

# Bio-Manufacturing: A strategic clean energy manufacturing opportunity

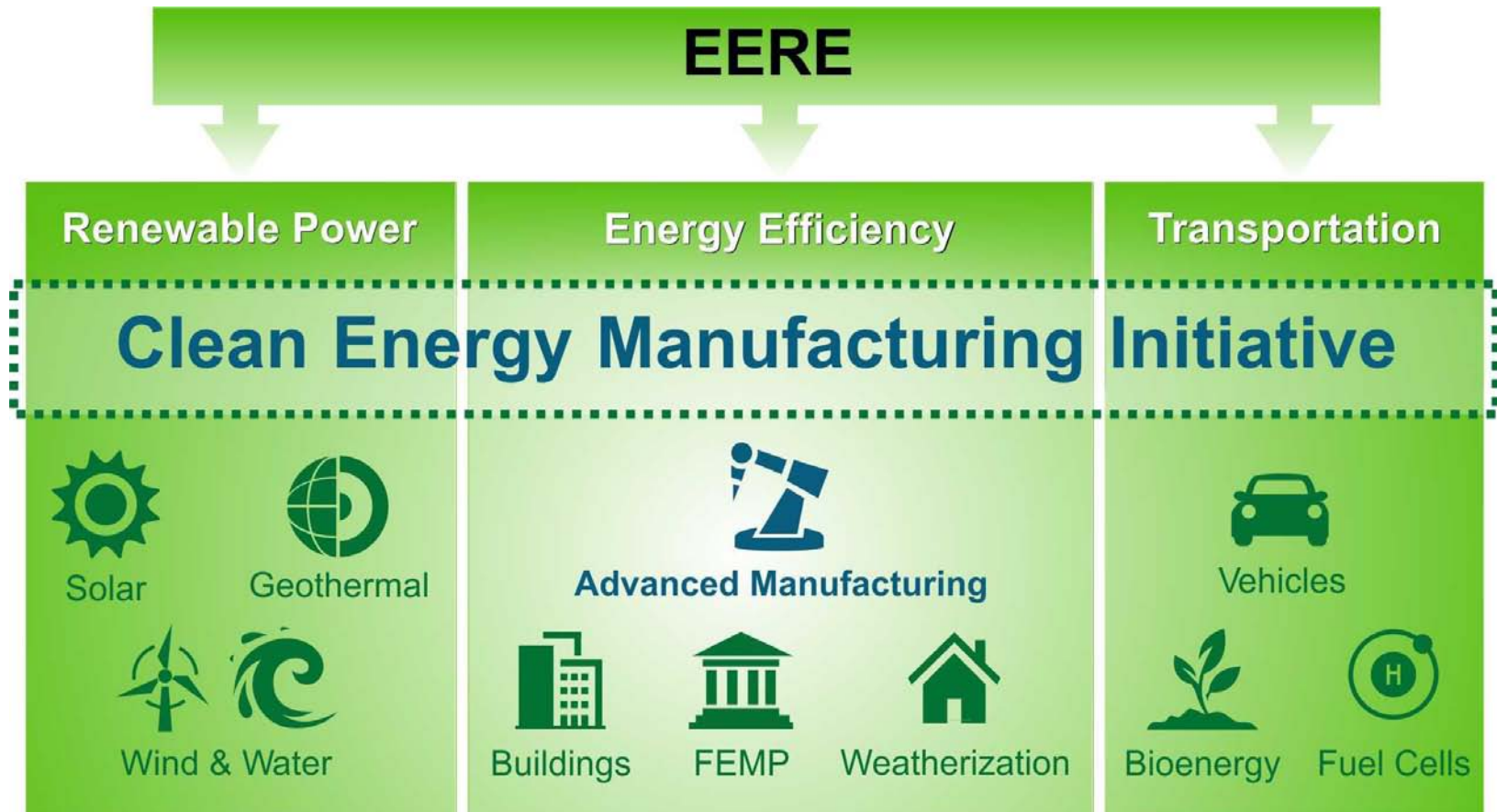


U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

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Director, Clean Energy Manufacturing Initiative  
Biomass 2013 7/31/2013

