



**EPRI**

ELECTRIC POWER  
RESEARCH INSTITUTE

## Advanced Manufacturing

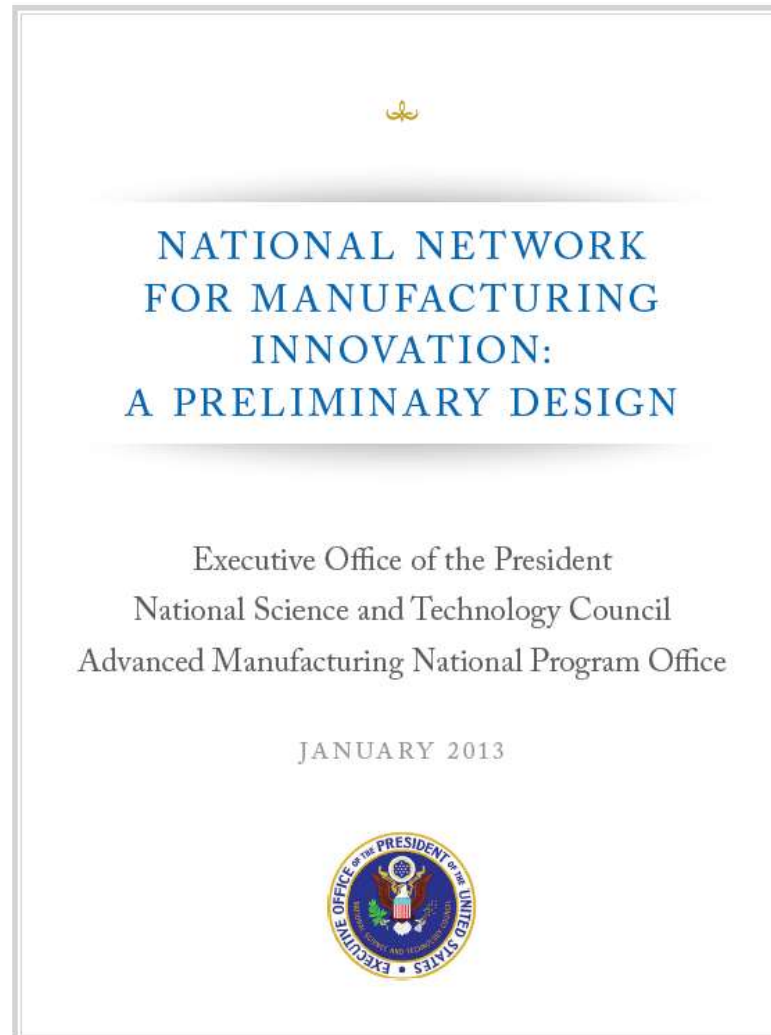
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Director, Washington & State Relations

**NASEO-ASERTTI Annual Conference**

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# National Network for Manufacturing Innovation



