



U.S. Department of Energy
Energy Efficiency and Renewable Energy

industrial technologies program

DOE-Industry Partnerships at Work: Lost Foam Casting Research

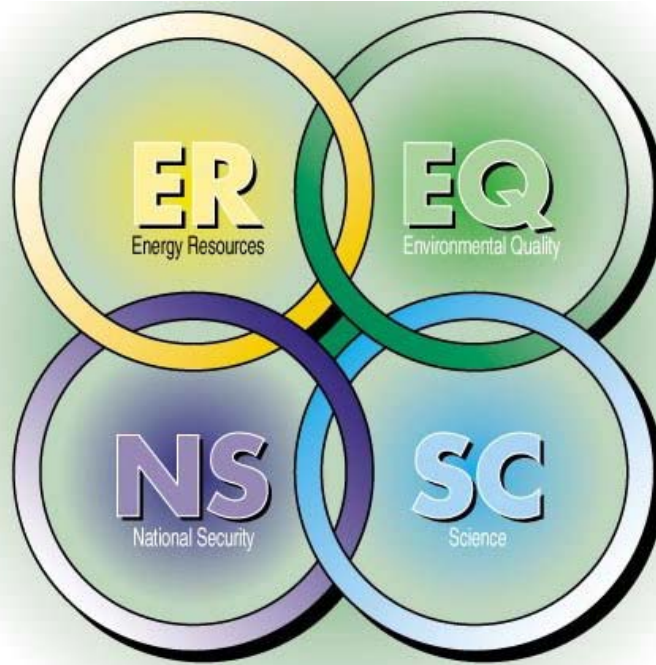
Presented to
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by
Buddy Garland
Program Manager
Industrial Technologies Program



U.S. Department of Energy
Energy Efficiency and Renewable Energy

Energy
Resources

National
Security



Environmental
Quality

Science

**DOE is the THIRD largest government sponsor of
basic research and FOURTH largest sponsor of
applied research in the United States.**

