



A2EP – 2xEP Energy Productivity Summit
04-05 April, 2017
Australian National Maritime Museum
Darling Harbour, Sydney

Session 01
The 2xEP imperative: Why? How?

Benoit Lebot

Denise Swink > Presentation follows

Christoph Spesshardt

Peter Burn

Chair: Jonathan Jutsen



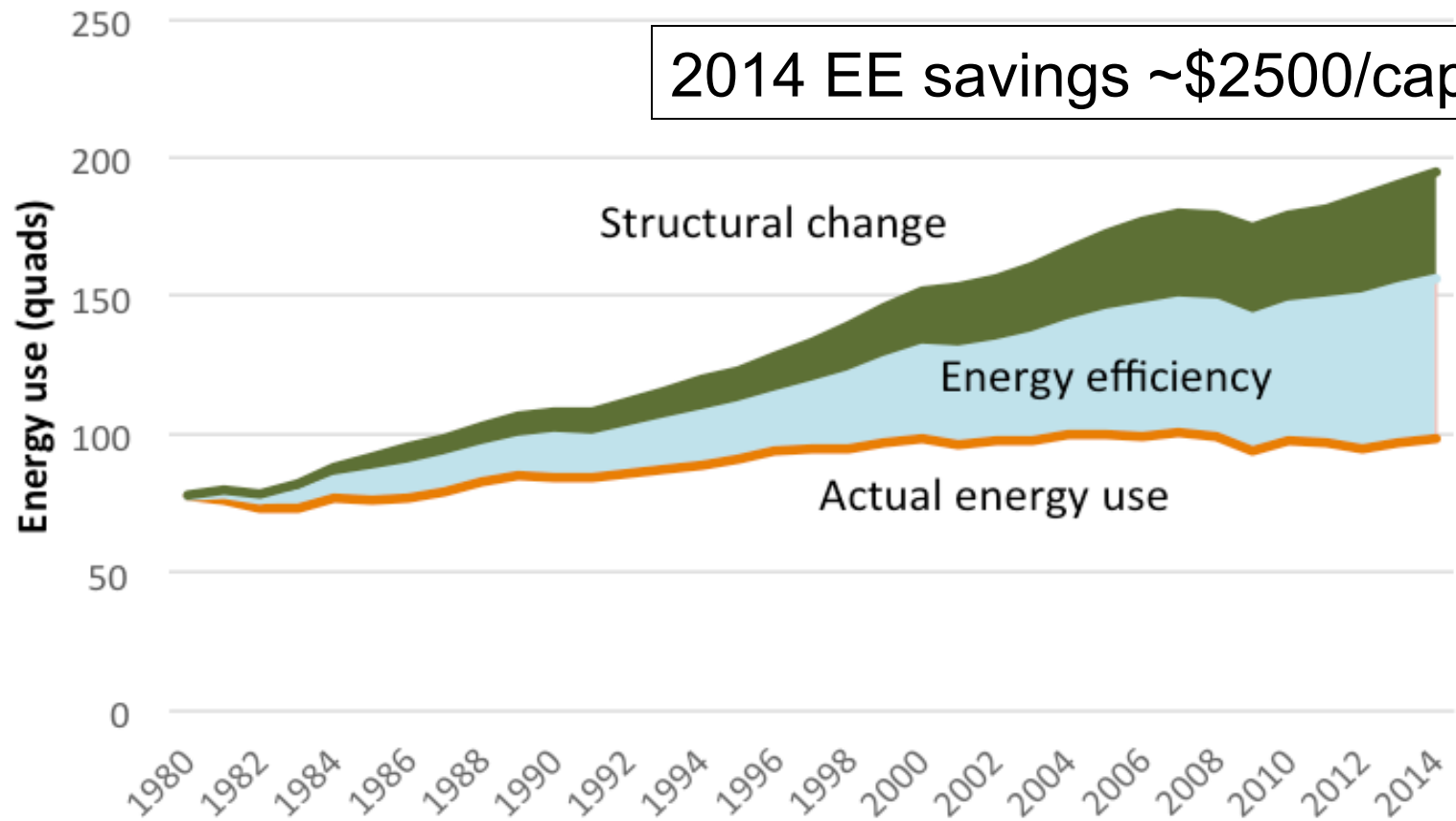
Doing more. Using less.