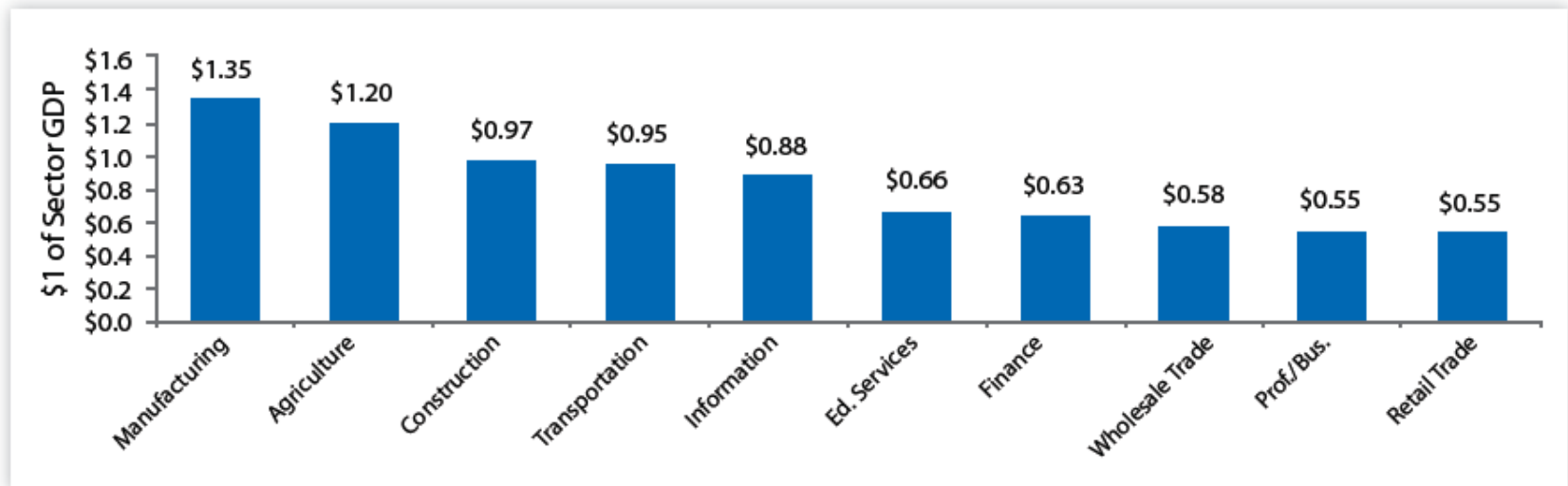
# Background

- Manufacturing constituted 12.2% (\$1.7 trillion) of GDP in 2011
  - \$1 spent in manufacturing drives \$1.35 in economic activity
  - 86% of all US goods exported in 2011
  - World Economic Forum: over 70% of income variations of 128 nations are explained by differences in manufacturing product export
  - The nature of manufacturing itself is undergoing transformative change

# President's Council of Advisors on Science & Technology -- 2012

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

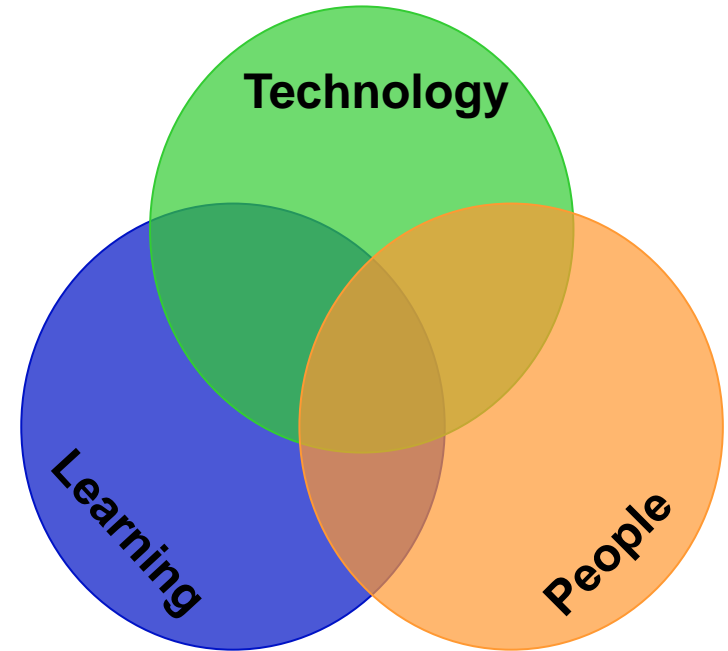
**Figure 1. Economic Activity Generated by \$1 of Sector Output, 2010**



Source: AMP Steering Committee based on data from Bureau of Economic Analysis, Input-Output Tables available at [www.bea.gov/iTable/index\\_industry.cfm](http://www.bea.gov/iTable/index_industry.cfm).

# Background

- Business Impact report on Advanced Manufacturing (MIT, July 2011): between 2000 - 2010, US manufacturing jobs declined 34%
- Advanced manufacturing is emerging as an especially potent driver of future economic growth especially during next 20 years.
- Annual Energy Review 2010: manufacturing accounts for:
  - ✓ 12 million US jobs
  - ✓ 30% of all energy consumption



# Background: US response

- In June 2011, President Obama announced Advanced Manufacturing Initiative inviting input from manufacturers, academia, and local governments to develop a comprehensive national plan.
- Led by Commerce (NIST), other agencies joined: DHS, DOD, Labor, EPA, and DOE's Advanced Manufacturing Office.
- Proposed \$1 billion investment -- coordinated by Advanced Manufacturing National Program Office (AMNPO) – to establish 15 Institutes.

