Energy Materials Network

U.S. Department of Energy

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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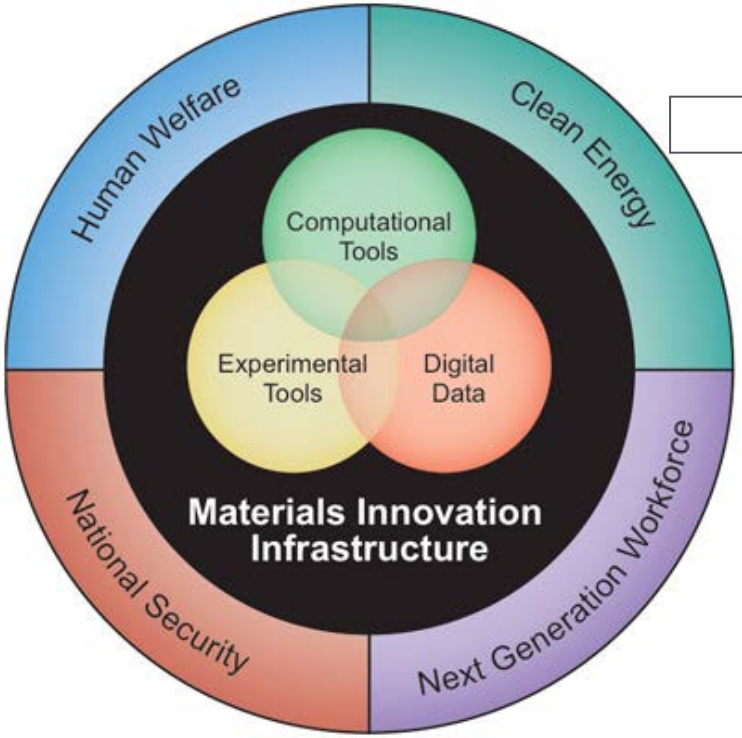
July 27th, 2016

In Support of the Materials Genome Initiative (MGI)



MGI - Framework

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Coordinated resource network with a suite of capabilities for advanced materials R&D

Predictive Simulation Across Scales	Synthesis & Characterization	Rapid Screening	End Use Performance
Process Scalability	Process Control	Real-time Characterization	Reliability Validation

Data Management & Informatics

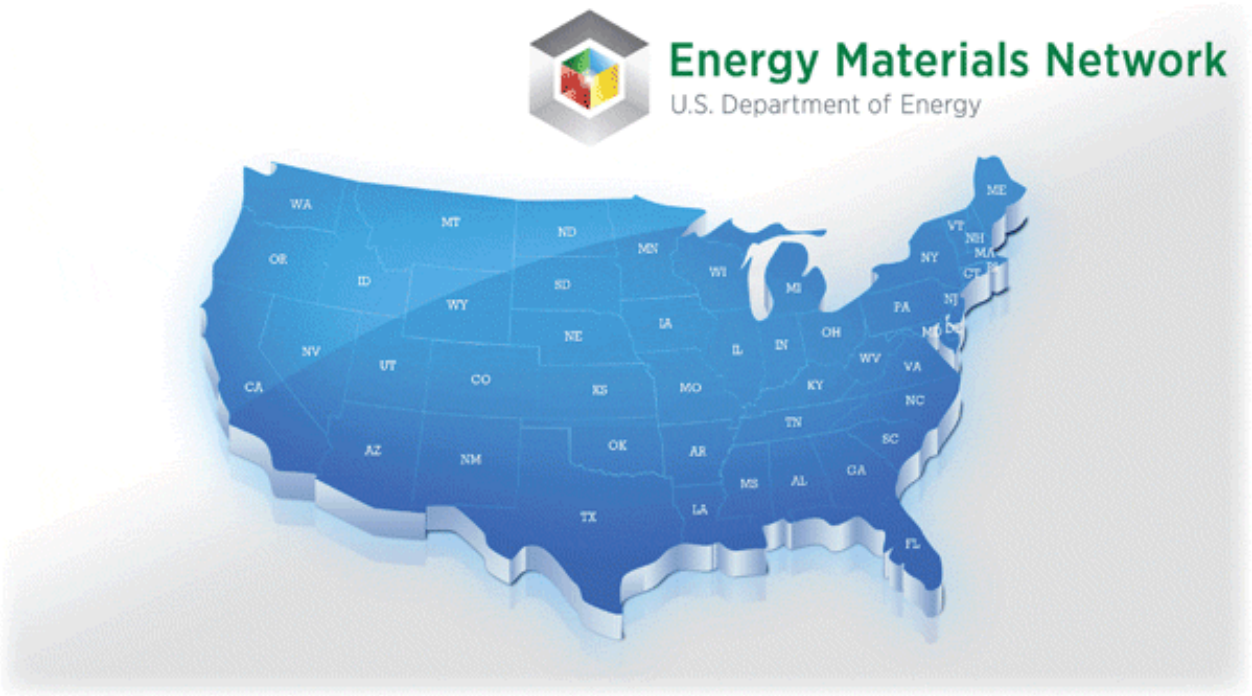
Materials Design & Synthesis → **Functional Design** → **Process Scale-Up & Qualification**