# Coordination of Clean Energy Manufacturing in EERE



Collaboration toward:

- Common goal to collectively ***increase U.S. manufacturing competitiveness***

Coordination for:

- Maximizing efficiency & synergy
- Translation of best practices
- Codifying universal models



# Clean Energy Manufacturing Initiative: 2 Objectives

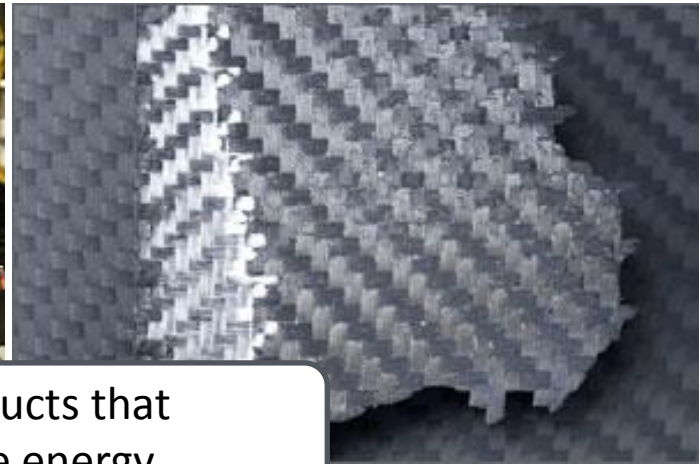
## 1. Increase U.S. competitiveness in the production of clean energy products



Products that generate clean energy



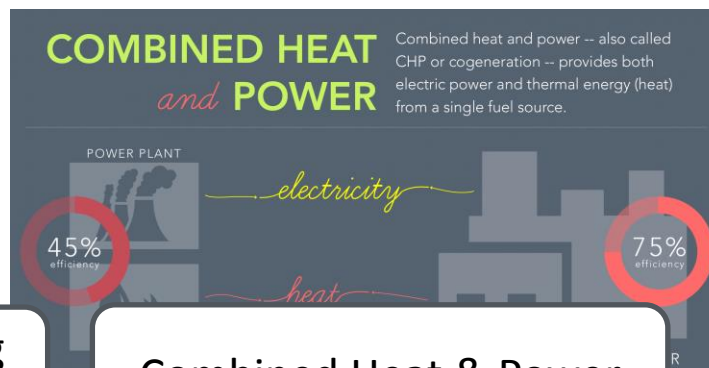
Products that save energy



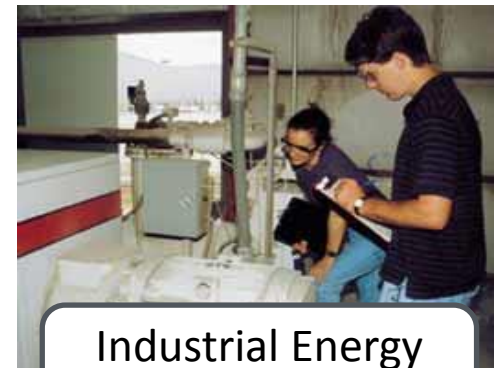
## 2. Increase U.S. manufacturing competitiveness across the board by increasing energy productivity



Advanced Manufacturing Technologies



Combined Heat & Power



Industrial Energy Efficiency

# President Obama's Manufacturing Focus

“The path towards sustainable energy sources will be long and sometimes difficult. But America cannot resist this transition; we must lead it. We cannot cede to other nations the technology that will power new jobs and new industries – we must claim its promise.”

*President Obama, Inaugural Address 2013*

“If we want a robust growing economy, we need a robust manufacturing sector. ... We cannot remain the world's engine of innovation without manufacturing activity.” *President Obama*



Presidential Manufacturing Strategy

Advanced Manufacturing Partnership

National Science & Technology Council

Advanced Manufacturing  
National Program Office

President Obama's Export  
Initiative & Trade Promotion

CEMI

Investing in Manufacturing  
Communities Partnership

Efficiency &  
Renewable Energy

# CEMI – Partnering across EERE on National Initiatives

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MEP • MANUFACTURING  
EXTENSION PARTNERSHIP



- Advanced Manufacturing National Program Office
  - NNMI
- National Export Initiative
  - RE4I Working Group
- Investing in Manufacturing Communities Program
  - Coordinate Technical Assistance
- NIST: Manufacturing Extension Partnership
  - Webinars
- DOE – DOD MOU