# National Network for Manufacturing Innovation

- Objective: to solicit 2012 input on NNMI in four categories—
  - ✓ Technologies with Broad Impact
  - ✓ Institute Structure and Governance
  - ✓ Strategies for Sustainable Institute Operations
  - ✓ Education and Workforce Development



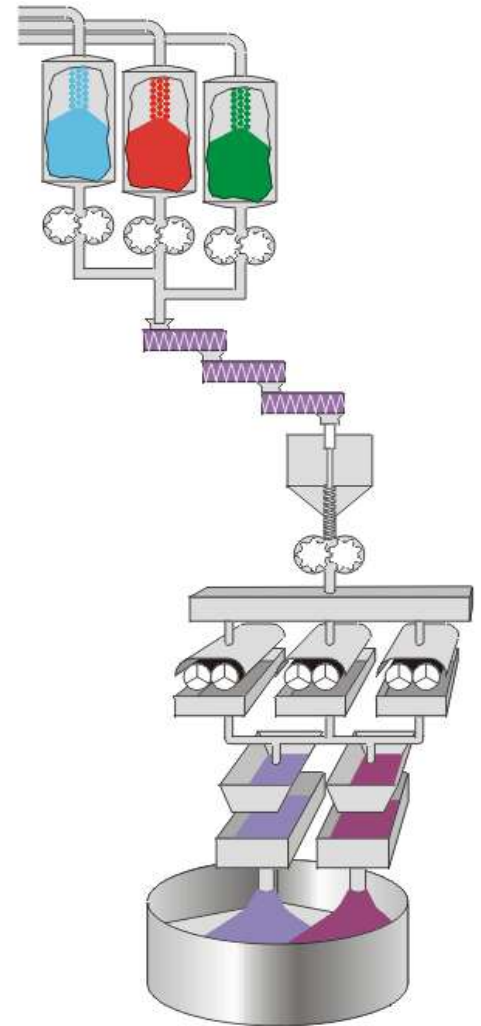
# Background: US competitiveness

- Infrastructure strengths: “world-class university system, strong intellectual property protection, sophisticated managerial talent, ready access to capital, huge domestic market” [2011 National Research Council report]
- To maximize success, regional innovation clusters should: leverage local strengths, encourage self-organization, pool resources, share risks, grow a trained workforce, connect with local universities and laboratories, provide long-term commitment, provide incentives, monitor & measure industry needs.
- EPRI is collaborating with other public / private stakeholders in the Smart Manufacturing Leadership Committee.



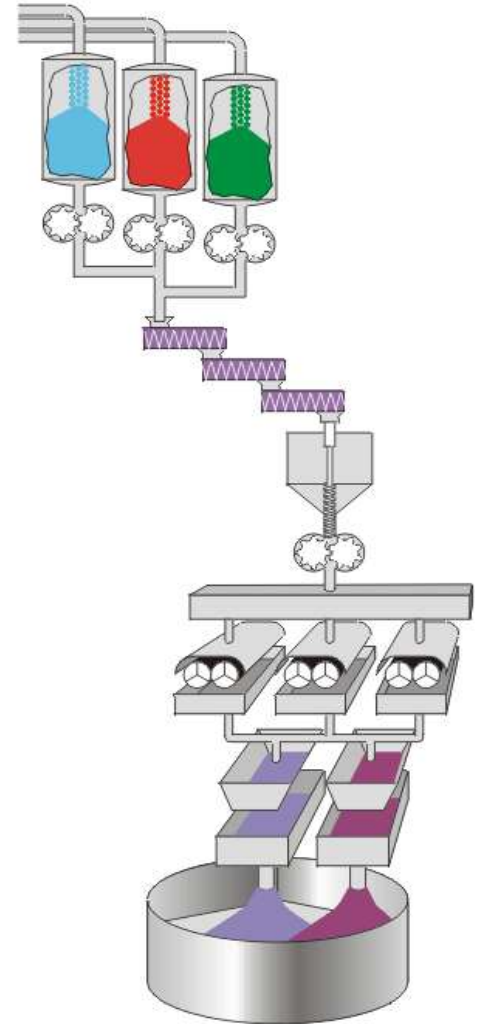
# What is advanced manufacturing?

