

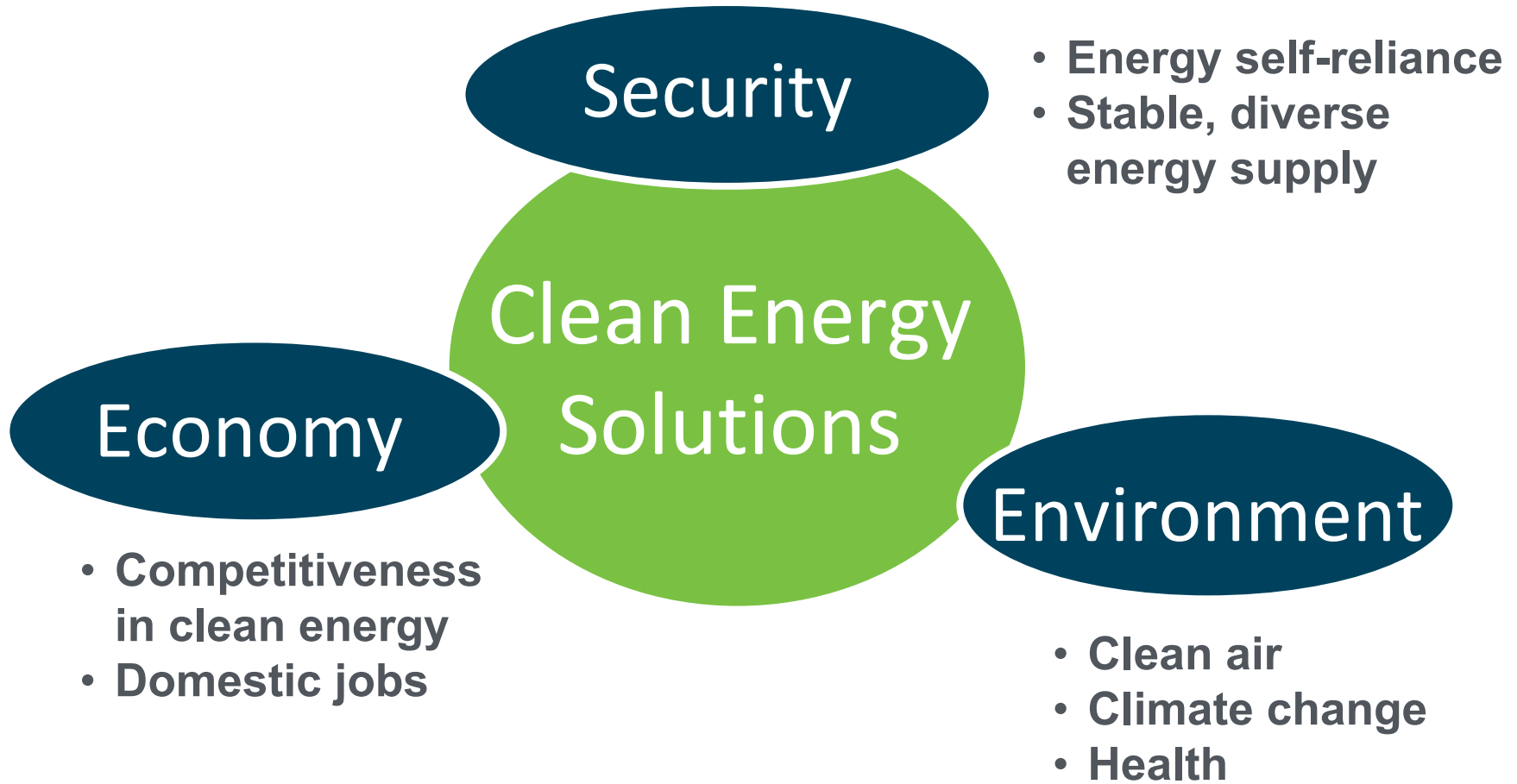
Advanced Manufacturing R&D for Clean Energy at the U.S. Department of Energy

EUREKA Briefing

March 24th, 2016

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www.manufacturing.energy.gov