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

How do I find the right resource to accelerate a solution to my materials challenge?

How do I engage with the National Labs quickly and effectively?

Leveraging World-Class Capabilities Across National Labs



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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.

Clear Points of Engagement

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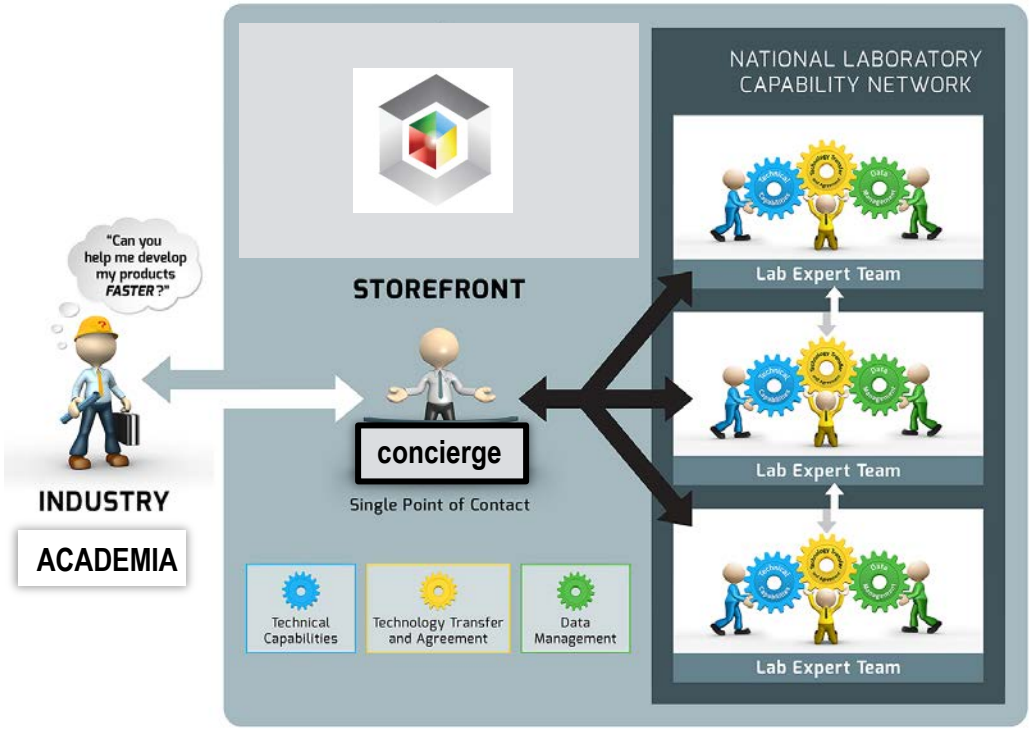
- *EMN Concierge is one-stop-shop for learning about and accessing the network*
- *Match-making industry needs with resources across the network*
- *Facilitating rapid IP, NDA, and contract agreements*
- *Coordinating movement, storage, and analysis of project data*
- *Conducting outreach activities*



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Capturing and Leveraging Data

