



Energy Materials Network

U.S. Department of Energy



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

February 9th, 2017
Sarah Ollila
Department of Energy

In Support of the Materials Genome Initiative



Energy Materials Network

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Lightweight Materials Consortium



Electrocatalysis Consortium



Durable Module Materials Consortium



Chemical Catalysis for Bioenergy



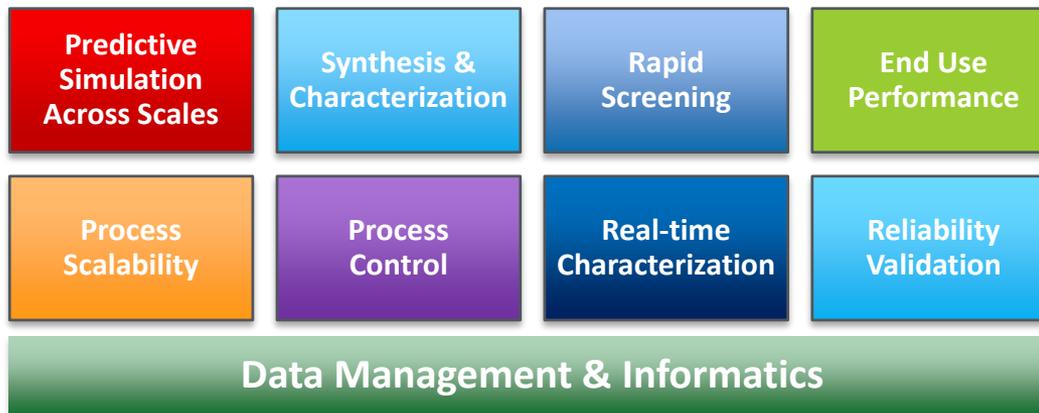
CALORIC MATERIALS CONSORTIUM



Advanced Water Splitting Materials

Hydrogen Materials – Advanced Research Consortium

1. *World Class Materials Capability Network*



2. *Clear Point of Engagement*

3. *Streamlined Access*

4. *Data & Tools Collaboration*

New Material Innovations for Clean Energy 2X Faster and 2X Cheaper



Network Requirements

1. **WORLD CLASS MATERIALS CAPABILITY NETWORK**: Create and manage a **unique, accessible set of capabilities** within the DOE National Laboratory system
2. **CLEAR POINT OF ENGAGEMENT**: Provide a **single point-of-contact** and concierge to direct interested users (e.g. industry research teams) to the appropriate laboratory capabilities, and to **facilitate efficient access**.
3. **DATA AND TOOL COLLABORATION FRAMEWORK**: **Capture data, tools, and expertise** developed at each node such that they can be **shared and leveraged** throughout the EMN and **in future programs**. Establish data repositories and, where appropriate, distribute data to the scientific community and public. Accelerate learning and development through data analysis using advanced informatics tools.
4. **STREAMLINED ACCESS**: Facilitate **rapid completion of agreements** for external partners, and aggressively pursue approaches to reduce non-technical burden on organizations seeking to leverage the EMN for accelerated materials development and deployment.

Key Guidance & Principles

- 1. NATIONAL LABORATORY LED CONSORTIA**
- 2. COMMON YET FLEXIBLE CONSORTIUM MODEL**
- 3. CONSISTENCY AND TRANSPARENCY ACROSS EFFORTS**
- 4. ENDURING CAPABILITIES WITHIN THE NETWORK**

The Energy Materials Network (Fiscal Year 2016)



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**Lightweight
Materials**

**Chemical Reactions
& Catalysis**

**Energy Conversion
Materials**

**Coatings &
Thin Films**



**Lost Cost Mg
Sheet for
Auto**

**PGM-Free
Catalysts and
MEAs for Fuel
Cells**

**Caloric
Materials**

**Durable
Materials
for Solar
Modules**

Building Momentum...



The Energy Materials Network (EMN) aims to dramatically decrease time-to-market for advanced materials that are critical to many clean energy technologies.