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# US Manufacturing Policy Milestones



**June 2011**

REPORT TO THE PRESIDENT ON  
ENSURING AMERICAN  
LEADERSHIP IN ADVANCED  
MANUFACTURING

Executive Office of the President  
President's Council of Advisors  
on Science and Technology

JUNE 2011



**February 2012**

A NATIONAL STRATEGIC  
PLAN FOR ADVANCED  
MANUFACTURING

Executive Office of the President  
National Science and Technology Council

FEBRUARY 2012



**July 2012**

REPORT TO THE PRESIDENT ON  
CAPTURING DOMESTIC  
COMPETITIVE ADVANTAGE IN  
ADVANCED MANUFACTURING

Executive Office of the President  
President's Council of Advisors on  
Science and Technology

JULY 2012



**January 2013**

NATIONAL NETWORK  
FOR MANUFACTURING  
INNOVATION:  
A PRELIMINARY DESIGN

Executive Office of the President  
National Science and Technology Council  
Advanced Manufacturing National Program Office

JANUARY 2013



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# Advanced Manufacturing Partnership: Top R&D



## REPORT TO THE PRESIDENT ON CAPTURING DOMESTIC COMPETITIVE ADVANTAGE IN ADVANCED MANUFACTURING

Executive Office of the President  
President's Council of Advisors on  
Science and Technology