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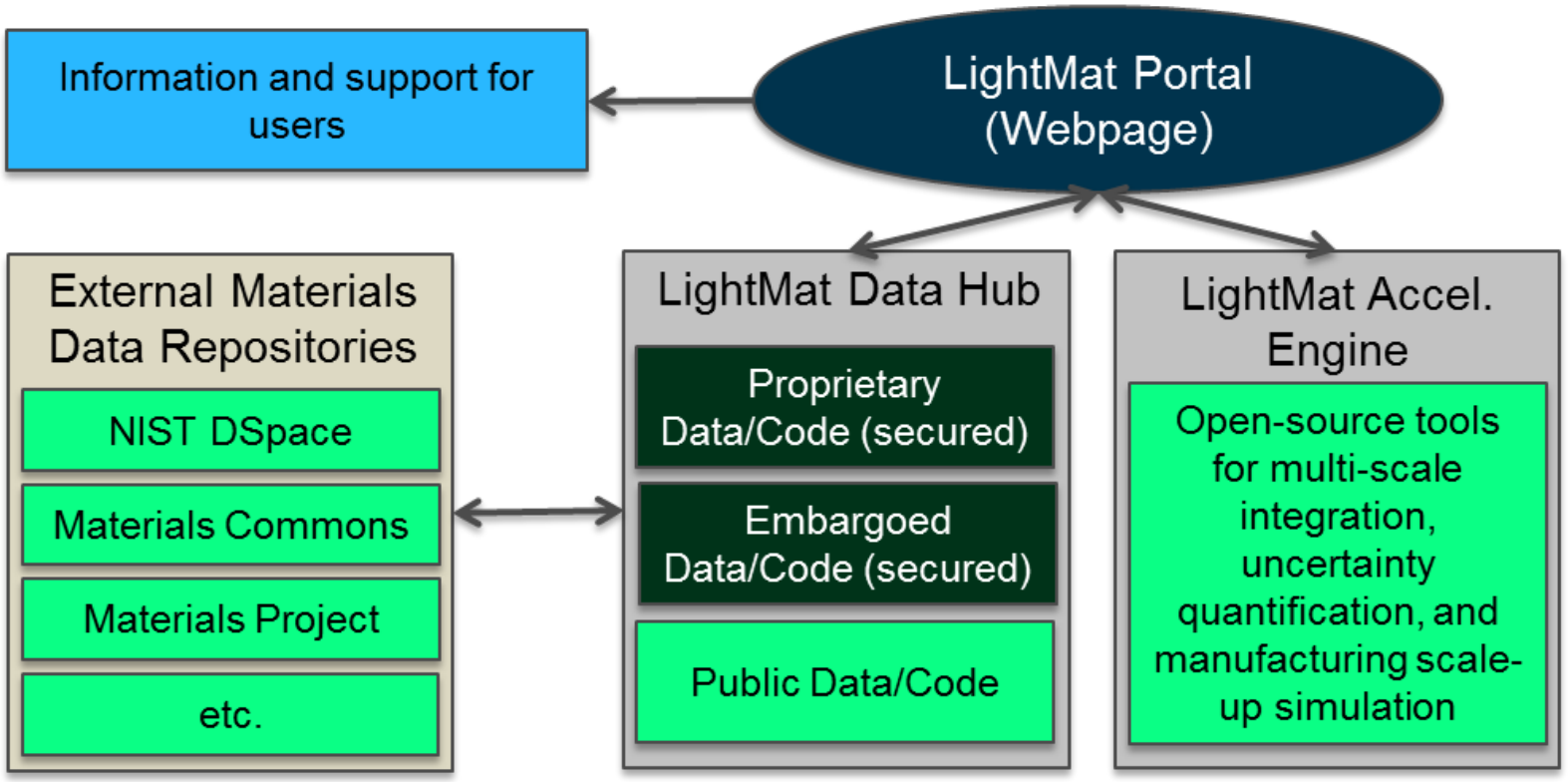
LightMAT Example:

Lightweight Materials Consortium



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Streamlined Access

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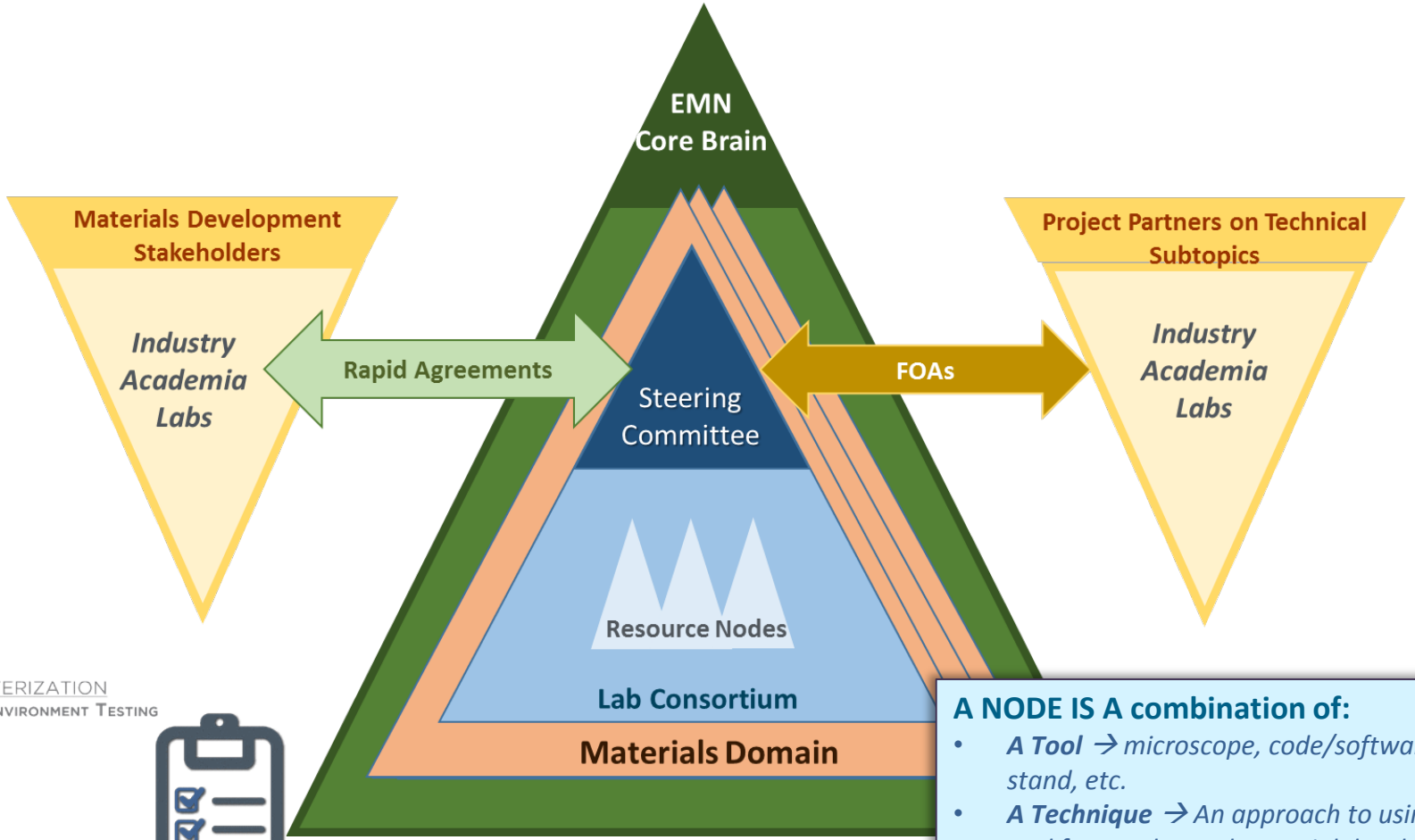
Simplify agreement process to the greatest extent possible

- *Maintain a catalog of short-form or rapid CRADAs, ACT agreements, Strategic Partnership Projects, etc. for use whenever possible*
- *Develop a single, pre-approved, mutual NDA between all consortium partners*
- *Use exploratory licenses whenever possible*

Facilitate agreement process when complexity is unavoidable

- *Concierge provides support throughout the agreement process*
- *Steering committee reviews completed agreements to implement new approaches and new best practices for reducing complexity*

