

Advanced Manufacturing Office

U.S. Department of Energy

DOE Workshop:

Microwave (MW) and Radio Frequency (RF) as Enabling Technologies for
Advanced Manufacturing

Venue:

The 2nd Global Congress on Microwave Energy Applications (2GCMEA)

July 25, 2012

Long Beach Hilton

Long Beach, CA

Rob Ivester

Acting Deputy Program Manager, Advanced Manufacturing Office

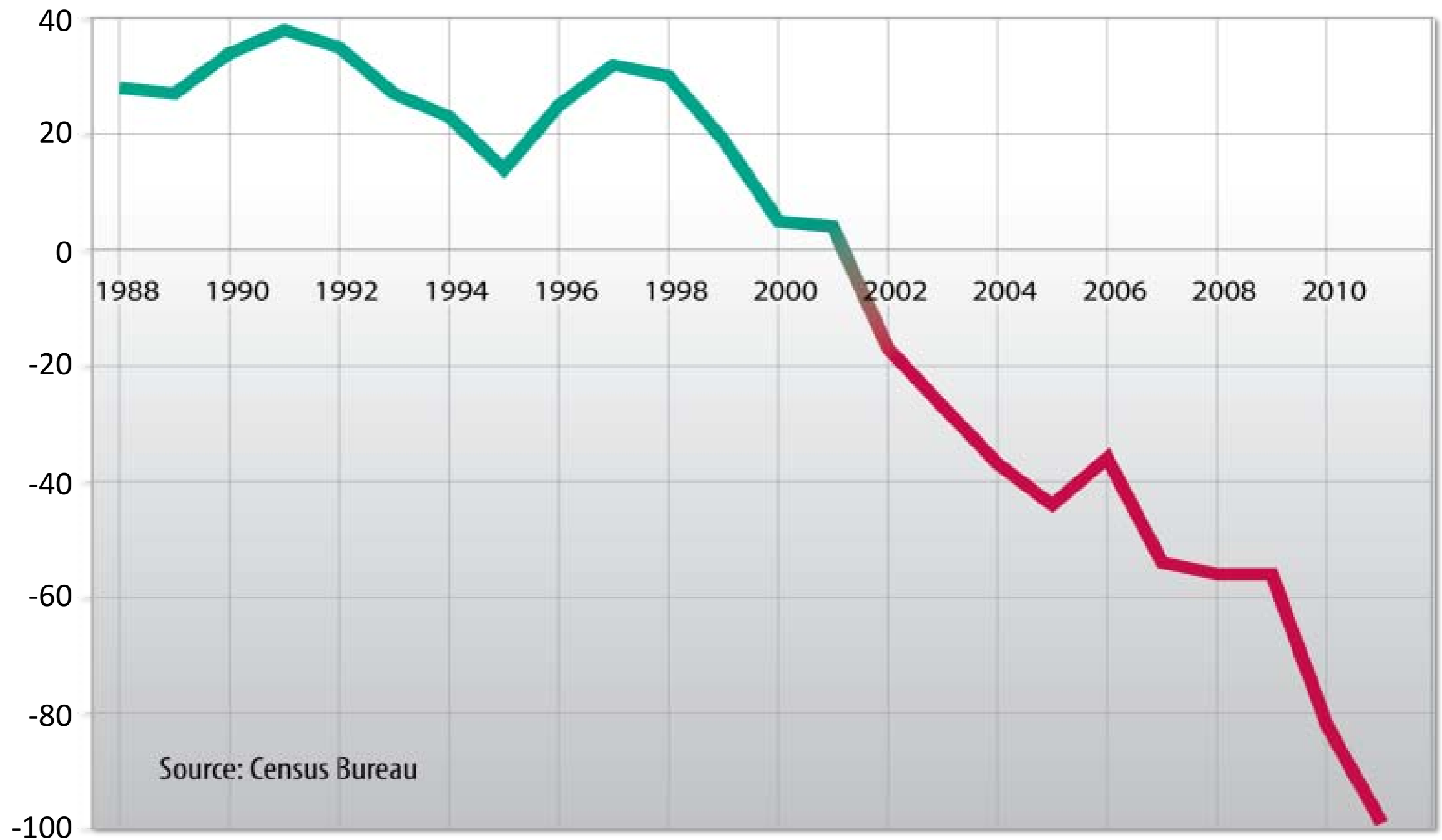
Agenda

Time	Activity
2:00-2:30 PM	<p>Opening Session - AMO</p> <ul style="list-style-type: none"> ○ Presentation of Industry Energy Futures: Efficiency & Energy ○ Advanced Manufacturing: Enabling & Keystone Technologies ○ Manufacturing Demonstration Facilities
2:30-3:30 PM	<p>Industry and Academic Panel Discussion - The state of industrial electrotechnology deployment worldwide.</p> <ul style="list-style-type: none"> ○ Recent trends ○ Country-by-country status ○ Drivers of and barriers to deployment – technical and business perspectives
3:30-3:45	<p>Short Break</p>
3:45-5:15 PM	<p>Facilitated Discussion – How Can the Future be Different?</p> <ul style="list-style-type: none"> ○ Potential of Electrotechnologies for efficiency ○ Potential of Electrotechnologies as Keystone technology ○ Barriers: Technical, Economic, Other? ○ Drivers of Change ○ Value of the MDF approach: pros & cons ○ Future Uncertainties ○ Needs of Technology Suppliers and Technology Users
5:15 - 5:30 PM	<p>Next Steps and Closing Remarks</p>

Manufacturing is vital to the U.S. economy

- 11% of U.S. GDP
- 12 million U.S. jobs
