



EERE NATIONAL LAB IMPACT SUMMIT



MAY 4, 2016
GOLDEN, COLORADO

AMO Public-Private Partnerships

- National Network for Manufacturing Innovation (NNMI) Institutes
- Manufacturing Demonstration Facility (MDF)
- Critical Materials Institute (CMI)
- High Performance Computing for Manufacturing (HPC4M)
- Cyclotron Rd

3 DOE Manufacturing Innovation Institutes



IACMI
Adv. Composites
Knoxville, TN

Power America
Power
Electronics
Raleigh, NC

Upcoming DOE Institutes:

Smart Manufacturing
TBA



*Smart
Mfg.*

**Modular Chemical
Process Intensification**
TBA



MCPI Mfg.

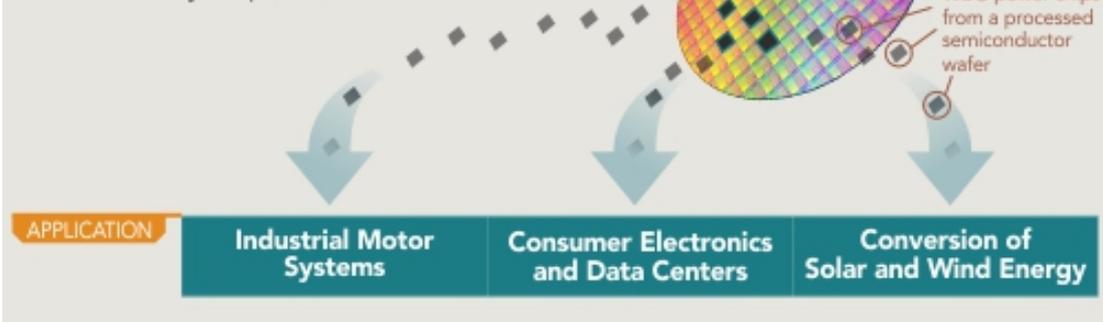
- Part of President's broader National Network for Manufacturing Innovation
- Institutes have attracted hundreds of companies and universities as active partners from across the country

...and one more topic in 2016 (FY16)

PowerAmerica: Next Generation Power Electronics

WIDE BANDGAP

Semiconductors
to increase the energy efficiency
and reliability of power electronics



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

Institute Mission:

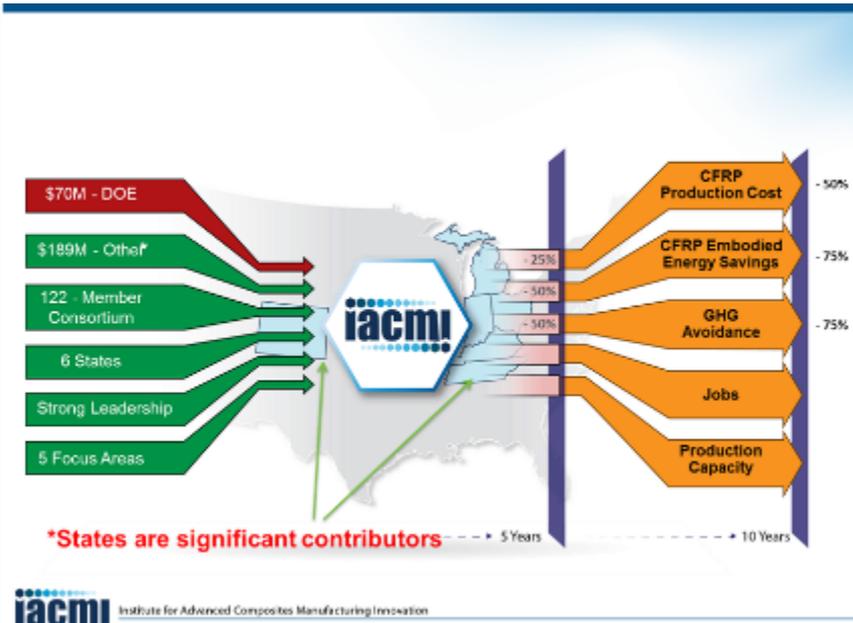
Develop advanced manufacturing processes that will enable large-scale production of wide band gap semiconductors

Institute for Advanced Composite Manufacturing Innovation

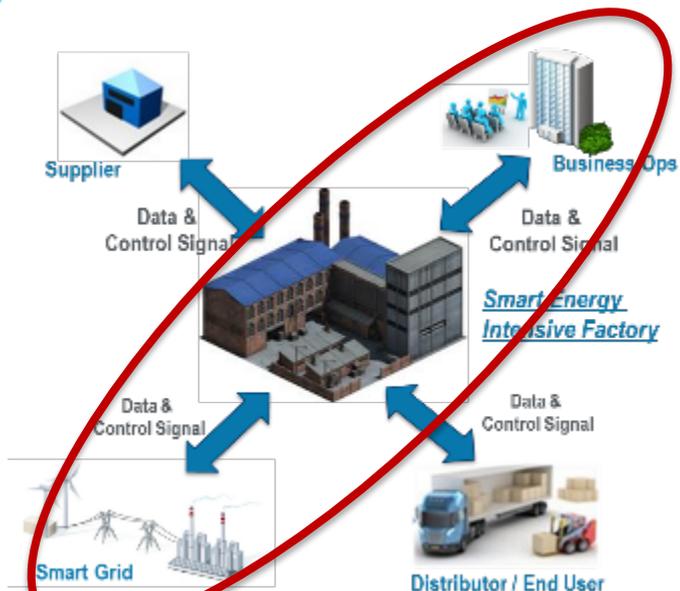
Institute Mission:

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

- 50% Lower Cost
- 75% Less Energy
- 95% Recycled material



Smart Manufacturing: Advanced Controls, Sensors and Models



**Focus on Real-Time
For Energy Management**

Institute Goals:

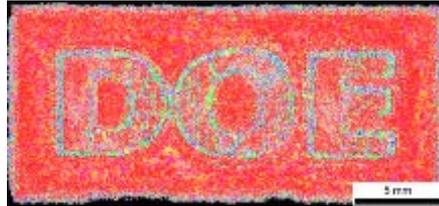
- **>50% improvement in energy productivity**
- **>50% reduction in installation cost of Smart Manufacturing hardware and software**
- **15% Improvement in Energy Efficiency at systems level**
- Increase productivity and competitiveness across all manufacturing sectors

Applications received Jan. 29, 2016—Under Merit Review

Manufacturing Demonstration Facility (MDF)

Supercomputing
Capabilities

Spallation
Neutron Source



Additive Manufacturing



Arcam electron beam processing
AM equipment



POM laser processing AM
equipment

Program goal is to accelerate the manufacturing capability of a multitude of AM technologies utilizing various materials from metals to polymers to composites.



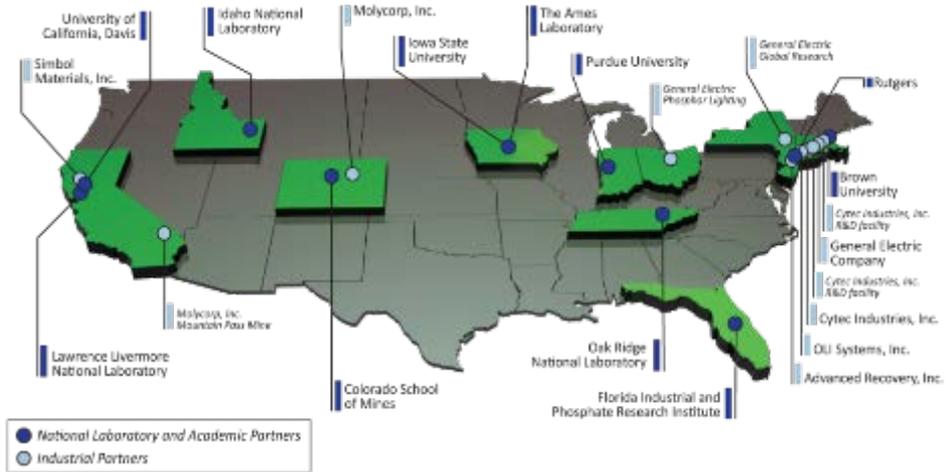
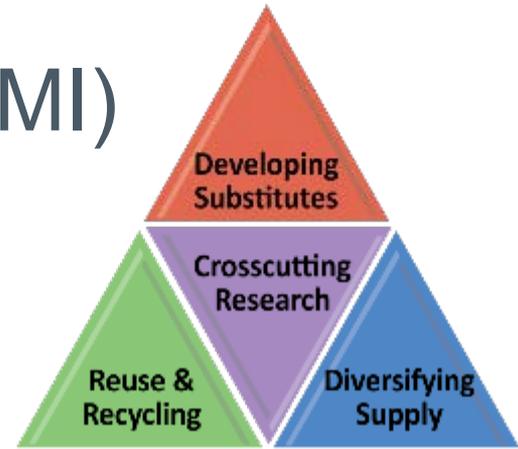
America Makes



Critical Materials Institute (CMI)

Eliminate materials criticality as an impediment to clean energy technologies

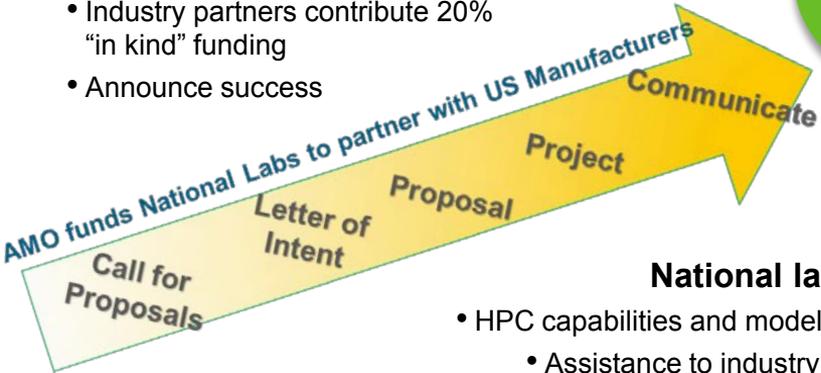
- Develop supply chains
- Commercialize technologies
- Up-to-date criticality assessments



HPC4Mfg: Advancing Manufacturing Innovation through High Performance Computing

U.S. Manufacturers, Industry Partners, and Consortia

- Identify industry challenge
- Industry partners contribute 20% “in kind” funding
- Announce success



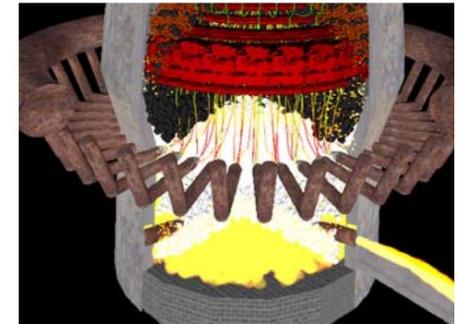
Increase Energy Efficiency - Advance Clean Energy Technologies

National laboratories provide

- HPC capabilities and modeling/simulation expertise
 - Assistance to industry to develop full proposal
- Develop standard CRADA sympathetic to protection of industry IP
 - DOE funding < \$300K



A computer simulation of a virtual blast furnace.



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)

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