Clean Energy and Manufacturing: Nexus of Opportunities

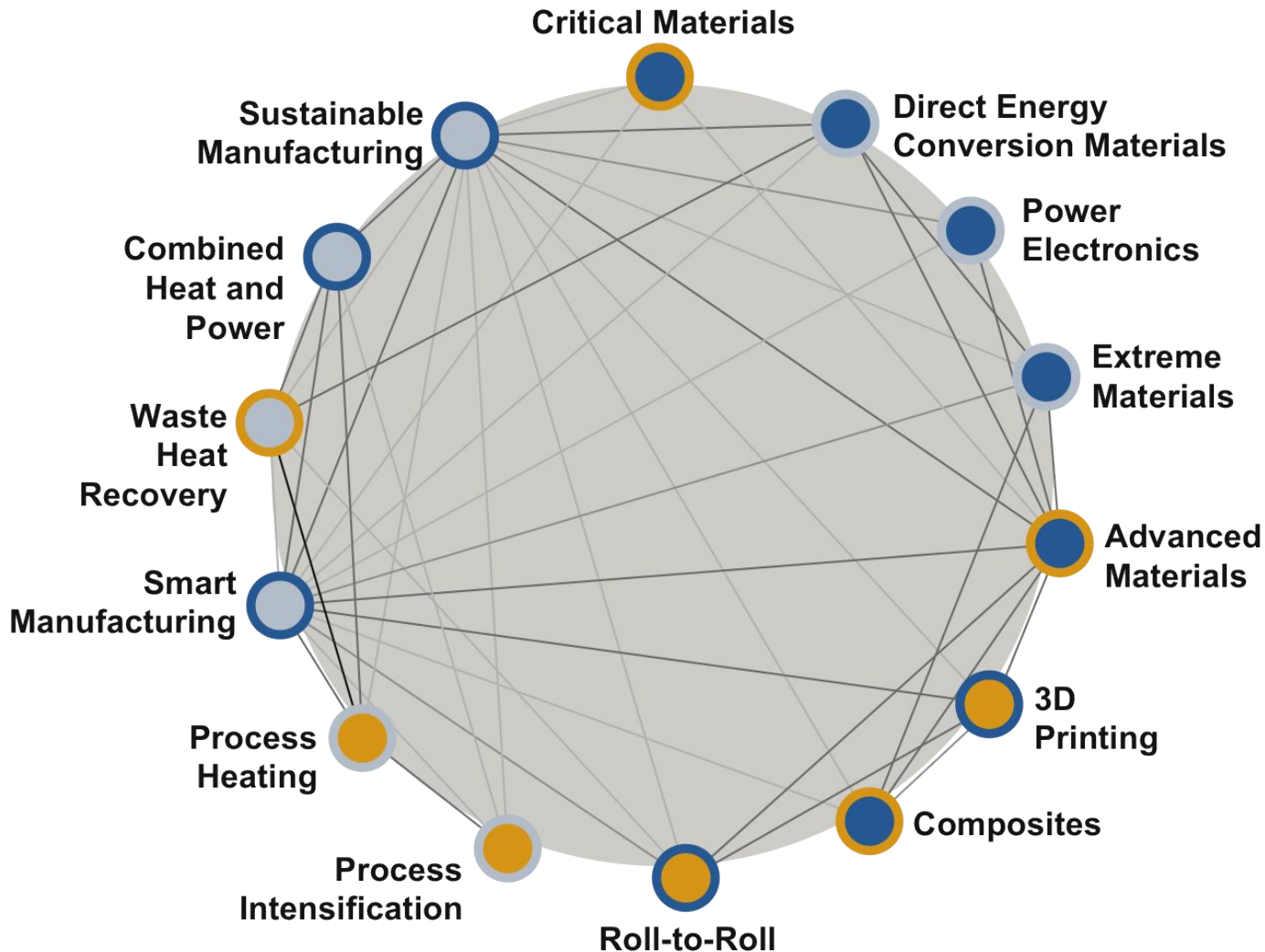


Clean Energy
Manufacturing
Making
Products
which Reduce
Impact on
Environment



Quadrennial Technology Review (QTR)

Advanced Manufacturing – Chapter 6



Achieved through public input, open competition, Public-Private and National Lab Partnerships, and focused execution.