- 60% of U.S. engineering and science jobs
- 57% of U.S. Exports
- Nearly 20% of the worlds manufactured value added

U.S. Trade Balance for Advanced Technology Manufacturing Products (\$ billions)



Manufacturing and Advanced Manufacturing

“The economic evidence is increasingly clear that a strong manufacturing sector creates spillover benefits to the broader economy, making manufacturing an essential component of a competitive and innovative economy.”

Gene Sperling, Director of the National Economic Council

Remarks at the Conference on the Renaissance of American Manufacturing, March 27, 2012

“There is a close connection between R&D and manufacturing in many of the emerging sectors R&D engineers may have to stay close to manufacturing to develop new strategies for making processes more efficient. The tighter integration of innovation and production may also present opportunities to bring design closer to end users, as advanced manufacturing technologies make it possible to produce higher-value goods at lower volume.”

Professor Suzanne Berger, co-chair of MIT's Production in the Innovation Economy (PIE)

Office Goals and National Importance

The Advanced Manufacturing Partnership



Spark a renaissance in American manufacturing through public private partnerships that help our manufacturers compete with anyone in the world.

Office of Energy Efficiency and Renewable Energy

U.S. Dept. of Energy

Strengthen America's energy security, environmental quality, and economic vitality through enhanced energy efficiency and productivity

