

Recipient	In Collaboration with	Location	Project Name (control number)	Estimated Cost Share*	DOE Investment
The University of Utah	<ul style="list-style-type: none"> • 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 (0560-1833)	\$370,000	\$1,460,285
This project will develop a new process for producing titanium components that could reduce the materials needed by ten-fold in aircraft and vehicle manufacturing. This technology combines a lower temperature powder metallurgy process with minimal post-processing steps to build parts with titanium's high strength-to-weight ratio.					
General Motors LLC	<ul style="list-style-type: none"> • Meridian Lightweight Technologies • The Ohio State University 	Warren, MI	Development of Energy Efficient Integrated Die Casting Process for Large Thin-Walled Magnesium Applications (0560-2064)	\$668,031	\$2,672,124
This project will develop an integrated super-vacuum die casting process using a new magnesium alloy to 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 significant fuel economy improvements and carbon emission savings.					
MEMC Electronic Materials, Inc.	<ul style="list-style-type: none"> • 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 (0560-2125)	\$920,000	\$3,680,000
This project will enable more efficient manufacturing of gallium nitride (GaN) which 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	<ul style="list-style-type: none"> • BASF Qtech Inc. • Quantiam Technologies Inc. 	Newtown Square, PA	Catalyst-Assisted Production of Olefins from Natural Gas Liquids: Prototype Development and Full-Scale Testing (0560-2131)	\$2,199,895	\$4,500,000
This project will use a new coating material to reduce surface deposits (unwanted byproducts) and improve the energy efficiency of ethylene production. As ethylene production is the largest user of energy in the chemical industry, a 6 to 10% per plant reduction in energy consumption would result in an annual energy savings of 20-35 trillion Btus. The proposed technology can be installed during the normal maintenance cycle, and, with the growing availability of shale gas, it has the potential to help the U.S. maintain its position as a world leader in olefins production.					

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American Iron and Steel Institute (AISI)	<ul style="list-style-type: none"> University of Utah 	Salt Lake City, UT	A Novel Flash Ironmaking Process (0560-2267)	\$ 1,780,000	\$7,120,000
<p>This project will develop 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. This new process has the potential to reduce the energy needed to make iron by more than 50%</p>					
Research Triangle Institute	<ul style="list-style-type: none"> Duke University Veolia, Inc. 	Research Triangle Park, NC	Advanced, Energy-Efficient Hybrid Membrane System for Industrial Water Reuse (0560-2310)	\$1,199,982	\$4,800,000
<p>This project will develop and demonstrate a single hybrid system for industrial wastewater treatment and reuse that combines two known processes - forward osmosis and membrane distillation. 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 the facilities' wastewater, decrease wastewater discharge, and recover significant amounts of industrial waste heat.</p>					
The Dow Chemical Company	<ul style="list-style-type: none"> Oak Ridge National Laboratory Ford Motor Company 	Midland, MI	Scale-Up of Novel Low-Cost Carbon Fibers Leading to High-Volume Commercial Launch (0560-2328)	\$4,500,432	\$9,000,000
<p>This project will develop a lower cost carbon fiber production process that uses polyolefin in place of conventional polyacrylonitrile as the feedstock. Low-cost carbon fiber has widespread application in automobiles, wind turbines, and various other industrial applications. Potentially this novel process could reduce production costs by 20% and total carbon dioxide emissions by 50%.</p>					
Teledyne Scientific and Imaging	<ul style="list-style-type: none"> 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 (0560-2445)	\$530,000	\$2,110,000
<p>This project will develop, optimize and test a highly durable membrane coating for the black liquor-to-fuel concentration process used by the pulp and paper industry. 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 Btus per year.</p>					

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Massachusetts Institute of Technology (MIT)		Cambridge, MA	Continuous Processing of High Thermal Conductivity Polyethylene Fibers and Sheets (0560-2479)	\$29,350	\$1,000,000
<p>This project will research a new continuous manufacturing process to make high molecular weight, high thermal conductivity polyethylene fibers and sheets to replace metals and ceramics parts in heat transfer equipment. Also, because polyethylene density is 35% less than aluminum, the new materials developed as part of this project could generate fuel savings in vehicle applications.</p>					
Third Wave Systems, Inc.	<ul style="list-style-type: none"> • 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 (0560-2551)	\$964,717	\$4,069,882
<p>This project will develop microstructural modeling tools for metals and demonstrate a design framework to improve the understanding of dynamic response and statistical variability. This project will enable design engineers to evaluate effects of design changes and various materials; anticipate quality and cost, prior to factory floor implementation; and achieve processes for low-waste, low-cost manufacturing.</p>					
Air Products and Chemicals, Inc.	<ul style="list-style-type: none"> • 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 (0560-2559)	\$300,000	\$1,200,000
<p>This project combines a microbial reverse electrodialysis technology with waste heat recovery to convert effluents into electricity and chemical products including hydrogen gas. This technology uses salinity gradients to overcome the thermodynamic barriers and over potential associated with hydrogen production. This technology will be applicable to a wide variety of U.S. industrial sectors, including the chemical, food, pharmaceutical, and refinery industries and, by providing on-site electricity generation, could save industry 40 trillion Btus annually and further offset 6 million tons of carbon dioxide emissions each year.</p>					

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PolyPlus Battery Company	<ul style="list-style-type: none"> • Corning Incorporated • Johnson Controls Incorporated 	Berkeley, CA	Innovative Manufacturing of Protected Lithium Electrodes for Ultra High Energy Density Batteries (0560-2702)	\$2,915,287	\$8,999,920
<p>This project will develop a protected lithium electrode, a solid electrolyte and a scaled up manufacturing process for high energy density lithium-air, lithium-water and lithium-sulfur batteries. This project will scale up the 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 Btus of energy annually.</p>					
Delphi Automotive Systems, LLC	<ul style="list-style-type: none"> • Raydiance, Inc 	Rochester, NY	High Metal Removal Rate Process for Machining Difficult Materials (0560-2805)	\$925,000	\$3,700,000
<p>This project will develop fast lasers that use micro precision cutting in a single-step manufacturing process, and verify this operation for producing flow control openings for 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 up to 20%–25% over standard practices.</p>					
Total				\$17,302,694	\$54,312,211

* Cost-share totals subject to change with final negotiations