

# Small Business Innovation Research Small Business Technology Transfer Energy Independence and Security Act Annual Report

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## Fiscal Year 2014

Section 9(z) of the Small Business Act, 15 U.S.C. §638(z) requires that the annual report include a determination of whether the following priority described is being carried out: (A) ensure that such departments and agencies give high priority to small business concerns that participate in or conduct energy efficiency or renewable energy system research and development projects; and (B) include in the annual report to Congress under subsection (b)(7) a determination of whether the priority described in subparagraph (A) is being carried out.

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## Department of Agriculture (USDA)

*Examples of USDA SBIR and STTR projects related to energy efficiency or renewable energy*

Firm Name	Project Title	Phase
Thermal Framing LLC	Low Thermal Bridge Building Components Structural Research	I
Magnetic Development, Inc.	Solar Refrigeration for Storage of Food Products	I
CEC Farm	Solar Energy for Low Income Rural Households	I
Proton Energy Systems	High Efficiency Low Cost Electrochemical Ammonia Production	I
BioChemInsights, Inc.	Enhanced Butanol Yields for Advanced Biofuels Production Using an Electrochemical Bioreactor	I
Sonsight Inc.	Extended Rotor Turbine	II
ORPC Alaska, LLC	Harnessing Clean River Energy with the RivGen Power System to Replace and Offset Diesel Fuel Use by Rural Communities	II
Precision Combustion, Inc.	Compact Efficient and Economic Soil Steam Disinfestation	II

### *Procedures and mechanisms USDA used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

At the beginning of the USDA SBIR Solicitation, two crosscutting priorities that apply to the entire USDA SBIR program are listed. These are Energy Efficiency and Alternative and Renewable Energy. Applicants are directed to indicate if they meet these crosscutting areas within their Project Narrative by responding to the following section “Responsiveness to USDA SBIR Program Priorities”. If a proposal is responsive to the Energy Efficiency and Alternative and Renewable Energy issue the proposal will be given extra consideration during the review process.

### *Specific actions USDA has taken to promote and support energy efficiency and renewable energy research projects*

Several of USDA’s topic areas give priority and visibility to energy efficiency and/or alternative and renewable energy and in that way applicants are encouraged to submit proposals that deal with either or both issues.

## Department of Commerce (DOC)

### *Examples of DOC SBIR and STTR projects related to energy efficiency or renewable energy*

The Wind Forecast Improvement Project (WFIP) has been completed. Earth System Research Laboratory (ESRL) successfully improved its wind forecasts by having additional observations in the models and by improving the model physics. Results are found at: [http://www.esrl.noaa.gov/research/renewable\\_energy/](http://www.esrl.noaa.gov/research/renewable_energy/). Wind Forecast Improvement Project-2 ESRL is currently preparing for a second Wind Forecast Improvement Project - WFIP2, which will focus on improving forecasts for wind plants in complex terrain, with a field campaign in 2015-2016 in the Columbia River Gorge. NOAA will deploy numerous remote sensing instruments and will use these measurements to develop and validate improved physical parameterizations for use in the research and operational versions of the HRRR model. NOAA/ESRL/GSD, CSD, PSD and ARL and the NWS are all working with DOE on WFIP2. Read about the Energy Department Announces \$2.5 Million to Improve Wind Forecasting <http://research.noaa.gov/News/NewsArchive/LatestNews/TabId/684/ArtMID/1768/ArticleID/10988/Energy-Department-Announces-25-Million-to-Improve-Wind-Forecasting.aspx>

### *Procedures and mechanisms DOC used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

Solar Forecast Improvement Project (SFIP) For the Solar Forecast Improvement Project (SFIP), the ESRL is partnering with the National Center for Atmospheric Research (NCAR) and IBM to develop more accurate methods for solar forecasts using their state-of-the-art weather models. The Department of Energy (DOE) is funding this effort. SFIP has three main goals:

- 1) to develop solar forecasting metrics tailored to the utility sector;
- 2) to improve solar radiation forecasts from minutes to several hours to two days; and
- 3) to incorporate solar forecasts into utility and Independent System Operator (ISO) system operations and identify economic and reliability benefits.

NOAA is providing numerical weather prediction (NWP) modeling with new information that will help solar forecasts. Specifically, NOAA is modifying forecasts from the 3-km High-Resolution Rapid Refresh (HRRR) model and an advanced version of the 13-km Rapid Refresh (RAP) model to provide information forecasters need to predict power production from photovoltaic (PV) and concentrating solar power (CSP) systems. NOAA is providing these grids to the NCAR and IBM teams. NOAA is also providing high-quality, ground-based solar measurements from its Integrated Surface Irradiation Study (ISIS) and SURFace RADiation (SURFRAD) networks. The ISIS and SURFRAD instruments at sites across the U.S. measure incoming direct beam, total and diffuse solar radiation with the high accuracy required to calibrate satellites and verify model output. NOAA also will provide advanced satellite products.

*Specific actions DOC has taken to promote and support energy efficiency and renewable energy research projects*

National Energy (with) Weather System Researchers at the ESRL have developed a tool—National Energy with Weather System (NEWS) Simulator—to simulate the electric (and energy) sector. Specifically, they are investigating what happens within the system as large amounts of variable generation (wind and solar PV) are integrated as power sources. The aim is to produce a simulator that can be leveraged for decision making on a variety of scales and incorporate a broad range of technologies. The NEWS simulator designs new systems based on the inputs provided, and the system is cost optimized. NEWS can find additional solutions that produce the least amount of carbon dioxide, waste the smallest percentage of the electric load, build the least amount of new generation, or even create the smallest amount of new transmission. One important requirement of the new system is that it must meet the electricity demand each hour for the entire year, without fail. NEWS will select the type of energy and the locations for generation that best meet the specific needs of the system. The simulator uses linear programming to find optimal solutions that consider simultaneously generation, transmission, losses, variability, and electric load. The current version has a built-in dataset for the weather over the U.S. for 2006 to 2008 with concurrent electric load for 256 regions. Additional datasets include the power estimates from the weather, siting constraints on variable (and current conventional) generators and the HVDC transmission line paths that can be constructed by the simulator. There is also a global weather and power dataset for 2008 that allows NEWS to be used around the world.

