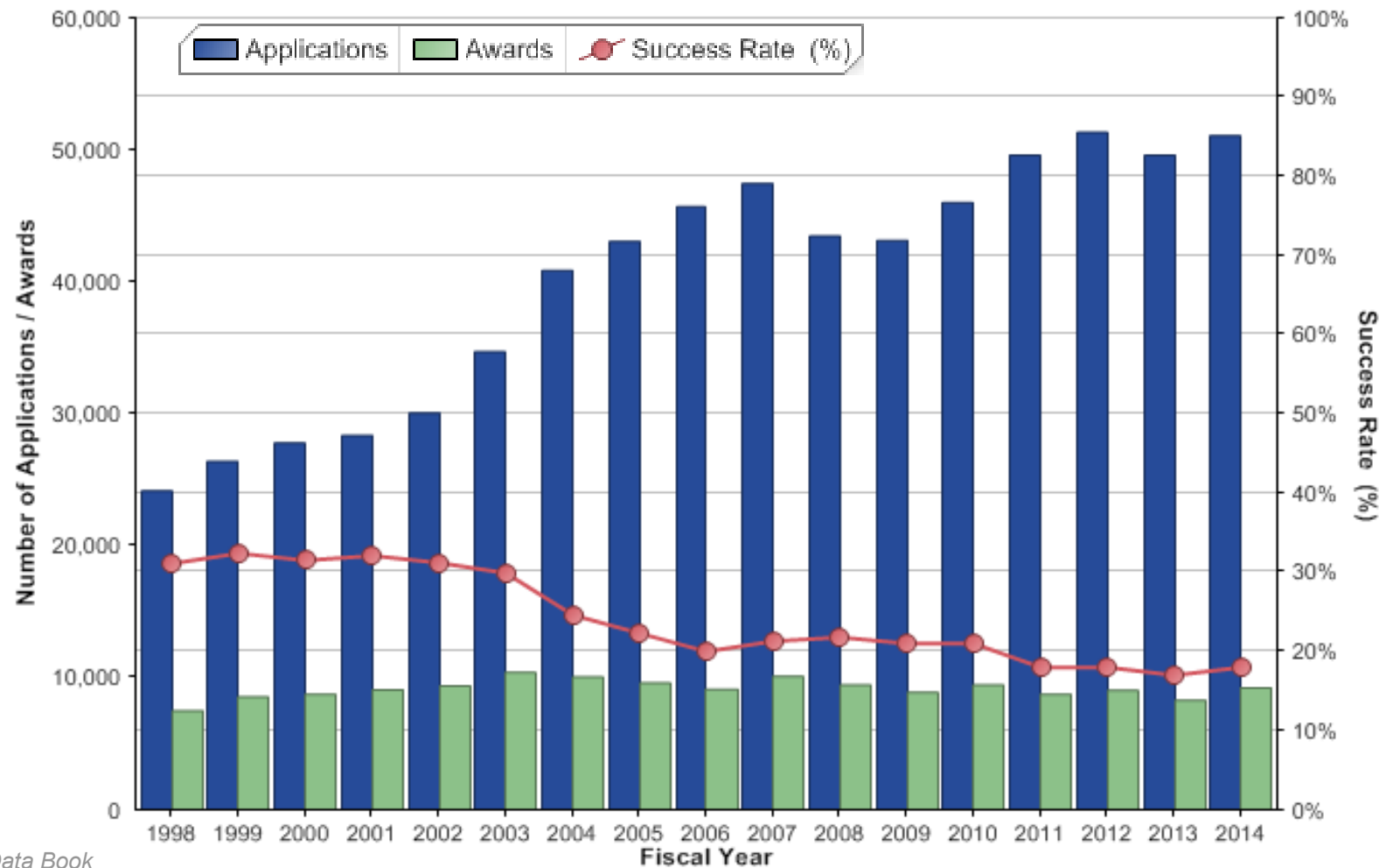


Trends in Federal R&D as percentage of GDP





NIH research project grant success rates





Industry partnerships in transition

Grants → Contracts

Reports → Deliverables