EMN Structure and Taxonomy



CHARACTERIZATION
EXTREME ENVIRONMENT TESTING

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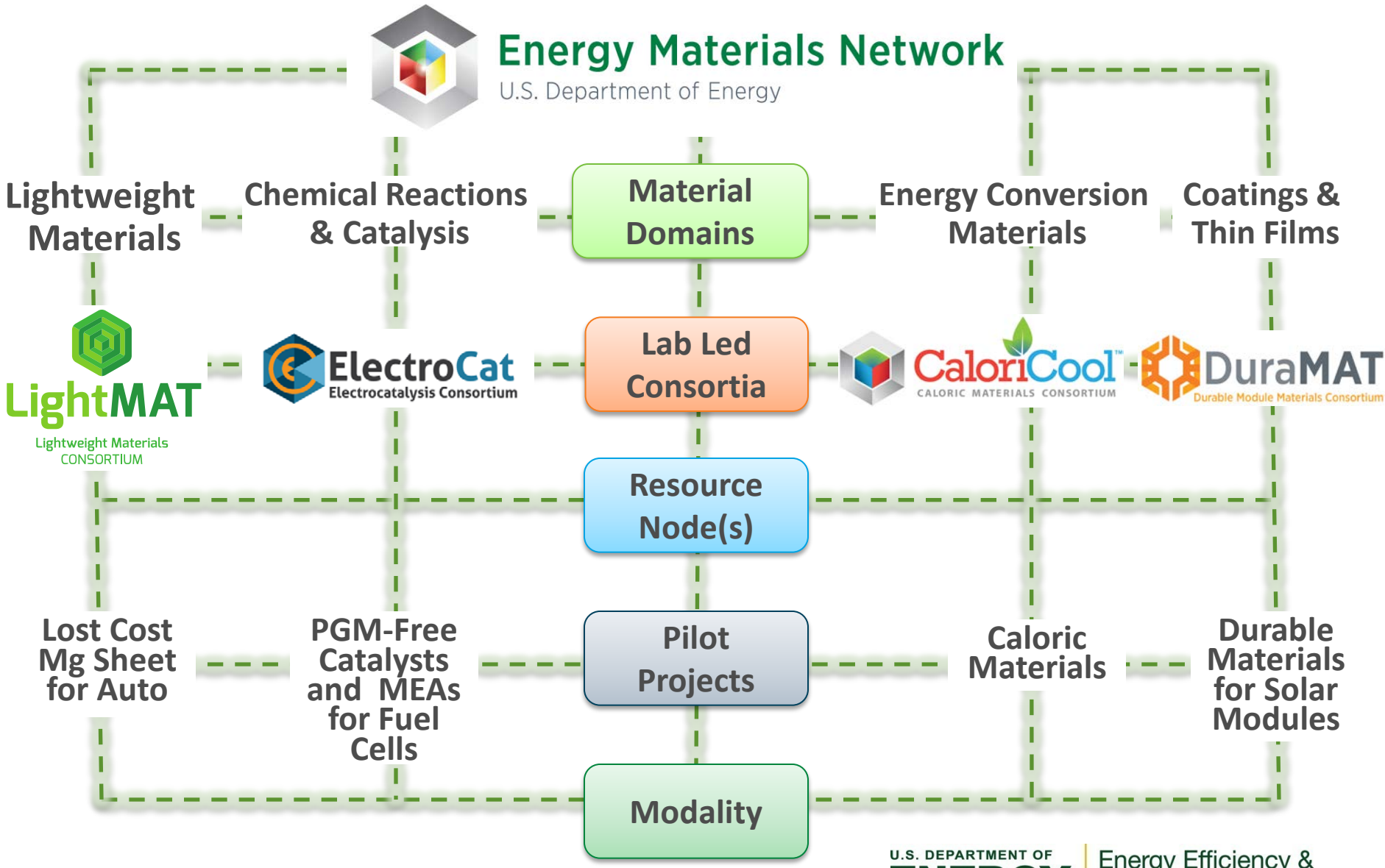
A NODE IS A combination of:

- ***A Tool*** → *microscope, code/software, test stand, etc.*
- ***A Technique*** → *An approach to using the tool for accelerated material development*
- ***People and Expertise*** → *The scientists, engineers, and know-how to combine the tool and technique to accelerate materials development*

Each consortium will assemble national lab resources, led by a Steering Committee.