## Department of Defense (DOD)

### *Examples of DOD SBIR and STTR projects related to energy efficiency or renewable energy*

DoD SBIR/STTR releases three solicitations per year; included in these solicitations are topics related to and promoting energy efficiency and renewable energy. A list of projects promoting energy efficiency and renewable energy can be found in the following table:

Firm Name	Component	Proposal Number	Proposal Title	Award Amount	Project Status
Mainstream Engineering Corporation	Air Force	F141-204-2146	Innovative DMFC Power Supply for NDI Hand Tools	\$149,965	Active Phase I
PH Matter, LLC	Air Force	F141-204-1271	Improve Energy Source for NDI Equipment Tools	\$149,999	Active Phase I
L. Raymond & Associates	Air Force	F141-203-1397	Innovative Process for Developing Improved LHE Zn-Ni and Cd Baking Process	\$77,102	Active Phase I
(ES3) Engineering & Software System Solution, Inc.	Air Force	F141-203-0615	Improved LHE Zn-Ni and Cd Plating Process	\$150,000	Active Phase I
FTL Labs Corporation	Air Force	F141-211-0893	Enhanced Fuel Cells from Wastewater Treatment (Bacteria Generated System) as a Renewable Energy Source	\$150,000	Active Phase I
Mainstream Engineering Corporation	Air Force	F141-080-2351	Rapidly Configurable Turbomachines for Air Cycle Machine Emulation	\$149,978	Active Phase I
PC Krause and Associates, Inc.	Air Force	F141-080-1842	Air Cycle Toolsets for Aircraft Thermal Management System (TMS) Optimization	\$149,998	Active Phase I
New Eagle Consulting LLC	Air Force	F141-068-1343	Generic Power/Propulsion Microcontroller for Unmanned Aircraft Systems (UAS)	\$149,826	Active Phase I
Leucadia Engineering LLC	Air Force	F141-068-1343	Generic Power/Propulsion Microcontroller for Unmanned Aircraft Systems (UAS)	\$149,876	Active Phase I
Structured Materials Industries	Air Force	F141-062-1929	Lightweight Graphene Wire Production	\$149,999	Active Phase I
Hyper Tech	Air Force	F141-062-1697	Lightweight Electric Wires and	\$150,000	Active Phase I

Research Inc.			Cables from CNT-Cu Composites for Airborne Platforms		
Lynntech, Inc.	Air Force	F141-070-0939	Non-flammable Ionic Liquid Electrolytes for Li-ion Batteries	\$149,996	Active Phase I
Physical Sciences Inc.	Air Force	F141-070-1002	High Performance, Nonflammable IL Electrolyte	\$149,935	Active Phase I
MSNW LLC	Air Force	F141-089-0420	Combustion Enhanced Electric Propulsion	\$149,999	Active Phase I
Busek Co. Inc.	Air Force	F141-089-1539	Low Mass Low Specific Power Hall Effect Thruster	\$149,994	Active Phase I
Spytek Aerospace Corporation	Air Force	F131-160-0936	Multi-ITB-Turbo Fan for Advance Propulsion and Power Concepts for Large Size Class UAS Equipped with Variable Turbine	\$674,992	Active Phase II
Engine Research Associates Inc.	Air Force	F131-160-1905	Advanced Propulsion and Power Concepts for Large Size UAS	\$746,885	Active Phase II
Creare Inc.	Air Force	F131-165-1308	Dynamic Aircraft Energy Management Optimization Tools	\$748,394	Active Phase II
CU Aerospace	Air Force	F131-165-2041	Dynamic Aircraft Energy Management Optimization Tools	\$749,998	Active Phase II
ArmorWorks Inc.	Air Force	F121-192-1060	Wireless Power for Battlefield Airmen	\$742,676	Active Phase II
Illinois Rocstar LLC	Air Force	F093-190-0193	A Modeling/Experimental Program for Nano-Energetic Particles	\$726,739	Active Phase II
Busek Co	Air Force	F081-065-0906	Catalyst-Free, Highly Throttleable Electric Propulsion Thruster	\$745,513	Active Phase II
Mainstream Engineering	Air Force	F103-225-1218	Maximum Hydrogen Storage Densities in Scalable, Low-Cost Vessels through Compression and Adsorption	\$784,086	Active Phase II
Green Cooling Revolution	Air Force	F112-205-0173	Improved Energy Conservation for Data Centers	\$750,000	Active Phase II
Select Engineering Services	Air Force	F103-246-0934	Energy-Efficient Tactical Shelters	\$1,280,182	Active Phase III
(ES3) Engineering &	Air Force	F093-203-0818	Improved Landing Gear	\$1,205,655	Active Phase

