U.S. D.O.E. Office of Energy Efficiency and Renewable Energy

Advanced Manufacturing Office

(formerly Industrial Technologies Program)

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AMO Overview

Office Goals and National Importance

National

- **President's Advanced Manufacturing Partnership**: $120 Million for innovative manufacturing processes and materials
- **President's Materials Genome Initiative**: Decrease time-to-market for advanced materials by 50%
- **President's Better Buildings, Better Plants Goal:** Upgrade energy performance of buildings including industrial plants by a minimum of 20% by 2020.

Program

- Reduce the energy intensity and life-cycle energy consumption of manufactured goods and promote a corporate culture of continuous improvement in energy efficiency among existing facilities and manufacturers

Sub-program

- **Next Generation Materials Goal:** Reduce energy consumption of manufactured goods across product life-cycles by 50% over 10 years
- **Next Generation Manufacturing Process Goal:** Reduce energy consumption of manufactured goods across product life-cycles by 50% over 10 years
- **Technology Deployment Goal:** 10,000 plants continually improving energy management through supply chains and Better Plants companies

Project

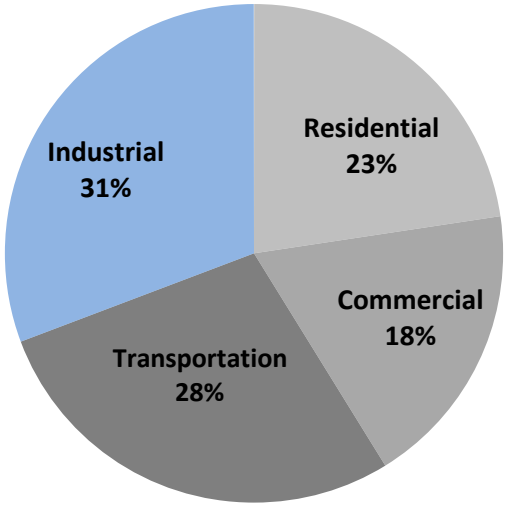
- e.g. Demonstrate an electrolytic net-shape Ti process at a scale convincing to manufacturers that consumes 50% less energy at a cost less than conventional technologies in 3 years.
- e.g. Certify 750 plants for Superior Energy Performance by 2015

Industrial Energy Use: Background and Opportunity

U.S. Industry and Manufacturing:

- Constitutes 11% of GDP
- Employs 12 million people
- Employs 60% of engineers and scientists
- Accounts for ~30% of all energy consumption in the United States

2010 U.S. total primary energy consumption*



*Includes total primary energy direct use and electricity use in end-use sectors including losses
Source: *Annual Energy Review 2010*, US EIA

AMO programs target:

- Research, Development and Demonstration of new, advanced processes and materials technologies that reduce energy consumption for manufactured products and enable life-cycle energy savings
- Efficiency opportunities through deployment of known technologies to existing manufacturing practices, especially for energy-intensive steam, process heating, and machine drive end-uses

Advanced Manufacturing Office

Office Mission:

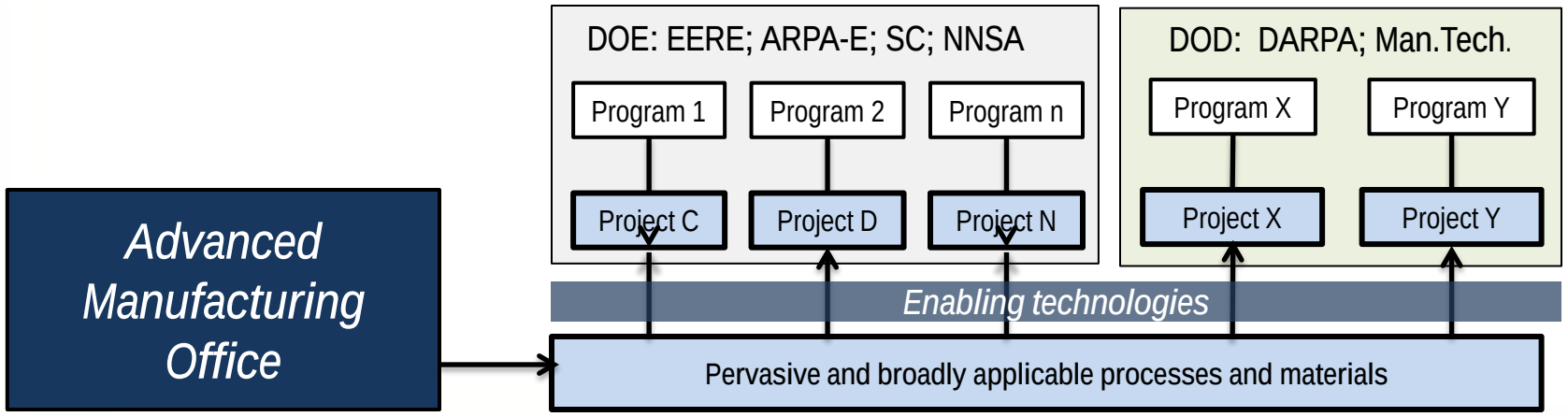
Research, Develop, and Demonstrate new energy-efficient manufacturing processes and materials technologies at a convincing scale to reduce the energy intensity and life-cycle energy consumption of manufactured products and promote a corporate culture of continuous improvement in energy efficiency among existing facilities and manufacturers