EMN Framework



EMN Planned Consortia (to date)

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Consortia	FY16	FY17
LightMAT Lightweight Materials CONSORTIUM	Low Cost Mg Sheet for Auto	Low Cost Precursors for Carbon Fiber; Mg Corrosion
ElectroCat Electrocatalysis Consortium	PGM-Free Catalysts and MEAs for Fuel Cells	Continuation
CaloriCool™ CALORIC MATERIALS CONSORTIUM	Caloric Materials for Efficient Cooling	Continuation
DuraMAT Durable Module Materials Consortium	Durable, PV Form Factors	Continuation
ChemCatBio Chemical Catalysis for Bioenergy		Advanced Catalysts for Biofuels
HyMARC		Materials Based, Low Pressure H_2 Storage
HydroGEN Advanced Water Splitting Materials		Advanced Water Splitting for Renewable H_2

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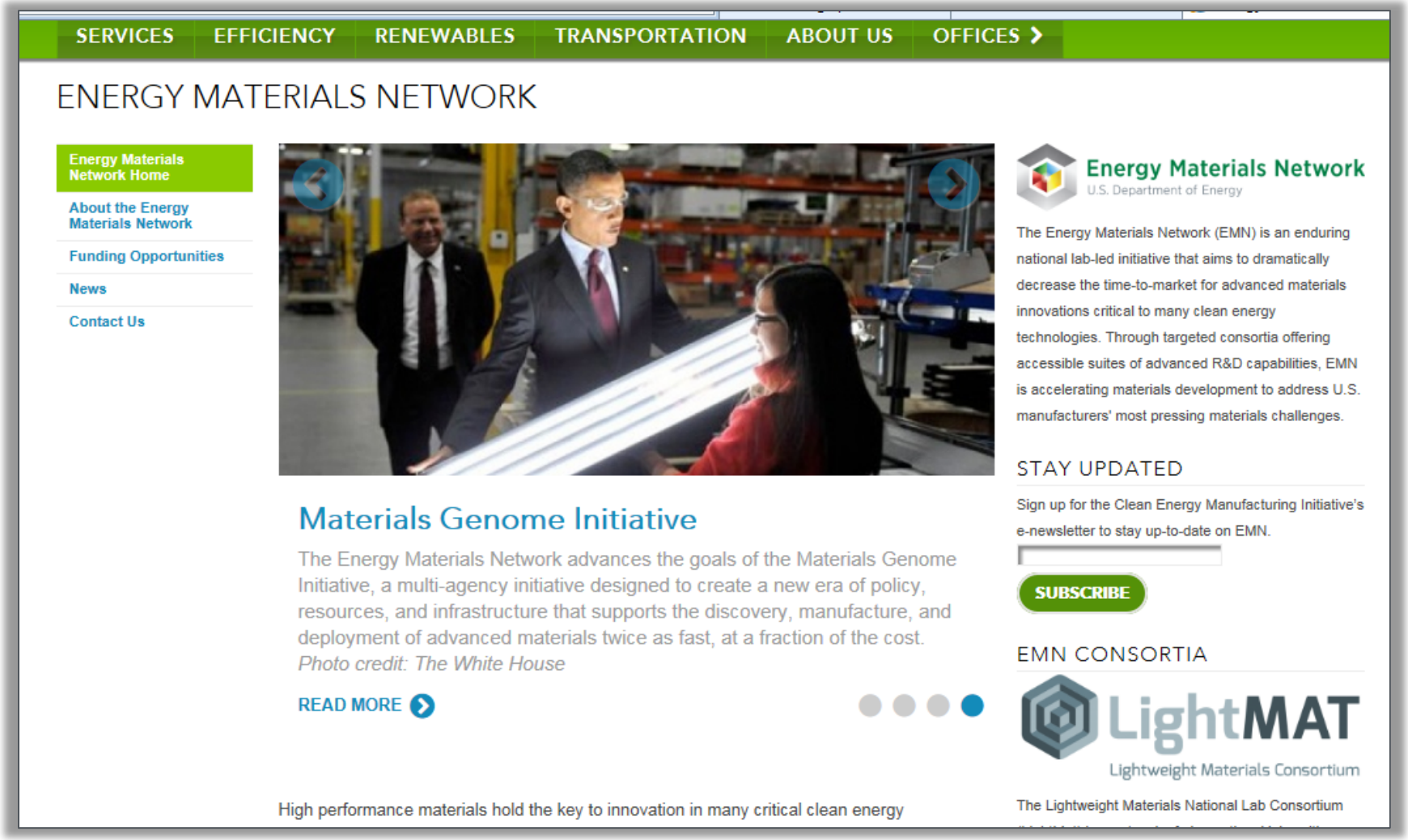
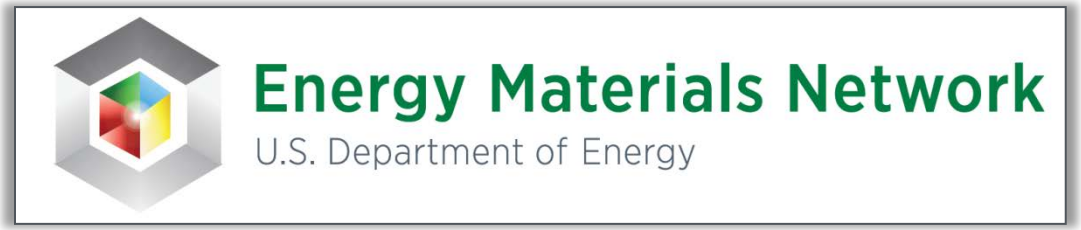
Website: EMN Information Resource