Software System Solution, Inc.			Grinding/Finishing Methods on Hard Wear Resistant Surfaces		III
M3 Consulting Services, Inc.	Air Force	F103-252-1453	Direct Conversion of CO2 to Liquid Hydrocarbon Fuel	\$749,204	Active Phase II
Energy Quest Technologies Inc.	Air Force	F112-219-1620	Multi-Source Integrated Cooling Heating and Power System	\$750,000	Active Phase II
SunDanzer Development Incorporated	Army SBIR	A2-1976	Solar Refrigeration	\$1,841,155	In Process Phase III
Physical Optics Corporation	Army SBIR	A2-5702	Ambient Energy Conversion System	\$999,912	Completed Phase II
Carbon Solutions, Inc.	Army SBIR	A2-5649	All-solid-state Battery-Ultracapacitor Hybrid Devices Based on Nanostructured Materials	\$471,600	In Process Phase II
Simpson Weather Associates, Inc.	Army SBIR	A2-5375	Optimizing the use of atmospheric energy to extend range and endurance of low altitude UAVs and small manned aircraft	\$1,114,400	In Process Phase III
Advanced Cooling Technologies, Inc.	Army SBIR	A2-5363	Heat-Pipe Embedded Exhaust Heat Recovery System	\$999,937	Completed Phase II
V Squared Wind, Inc.	Army SBIR	A2-5349	Wind Energy Systems for Base Camp Applications	\$999,973	Completed Phase II
SAFCell, Inc.	Army SBIR	A2-5345	Feasibility Study for a Propane Fueled 50 W SAFC System	\$999,999	Completed Phase II
Powdermet Inc.	Army SBIR	A2-5312	Nanodielectrics for High Energy Density Capacitors	\$999,999	In Process Phase II
Cambrian Innovation, Inc.	Army SBIR	A2-5232	Mobile Bioelectric Filtration System (MBFS): Accelerated Anaerobic Digestion via Bio-Electrochemical Reactions	\$999,907	In Process Phase II
Tremont Technology LLC	Army SBIR	A2-5140	Development of a Direct Ethanol Fuel Cell System with Anion Exchange Membranes	\$729,787	In Process Phase II
Mainstream Engineering Corporation	Army SBIR	A2-5019	Low Temperature Extended Lifetime Fuel Cell (LoTEL-FC) Power System for Unattended	\$999,243	In Process Phase II



			Ground Sensors		
CFD Research Corporation	Army SBIR	A2-4343	High Power and Capacity Anode for Thermal Battery	\$1,229,909	CRP
Lionano Inc.	Army SBIR	A142-082-0215	High Energy Density Materials for Projectile Li-ion Battery	\$99,973	In Process Phase I
TIAX LLC	Army SBIR	A141-023-0292	Abuse Tolerant High Energy LiCoPO4-Based 5V Li-ion Cells	\$99,939	Completed Phase I
Giner, Inc.	Army SBIR	A141-009-0401	High Energy Density Thermal Battery for Military Applications	\$96,833	In Process Phase I
CFD Research Corporation	Army SBIR	A141-009-0214	Novel Cathodes for High Capacity Thermal Battery	\$99,900	In Process Phase I
The ENSER Corporation	Army SBIR	A141-009-0194	High Capacity Materials and Advanced Engineering for Thermal Batteries	\$99,520	In Process Phase I
Physical Optics Corporation	Army SBIR	A131-046-0391	Ambient Energy Conversion System	\$149,957	Pending PH II
Carbon Solutions, Inc.	Army SBIR	A131-008-0204	All-solid-state Battery-Ultracapacitor Hybrid Devices Based on Nanostructured Materials	\$150,000	Pending PH II
NexTech Materials, Ltd.	Army SBIR	A121-068-0377	Sulfur Tolerant Solid Oxide Fuel Cell (SOFC) Stack	\$150,000	Pending PH II
Morton Photonics Incorporated	Army STTR	A14A-005-0024	Ultra-Coherent Semiconductor Laser Technology	\$149,999	Active Phase I
Telaris Inc.	Army STTR	A14A-005-0029	Ultra-Coherent Semiconductor Laser Technology	\$149,971	Active Phase I
Technology Assessment & Transfer, Inc.	Army STTR	A14A-011-0097	Freeze Casting of Tubular Sulfur Tolerant Materials for Solid Oxide Fuel Cells	\$149,967	Active Phase I
MillenniTEK LLC	Army STTR	A14A-011-0171	Freeze Casting of Tubular Sulfur Tolerant Materials for Solid Oxide Fuel Cells	\$149,974	Active Phase I
SI2 Technologies	Army STTR	A2-5753	Printed, Flexible Ultracapacitors Based on Novel, High-Performance Carbon Nanomaterials	\$592,574	Active Phase II
Fulcrum Bioscience	Army STTR	A2-5774	Bioelectrocatalyzed Nitrogen Fixation under Standard Conditions	\$499,976	Active Phase II

Computational Sciences, LLC	Army STTR	A2-5691	A universal framework for non-deteriorating time-domain numerical algorithms in Maxwell's electrodynamics	\$499,947	Active Phase II
Applied Mathematics, Inc.	Army STTR	A2-5755	Near Real-Time Quantification of Stochastic Model Parameters	\$500,000	Active Phase II
Staib Instruments, Inc.	Army STTR	A2-5781	Chemical Analyzer System for In Situ and Real Time Surface Monitoring for Composition Control During Synthesis of Compound Semiconductor Films	\$644,423	Active Phase II
Ultra Communications Inc.	Army STTR	A2-5450	Alignment Tolerant Optical Connector with Active Regenerative Element	\$374,916	Active Phase II
CFD Research Corporation	Army STTR	A2-5418	Oriented Enzymatic Electrodes with Enhanced Charge Transfer	\$372,733	Active Phase II
NLA Diagnostics LLP	Army STTR	A2-5499	Nondestructive Concrete Characterization System	\$248,125	Active Phase II
New Jersey Microsystems, Inc.	Army STTR	A2-5063	MEMS based thermopile infrared detector array for chemical and biological sensing	\$361,780	Active Phase II
Trident Systems Inc.	Army STTR	A2-5036	Multi-input Multi-Output Synthetic Aperture Radar with Collocated Antennas	\$429,070	Active Phase II
Pranalytica, Inc.	Army STTR	A2-5083	Coherent Beam Combining of Mid-IR Lasers	\$389,038	Active Phase II
Lynntech, Inc.	Army STTR	A2-4999	Improved Combustion Efficiency and Reduction of Emissions of Compression Ignition Engines Using On-Board Non-Thermal Plasma Generated Hydrogen/Syngas	\$357,215	Active Phase II
QmagiQ, LLC	Army STTR	A2-5773	VLWIR SLS Digital FPA and Camera for Imaging Spectroscopy	\$528,651	Active Phase II
Lumilant, Inc.	Army STTR	A2-5756	Advanced Spectrally Selective Materials for Obscurant Applications	\$499,996	Active Phase II
Five Stones Research	Army STTR	A2-5071	Plasmonic MEMS Sensor Array	\$365,311	Completed Phase II