2XEP PRODUCTIVITY SUMMIT,
04-05 APRIL 2017, SYDNEY

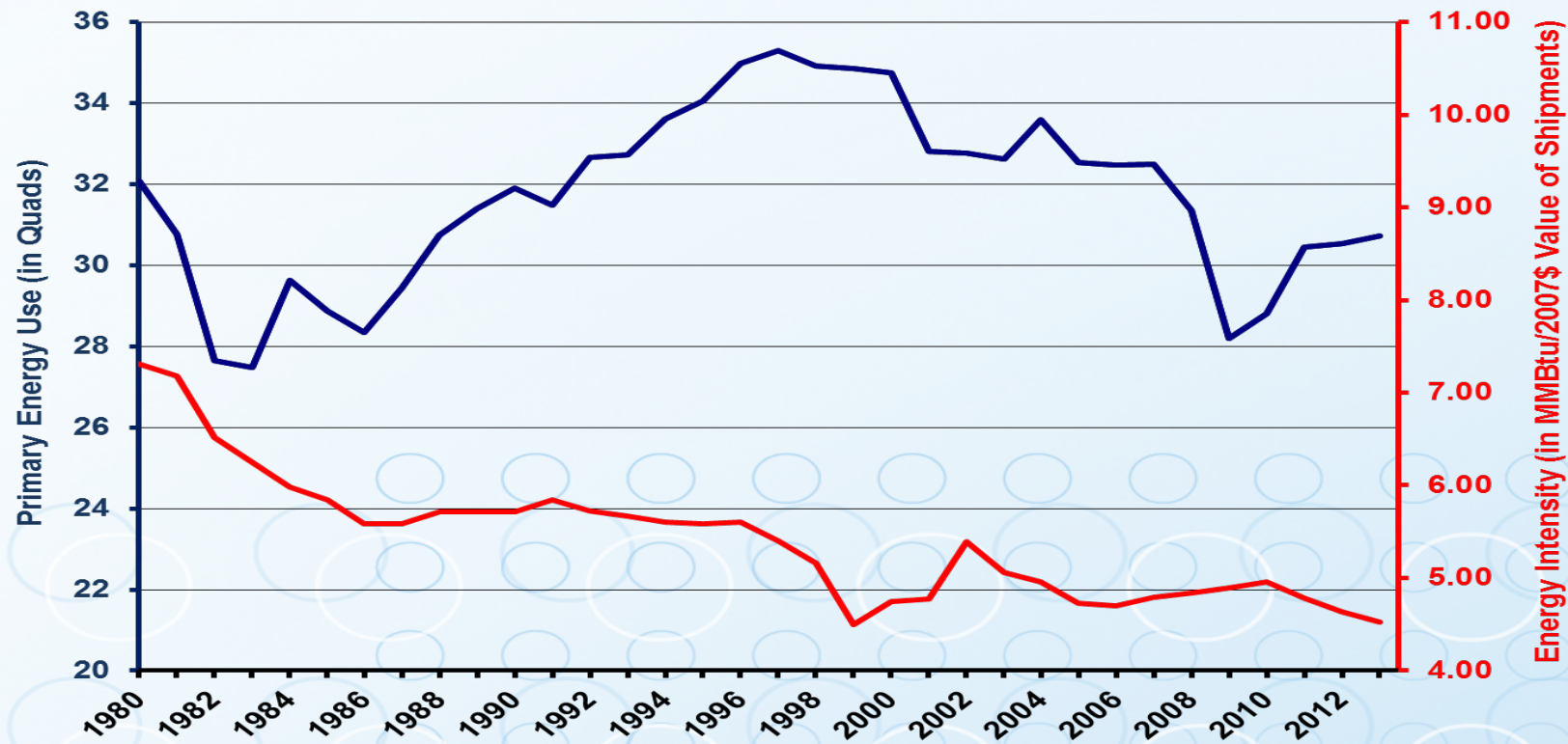
KEYNOTE, DENISE SWINK, CEO,
SMART MANUFACTURING LEADERSHIP
COALITION (SMLC)

SMARTMANUFACTURINGCOALITION.ORG

U.S. Energy Use Since 1980



Industrial Energy Use and Intensity



ENERGY.GOV

OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY

Technical Assistance Activities

AMO's Industrial Technical Assistance supports the deployment of manufacturing technologies and practices, including strategic energy management and combined heat and power, across American industry to increase productivity and reduce water and energy use.