JULY 2012



### REPORT TO THE PRESIDENT ON CAPTURING DOMESTIC COMPETITIVE ADVANTAGE IN ADVANCED MANUFACTURING

#### *Recommendation #2: Increase R&D Funding in Top Cross-Cutting Technologies*

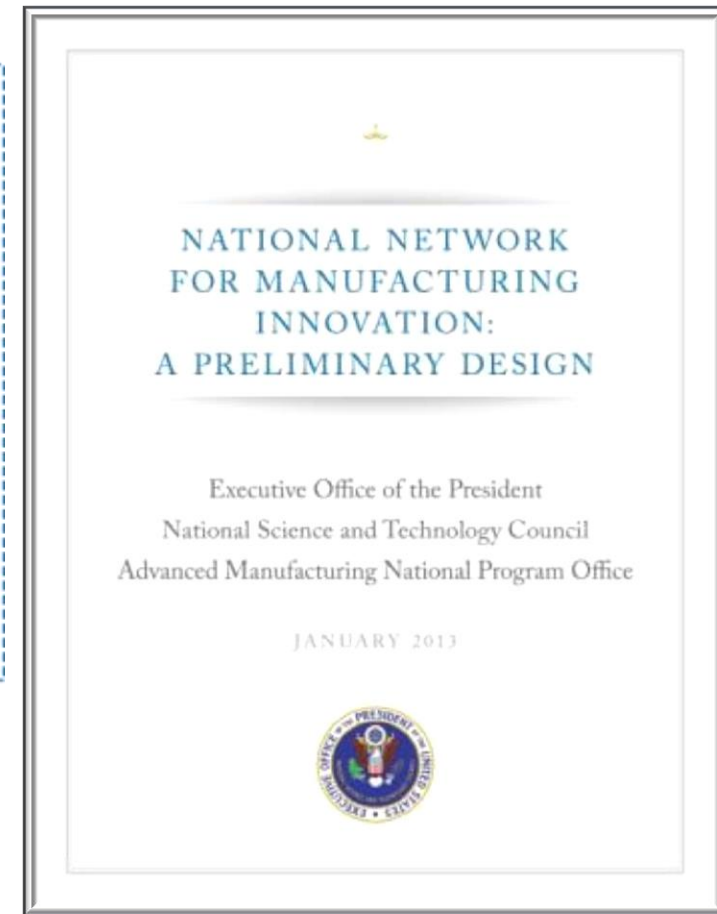
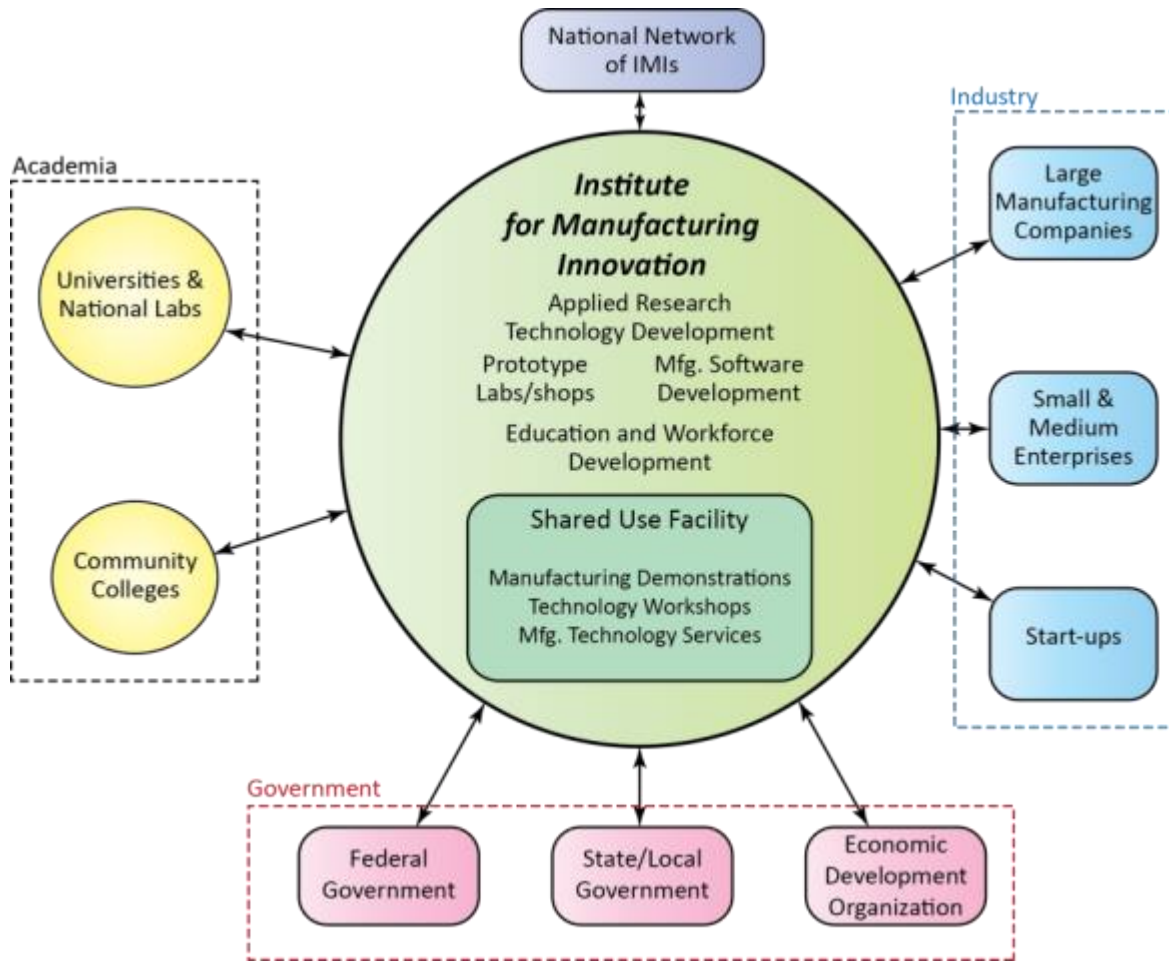
Eleven cross-cutting technology areas were selected as the initial list on which the Advanced Manufacturing National Program Office should focus its attention. While time did not permit the development of detailed technology roadmaps for each of these technologies, they consistently emerged as the top candidates for further consideration through consultations with key stakeholder groups, including the AMP Steering Committee itself, AMP Steering Committee Regional Meeting participants, and members of MAPI, the National Center for Manufacturing Sciences (NCMS) and the Association of Public and Land-grant Universities (APLU). (See [Annex 1](#).)