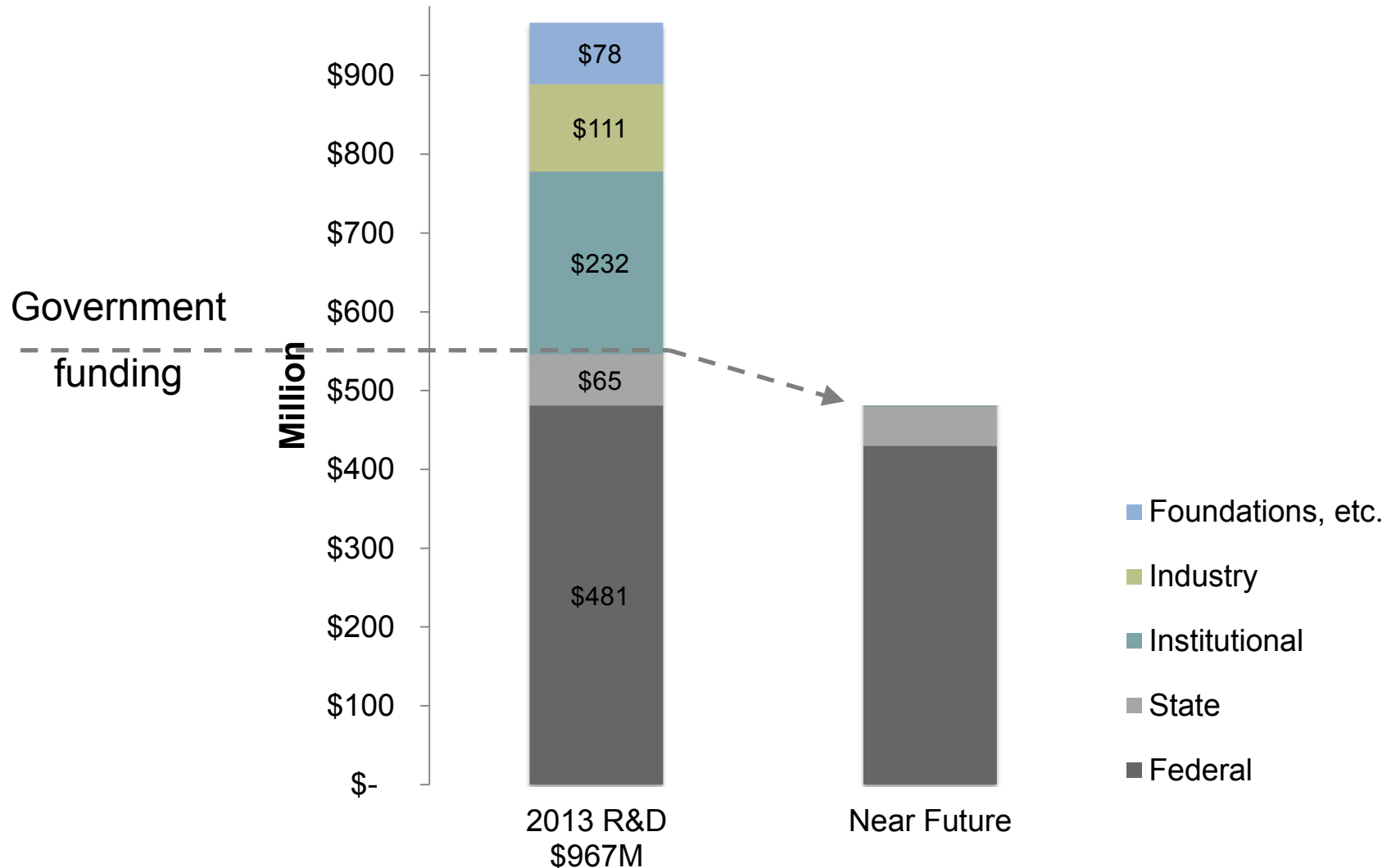
Transactions → Strategic relationships

Driven by near-term customer requirements

Companies shedding university R&D partnerships

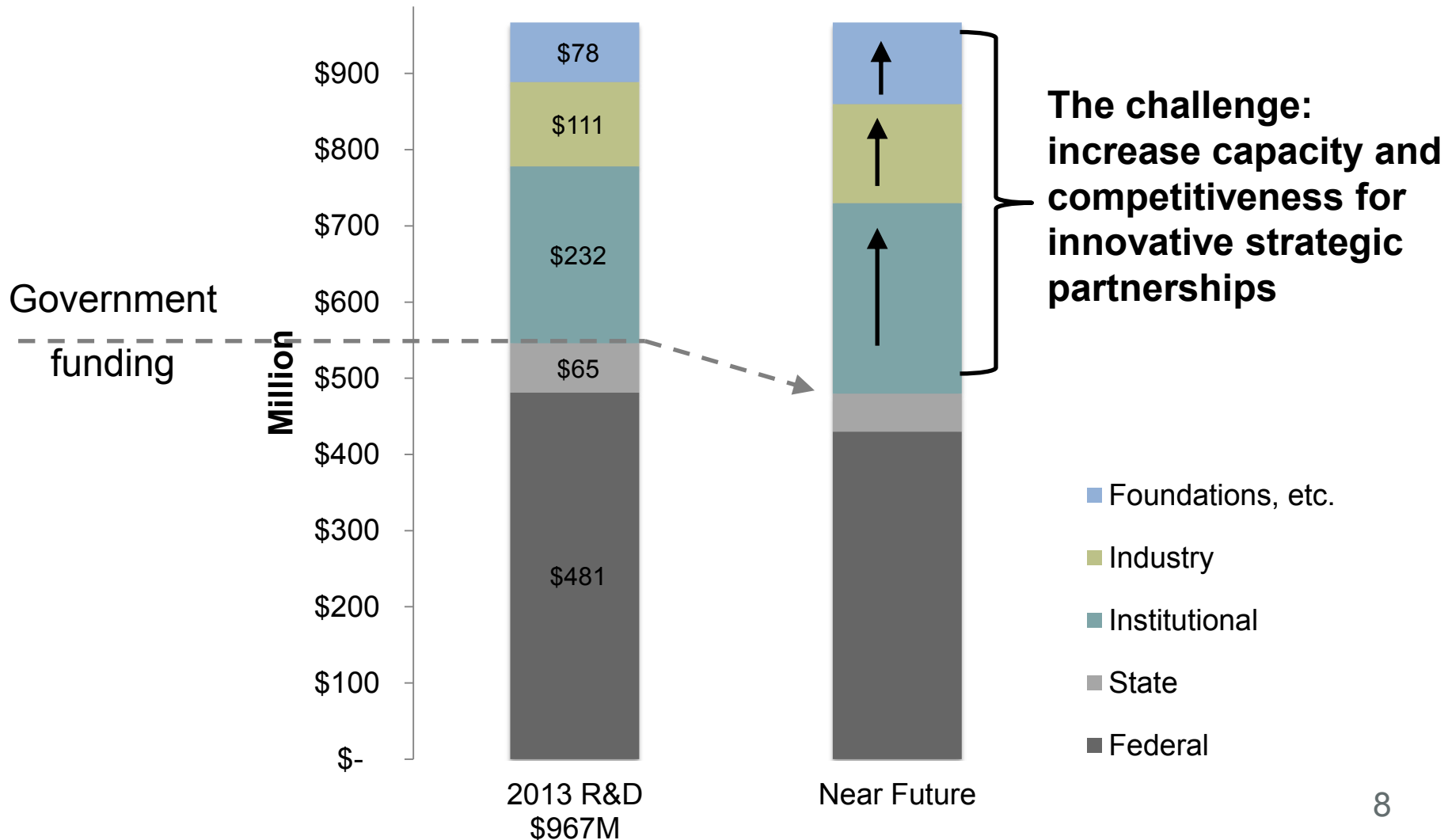


Something's gotta change...