Three Pillars: Addressing Specific Gaps

Assistance: (Dissemination of Knowledge)

Driving a corporate culture of continuous improvement and wide scale adoption of proven technologies, such as CHP, to reduce energy use in the industrial sector

Projects: (Individual R&D Projects)

Research and Development Projects to support innovative manufacturing processes and next-generation materials

Facilities: (Innovation Consortia)

Place-based Innovation for Technology and Workforce Development through focused engagement with private sector

Industry Technical Assistance (Dissemination of Knowledge)

Better Plants: *Represents 11.4% of manufacturing energy footprint and has saved U.S. manufacturers \$2.4 billion cumulative in energy costs*

Industrial Assessment Centers: *Student-driven energy audits identify average of \$130,000 annual savings for every manufacturer assessed*

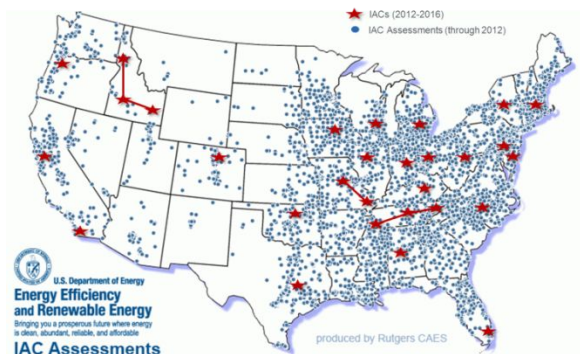
Technical Assistance Partnerships



Better Plants—Energy Savings Partnerships



Industrial Assessment Centers Student Training & Energy Assessments



R&D Projects—FY16 Highlights

R&D Incubator

More than \$20 million for off-road, high-reward projects (FY16)



High Performance Computing for Manufacturing (HPC4M)

Leveraging National Lab computing facilities to drive innovation in manufacturing

Manufacturing Demonstration Facility (MDF)

More than \$20 million in Public-Private CRADAs (FY16)