WORLD-CLASS INNOVATION

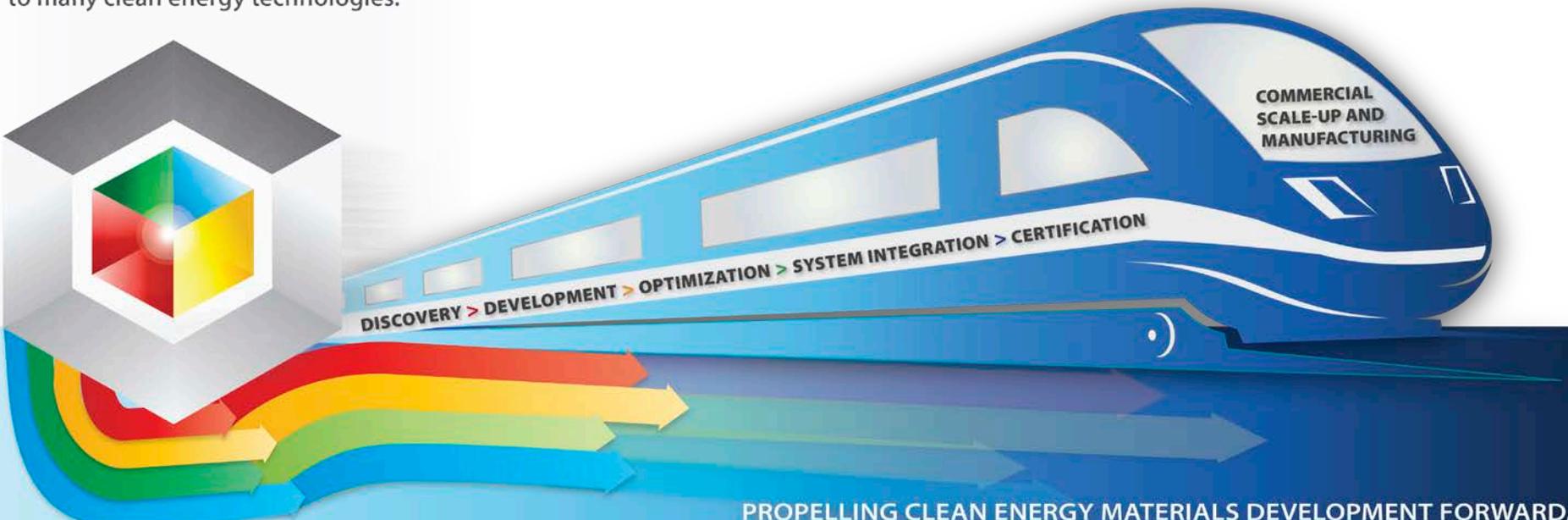
EMN is fueling U.S. industry with leading scientific and technical capabilities, data, and tools, and helping deliver innovative clean energy products to the world marketplace through its network of national lab-led consortia.

CLEAR POINTS OF ENGAGEMENT

In building an enduring, accessible network, EMN offers industry clear points of engagement and streamlined access to national lab resources by providing technical support, collaboration tools, and data platforms.

RAPID SCALE-UP

EMN is addressing market deployment barriers and getting new technologies to market faster by better integrating all phases of the materials development cycle, from discovery through deployment.



PROPELLING CLEAN ENERGY MATERIALS DEVELOPMENT FORWARD, 2X FASTER AND AT HALF THE COST

EMN's initial consortia are focusing on targeted materials tracks aligned with some of industry's most pressing clean energy materials challenges.