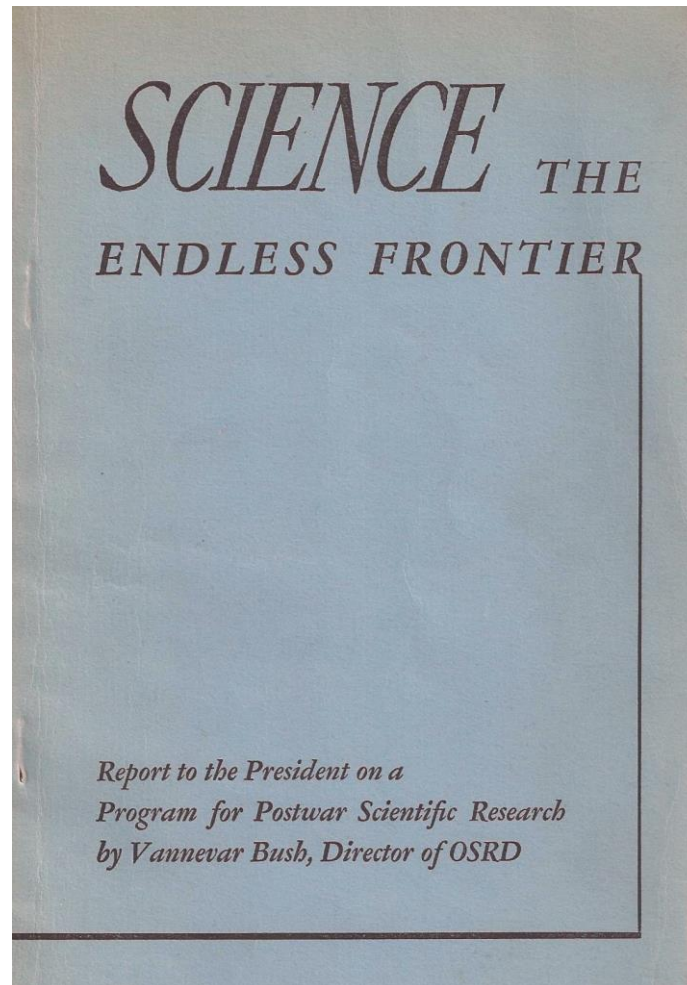


The challenge





Time for version 2.0



Options



- 1. Stay the course, hope it changes
- 1. Revector but keep current activity mix
- 1. Continuous adaptation: new innovation cells



CREATING THE UNIVERSITY OF THE FUTURE

Case Studies



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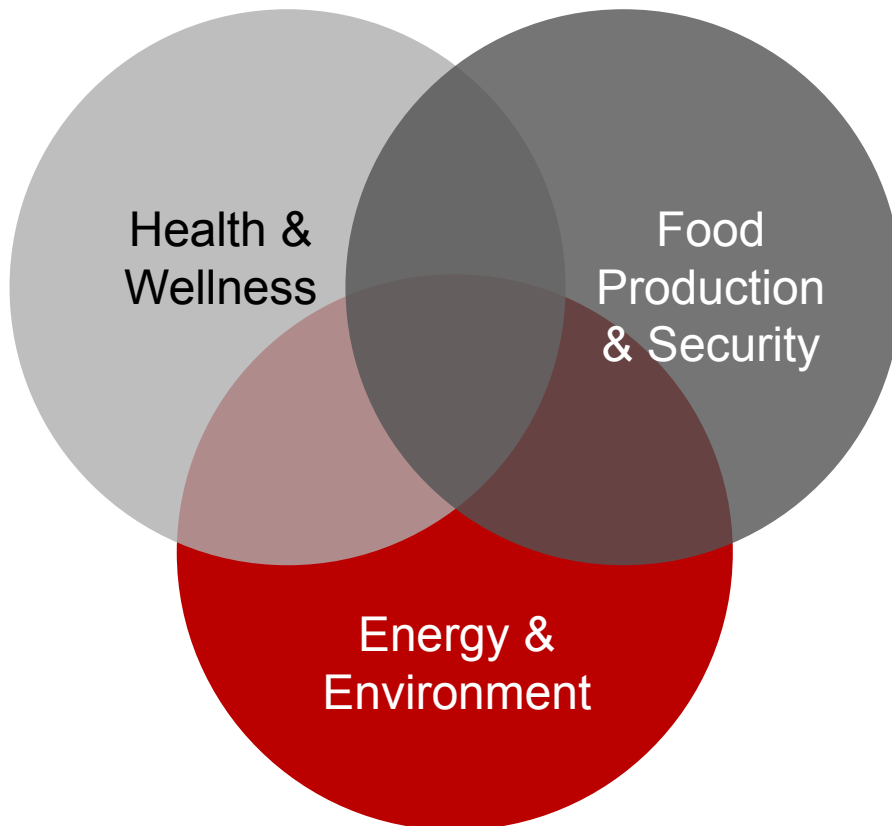


Discovery Themes



Discovery Themes Initiative

Investing in solutions-based scholarship



A new approach

- 400 new faculty (~10%)
- 7 new project areas
- Innovation cell model
- Proven PMs
- Positive ROI required



Discovery Themes Initiative

Investing in solutions-based scholarship

Seven Project Areas

- Sustainable and Resilient Economy
- Infectious Disease
- Food Security
- Foods for Health
- Brain Injury
- Data Analytics
- Materials and Manufacturing for Sustainability



DTI: Materials and Manufacturing for Sustainability

Approach: Discovery-to-deploy at OSU

41 faculty members, 19 centers, 14 departments

New faculty hired in 3 clusters

- **energy harvesting, storage and systems**
- **high performance materials and structures**
- **materials for sustainable information processing**