Partners with AmericaMakes in Youngstown

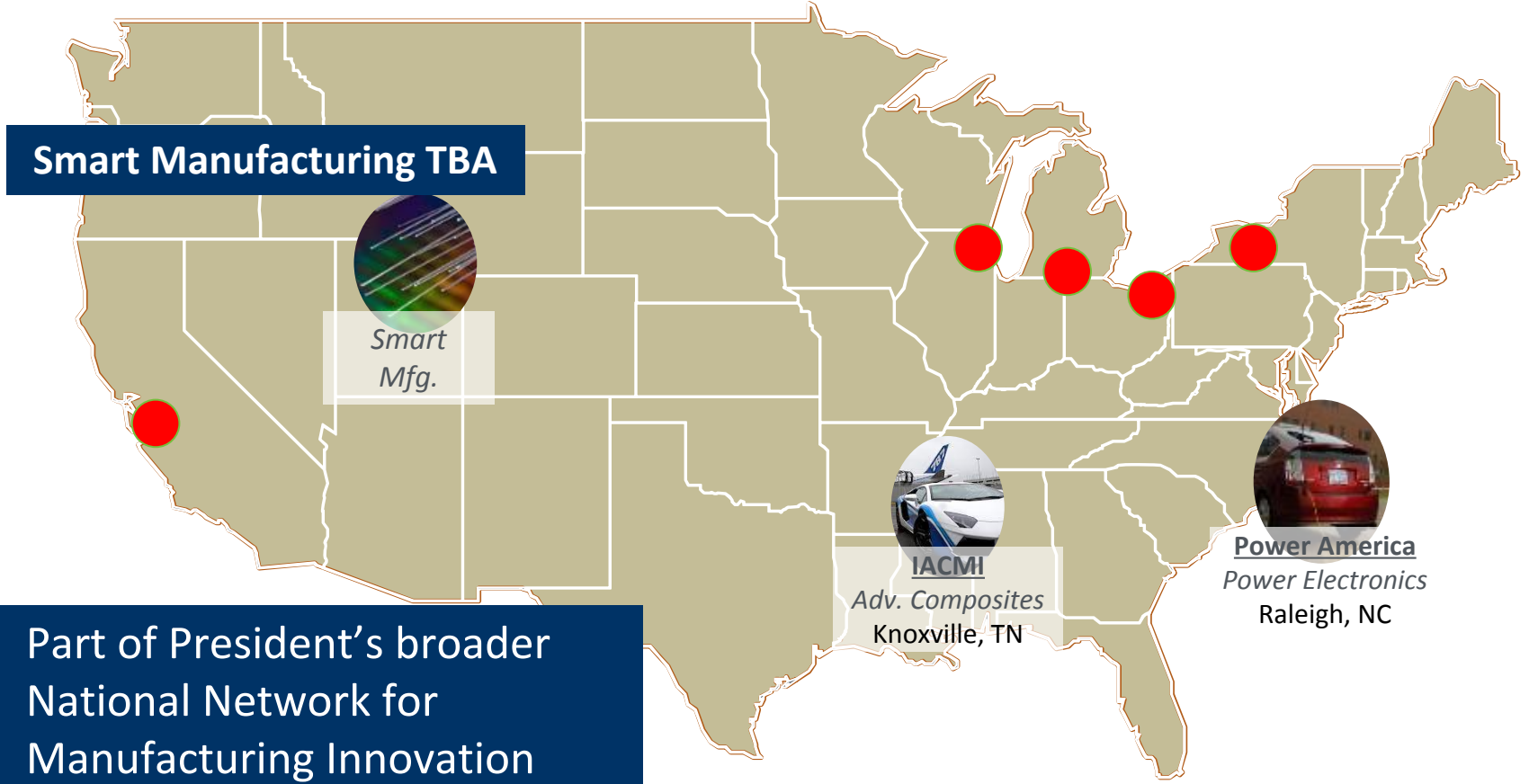


America Makes



3 DOE Manufacturing Innovation Institutes

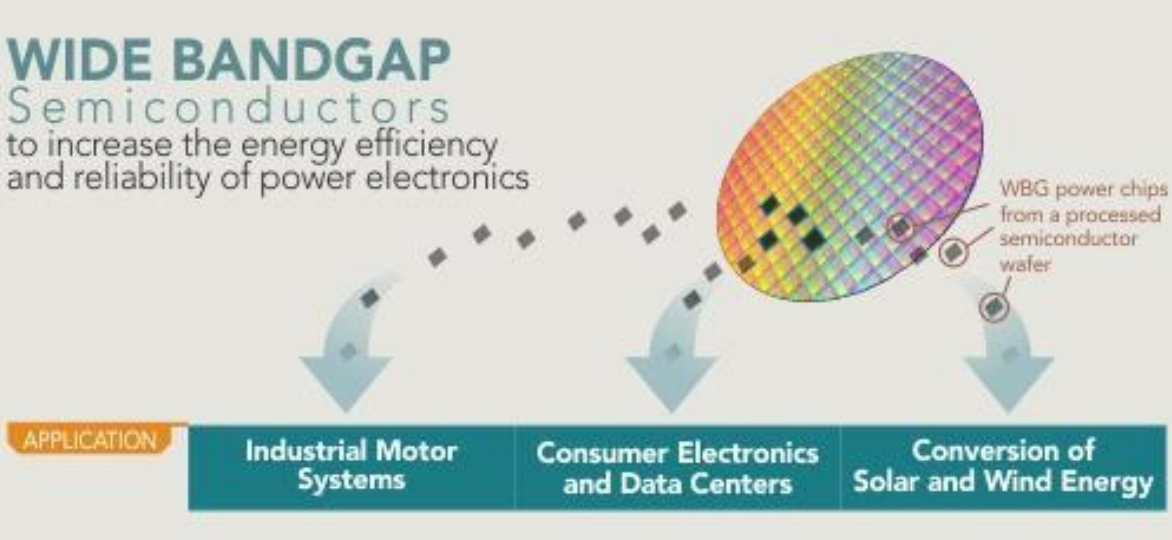
 *DOD Managed Institutes*



- Part of President's broader National Network for Manufacturing Innovation
- Institutes have attracted hundreds of companies and universities as active partners from across the country

...two more topics to be announced in 2016 (FY16)

PowerAmerica: Next Generation Power Electronics Manufacturing



Institute Mission:
Develop advanced manufacturing processes that will enable large-scale production of wide bandgap semiconductors

- Higher temps, voltages, frequency, and power loads (compared to Silicon)
- Smaller, lighter, faster, and more reliable power electronic components
- \$3.3 B market opportunity by 2020.¹
- Opportunity to maintain U.S. technological lead in WBG