LIGHTWEIGHT MATERIALS FOR VEHICLES

DURABLE MATERIALS FOR SOLAR MODULES

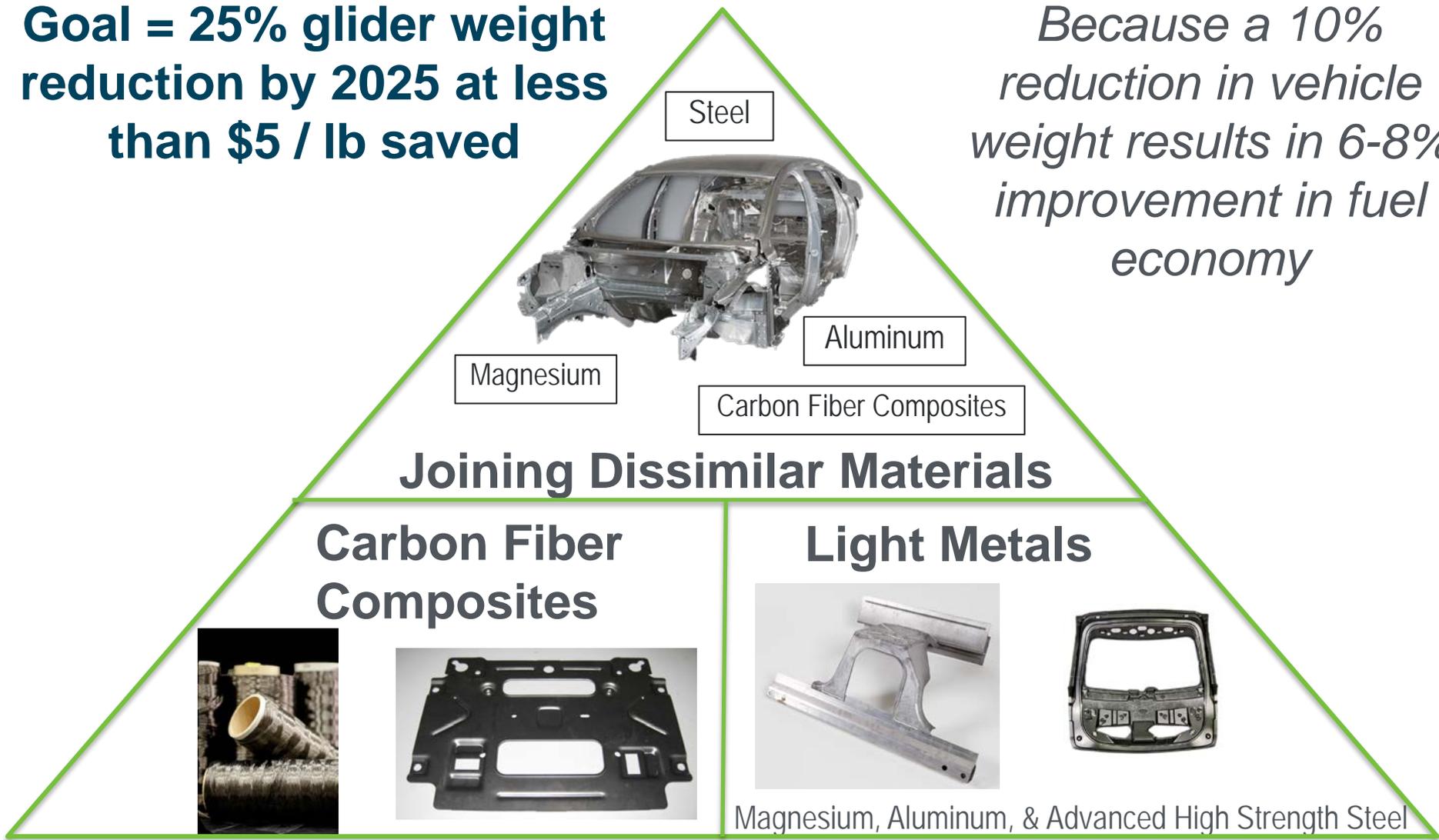
CALORIC MATERIALS FOR HEAT PUMP TECHNOLOGIES

NEXT-GENERATION ELECTRO-CATALYSTS FOR FUEL CELLS

Light Weight Materials for Vehicles

Goal = 25% glider weight reduction by 2025 at less than \$5 / lb saved

Because a 10% reduction in vehicle weight results in 6-8% improvement in fuel economy

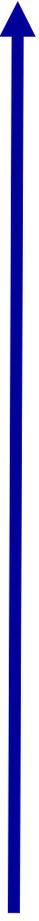


Material Technology Roadmap - Opportunities & Challenges

Increasing Severity of Challenge



Increasing Impact on Reducing Vehicle Mass



Material	Critical Challenges				
Carbon-Fiber Composites	Low-Cost Fibers	High-Volume Mfg.	Predictive Modeling	Recycling	Joining/ NDE & Life monitoring
Aluminum	Feedstock Cost	Manufacturing	Improved Alloys	Recycling	
Magnesium	Feedstock Cost	Corrosion Protection	Improved Alloys	Manufacturing	Recycling
Advanced High-Strength Steels	Manufacturability	Wt. Reduction Concepts	Alloy Development		
Multi-material Systems	Joining	Corrosion	Body Structure Design	New Assembly Operations	NDE & Life monitoring
Glazings	Low-Cost Lightweight Matls.	Noise, Structure Models Simulations	Noise Reduction Techniques	UV and IR Blockers	
Metal-Matrix Composites	Feedstock Cost	Compositing Methods	Powder Handling	Compaction	Machining & Forming
Titanium	Low-Cost Extraction	Low-Cost Production	Forming & Machining	Low-Cost PM	Alloy Development