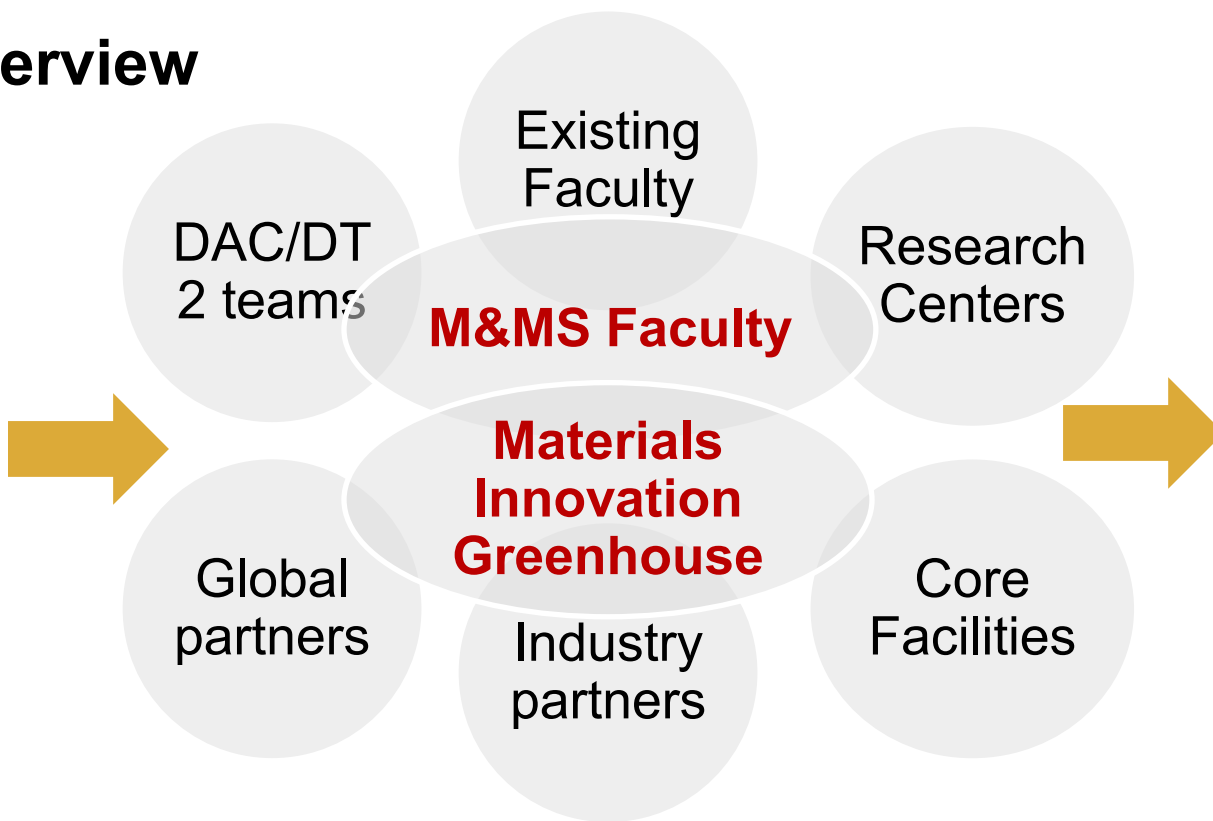
Lead PI: Dr. Steven A. Ringel, Executive Director, Ohio State Institute for Materials Research



M&MS Overview

Needs and Challenges

Regional
National
International
Industrial



Example “Real”

Affordable,
deployable
solar energy

Sustainable
Buildings

Energy
efficient
systems &
smart grids

Non-
degrading
components

Ultra light
vehicles

Low energy
electronics/IT

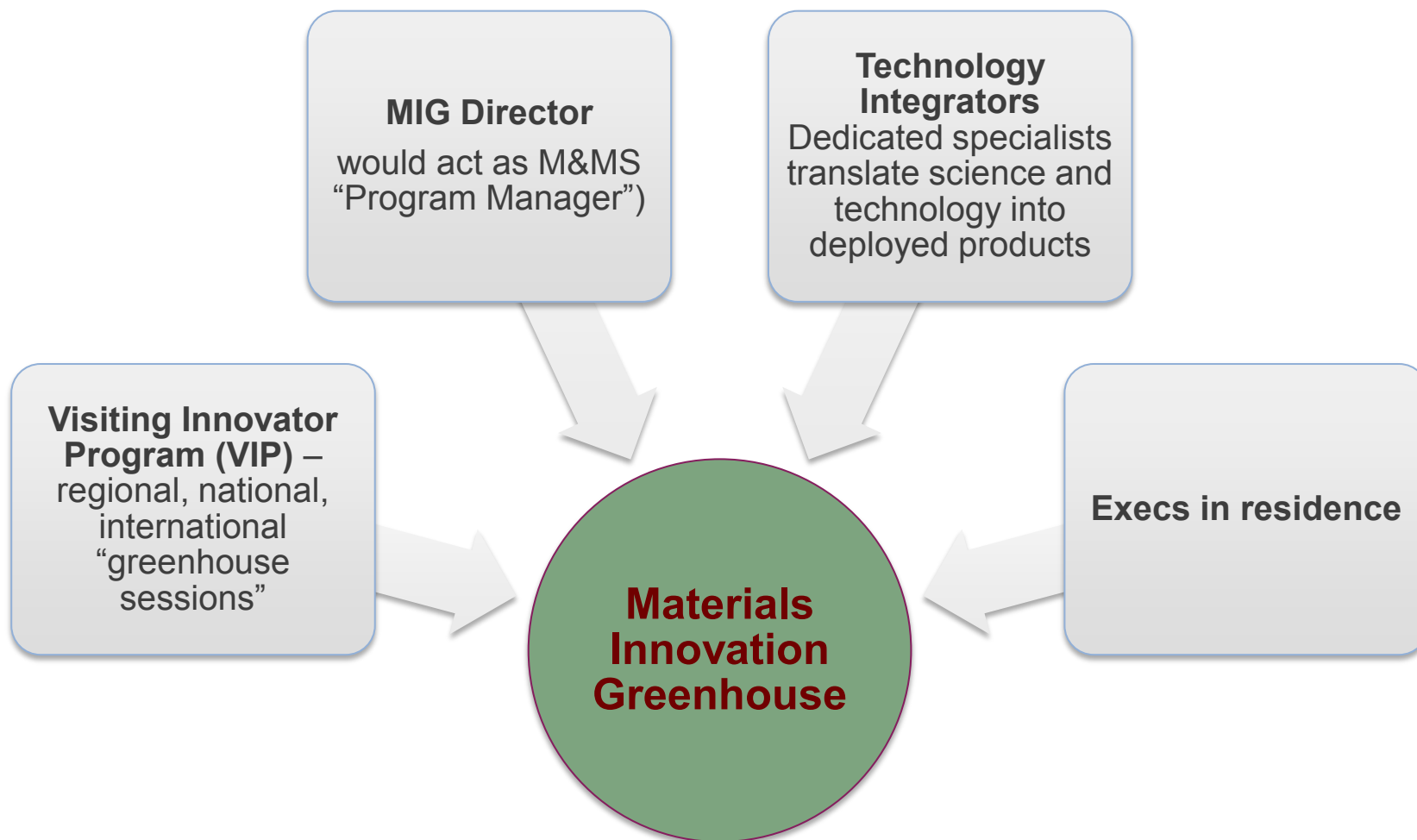
OSU new internal investments in RED

Discovery/Educate

Deploy



Materials Innovation Greenhouse





Manufacturing Initiatives



Imagine...

Going to the Ohio State Board of Trustees and telling them that if OSU is to be part of the winning team for an NNMI, we need to create a new 501(c)(3) in Michigan with UM and EWI.