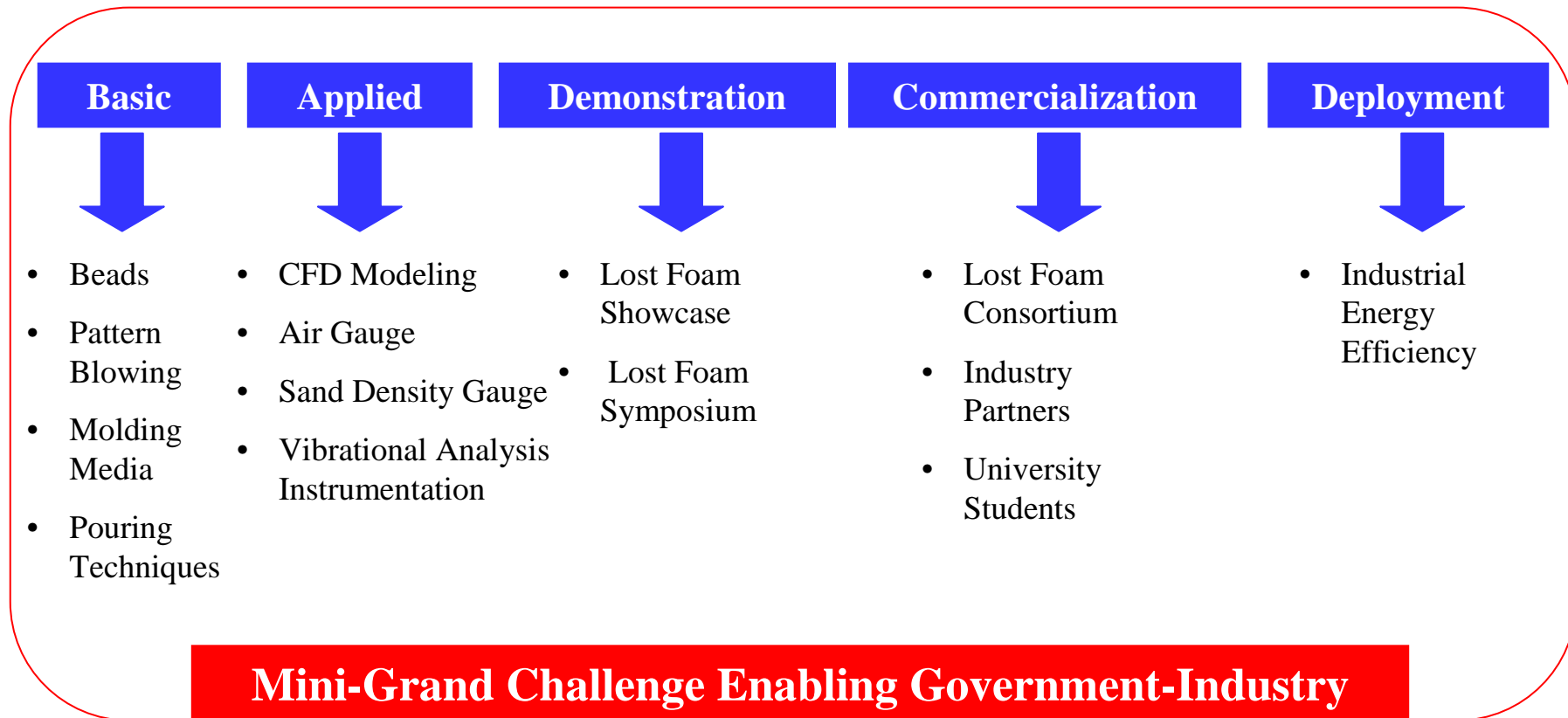


Lessons Learned

- **Learn from your peers**
- **Take action back home**
- **Include your peers**



Full Cycle of Government-Industry Collaboration



Mini-Grand Challenge Enabling Government-Industry Partnerships To Meet National Energy Policy Goals



Lost Foam Process



- **Ability to produce complex parts and shapes**
- **Allows designers to consolidate parts and reduce machining and assembly**
- **New process controls measures developed**
- **Significant leap in technical understanding of lost foam process**





Partnership Impacts

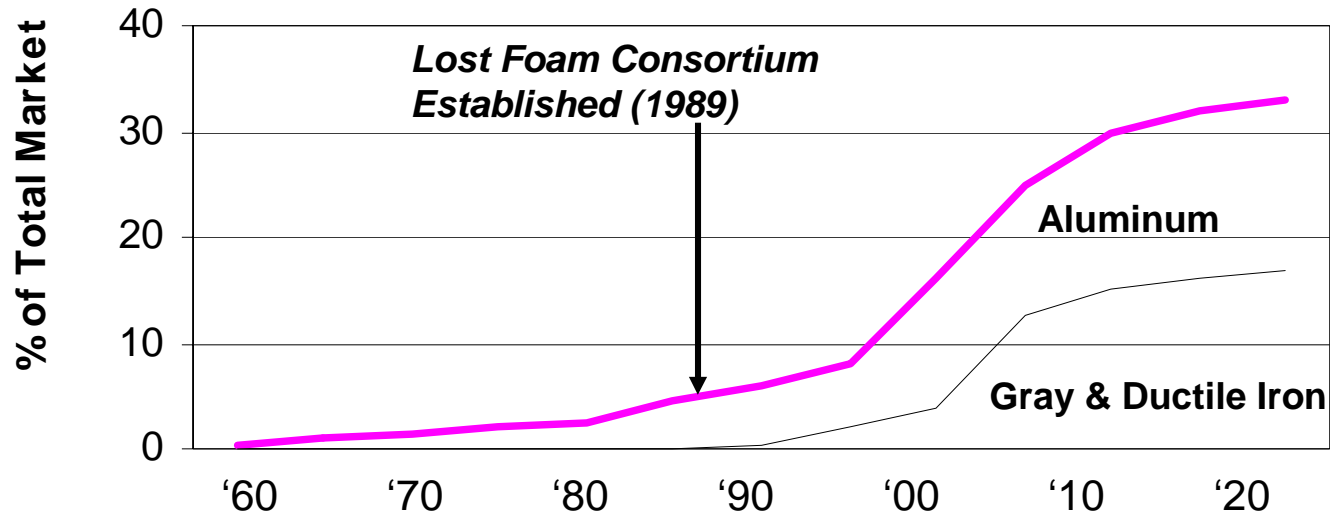
- Rapid Market growth in Lost Foam
 - Slow technology growth since 1950
- Accelerating path from *Vision* to *Reality*
- Increasing information sharing and collaboration
- Increasing technology transfer
- Increasing technical capability at U.S. universities
 - Enhancing U.S. technical curriculum
 - Exposing U.S. students to base industries



Rapid Market Growth

An estimated 9.4 million tons of castings will be offset by lost foam (1994 – 2005) saving an estimated 3 trillion Btu

Lost Foam Casting as a Percent of Aluminum and Iron Casting Markets





Partners

University of Alabama-Birmingham – Coordinates various tasks and coordinates real-time X-ray visualization of metal fill studies.

University of Missouri – Rolla –Determines causes for defects

Flow Science – Improves fill and solidification

Arena Flow – Extends bead fill and steaming code.

Walford Technologies – Determines escape paths of gases and liquid components using Infra-Red cameras and Real Time X-Ray.

Lost Foam Foundries

Fundilag
Citation Foam Casting
Teksid Aluminum Components
Mueller Company
Willard Industries
General Aluminum
Nemak

Coating Suppliers

Ashland Chemical
HA International
Southeastern Foundry Products

Automotive Powertrain

General Motors
BMW
Montupet

Marine Products

Mercury Marine
Bombardier

Casting Buyers

Copeland Corporation
Kohler General

Bead Suppliers

Styrochem International

Modeling and Analysis

Procast (UES)
Magma Technologies

Pattern Suppliers

Foseco Morval

Equipment Suppliers

Vulcan Engineering
General Kinematics
Reference Tool



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