Advanced Manufacturing Office

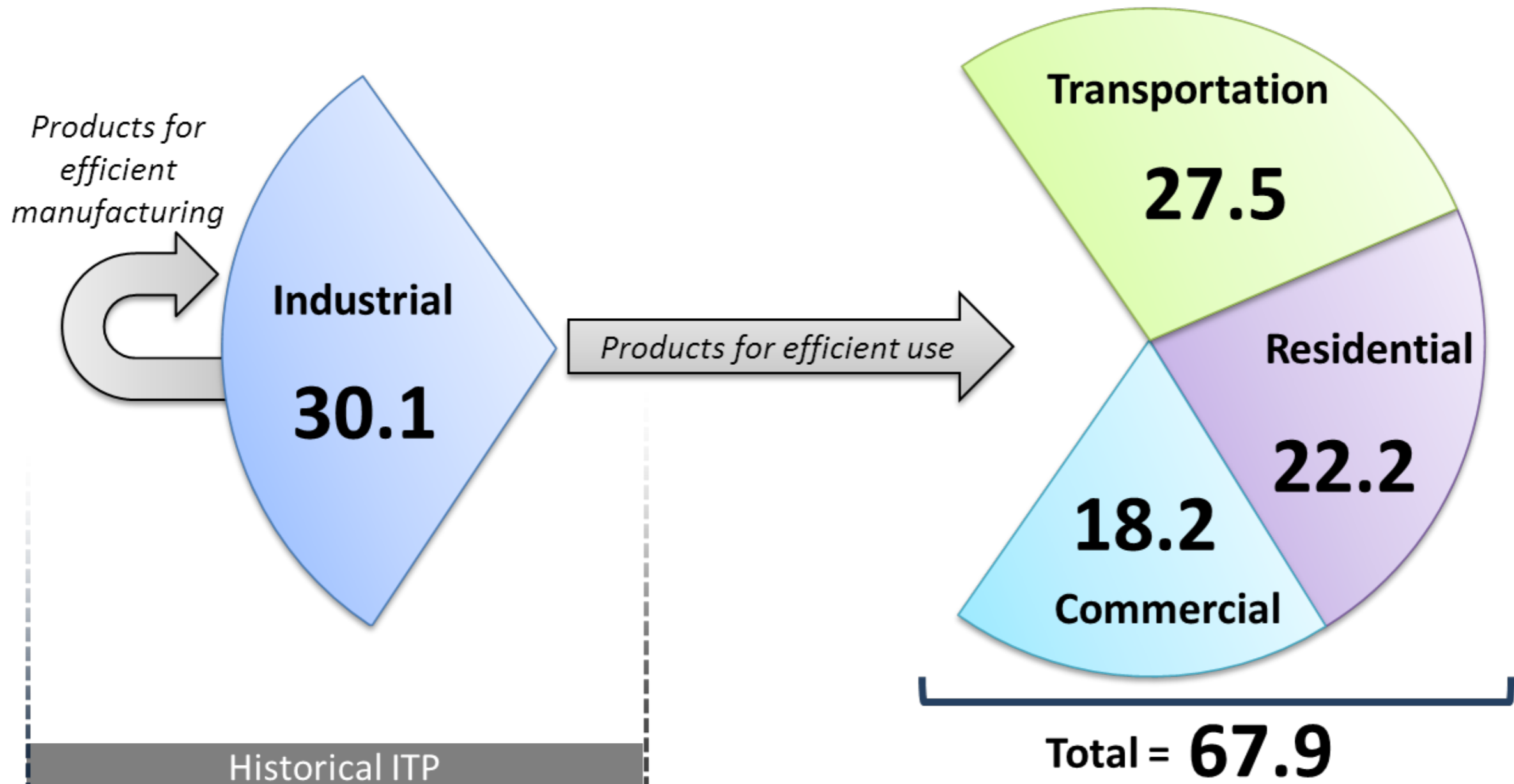
Partner with industry, small business, universities, and other stakeholders to invest in technologies with the potential to create high-quality domestic manufacturing jobs and enhance the global competitiveness of the United States.



The Advanced Manufacturing Office (AMO) partners with industry, small business, universities, and other stakeholders to invest in manufacturing challenges that are common to multiple clean energy technology production systems.