Technical Assistance Programs

- Better Plants Program
- Better Plants Challenge
- Superior Energy Performance
- Industrial Assessment Centers
 - CHP Deployment

Energy Resource Center

- Software Tools
 - Training
- Technical Publications
 - Case Studies
- State and Utility Engagement
- Industrial Assistance and Projects

Other Industrial Support

- SEE Action: Industrial Energy Efficiency and CHP Working Group
 - Boiler MACT TA
- AMO Funding Opportunities
 - State Resources
- Energy Analysis by Sector
 - Water Energy Tech Team
- ISO 50001 Energy Management Standard

- View AMO Technical Assistance Activities by state

Plant Energy System Areas

- Plant Wide
 - Steam
- Process Heating
- Combined Heat & Power
 - Compressed Air
 - Motor
 - Pump
 - Fan
- Waste Heat Recovery

Industrial Savings Opportunities

- Primary Metals
 - Chemicals
 - Paper

AMO TA State Activities

NATIONAL ASSOCIATION OF STATE ENERGY OFFICES

State and territory energy policies and programs are vital to spurring economic development, increasing energy efficiency, and expanding clean, domestic energy resources.

The 56 [State and Territory Energy Offices](#) were formed in response to the energy crisis of the early 1970s. They have evolved to become important agents of change – advancing practical energy policies and supporting energy technology research, demonstration, and deployment. In partnership with the private sector, the SEOs accelerate energy-related economic development and enhance environmental quality through energy solutions that address their citizens' needs and enhance national energy security.

The SEOs' work is generally under the direction of the governors or legislatures, and is funded by state and federal appropriations, such as the [U.S. State Energy Program \(SEP\)](#). State Energy Offices are deeply involved in energy efficiency programs and allocate or oversee more than \$7 billion of energy efficiency funds derived from ratepayers and state appropriations each year.

The activities of State Energy Offices vary, depending upon states' indigenous resources and needs. However, most State Energy Offices:

- Advise governors and legislators on energy issues;

- Ensure that the needs and issues of industry, business, and residential energy consumers are considered during energy policy and program development;

- Support the private sectors' advanced manufacturing and industrial efficiency efforts as a means to retain and create jobs;

- Assist in achieving energy-related environmental goals;

- Assist energy providers and consumers during energy emergencies and natural disasters to mitigate supply disruptions and coordinate state, local and regional responses;

- Aid citizens – through education and incentives – in adopting energy efficiency measures that lower utility costs and reduce waste;

- Demonstrate the application of emerging energy technologies in real-world situations;

- Manage certain federal energy research, development, deployment and demonstration programs more effectively and at lower costs than many traditional federal program management mechanisms;

- Work with other state agencies to deploy cost-effective, state-of-the-art technologies to reduce public facility energy consumption at the state and local levels; and

- Communicate to the public the importance of energy to economic development and the environment, emphasizing the value of cost-effective energy efficiency measures.