Primary Focus

Future Focus



LightMAT: A Multi Lab Consortium for Accelerated Lightweight Materials Development



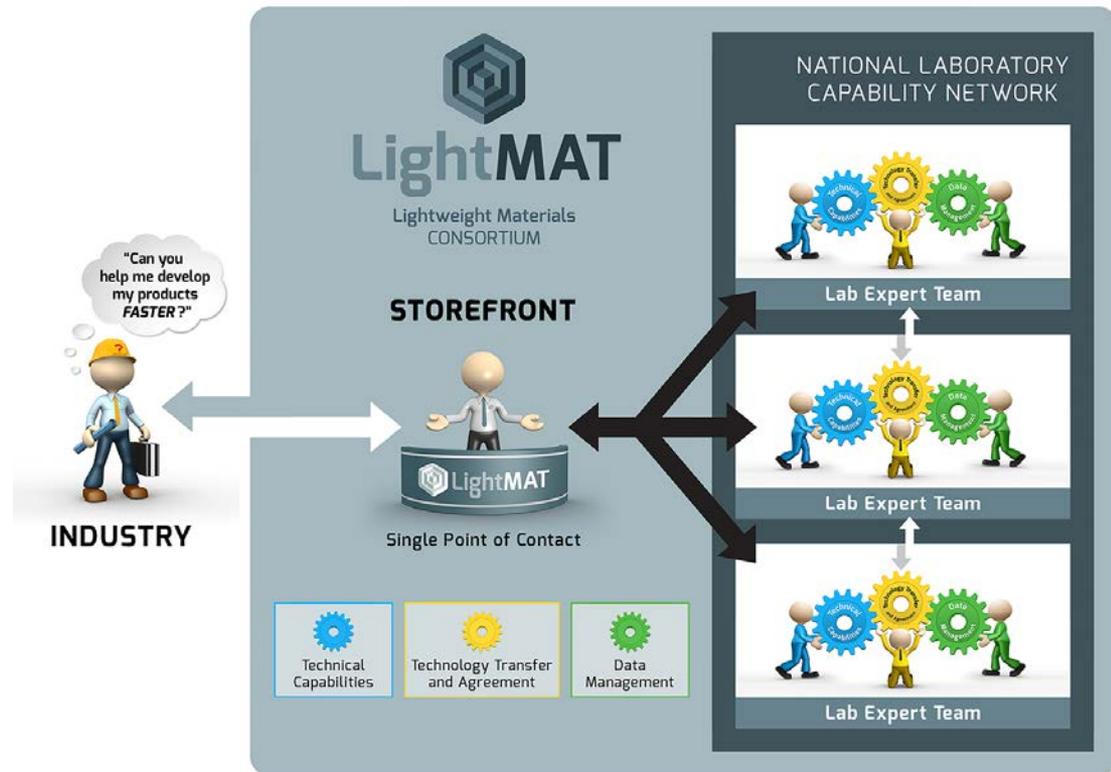
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February 20, 2017

LightMAT – Lightweight Materials Consortium

LightMAT Objectives:

- Support industry in the discovery, manufacturing, and deployment of advanced materials twice as fast, at a fraction of the cost.
- Create and oversee a National Laboratory Resource Network that provides an enduring capability for accelerated lightweight materials development in the U.S.
- Connect industry needs to resources and capabilities across the DOE National Laboratories



Funding Mechanisms

› Funding Opportunity Announcements (FOA)

- FOA released for specific technology topic area (e.g. Mg Sheet)
- Awardees can access LightMAT resources at no cost

› Direct Funded Project Support

- Industry users approach LightMAT (or vice-versa) and develop project plan with the concierge at no cost
- Pending HQ approval, LightMAT funds support activity at the National Labs while at least 50% cost-share supports industry activity

› Work For Others

- Industry users approach LightMAT (or vice-versa) and develop project plan with the concierge at no cost
- Industry covers the entire cost of the project, including the cost of the National Lab resources

Who is LightMAT



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Established as part of the Energy Materials Network, under the U.S. Department of Energy's Clean Energy Manufacturing Initiative, the mission of the Lightweight Materials National Lab Consortium is to create an enduring national lab-based network, enabling industry to utilize the national labs' unique capabilities related to lightweight materials.



Contact Us!

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