Energy Economy-wide lifecycle impacts

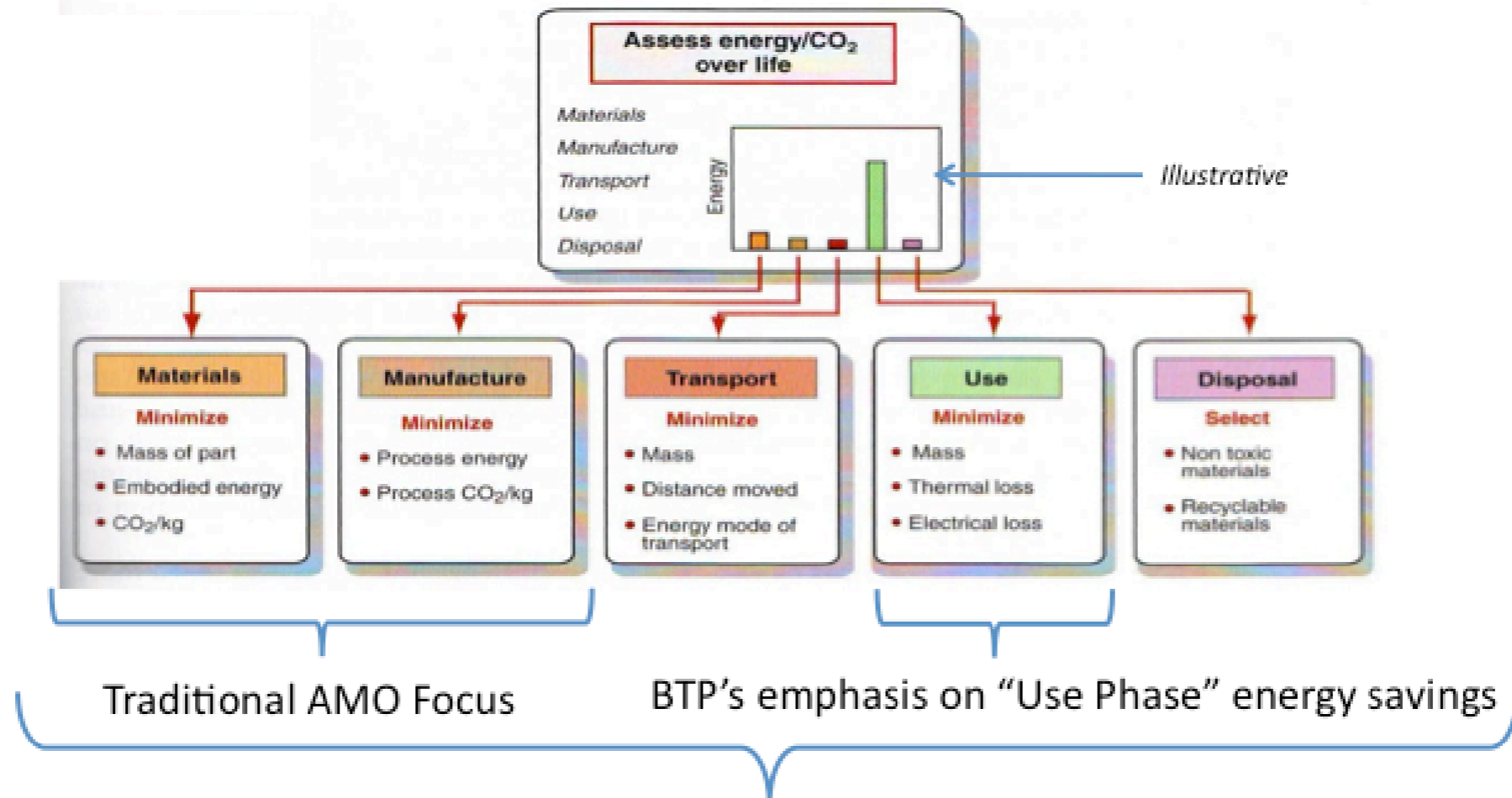
Primary Energy Consumption by Sector, 2010 (Quads)



Historical ITP

Advanced Manufacturing Office

Addressing manufacturing opportunities for life cycle improvements across the Office of Energy Efficiency & Renewable Energy (EERE); Building Technologies Program (BTP) example.

