Recipient	In Collaboration with	Location	Project Name	DOE Fund Request
The University of Utah	• Army Research Laboratory • Reading Alloys/Ametek • Ford Motor Company	Salt Lake City, UT	A New Method for Low-Cost Production of Titanium Alloys for Reducing Energy Consumption of Mechanical Systems	$1,460,285
A novel metallurgical process for producing titanium (Ti) components could produce a ten-fold material usage improvement in aircraft and vehicle manufacturing. This technology combines a lower temperature melting process with minimal post-processing steps to achieve part structures with Ti's high strength-to-weight ratio.				
General Motors LLC	• Meridian Lightweight Technologies • The Ohio State University	Warren, MI	Development of Energy Efficient Integrated Die Casting Process for Large Thin-Walled Magnesium Applications	$2,672,124
An integrated super-vacuum die casting process uses a new magnesium alloy to potentially achieve a 50% energy savings compared to the multi-piece, multi-step, stamping and joining process currently used to manufacture car doors. By substituting magnesium for steel inner panels, car doors could weigh 60% less, resulting in serious fuel economy improvements and carbon emission savings.				
MEMC Electronic Materials, Inc.	• Sandia National Laboratories • Georgia Institute of Technology	St. Peters, MO	High-Quality, Low-Cost Bulk Gallium Nitride Substrates Grown by the Electrochemical Solution Growth Method	$3,680,000
Efficient manufacturing of gallium nitride (GaN) could reduce the cost of and improve the output for light-emitting diodes, solid-state lighting, laser displays, and other power electronics. Use of GaN—a semi-conductor material—holds the potential to reduce lighting energy use by 75%, electric drive motor energy use for consumer applications by 50%, electric motor energy used for transportation by 60%, and energy for information technology infrastructure power delivery by 20%.				
Lyondell Chemical Company	• BASF Qtech Inc. • Quantiam Technologies Inc.	Newtown Square, PA	Catalyst-Assisted Production of Olefins from Natural Gas Liquids: Prototype Development and Full-Scale Testing	$4,500,000
An innovative catalytic coating material could significantly reduce surface deposits on ethylene steam cracker furnace coils. As ethylene production is the largest user of energy in the chemical industry, a 6 to 10% reduction in energy consumption per plant would save an estimated 20-35 trillion Btu annually. The proposed technology can be installed during the normal maintenance cycle and with the growing availability of shale gas, has the potential to help the United States maintain its global leadership in olefins production.				

Recipient	In Collaboration with	Location	Project Name	DOE Fund Request
American Iron and Steel Institute (AISI)	• University of Utah • Berry Metal Company • United States Steel Corp. • The Timken Co. • ArcelorMittal USA	Salt Lake City, UT	A Novel Flash Ironmaking Process	$7,120,000
A process that sprays iron ore directly into the furnace chamber and uses natural gas, hydrogen, or syngas as a reducing agent to replace the energy- and capital-intensive coke oven and blast furnace process steps— with the potential to reduce iron making energy consumption by 32%–57%.				
Research Triangle Institute	• Duke University • Veolia, Inc.	Research Triangle Park, NC	Advanced, Energy-Efficient Hybrid Membrane System for Industrial Water Reuse	$4,800,000
A single hybrid system for industrial wastewater treatment and reuse that combines two known processes—forward osmosis and membrane distillation—will be developed and demonstrated. This system will use waste heat to treat a wide variety of waste streams at manufacturing facilities. The process will reuse more than 50% of a facility's wastewater, decrease wastewater discharge, and recover significant amounts of industrial waste heat.				
The Dow Chemical Company	• Oak Ridge National Laboratory • Ford Motor Company • Michigan Economic Development	Midland, MI	Scale-Up of Novel Low-Cost Carbon Fibers Leading to High-Volume Commercial Launch	$9,000,000
An extrusion process for making carbon fiber uses a novel polyolefin material in place of conventional polyacrylonitrile. Low-cost carbon fiber has widespread application in automobiles, wind turbines, and other industrial applications. This novel process could potentially reduce production costs by 20% and total carbon dioxide emissions by 50%.				
Teledyne Scientific and Imaging	• Agenda 2020 Technology Alliance • Georgia Institute of Technology	Thousand Oaks, CA	Sacrificial Protective Coating Materials that Can Be Regenerated In-Situ to Enable High-Performance Membranes	$2,110,000
A highly durable membrane coating will be developed, optimized, and tested for the pulp and paper industry's black liquor-to-fuel concentration process By eliminating two steps in the conventional five-step black liquor evaporator process, this technology has the ability to save the paper industry roughly 110 trillion Btu per year.				