Corporation					
Intraband LLC	Army STTR	A2-4541	On-Chip Passive Phase-Locking for High Coherent Power, Mid-IR Quantum Cascade Lasers	\$367,358	Completed Phase II
Silicon Informatics, Inc.	Army STTR	A2-5053	Random Number Generation for High Performance Computing	\$375,000	Completed Phase II
InnovaTek, Inc.	Army STTR	A2-4580	Catalytic membrane reactor for the production of hydrogen from butanol	\$375,000	Completed Phase II
JSJ Technologies, LLC	Army STTR	A2-4591	Activated Reactants to Reduce Fuel Cell Overpotentials	\$397,078	Completed Phase II
Antek	Army STTR	A2-5090	Automated Blood Component Separator	\$374,914	Completed Phase II
Net-Scale Technologies, Inc.	Army STTR	A2-5015	Incremental Learning for Robot Sensing and Control	\$344,320	Completed Phase II
Mainstream Engineering Corporation	OSD	O133-EP1-2218	Phase Change Material Thermal Energy Storage (PCM-TES) for ECU Efficiency Improvement	\$149,680	Active Phase I
Aqwest	OSD	O133-EP1-2208	Phase Change Thermal Buffers for Environmental Control Unit Efficiency Improvement	\$149,921	Active Phase I
Advanced Cooling Technologies, Inc.	OSD	O133-EP1-2035	Environmental Control Unit with Integrated Thermal Storage	\$149,962	Active Phase I
APECOR	OSD	O133-EP2-2210	High Efficiency Electric Power Manager for Man-Portable Photovoltaic Systems	\$149,919	Active Phase I
Genasun LLC	OSD	O133-EP2-2248	High Efficiency Man-Portable Photovoltaic Power Manager	\$147,315	Active Phase I
SeaLandAire Technologies, Inc.	OSD	O133-EP2-2138	High Efficiency Electric Power Manager for Man-Portable Photovoltaic Systems	\$149,985	Active Phase I
MicroLink Devices	OSD	O133-EP3-1143	Increasing the Specific Power of Epitaxial Lift-Off Solar Cells for Cost-Effective, High-Efficiency, Flexible Photovoltaics	\$150,000	Active Phase I
Vanguard Space Technologies, Inc.	OSD	O133-EP3-1099	High Efficiency Flexible Photovoltaics	\$149,991	Active Phase I

Applied Nanotech, Inc.	OSD	O133-EP3-1120	High Efficiency Flexible Photovoltaics	\$149,966	Active Phase I
Applied Novel Devices	OSD	O133-EP3-1141	High Efficiency Flexible Photovoltaics	\$150,000	Active Phase I
Materials & Electrochemical Research (MER) Corp.	OSD	O133-EP4-2222	Ultra-High Power Density Metal Supported SOFC Stack for High Efficiency Propulsion and Power Systems	\$149,999	Active Phase I
Redox Power Systems, LLC	OSD	O133-EP4-2012	Ultra-High Power Density Solid Oxide Fuel Cell Stack for High Efficiency Propulsion and Power Systems	\$149,048	Active Phase I
NexTech Materials, Ltd.	OSD	O133-EP4-2077	Ultra-High Power Density Solid Oxide Fuel Cell Stack for High Efficiency Propulsion and Power Systems	\$150,000	Active Phase I
Naeim Henein	OSD	O133-EP5-2051	Precision In-Cylinder Pressure Sensor System for Heavy Duty Diesel Engines	\$98,367	Active Phase I
Mide Technology Corporation	OSD	O133-EP5-2225	Precision In-Cylinder Pressure Sensor System for Heavy Duty Diesel Engines	\$150,000	Active Phase I
Optrand Incorporated	OSD	O133-EP5-2211	Miniature Static-Dynamic Cylinder Pressure Sensor	\$143,502	Active Phase I
IntraMicron, Inc.	OSD	O2-1499	Advanced Thermal Management Materials and Strategies for Packaging High Rate Cylindrical Cells and Battery Packs	\$999,968	Active Phase II
PC Krause and Associates, Inc.	OSD	O2-1518	Intelligent Power Management Module for Autonomous Power Generator Operation	\$570,317	Active Phase II
CFD Research Corporation	OSD	O2-1473	First-Principles-Based Framework for Discovery and Design of Sustainable Non-Rare-Earth High-Temperature Alloy Systems	\$749,942	Active Phase II
5-D Systems	OSD	O2-1517	Militarized Power Line Communication	\$979,582	Active Phase II
InnovaTek, Inc.	OSD	O2-1402	Multi-Fuel Processor for Portable Power	\$1,000,000	Active Phase II

Precision Combustion, Inc.	OSD	O2-1393	Fuel Flexible Reformer	\$999,927	Active Phase II
MSW Power Corporation	OSD	O2-1415	Solid Waste Destruction System (SWDS) for Small Contingency Base Camps	\$421,754	Active Phase II
CoolCAD Electronics	OSD	O2-1408	Computer Aided Design Platform for Silicon Carbide Power Electronics	\$999,969	Active Phase II
Intelligent Automation, Inc.	OSD	O2-1463	HMI for Efficient, Lite, and Intuitive Operator-communication and Sense-making in Power Networks (HELIOS-PN)	\$976,021	Active Phase II
Creare Inc.	OSD	O2-1374	A Fast Acting Solid-State Circuit Breaker for Electrical Power Systems	\$739,771	Active Phase II
Correlated Magnetics Research	OSD	O2-1227	Application of Correlated Magnetics to Magnetic Torque Transfer Devices	\$747,665	Active Phase II
Intelligent Power & Energy Research Corporation	OSD	O2-0808	Develop plug and play architecture for Tactical power grids	\$1,348,170	Active Phase II Enhancement
Creare Inc.	OSD	O2-0899	Shaft-Mounted Cryogenic Refrigerator for HTS Motors and Generators	\$2,486,672	Active Phase II Enhancement
Physical Optics Corporation	OSD	O2-0816	Hierarchical Intelligent Energy Resource Controller	\$2,610,286	Active Phase III
Logos Technologies	DARPA	D133-004-0032	Hybrid Off-Road Motorcycle	\$149,145	Active Phase II
Logos Technologies	DARPA	D2-1396	Hybrid Off-Road Motorcycle	\$1,499,941	Active Phase II
Land Sea Air Autonomy	DARPA	D2-1272	Hybrid Off-Road Motorcycle	\$1,740,856	Active Phase II
Fairmount Technologies LLC	DLA	L2-0024	Stretch Roll Forming	\$661,213	Active Phase II
Coventry Associates	DLA	L2-0025	Method for Reducing the Cost and Improving the Quality of	\$749,647	Active Phase II