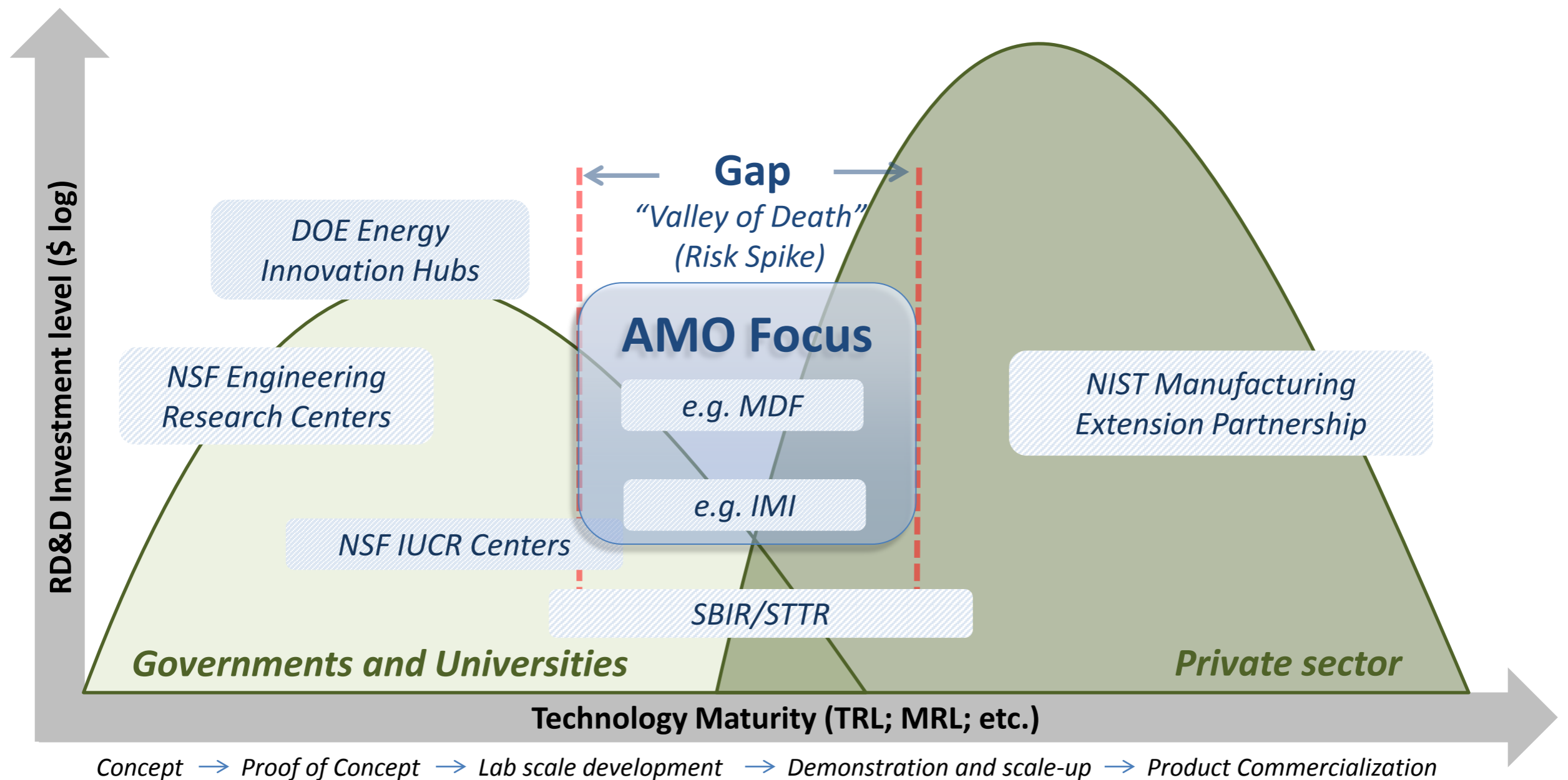


Reference: "Materials & the Environment," Michael F. Ashby

Cross-Cutting projects open the opportunity space through the full life cycle



AMO Investments leverage strong Federal support of basic research by partnering with the private sector to accelerate commercialization



AMO's investment strategies

Identify timely, high-impact, foundational clean energy technologies with the potential to transform energy use and accelerate their introduction into the US economy