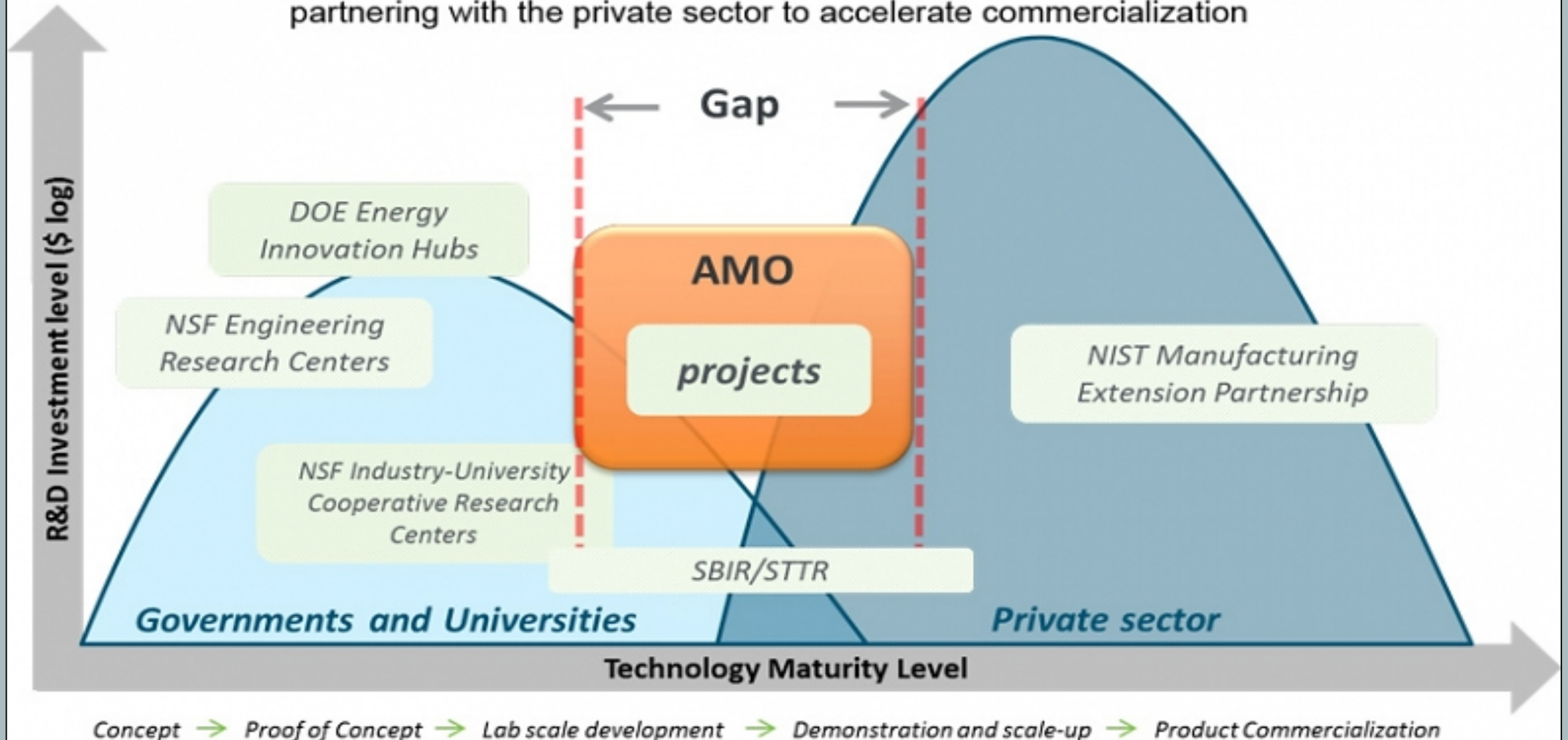
In addition, many State Energy Offices develop [State Energy Plans](#) that provide a strategy for how to meet future energy needs in an environmental and economic way.

[Contact Information](#)

National Association of State Energy Officials
2107 Wilson Boulevard, Suite 850
Arlington, Virginia 22201
(703) 299-8800 fax: (703) 299-6208