Well, it worked...

\$158 M National Network
of Manufacturing
Institutes award
announced at White
House ceremony





Lightweight Innovations For Tomorrow (LIFT)

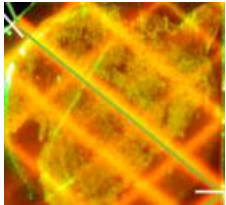
- LIFT, \$158M enterprise
- Jointly funded by the Navy, Industry, OSU & UM, the States of Ohio and Michigan
- Headquartered in Detroit, est. 2015

It paid off: OSU now on four of the funded NNMIIs





What do you get if you take the best features of...



Photonics Lab
(MIT)



VCSI
(Huntsville, AL)



Glennan Microsystems
Initiative (Ohio)



Center for Design and Manufacturing Excellence

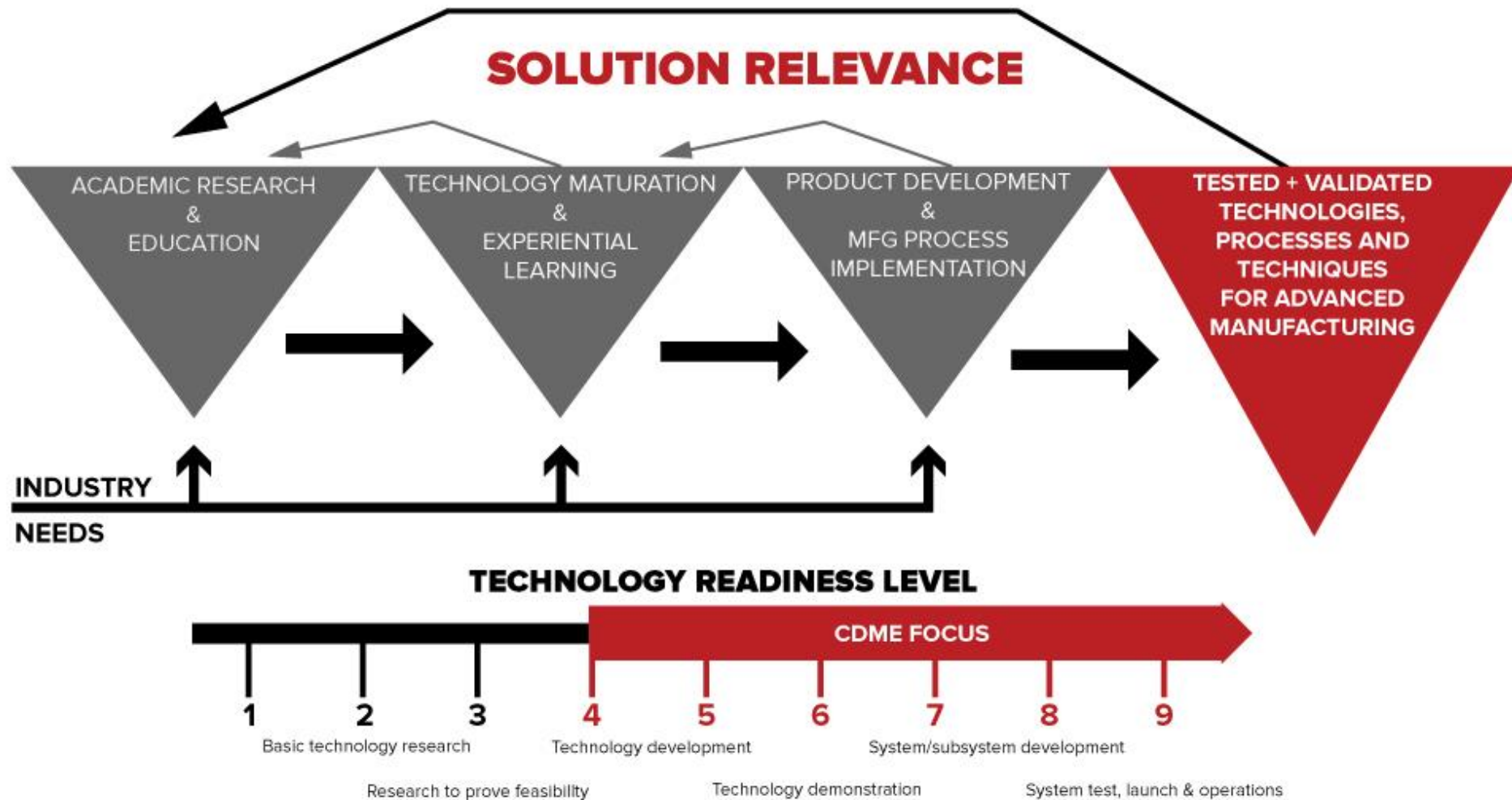
A new and innovative
approach to advanced
manufacturing



Center for Design and Manufacturing Excellence

CDME redefines the relationship between the university and its industry partners.

- First OSU Center directed by non-faculty
- Driven by industry requirements
- Novel approach to IP
- Industry controls the board, hiring and the focus of activities
- Unique industry membership model