			Aerospace Bearing Production		
Materials & Electrochemical Research (MER)	DLA	L2-0028	Rapid Additive Manufacturing of Very Low Cost 3-Dimensional Titanium Alloy Components	\$750,042	Active Phase II
Scientific Forming Technologies Corporation	DLA	L122-001-0024	Advanced Forging Manufacturing Innovations	\$99,985	Active Phase I
VEXTEC Corporation	DLA	L122-001-0029	Advanced Forging Manufacturing Innovations	\$99,938	Active Phase I
AMERICAN ENERGY TECHNOLOGIES CO	DLA	L122-002-0003	20-year Lithium Primary battery for Missile-Implantable Corrosion Monitoring Systems and as Prime Power Sources for mini-UAVs	\$96,165	Active Phase I
Giner, Inc.	DLA	L122-002-0006	An Integrated Li-ion Battery Manufacturing Process for Improved Safety and Decreased Battery Cost	\$99,966	Active Phase I
Eskra Technical Products, Inc.	DLA	L122-002-0030	Advanced Battery Technologies and Manufacturing Process Improvements	\$99,970	Active Phase I
Reactive Innovations, LLC	DLA	L122-002-0073	Low Cost Production of Carbon Monofluoride (CFx) for Lithium Batteries	\$99,999	Active Phase I
Retriev Technologies, Inc.	DLA	L142-001-0007	Green Lower Cost Batteries	\$99,876	Active Phase I
Physical Sciences Inc.	DLA	L142-001-0014	Development of Advanced Battery Manufacturing Techniques	\$99,975	Active Phase I
CAMX Power LLC	DLA	L142-001-0019	Logistically Robust, Long Life, High Power Rechargeable Battery	\$99,933	Active Phase I
CAMX Power LLC	DLA	L142-001-0020	Reduced Manufacturing Cost for Li-ion Batteries	\$99,963	Active Phase I
Xerion Advanced Battery Corporation	DLA	L142-001-0023	Advanced Battery Manufacturing Technologies	\$99,920	Active Phase I
ADA Technologies, Inc.	DLA	L142-001-0024	High Speed, Automated Lithium Ion Laser Electrode Cutter	\$99,999	Active Phase I
K2 Energy Solutions,	DLA	L142-001-0033	Advanced Battery	\$99,008	Active Phase I

Inc.			Manufacturing Technologies		
Giner, Inc.	MDA	B2-1976	Lightweight Hydrogen/Oxygen Thermal Generators for Fuel Cell Power	\$974,458	Active Phase II
Lithiumstart LLC	MDA	B2-2004	Solid State High Energy Laser Batteries and Power Sources	\$973,966	Active Phase II
Radiance Technologies Inc.	MDA	B2-1965	Smart Sensing for Integrated Low Power Radiological Protection	\$972,733	Active Phase II
Triton Systems, Inc.	MDA	B2-1974	Ultra-Low Power Sensor for Missile Defense Applications	\$974,956	Active Phase II
Mide Technology Corporation	MDA	B2-2008	Long Duration Zero Power Sensor Technology	\$500,000	Active Phase II
Arete Associates	Navy	N061-002-0336 / N061-002-0336a	Sea Surface Slope and Elevation Statistics to Support Radar Performance Modeling / Ocean Characterization Tools	\$2,215,015	SBIR Closed
CFD Research Corporation	Navy	N043-239-1092 / N043-239-1092a	Ram Air Turbine Driven Power and Cooling Unit for Enhanced EA-18 Pod Effectiveness / Ram Air Turbine Driven Power and Cooling Unit for Enhanced EA-18 Mission Effectiveness	\$2,109,928	SBIR Closed
Coherent Logix, Incorporated	Navy	N051-078-1540	Adaptive Anti-Jam Radio System (AAJRS)	\$3,344,947	SBIR Closed
Creare Inc.	Navy	N064-023-0009 / N064-023-0009a	A Portable Swaging Machine for Aircraft Carrier Purchase Cable Terminals / A Compact Swaging Machine for Aircraft Carrier Purchase Cable Terminals	\$1,423,840	SBIR Closed
Dynamet Technology, Inc.	Navy	N042-153-0035	Development of Low Cost Titanium Alloy Feedstock for Casting of Net Shape Combat Vehicle Components	\$768,214	SBIR Closed
Edward Pope Dr dba MATECH	Navy	N022-0463 / N022-0463a	SiNC Ceramic Fibers for the JSF/VAATE Engine / Phase II.5 SBIR: SiNC Ceramic Fibers for the IHPTET/VAATE Engine	\$2,561,401	SBIR Closed
Engineering Science Analysis Corp.	Navy	NBCH-C06-0024	Non-lethal, target-sensitive swimmer and diver defense system	\$491,776	SBIR Closed