These technologies address key national needs such as defense, energy independence and efficiency, food security, homeland security, and health care. They are pivotal in enabling U.S. manufacturing competitiveness, both in terms of differentiation and tradability of goods. Universities, national labs, intermediate technology institutes, independent research institutions, and community colleges will need to work together with industry to support research, development, and deployment of these manufacturing technologies, and to develop the talent pipeline for industry.

- Advancing Sensing, Measurement, and Process Control
- Advanced Materials Design, Synthesis, and Processing
- Visualization, Informatics, and Digital Manufacturing Technologies
- Sustainable Manufacturing
- Nanomanufacturing
- Flexible Electronics Manufacturing
- **Biomanufacturing and Bioinformatics**
- Additive Manufacturing
- Advanced Manufacturing and Testing Equipment
- Industrial Robotics
- Advanced Forming and Joining Technologies

# National Network for Manufacturing Innovation

Obama Administration's vision for innovation





# Investing in Manufacturing Communities Partnership

## Obama Administration's vision for regional economic development

1

**Encourage local convening,  
take stock and develop an  
implementation-ready plan**

*FY13 grants, roundtables*

- Communities convene key players, evaluate comparative advantages, and identify key technologies or public goods investments that will promote manufacturing competitiveness
- 20 grants of up to \$500,000 each to develop economic plants

2

**Invest in  
public goods**

*FY14 challenge fund and  
enhanced funding coordination*

- Merit-based catalytic funding, matched by industry and localities will seed these economic strategies
- DOC-EDA grants act as the initial investment in communities' development plans (~\$20-25m)
- Federal funding is aligned through preference for and supplemental funding for IMCP winners

3

**Advance sustainable  
Growth**

*Ongoing technical assistance*

- Provided to winners and non-winners
- Technical assistance incentivizes transformation and capacity-building, helping communities to develop and implement workable plans

# Trade Promotion

- In support of President Obama's Export Initiative
- Collection of commitments across 8 federal agencies
- Advised by Federal Advisory Committee
- Recommit to breaking down trade barriers
- Increase trade promotion
- 23 commitments so far

## Renewable Energy and Energy Efficiency Export Initiative



# Clean Energy Manufacturing Initiative

*Official launch on March 26, 2013*

## Components of Initiative

1. Manufacturing R&D:  
**>\$500 M in FY14 Request**
2. Facilities for manufacturing innovation & demonstration:  
**Wide Band Gap Power Electronics Manufacturing Institute**
3. Energy productivity
4. Competitiveness analysis
5. Partnerships & engagement