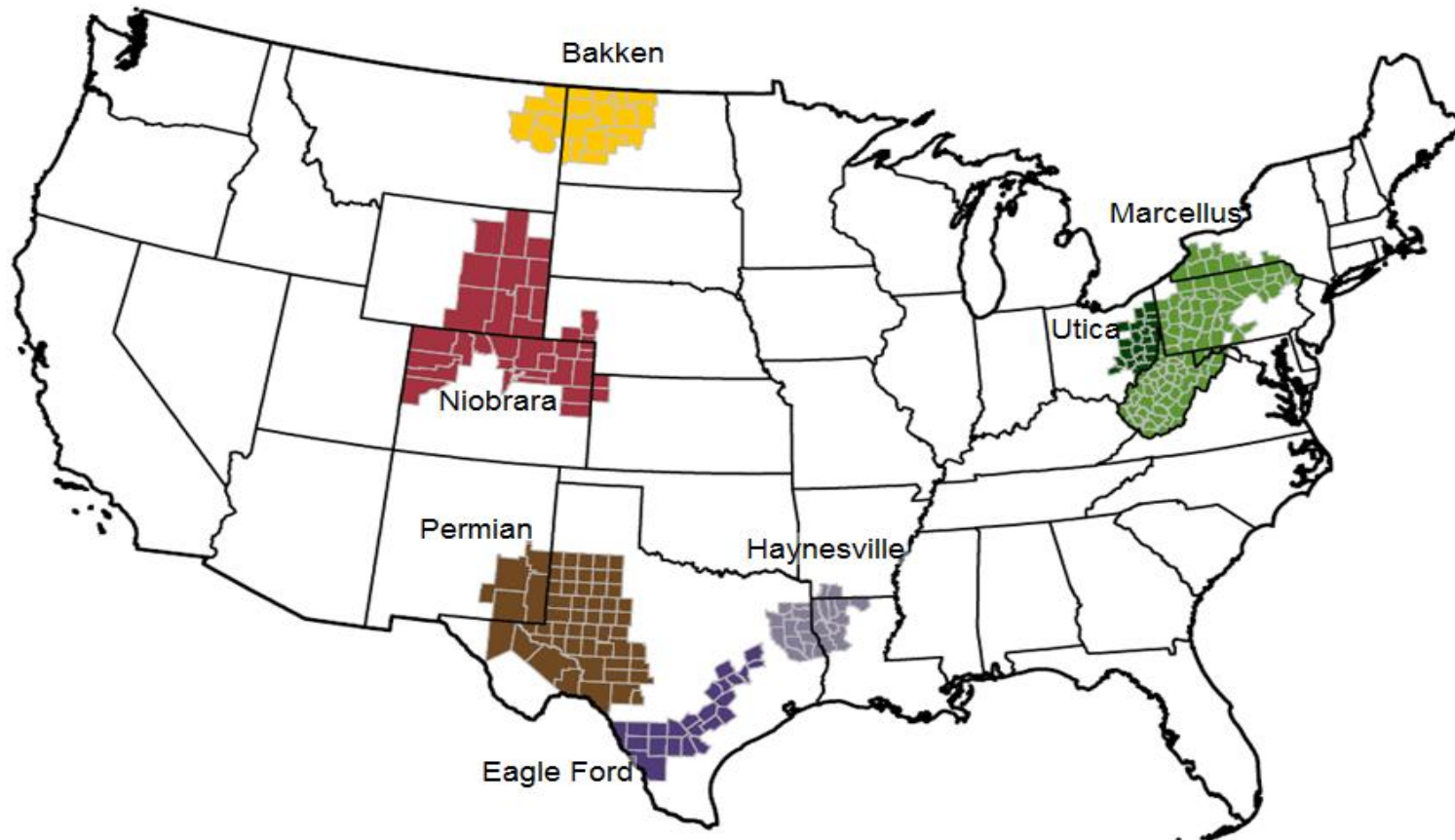
CDME is an applications-oriented center that would bridge the gap between industry needs and university research as well as provide a critical technology test bed. Focus of CDME and testing and applications-oriented projects and research - TRL 4 and above.