Fluorochem, Inc.	Navy	N041-111-0891	Synthesis of Energetic PrePolymers of Varying BAMO and NMMO or PGN Content and Structure	\$2,769,068	SBIR Closed
Harmonia Holdings Group	Navy	N031-1279 / N031-1279a	Using UIML to Automate Generation of Usability Prototypes and Tactical Software / Using UIML to Automate Generation of Usability Prototypes and Tactical Software	\$1,599,164	SBIR Closed
Herman Advanced Engineering, Inc.	Navy	N041-019-0699 /N041-019-0699a	Damping Coatings for Gas Turbine Compression System Airfoils / Free Layer Blade Damper by Magneto-mechanical Coating	\$1,461,680	SBIR Closed
InterScience, Inc.	Navy	N083-210-0212	Portable Biometric System (PBS) for Identity Dominance	\$1,314,663	SBIR Closed
Lightning Packs LLC	Navy	N064-026-0008	Harvesting Electric Power from Walking	\$3,091,749	SBIR Closed
Mainstream Engineering Corp.	Navy	N043-239-1064 / N043-239-1064a	Advanced Ram Air Driven Power and Cooling Unit / Development of 60 kW Prime Power Generating System for the Next Generation Jammer	\$2,955,329	SBIR Closed
Mayflower Communications Company, Inc.	Navy	N083-217-0058 / N083-217-0058a	Low Cost, Low Power, Integrated Full Anti-Jam SAASM GPS Receiver with Up-Finding Capability and M-Code Compatibility for Gun Launched Projectiles / Software-Defined Low Cost MGUE (SD-MGUE) for Resource Constrained Military Users	\$1,733,978	SBIR Closed
NanoSonic, Inc.	Navy	N061-081-0763 / N061-081-0763a	Highly Flame, Blast and Ballistic Resistant Hybrid Polysiloxane Coatings for U.S. Navy Ship Structures / CPP - Innovative Siloxane Nanocomposite Elastomers as Blast/Fire Resistant Polymer Coatings	\$1,949,999	SBIR Closed
Ocellus, Inc.	Navy	N054-015-0356	Aerogel Spray Thermal Barrier	\$1,718,972	SBIR Closed
Precision	Navy	A032-1150	JP-8 Gasifier and Pre-Reformer	\$500,000	SBIR Closed



Combustion, Inc.					
RCT System, Inc.	Navy	N082-181-0243 / N082-181-0243a	High Efficiency and High-Power Quality Electrical Power Conversion / LCS Mk-50 Gun Mission Module (GMM) Integrated Power System	\$2,746,853	SBIR Closed
RDRTec Inc.	Navy	N062-122-0440 / N062-122-0440a	Automated Ship and Small Craft Classification Tools for ISAR Imagery / Automated Ship and Small Craft Classification Tools for ISAR Imagery	\$2,498,440	SBIR Closed
Real-Time Analyzers	Navy	N992-4686 / N992-4686a	A portable Raman instrument for fuel characterization / Marine Corps Fuel Analyzer	\$3,751,343	SBIR Closed
SKC Powerteh, Inc.	Navy	N041-048-0779	Low Magnetic Signature, Rechargeable, Modular Battery Technologies for Mine Warfare	\$644,408	SBIR Closed
Srico, Inc.	Navy	N061-028-0373 / N061-028-0373a	Ferroelectric Relaxor Materials for High-Frequency Sensors and High-Speed Optical Switches / Ferroelectric Relaxor Materials for High-Frequency Sensors and High-Speed Optical Switches	\$2,008,928	SBIR Closed
TPL, Inc.	Navy	N041-125-1456/ N041-125-1456a	High Power Density Capacitors for High Temperature Navy Applications / High Power Density Capacitors for High Temperature Navy Applications	\$2,040,680	SBIR Closed
Trout Green Technologies, Incorporated	Navy	N061-068-0001 / N061-068-0001a / N061-068-0001b	Improved Aircraft Marker Lighting System / Advanced Systems for Aircraft Taxi Guidance / Evaluation and Optimization of Advanced Systems for Aircraft Taxi Guidance	\$2,248,960	SBIR Closed
TRS Ceramics, Inc.	Navy	N045-033-0295	Single Crystal Piezoelectric Tonpilz Elements for Small Footprint, High Power Acoustic Sensors	\$2,019,947	SBIR Closed
VPT, Inc.	Navy	N031-0194	Radar Power Sources and Power Conditioning	\$748,502	SBIR Closed

*Procedures and mechanisms DOD used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

DOD employs a multitude of procedures and mechanisms to give priority to energy-related projects. Components include Energy and Power Technology focus areas, as well as, Power and Directed Energy focus areas as part of SBIR/STTR solicitations. Further, when evaluating proposals submitted against energy related topics energy independence is often used as a 'tie breaker' in the selection process. Finally, DON SBIR/STTR promoted small business attendance at the 2015 ONR Naval Future Forces EXPO focused on energy technology firms, as the majority of DON SBIR/STTR energy topics derive from ONR projects and it is critical that small firms meet principals in DOD's innovative technology Communities of Interest.

*Specific actions DOD has taken to promote and support energy efficiency and renewable energy research projects*

DOD SBIR/STTR participating components promote energy efficiency and renewable energy projects through information sharing and networking via component specific websites. These websites bring together the small business community, researchers, Programs of Record, and prime contractors for possible collaboration new and ongoing SBIR/STTR projects. Another successful method for promoting energy efficiency and renewable energy projects is through collaboration with various stakeholders. These groups provide unique insights into alternative fuels, energy efficiency, and power generation as they relate to reducing logistic requirements and meeting Army and DOD goals.

Components also track and report SBIR/STTR success stories through these same websites, as well as brochures such as the Army Commercialization Brochure. These brochures are an excellent opportunity for organizations and Small Businesses to share information about their SBIR/STTR projects and the success of their projects. These brochures are typically distributed at conferences providing exposure to these exceptional SBIR/STTR projects.