- **Manufacturing has changed** over past few decades
  - **From** labor intensive set of mechanical processes (traditional manufacturing)
  - **To** a sophisticated set of information-technology-based processes (advanced manufacturing)



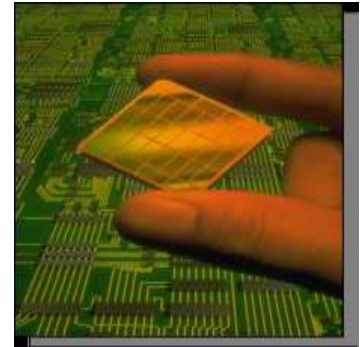
# What is advanced manufacturing?

- A distinguishing feature of **advanced manufacturing** is its continual improvement in processes and rapid introduction of new products.
- It is these paradigm-shifting aspects of advanced manufacturing that have the most potential to spin off entirely new industries.



# What is advanced manufacturing focused on?

- **Key technology areas** where advanced manufacturing could accelerate innovation, because they can **act as platforms** upon which other technologies or processes can be built:
  - **Semiconductors**
  - **Advanced materials** (with a focus on integrated computational materials engineering)
  - **Additive manufacturing**
  - **Bio-manufacturing** (with a focus on synthetic biology)



# Network-Based Manufacturing

Actionable business & operations



Business Systems, ERP

Increased performance, efficiency & productivity

Tracking & traceability

Supply Chain