Recipient	In Collaboration with	Location	Project Name	DOE Fund Request
Massachusetts Institute of Technology (MIT)		Cambridge, MA	Continuous Processing of High Thermal Conductivity Polyethylene Fibers and Sheets	$1,000,000
A new, continuous manufacturing process to make high molecular weight, high thermal conductivity polyethylene fibers and sheets will be developed to replace metals and ceramics in heat-transfer devices. Project innovations include using massively parallel nanochannels to align gel molecular chains and arranging closely spaced nanochannels to assist in sheet formation. Because polyethylene density is 35% less than aluminum, the new materials and process steps developed as part of this project could generate fuel savings for transportation applications.				
Third Wave Systems, Inc.	• Purdue University • Georgia Institute of Technology • University of California Santa Barbara • The Pennsylvania State University	Minneapolis, MN	Sustainable Manufacturing via Multi-Scale Physics-Based Process Modeling and Manufacturing-informed Design	$4,069,882
Micro-structural modeling tools for metals will be developed and used to demonstrate a design framework to improve the understanding of dynamic response and statistical variability. This project will enable design engineers to evaluate the effects of design changes and material selection; anticipate quality and cost prior to implementation on the factory floor; and enable low-waste, low-cost manufacturing.				
Air Products and Chemicals, Inc.	• The Pennsylvania State University	Allentown, PA	Bioelectrochemical Integration of Waste Heat Recovery, Waste-to-Energy Conversion, and Waste-to-Chemical Conversion with Industrial Gas and Chemical Manufacturing Processes	$1,200,000
A microbial reverse electrodialysis technology will be combined with waste heat recovery to convert effluents into electricity and chemical products, including hydrogen gas. This technology, which uses salinity gradients to overcome the thermodynamic barriers and over potential associated with hydrogen production, will be broadly applicable in U.S. industry, including the chemical, food, pharmaceutical, and refining sectors. By providing on-site electricity generation, the technology could save 40 trillion Btu annually and avoid 6 million tons of carbon dioxide emissions each year.				

Recipient	In Collaboration with	Location	Project Name	DOE Fund Request
PolyPlus Battery Company	• Corning Incorporated • Johnson Controls Incorporated	Berkeley, CA	Innovative Manufacturing of Protected Lithium Electrodes for Ultra High Energy Density Batteries	$8,999,920
A protected lithium electrode, solid electrolyte, and scaled-up manufacturing process will be developed for high-energy-density lithium batteries. This project will scale up production from a batch mode to a high-volume process. Commercial introduction of this manufacturing process could extend the driving range of electric vehicles, in turn saving 100 trillion Btu of energy annually.				
Delphi Automotive Systems, LLC	• Raydiance, Inc	Rochester, NY	High Metal Removal Rate Process for Machining Difficult Materials	$3,700,000
This project will develop fast lasers that use micro precision ablation in a single-step manufacturing process and verify this operation for producing flow control openings for gasoline direct-injection fuel injectors. This improved process will reduce re-work and scrap rates; eliminate secondary processes such as etching, surface cleaning, or deburring; and increase laser machining energy efficiency by up to 20%–25% over standard practice.				
Total				**$54,312,211**