Additional component specific examples of actions taken toward promoting and supporting energy efficiency and renewable energy follow:

- a. The Department of the Navy SBIR/STTR program collaborated with TechConnect World's annual Defense Energy Summit, held in Austin TX during November 2014 with ~7500 entrepreneurs in attendance, to expose these energy-centric inventors to SBIR/STTR opportunities.
- b. DARPA recently announced the Materials for Transduction (MATRIX) program to develop new transductional materials, reducing significant size, weight, and power (SWAP) for military devices and systems. MATRIX will take a systems approach that integrates state-of-the-art materials science, predictive modeling methods, and domain-specific expertise to rapidly validate and optimize new functional architectures that offer transformative defense-related capabilities. Potential applications include:
  1. Thermoelectrics – Energy transfer, thermal management, and refrigeration
  2. Multiferroics – Enhanced sensors, actuation, micro-power generation, tunable RF and microwave field engineering

### 3. Phase-Change Materials – Fast switching and sensor application

- c. MDA SBIR STTR is exploring new ways for promoting and facilitating energy efficiency and renewable energy products. Ideas include Technology Interchange Meetings, Industry Days, and Business Workshops for Phase I and Phase II contract selections. These options will likely include drawing on a broad range of business and technology subject matter experts.

## Department of Education (ED)

The ED SBIR program funds the research and development (R&D) of education products (such as computer software, curriculum materials, and web-based applications) that contribute to increased educational opportunities, student achievement, and learning. The ED SBIR program also funds the R&D of technologies that enhance access, health and function, community living and participation, and learning for individuals with disabilities.

In FY14, SBIR programs were administered through two ED offices – the Institute of Education Sciences (IES) and the Office of Special Education and Rehabilitative Services (OSERS)/National Institute on Disability and Rehabilitation Research (NIDRR).

### *Examples of ED SBIR and STTR projects related to energy efficiency or renewable energy*

Within ED's SBIR portfolio, one FY14 project directly focuses on teaching students about energy efficiency and renewable energy systems. As part of a 2011 Fast-Track award from IES, Diversified Construction Services is developing the STEM Solar Explorations platform. This platform will be a multidisciplinary solar energy field laboratory to supplement middle school standards. The hardware component will include physical solar equipment to capture real-time data to be wirelessly transmitted to classrooms. The web-based component will host the STEM curriculum focusing on energy concepts, a dashboard to present data, and materials to facilitate teacher training and implementation. The platform will allow students to apply knowledge to daily changes in the position of the sun and to solar energy production, and to conduct hands-on investigations to address curricular content. The project is scheduled to conclude in 2015. For a video demonstration of the current prototype of this project, see <http://ies.ed.gov/sbir>.

### *Procedures and mechanisms ED used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

While ED SBIR programs did not specifically highlight energy efficiency and renewable energy in the topics of the 2014 solicitations, the program topics did allow for proposals for the R&D of products to address energy and efficiency and renewable energy as follows.

- a. At IES in 2014, the SBIR program topic areas permitted proposals for the development of products to promote student science learning. Several proposals focused on science projects related to energy efficiency and renewable energy.
- b. At NIDRR in 2013, the program topic areas included accessible information technology, healthcare interventions, and assistive technology to improve functional capacity and community access and participation of individuals with disabilities in the workplace, as well as recreational and educational settings. This could include projects focusing on energy efficiency and renewable energy.

The ED SBIR program will continue to consult with SBA and the other Federal SBIR programs regarding how to best give priority to energy efficiency and renewable energy. The ED SBIR program offices at IES and OSERS/NIDRR will consider how to best promote energy efficiency and renewable energy-related projects.

*Specific actions ED has taken to promote and support energy efficiency and renewable energy research projects*

1. The ED SBIR program will promote and support energy efficiency and renewable energy within priorities and topics in solicitations.
2. The ED SBIR program has and will continue to promote energy efficiency and renewable energy initiatives at conferences and meetings.
3. The ED SBIR program has and will continue to track and report success stories demonstrating the impact of the SBIR programs on energy-related projects.
4. The ED SBIR program will consider initiatives/efforts to coordinate with other programs that support energy efficiency and renewable energy.

## Department of Energy (DOE)

*Examples of DOE SBIR and STTR projects related to energy efficiency or renewable energy*

Firm Name	Proposal Title	Topic Area
Arkansas Power Electronics International, Inc.	Reliability of Commercially Available and State-of-the-Art SiC MOSFETs Under Gate Stress and Body Diode Stress	Wide Bandgap Semiconductors for Energy Efficiency and Renewable Energy
Monolith Semiconductor Inc.	Quantifying Appropriate De-rating of SiC MOSFETs Subject to Cosmic Rays	Wide Bandgap Semiconductors for Energy Efficiency and Renewable Energy
Micromidas, Inc.	Conversion of Sugar Beet Waste to Commodity Chemicals	Catalysis
Spero Energy, Inc.	Selective Catalysis for One-Step Lignocellulose Delignification and Lignin Valorization to High Value Methoxyphenols	Catalysis
Protabit LLC	Computational Design of a Novel Dehydratase for Renewable Fuels and Chemicals	Catalysis
Tetramer Technologies LLC	New Approaches to Improved PEM Electrolyzer Ion Exchange Membranes	Membranes and Materials for Energy Efficiency
Giner, Inc	High Temperature High Efficiency PEM Electrolysis - Topic 13a	Membranes and Materials for Energy Efficiency
Amsen Technologies LLC	High-Performance Proton Exchange Membranes for Electrolysis Cells	Membranes and Materials for Energy Efficiency
GVD Corp	Flexible Barrier Coatings for Harsh Environments	Membranes and Materials for Energy Efficiency
MicroContinuum, Inc.	R2R Production of Low-Cost Integrated OLED Substrate with Improved Transparent Conductor & Enhanced Light Outcoupling Topic: 13c (Electronic Organic Materials Research for Solid State Lighting)	Membranes and Materials for Energy Efficiency
Pixelligent Technologies LLC	Advanced Light Extraction Material for OLED Lighting	Membranes and Materials for Energy Efficiency
nCarbon, Inc.	Advanced Carbon Electrode Materials for Superior Ultracapacitors	Membranes and Materials for Energy Efficiency

*Procedures and mechanisms DOE used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