AMO: Bridging the Innovation Gap

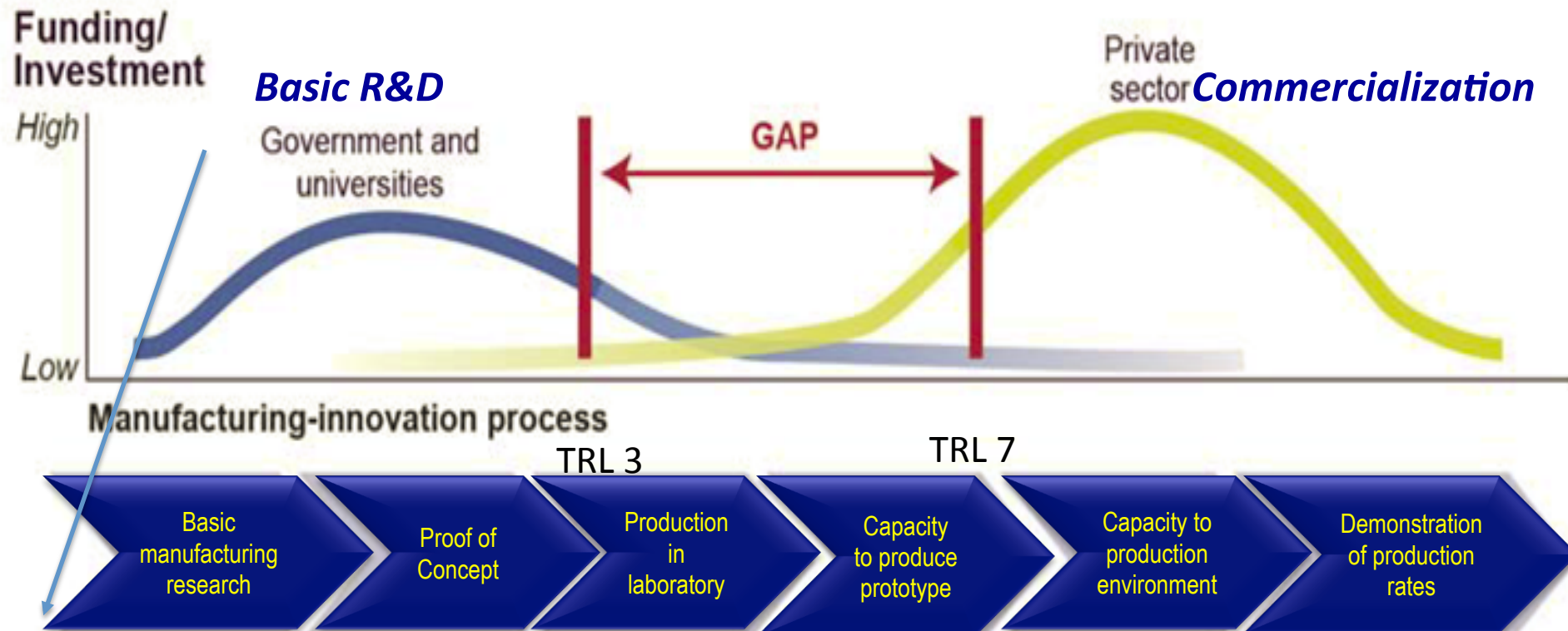
AMO Investments leverage strong Federal support of basic research by partnering with the private sector to accelerate commercialization



Manufacturing USA: Addressing the “Scale-up” Gap

Focus is to address market failure of insufficient industry R&D in the “missing middle” or “industrial commons” to de-risk promising new technologies