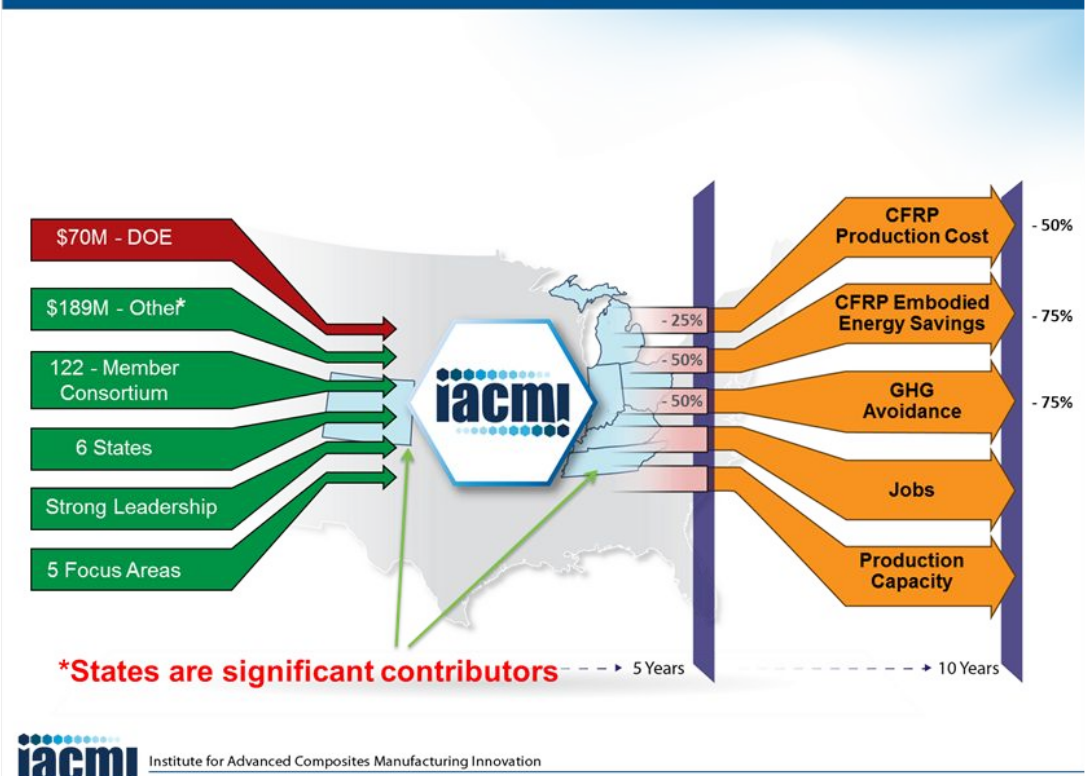
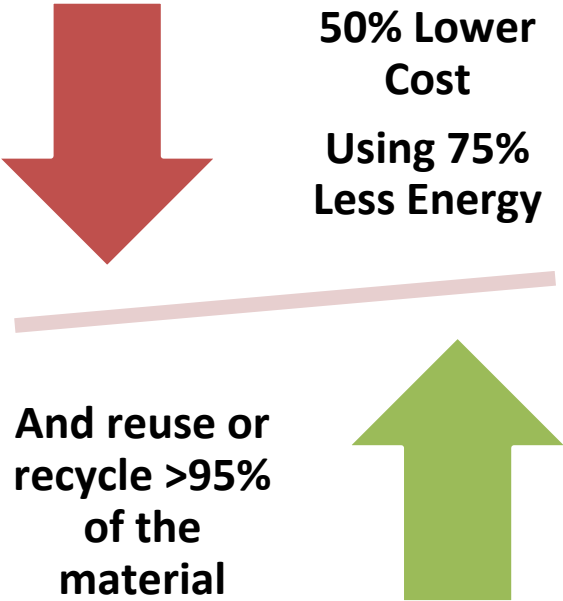
Poised to revolutionize the energy efficiency of electric power control and conversion

¹ Lux Research, 2012.