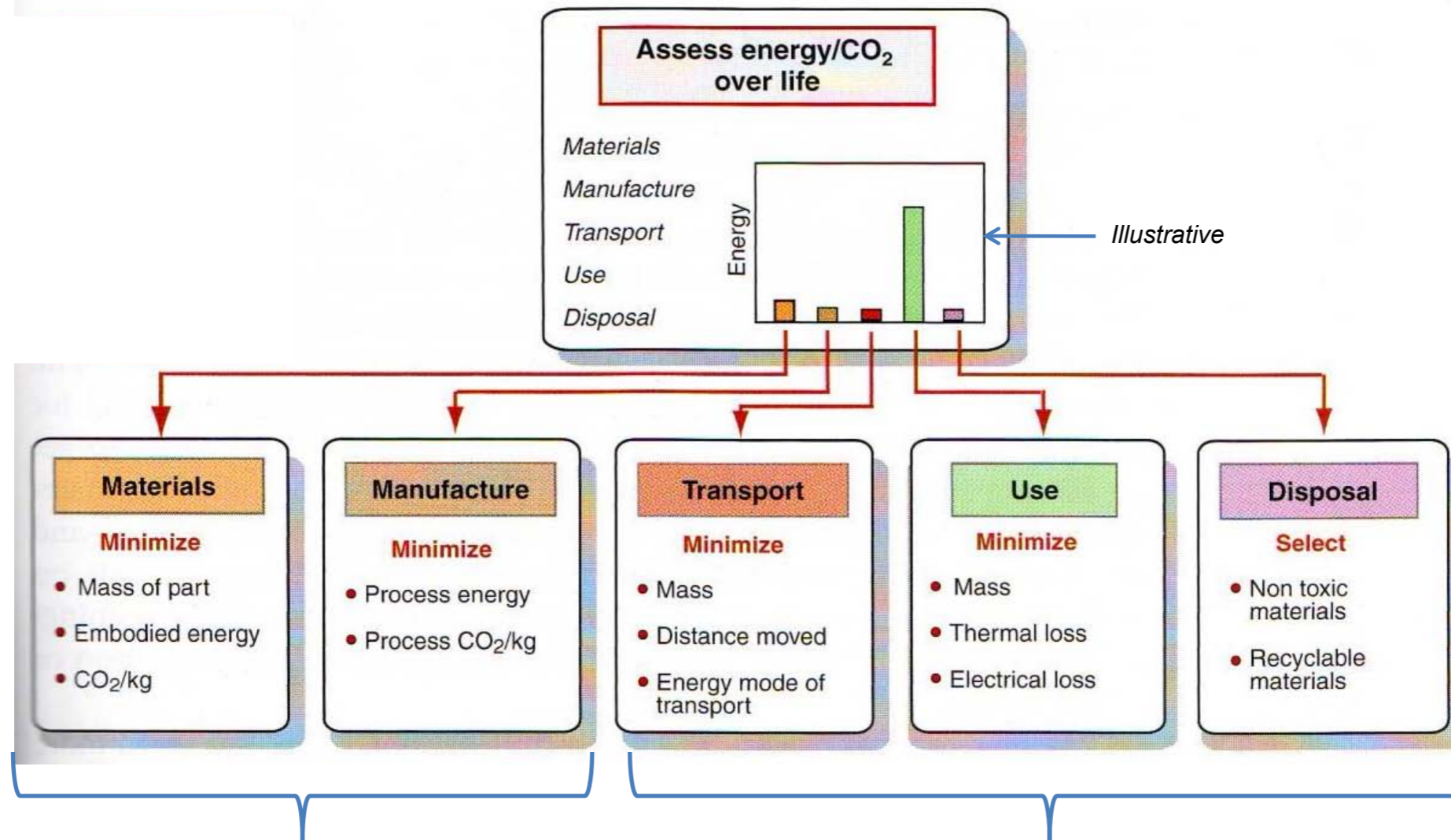
1. Invest in competitively-selected, cost-shared **Projects** to support *innovative manufacturing processes* and *next-generation materials manufacturing* for clean energy and energy efficiency industry
2. Establish **Manufacturing Demonstration (User) Facilities** *to reduce barriers to exploration of new ideas*
3. Engage with industry and other stakeholders to create a robust and scalable **Technology Deployment** program for existing technologies
 - Measurement and Verification
 - Information Sharing
 - Training

Targeted investments in high impact technologies

Foundational/Keystone Technology is:

- **Transformative:** Results in significant change in the life-cycle impact (energetic or economic) of manufactured products
- **Pervasive:** Creates value in multiple supply chains, diversifies the end use/markets, applies to many industrial/use domains in both existing and new products and markets
- **Globally Competitive:** Represents a competitive/strategic capability for the United States
- **Impactful:** Has a quantifiable *energetic or economic* value, e.g. reduced embodied energy, increased GDP, increased export value, increased jobs created/retained

What are the opportunities for manufacturing impacts across the life cycle?



Advanced Manufacturing leads to

- Use and re-use energy/emissions reductions (e.g. light-weighting)
- Increased value-added
- Improved quality
- _____

enable

MW and RF Technologies

- Manufacturing energy/emissions reductions
- Increased manufacturing efficiency (lower energy, faster throughput, etc.)
- New and improved processes/product

Panel discussion

What is necessary for MW/RF technologies to become more pervasive?