https://www.youtube.com/watch?feature=player_detailpage&v=FdNRViXAV3s

Summary of Key emn 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***

Building Momentum…

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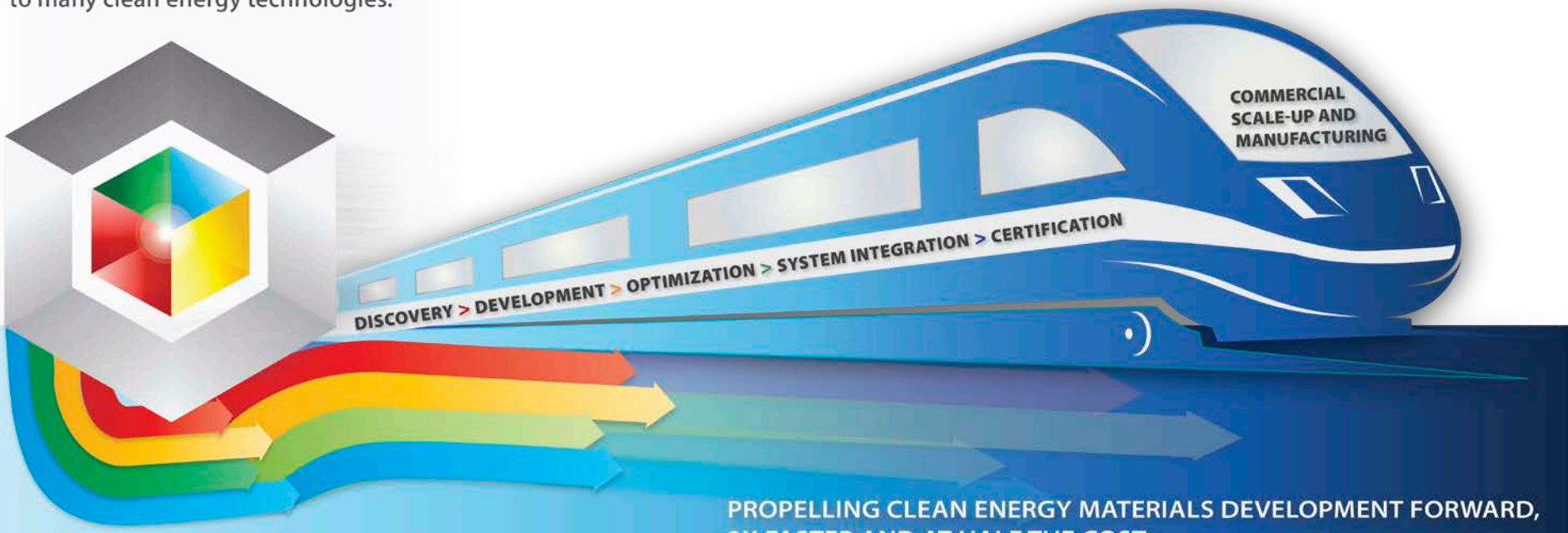
The Energy Materials Network (EMN) aims to dramatically decrease time-to-market for advanced materials that are critical to many clean energy technologies.

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.



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

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