Office Goal:

Reduce energy consumption of manufactured goods across product life-cycles by 50% over 10 years by targeting the production, use, and/or deployment of advanced manufacturing technologies

Office Approach:

Co-invest with other agencies/industry to produce and deploy technologies
at a scale meaningful to manufacturers



Advanced Manufacturing Office

Office Overview | Research, Development and Demonstration | Technology Deployment

Next Generation Materials

Pervasive materials technologies that lead to better products

Next Generation Manufacturing Processes

Broadly applicable processes that lead to better production

Technology Deployment

Promote better energy use practices to capture U.S. competitive advantage

Technology Research, Development, and Demonstration Programs

- Innovative Manufacturing Initiative (IMI) solicitation
- Manufacturing Demonstration Facilities (MDF)
- Manufacturing Challenges
- Lab/Industry manufacturing awards
- Manufacturing internship programs
- Advanced manufacturing city/state/industry/university regional clusters for manufacturing and material technologies
- Industry/lab collaborative “sandbox” facilities

Targeted Partnerships

- Better Buildings, Better Plants
- Superior Energy Performance
- Workforce Development
- Clean Energy Application Centers
- Partnerships

TRL 2-6 → TRL 2-8 → TRL 9-10

RD&D: Vision, Mission, and Goal

Mission: Research, Develop, and Demonstrate new energy-efficient manufacturing processes and materials technologies at a convincing scale to reduce the energy intensity and life-cycle energy consumption of manufactured products

Vision: Establish public-private partnerships that effectively leverage existing basic research resources by swiftly developing and demonstrating technologies through focused investments in the technology "Valley of Death":

- *Invest in generic, broadly applicable manufacturing processes*
- *Invest in pervasive materials technologies* with the potential to affect product life-cycles
- *Increase private-sector access to advanced manufacturing tools and resources* through federal, industry, national lab and academic collaborative partnerships, centers, and awards

Goal: Reduce energy consumption of manufactured goods across product life-cycles by 50% over 10 years by targeting the production of advanced manufacturing technologies

Technology Deployment: Vision, Mission, and Goal

Mission:

Accelerate improved energy efficiency *throughout* the manufacturing supply chain.

Vision:

A more adaptable, energy-efficient, and globally competitive manufacturing sector.

- *Culture change:* Energy efficiency firmly established as a pervasive and effective approach for strengthening competitiveness.
- *Widespread adoption:* Increased investments in advanced energy-efficient technologies, including CHP, and best practices.
- *Energy efficiency market:* Vibrant and self-sustaining energy management services, technologies, and system solutions available with well-trained energy professionals.
- *Lifecycle approach*: Increased ability of manufacturers to measure and actively reduce embedded energy in manufactured products across the supply chain.

Goals:

- By 2015, establish continuous improvement *energy management* programs in 10,000 U.S. manufacturing facilities that represent over 30% of the overall manufacturing energy footprint, enabling *accelerated adoption of advanced technology to save 330 TBtu per year.*
- By 2020, 40 gigawatts (GW) of new, cost-effective combined heat & power (CHP), *saving nearly 1 quad of energy.*

Program Structure – Three Program Thrusts

End-User Engagement

- Better Buildings, Better Plants
  - Challenge
  - Program
  - Supply chain engagement
  - Annual energy efficiency awards
- Regional Clean Energy Application Centers
- SME outreach through IACs

Energy Management and Technology Deployment Resources

- Superior Energy Performance
  - ISO 50001, M&V Protocol, certification
- Workforce development
  - IAC student training
  - Certified Practitioner programs
- Energy management resources
  - eGuide for ISO 50001
  - eGuide Lite
  - EnPI Tool 2.0
  - Energy system tools
  - Online training, information, webinars
- Technology forums
- Regional Clean Energy Application Centers

Outreach Partnerships

- Utilities
- States
- SEE Action IEE/CHP Working Group
- Federal partners