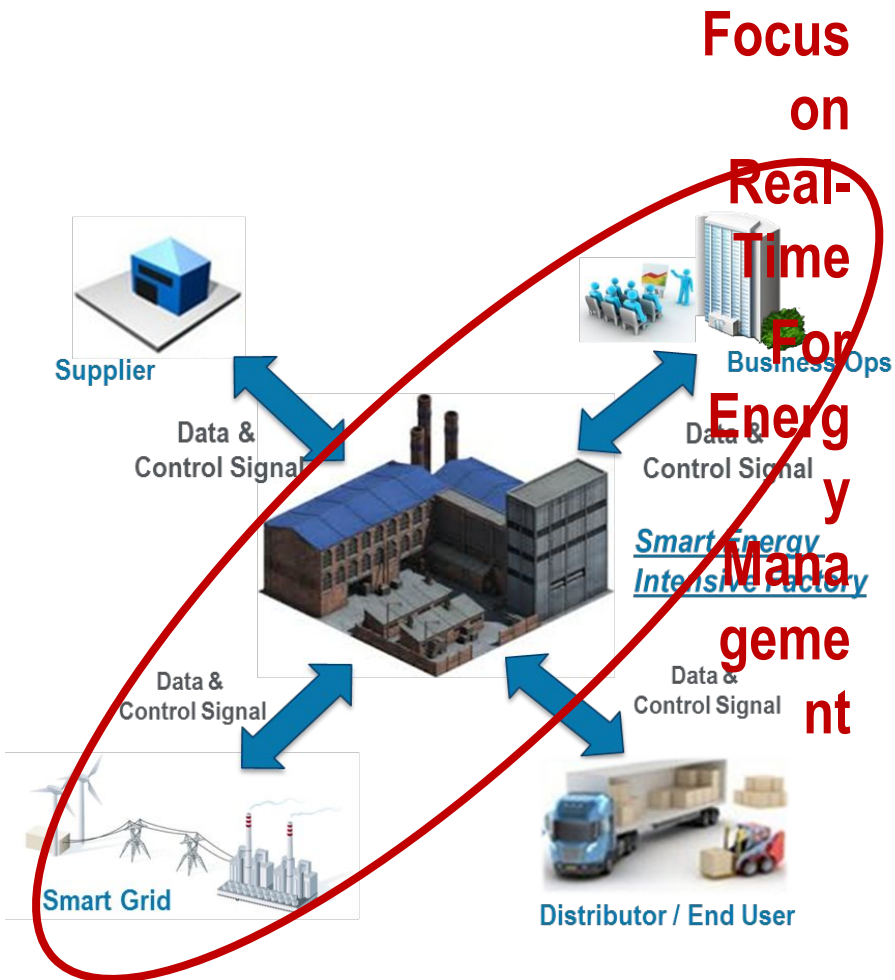
Institute for Advanced Composite Materials Innovation (IACMI)

Objective

Develop and demonstrate innovative technologies that will, within 10 years, make advanced fiber-reinforced polymer composites at...



Smart Manufacturing: Advanced Controls, Sensors, Models & Platforms for Energy Applications



Institute Goals:

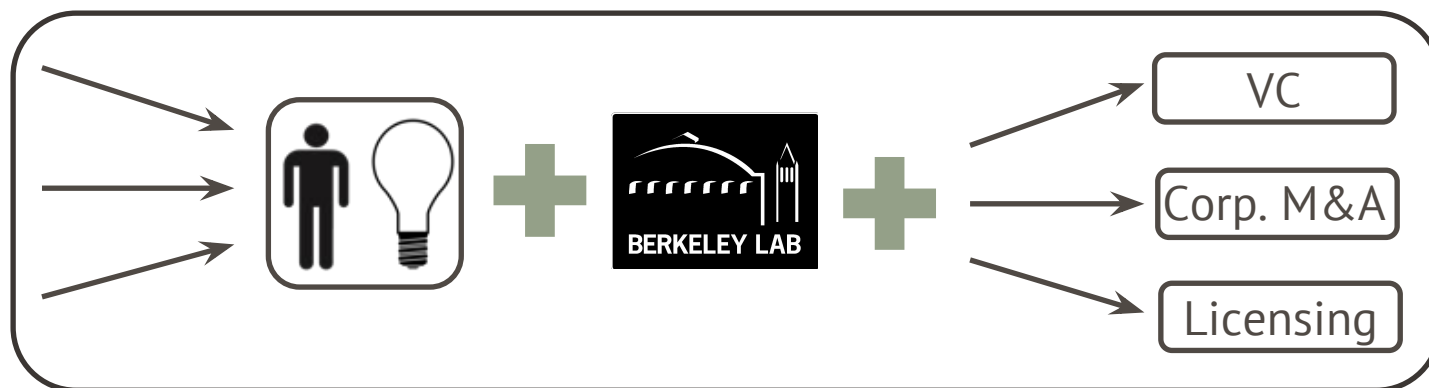
- >50% improvement in energy productivity
- >50% reduction in installation cost of Smart Manufacturing hardware and software
- 15% Improvement in Energy Efficiency at systems level
- Increase productivity and competitiveness across all manufacturing sectors

Applications received Jan. 29, 2016—Under Merit Review

Mission Innovation: Cyclotron Rd and Innovation Accelerators

Embedded Accelerator Model:

Let the nation's best energy innovators "spin in" to our national labs



1. **Recruit** the world's best energy technology innovators

2. **Leverage** experts and facilities at a world-class R&D institute

3. **Deploy** people, IP, and technology to the marketplace

...First pilot phase spurred **\$5 million in follow-on funding** and launched a **privately-funded startup** (Mosaic Materials)

What does Success Look Like?

**Energy Products
Invented Here...**



**...And Competitively
Made Here!**