Credits: Dr. Frank Gayle, AMNPO, NIST



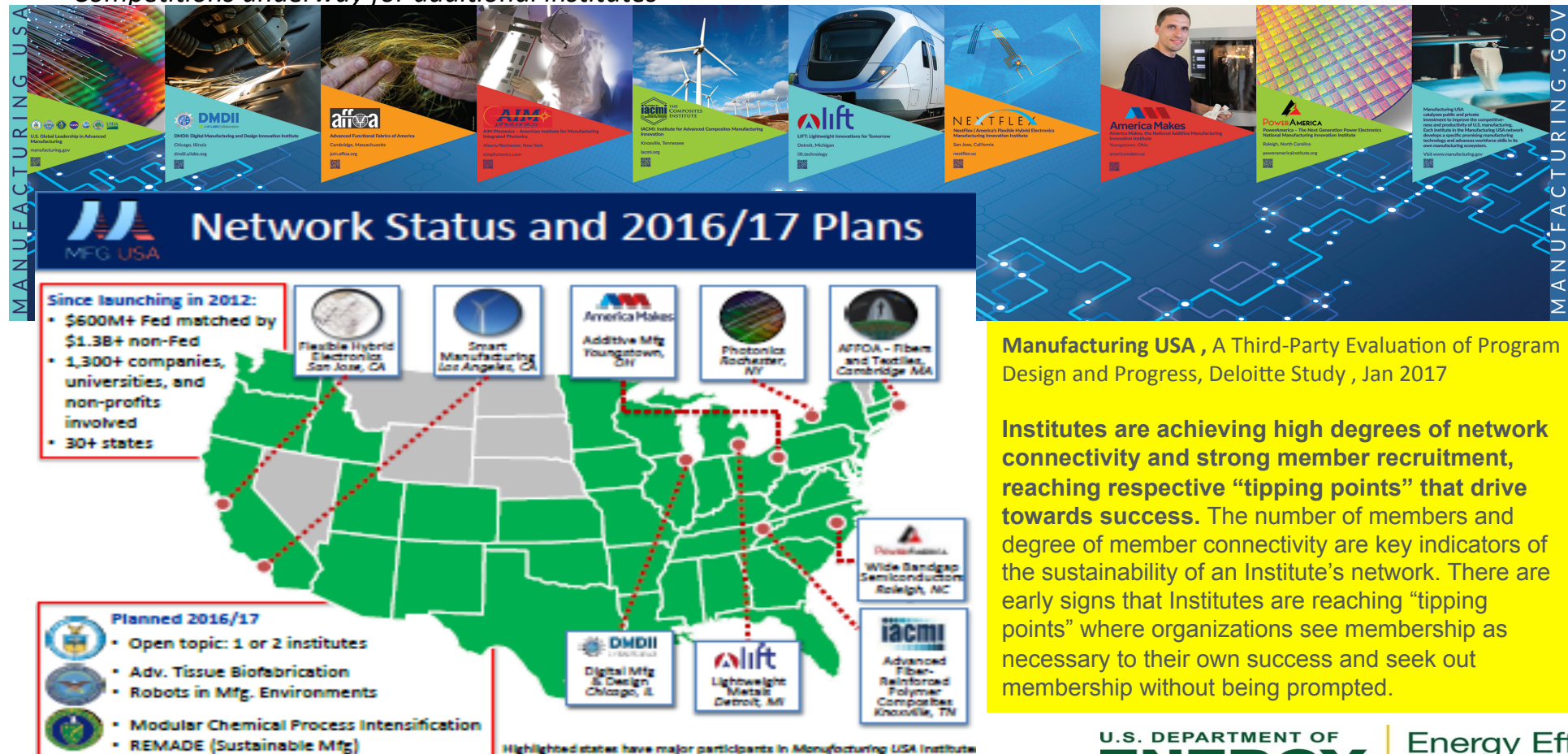
Dear Colleague Letter: Advanced Manufacturing Research to Address Basic Research Enabling Innovation at Manufacturing USA Institutes

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Progress to Date

- \$600 million federal investment matched by over \$1.3 billion non-federal
- Nine active institutes: 1,300 members, over 240 technology development projects.
 - Members include two-thirds of Fortune 50 U.S. manufacturers
 - 8 out of the 10 top-ranked research and engineering universities.
- Competitions underway for additional institutes



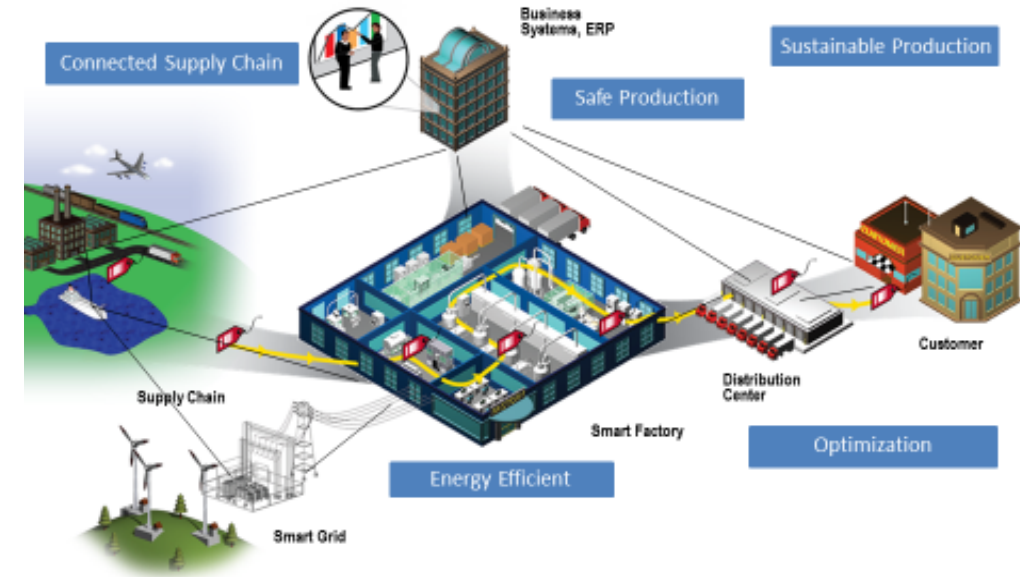
Manufacturing USA, A Third-Party Evaluation of Program Design and Progress, Deloitte Study, Jan 2017