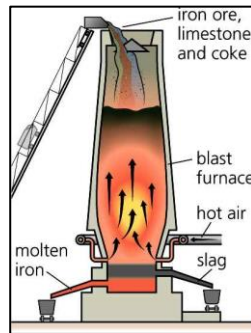


# CEMI: EERE Manufacturing Resources

## Manufacturing R&D

### Energy Intensive Manufacturing Processes

### Clean Energy Technologies



## Manufacturing Energy Efficiency

- Industrial Assessment Centers



- Clean Energy Application Centers
- Better Plants Challenge



## Manufacturing R&D Facilities

### Manufacturing Demonstration Facility



National Additive Manufacturing  
Innovation Institute - Pilot

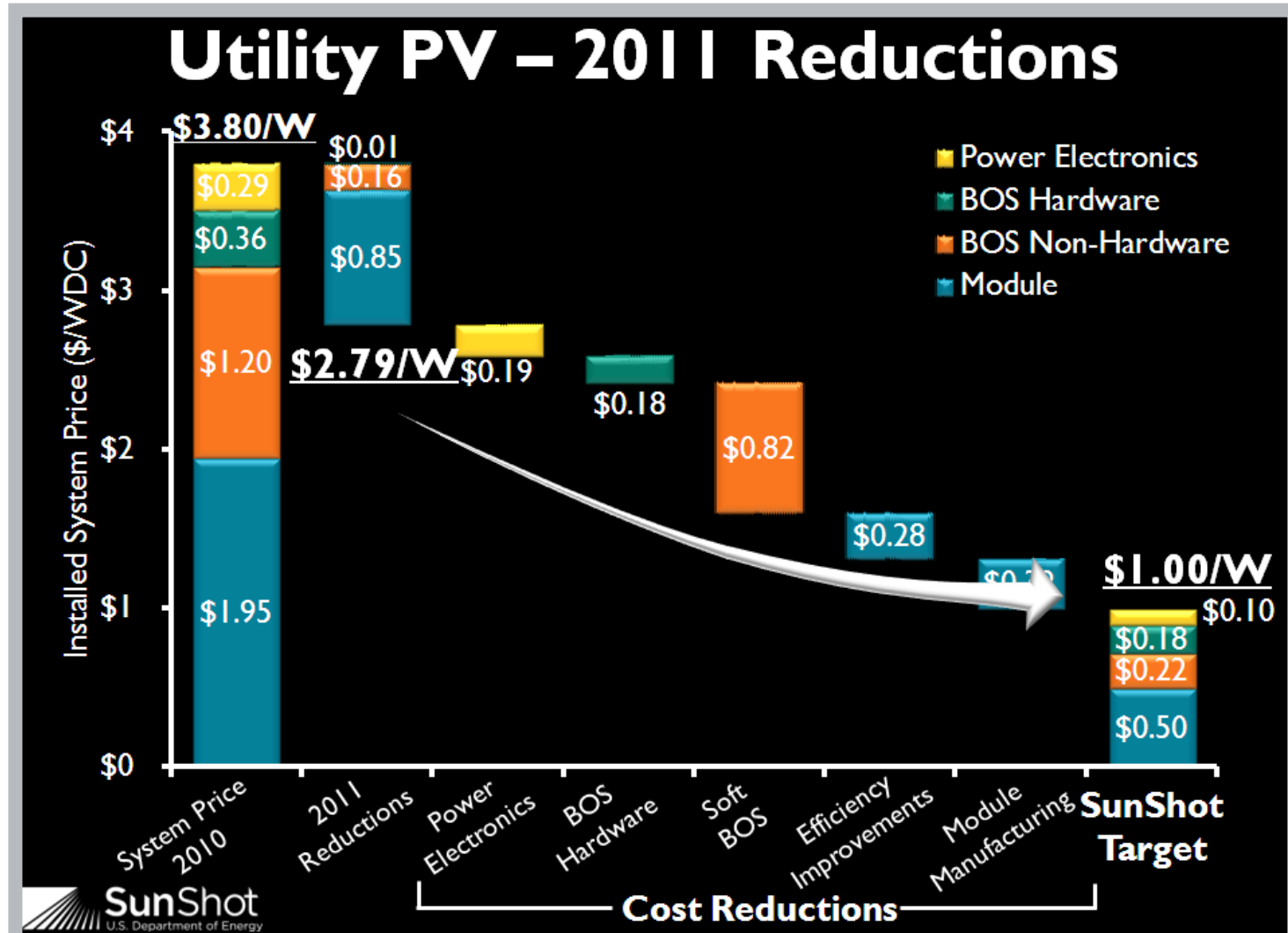
### Manufacturing Institutes

Now released for  
competition:

**Next Generation  
Power Electronics  
Manufacturing  
Innovation Institute**

# CEMI: Competitiveness Analysis

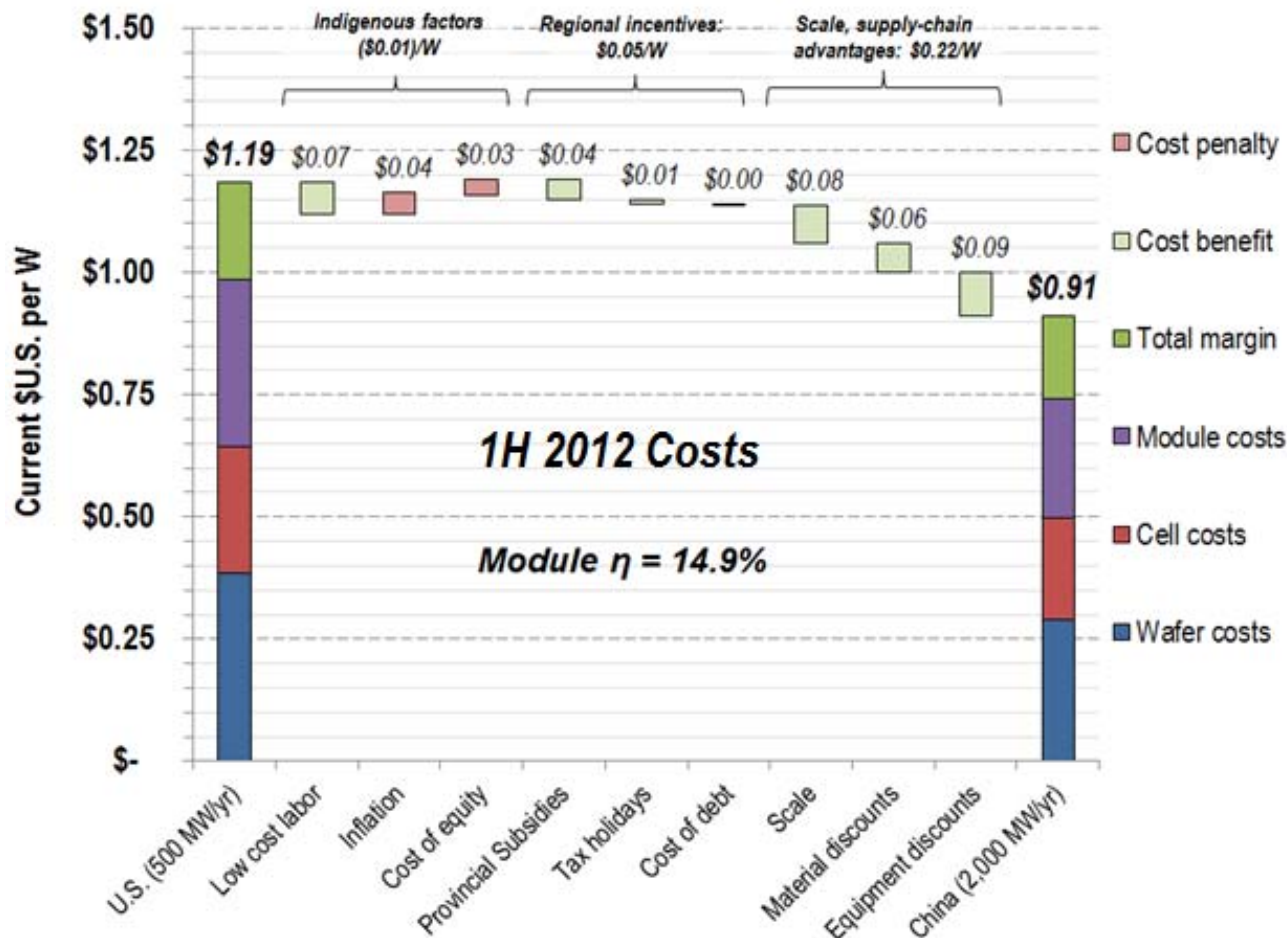
## Current Technical Analysis



Source: SunShot Vision

# CEMI: Competitiveness Analysis

## Silicon PV: Comparative Cost Assessment



Source: Original Clean Energy Manufacturing Initiative – SunShot research

Goodrich, A.; Buonassisi, T.; Powell, D.; James, T. "Assessing the Drivers of Regional Trends in Solar Photovoltaic Manufacturing", E&ES (submitted), October 2012.

NREL chart using data from Mints, P.; Donnelly, J. (2011). "Photovoltaic Manufacturing Capacity and Competitive Analysis 2010/2011." Report NPS-Supply 6, Navigant Solar Services Program. Palo Alto, CA.

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# CEMI: Council on Competitiveness & Public-Private Partnerships



Collaboration to create a  
Public-Private-Partnership

*Regional Design Dialogues*



*Annual Summit in  
Washington DC  
December 12*

# CEMI: Regional Summits

- Showcase regional Clean Energy Manufacturing activities, opportunities, priorities, and success stories
- Highlight EERE and Federal Clean Energy Manufacturing resources, including Investing in Manufacturing Communities
- Seek input on how the Initiative can strengthen national & regional manufacturing competitiveness
- Foster regional stakeholder networking and partnerships