Shale Energy Environmental Laboratory

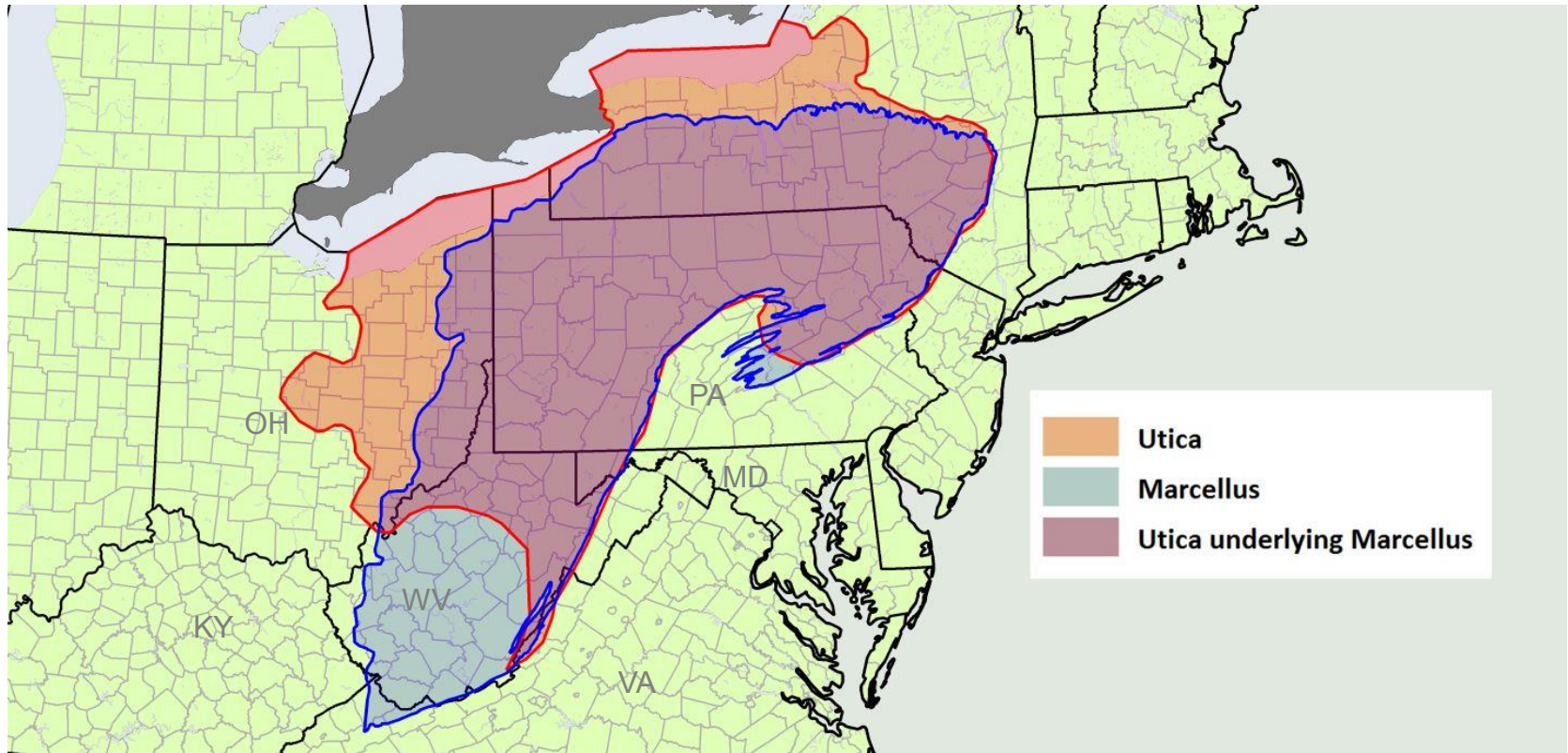


7 Most Productive U.S. Shale Plays





An opportunity with some unknowns

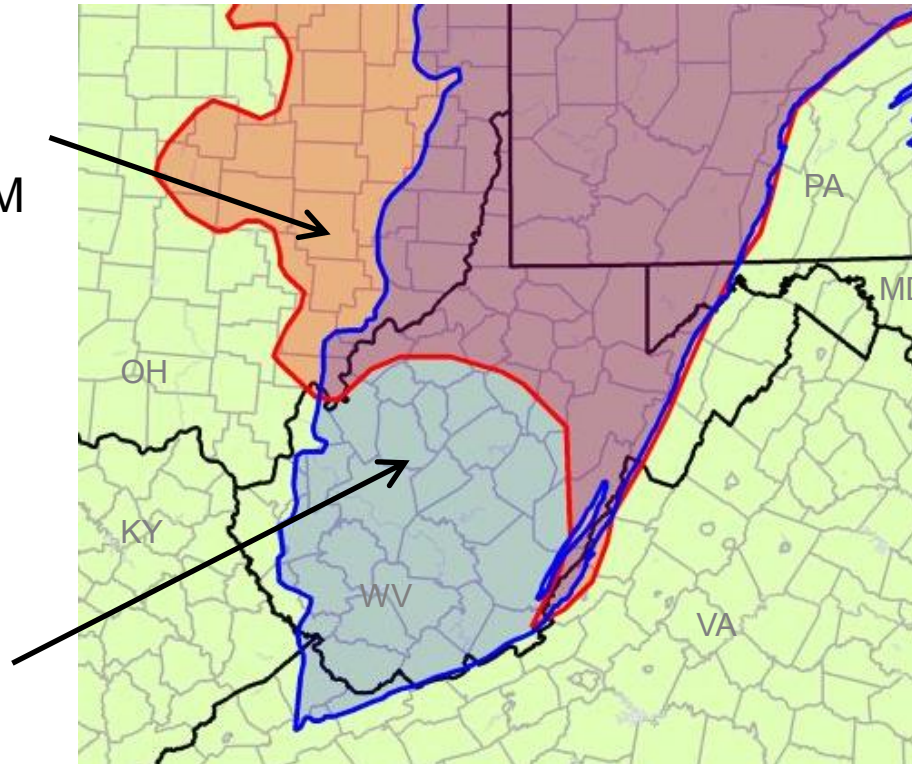




Parallel, Partnered Environmental Labs

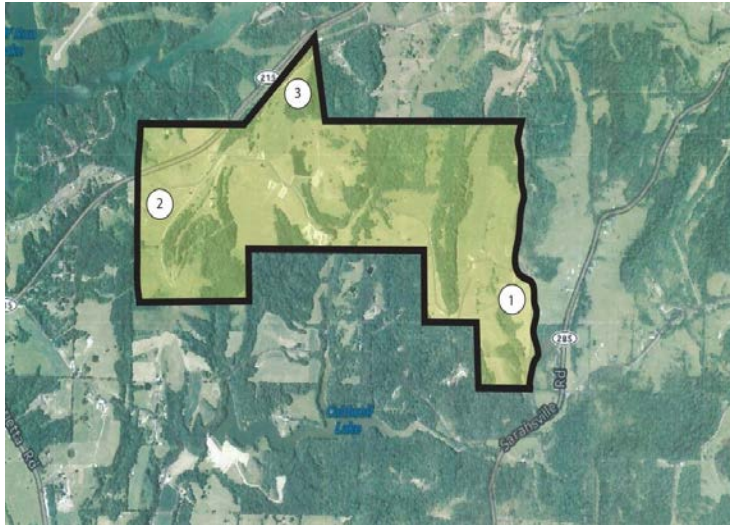
Utica SEEL
OSU lead
NETL award: \$12M

Marcellus SEEL
WVU lead
NETL award: \$7M





Original Site: University-owned ag research station





An unexpected twist...

The Columbus Dispatch

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Kasich reverses on fracking in state parks

Legislators call for investigation into ODNR plan

By [Darrel Rowland](#) & [Will Drabold](#)

The Columbus Dispatch • Wednesday February 19, 2014 6:12 AM

Less than three years after signing legislation opening up Ohio state parks and forests to fracking, Gov. John Kasich now opposes the controversial horizontal drilling for oil and gas on public lands.