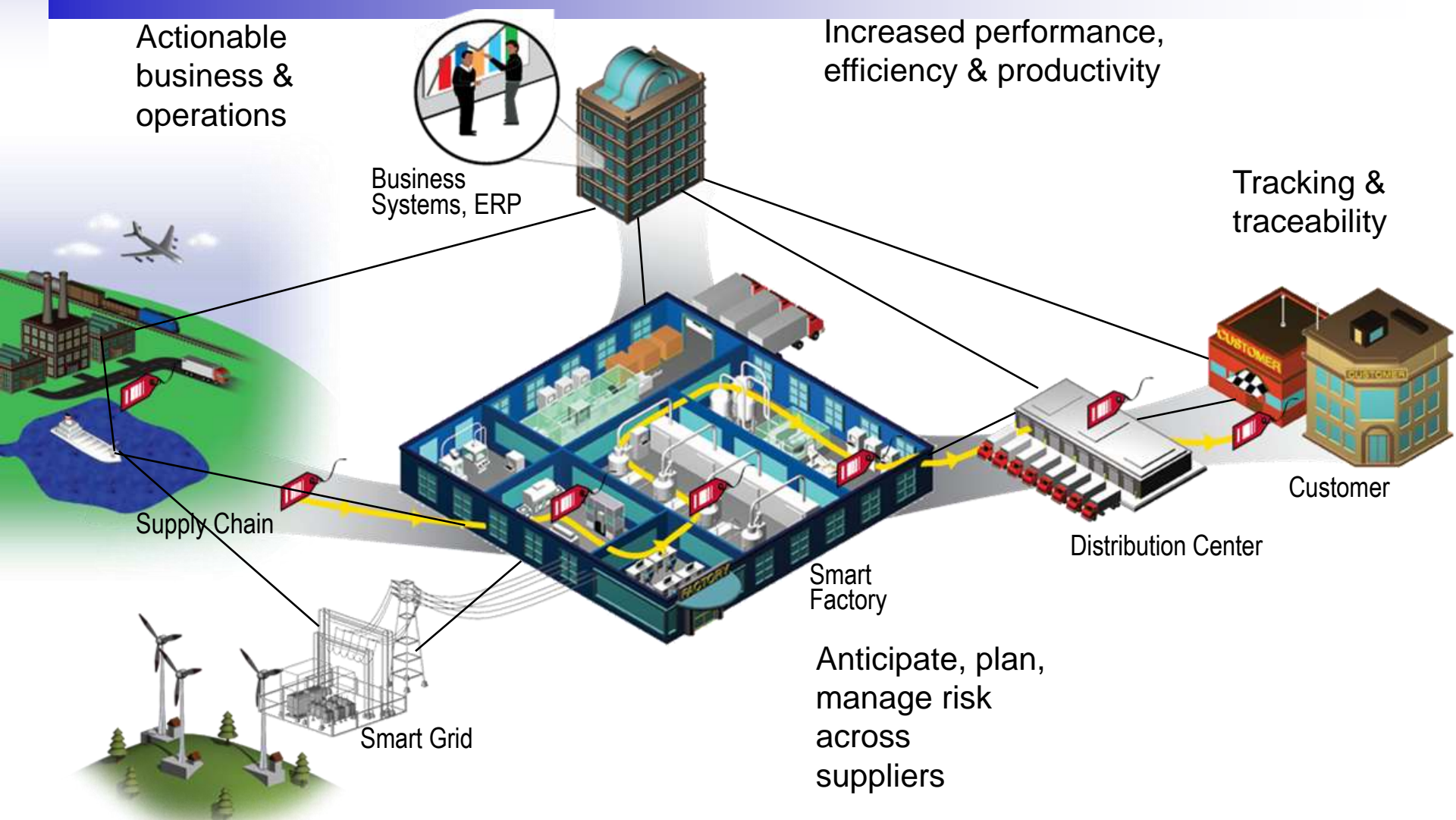
Smart Grid

Smart Factory

Distribution Center

Customer

Anticipate, plan, manage risk across suppliers

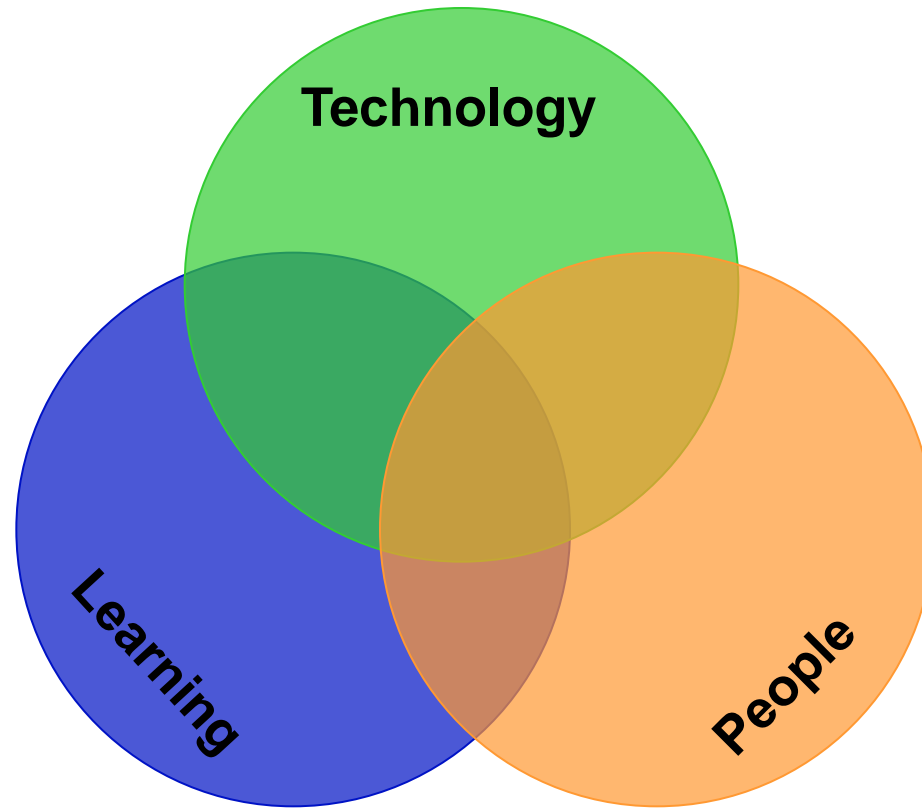


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# Why get involved?

- **Opportunity to shape the future of electricity:**
  - Understand new advanced loads, processes and their characteristics as related to novel manufacturing
  - Prepare required infrastructure to accommodate these loads
  - Promote sustainable manufacturing and growth through innovative technologies
  - Contribute to regional economy by retaining/developing jobs in companies that are better positioned for global competition

# Workforce Opportunities



# An Invitation

- What is mission critical?
  - RD&D of new energy-efficient manufacturing processes to reduce the energy intensity and life-cycle energy consumption of manufactured products
  - Reduce energy consumption across product life-cycle by 50% over 10 years by targeting the production, use, and/or deployment of advanced manufacturing technologies.
  - Encourage formation of regional consortia-type teams to apply for government funding



# Together...Shaping the Future of Electricity