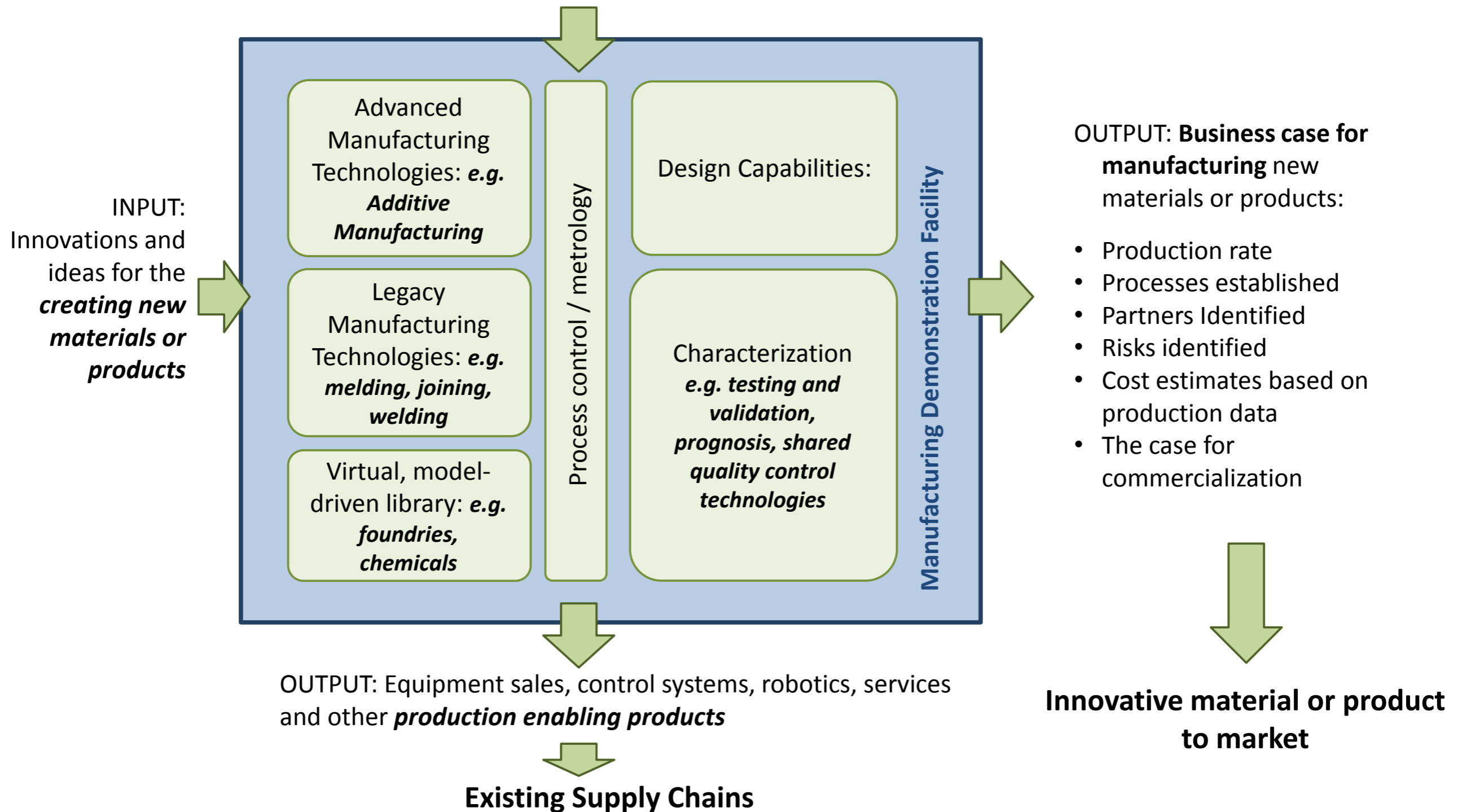
What are the advantages of MW/RF for advanced manufacturing?

What are the mechanisms for public/private cooperation in your country?

Manufacturing Demonstration Facilities (MDFs)

Two pathways through the MDF

INPUT: New Processes, techniques, tools, capabilities and other *production enabling innovations and technologies*



Facilitated discussion

Ground Rules for the discussion

- Please introduce yourself
- No speeches
- Listen to Each Other
- Suspend Judgement
- Spin/Churn Thoughts into Rich Ideas
- Merge Ideas to Create Strength
- Narrow to a Manageable Few
- Focus on Unique Factors
- Challenges Ideas, not People

Acknowledgements

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ORISE Engineering Sciences Fellow

Lynn Daniels

AAAS Science & Technology Policy Fellow