“At this point, the governor doesn’t support fracking in state parks,” Kasich



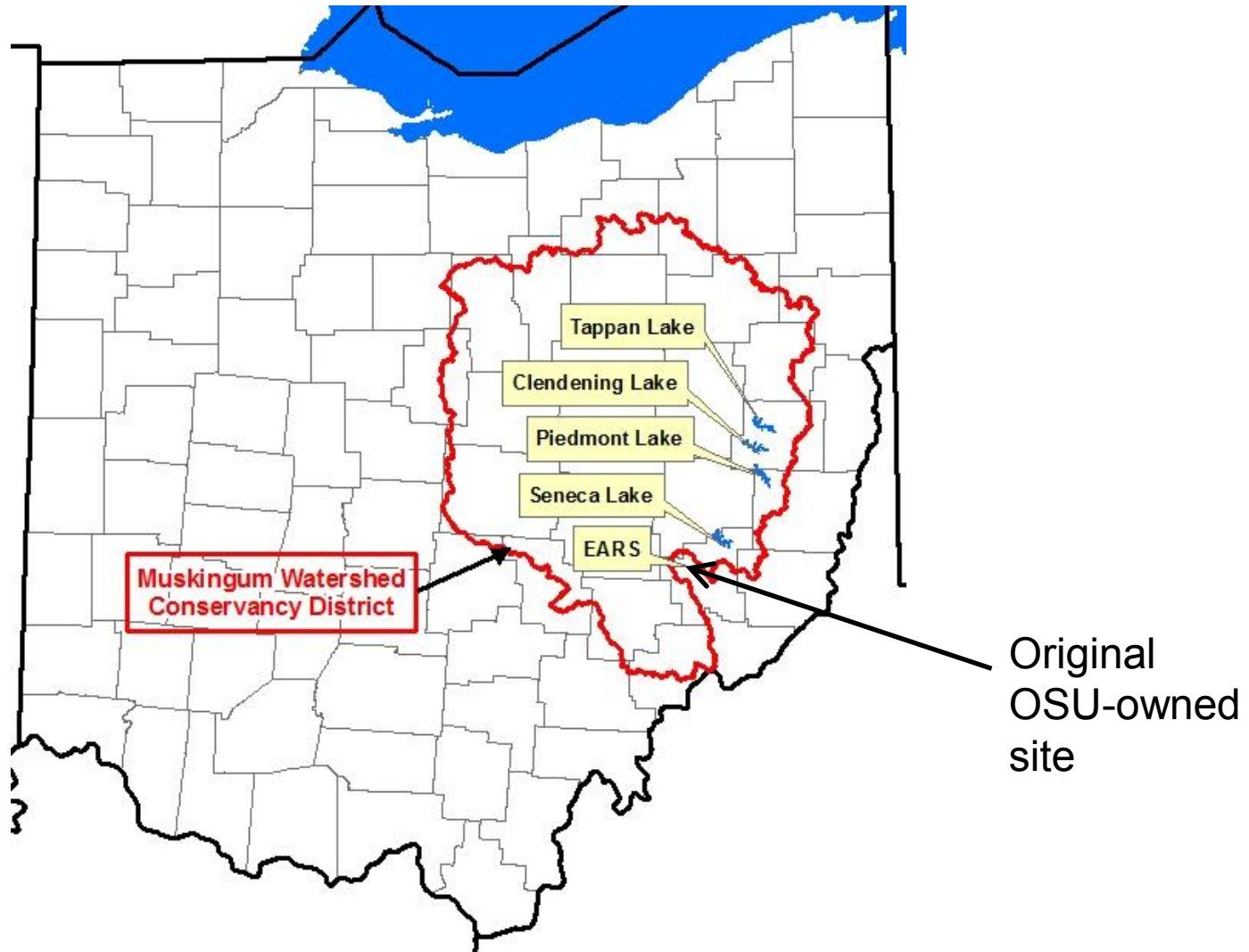
REQUEST TO BUY THIS PHOTO

ERIC ALBRECHT | DISPATCH FILE PHOTO

A spokesman for Gov. John Kasich said yesterday that the governor has been opposed to fracking in state parks “for the past year and a half.”



A workable solution





Global Water Initiative



Looking for pressing problems? Here's one.



Safeguarding the World's Water

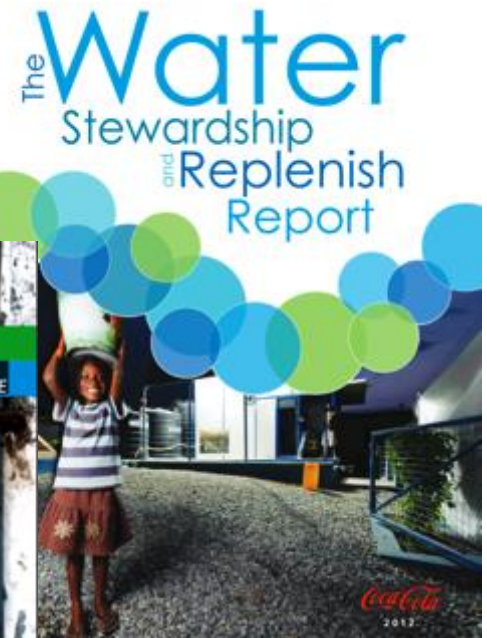
Report for USAID Fiscal Year 2012 Water Sector Activities



The Millennium Development Goals Report 2013



PROGRESS ON SANITATION AND DRINKING-WATER 2013 UPDATE





Venture philanthropy

GWI's consortium approach to funding solutions

The old model of development philanthropy

- Lots of disparate projects
- Hard to scale
- Inefficient use of funds, technical resources, and community goodwill
- Reactive, not proactive



One-time
donation-style
funding...



...buys one-
size-fits-all
technology...



...that may not
work or meet
needs in five
years.

A new public-private partnership

- Integrated network of assets
- University, industry, NGO, agency partners working water apps & solutions
- Global commitment to sustainability



Money from a
coalition; funding
only goes if the
right solution is
found



User needs go to
researchers;
winning solutions
integrated



Ongoing
engagement for
project
sustainability



In developing GWI, we did our homework.

- 2013: Market opportunity assessment, gap analysis, review of major global challenges and priorities
- **2014: Contracted with PWC** to validate the concept, gap analysis, and relationship of GWI to other initiatives
- Vetted the concept with:
 - ✓ World Business Council for Sustainable Development
 - ✓ Greif
 - ✓ Rabobank
 - ✓ United Nations
 - ✓ World Bank
 - ✓ World Vision
 - ✓ charity:water
 - ✓ Clinton Global Initiative
 - ✓ Many others...



“GWI’s systems approach to solving water issues will significantly and positively impact lives of those likely to be affected by climate change and water scarcity in developing countries across the globe.”

Scott Griffin
Chief Sustainability Officer
Greif, Inc.



GWl is a network of land-grant partners



Ohio State

MIT

Penn State

University of Nebraska

Michigan State

Purdue

Cornell

The Nelson Mandela African Institute of
Science and Technology





GWI encompasses three project focus areas that operate using the same innovative approaches.

Global Water Initiative



Wells to Wellness
*Rural Water
Development*



Field to Faucet
*Harmful Algal
Blooms*



**Coastal
Resilience**
*Disaster
preparedness/p
revention*





LESSONS, VICTORIES, WISHES



Lessons

- Change is embraced much less than discussed
- Measure success in years, not months
- Communicate, communicate, communicate
- Only strong teams can move the mountain
- Technology is less important than business model
- Collaboration—internal is important, external is CRITICAL



Victories

- Discovery Theme Hiring underway
- Ohio State now part of 4 NNMI winning teams
- CDME exists—director, member agreement, projects
- USEEL contract will be final July 1
- GWI has money, friends and opportunities
- More projects and activities in the queue...



I wish...

- I heard “why not?” instead of “you can’t do that” more often
- More people engaged with the hard work of change
- We could all work together to find innovative solutions to our world’s most pressing problems
- That this presentation is a catalyst for new projects with some of you!



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