Institutes are achieving high degrees of network connectivity and strong member recruitment, reaching respective “tipping points” that drive towards success. The number of members and degree of member connectivity are key indicators of the sustainability of an Institute’s network. There are early signs that Institutes are reaching “tipping points” where organizations see membership as necessary to their own success and seek out membership without being prompted.

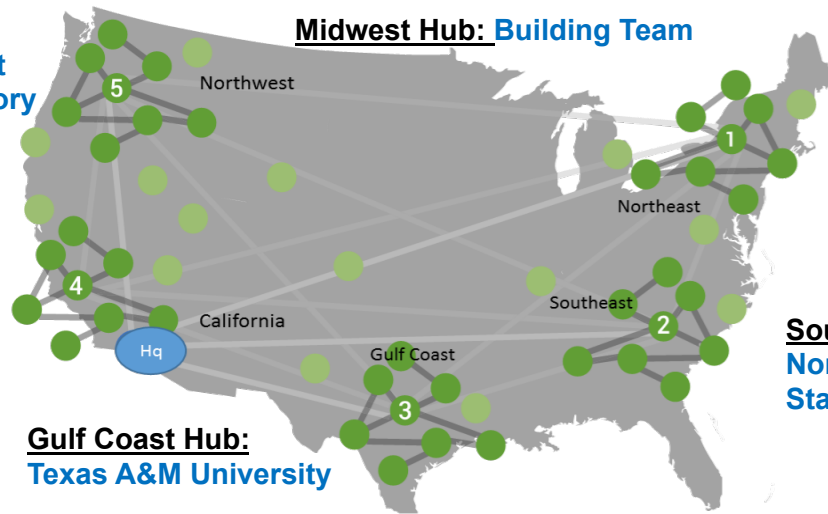
MISSION: Radically save time and costs of improving US manufacturing performance – developing and deploying tool sets of advanced sensors, controls, analytics and information technologies – supplying a highly skilled workforce – serving companies of all sizes.

VISION: Smart Manufacturing is manufacturing in 2030

Strategy: Bringing the institute to the manufacturers



Northwest Hub:
Pacific Northwest
National Laboratory



Midwest Hub: Building Team

Northeast Hub:
Rensselaer
Polytechnic
Institute

HQ: University
of California
Los Angeles

California Hub:
California
Manufacturing
Technology
Consulting

Gulf Coast Hub:
Texas A&M University

Southeast Hub:
North Carolina
State University

Key Metrics for CESMII:

- **First of kind live commercial test beds in the US.**
- **Cost and time to develop and deploy solutions halved.**
- U.S. energy productivity doubled every 10 years
- **US SM workforce capacity increased five-fold by 2030.**
- **40% ↗ in SM supply chain participation by 2030**

• **~200 partners from industry, academia, NGOs and state/local : \$70M federal funding, more than matching from partner's cost share.**



CESMII PERFORMANCE METRICS

To achieve what end results?

CESMII Performance Metrics include:

- Energy Productivity - in U.S. manufacturing will double every 10 years
- Energy Efficiency - a 15% improvement in energy efficiency in first of a kind Testbeds will be achieved within 5 years
- Deployment Costs - of SM systems will be reduced 50% relative to state of the art within 5 years
- Adoption Costs - of SM systems will be recovered from improved energy use in less than 10 years
- Workforce - SM workforce will be increased two-fold by 2020, and five-fold by 2030
- Supply Chain - value and participation will increase over 40% by 2030

HOW?

- Most affordable, accessible approach to achieve sustainability and sustaining energy productivity gains in manufacturing is applying Smart Manufacturing technologies and practices.
- The approach to make Smart Manufacturing a National reality is through collaboration.
 - Smart Manufacturing should be developed and delivered through an open, Cloud based Platform and Market Place, integrated with solution based advanced sensors, controls, modeling and simulation systems at industrial test bed applications.