DOE issues the following topics and subtopics to give priority in their SBIR/STTR Programs to energy efficiency and renewable energy projects:

- **ADVANCED MANUFACTURING:** Subtopics include: Manufacturing Improvements of Aluminum Nitride (AlN) for Wide Bandgap Semiconductor Power Devices; Rapid Heat Treatment of Metals; Desalination without Membranes; Critical Materials for Clean Energy Technologies
- **BUILDINGS:** Integrating Energy Efficient Solid-State Lighting with Advanced Sensors, Controls and Connectivity; Advanced Manufacturing Processes to Reduce Soft Costs of Energy-Efficient Building Envelope Technologies for Retrofitting Existing Buildings; Integrating Advanced Whole-Building Energy Simulation into End-User Workflows and Tools
- **FUEL CELLS:** Demonstration of a Prototype Fuel Cell-Battery Electric Hybrid Truck for Waste Transportation
- **GEOTHERMAL:** Well Construction Technologies that Reduce Energy Costs
- **SOLAR:** Software Tools for PV Soft Cost Reductions and Grid Integration 06b Analytical and Numerical Modeling and Data Aggregation; Supply Chain for Concentrating Solar Power; Labor Efficiencies through Hardware Innovation
- **VEHICLES:** Electric Drive Vehicle Batteries; Lightweight Materials; Electric Drive Vehicle Power Electronics Subcomponents; Injector Spray Imaging Techniques; Advanced Ignition Concepts; Engine/Driveline Friction Reduction
- **WIND:** Tower and Foundation Systems for Small Wind Turbine Technology; Avian and Bat Monitoring Technologies and Methods for Offshore Wind Facilities; US Offshore Wind O&M Vessels Personnel and Equipment Transfer System
- **TECHNOLOGY TRANSFER OPPORTUNITY with ENERGY EFFICIENCY AND RENEWABLE ENERGY:** Cost-Effective Membrane Electrode Assemblies Utilizing Novel Membranes and Non-Platinum Group Metal Catalysts for Direct Methanol Fuel Cells; Durable Membrane Electrode Assemblies for Polymer Electrolyte Membrane Fuel Cell Applications
- **WIDE BANDGAP SEMICONDUCTORS FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY:** Reliability of Gan and Sic Mosfets under Positive and Negative Bias Stress at Elevated Temperatures and Built-In Body Diodes; Increasing Ruggedness of Sic Mosfets against Cosmic Rays at the Earth's Surface; Other
- **CATALYSIS:** Catalysis for the Production of Hydrocarbon Fuels or Chemicals from Biomass-Derived Intermediates; Computer-Aided Design of Improved Catalysts for Synthesizing Biomass-Derived Products; Catalysis for the Conversion of Aqueous Biomass Intermediate Streams into Hydrocarbon Fuels and Products; Discovery and/or Development of Non-PGM Catalysts for PEM- and AEM- Fuel Cells and Electrolyzers; Photo- and Electrochemical Conversions in Especially High Heat Transfer Chemical Contacting Schemes; Other
- **MEMBRANES AND MATERIALS FOR ENERGY EFFICIENCY:** Membranes for Electrochemical Systems; Innovative Durable Materials for Extreme Use Conditions; Electronic Organic Materials Research for Solid State Lighting; Other

*Specific actions DOE has taken to promote and support energy efficiency and renewable energy research projects*

The mission of the Office of Energy Efficiency and Renewable Energy (EERE) is to strengthen America's energy security, environmental quality, and economic vitality through support for the research, development, demonstration, and market deployment (RDD&D) of clean, reliable, and affordable energy efficient and renewable energy technologies for the buildings, industry, transportation, and power sectors. EERE leads the Federal government's RDD&D efforts in energy efficiency and renewable energy. EERE's role is to invest in high-value RDD&D that is critical to the Nation's energy future and would not be sufficiently conducted by the private sector acting on its own. Program activities are conducted in partnership with the private sector, state and local government, DOE national laboratories, and universities. EERE also works with stakeholders to develop programs and policies to facilitate the deployment of advanced clean energy technologies and practices. For additional information regarding EERE priorities, click [here](#).



## Department of Health and Human Services (HHS)

### *Examples of HHS SBIR and STTR projects related to energy efficiency or renewable energy*

In FY 2014, there were no new awards made that relate to energy efficiency or renewable energy.

### *Procedures and mechanisms HHS used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

In direct response to the Independence and Security Act of 2007, NIH has, in previous years, developed targeted funding opportunity announcements (FOAs) focused on soliciting project ideas related to energy efficient or renewable energy systems research and development (R&D). Presently, the most recent FOAs have expired in 2012. NIH may utilize this targeted approach in future years again as appropriate to encourage participation and application submission from small businesses in this important targeted area.

### *Specific actions HHS has taken to promote and support energy efficiency and renewable energy research projects*

In addition to releasing targeted FOAs such as mentioned above, the NIH investigator-initiated funding model lends itself to receiving applications from the small business community throughout the year under NIH's annual Omnibus grant solicitations with several standard submission due dates. Under these solicitations, small business applicants can propose projects related to energy efficiency or renewable energy systems for Phase I, Phase II, and Fast Track options under the SBIR and STTR programs within the mission of NIH.

## Department of Homeland Security (DHS)

In FY14, 142 proposals were received in response to the DHS SBIR Phase I solicitations. Of these, six offerors self-identified that their proposed efforts were either related to energy efficiency or renewable energy. These six proposals were submitted in the following S&T Directorate topic areas: Mobile Footprint Detection; Status Indicator for Downed Power Lines; and Field Detection and Analysis for Fire Gases and Particulates; and the following DNDO topics area: Smartphone or Tablet Controlled Devices for Radiation Detection, Identification, Classification and Quantification. The DNDO projects are related to detection. However, low-power solutions are sought if viable for deployment.

### *Examples of DHS SBIR and STTR projects related to energy efficiency or renewable energy*

Of the proposals submitted to the S&T Directorate's FY14 SBIR topic areas, one contract was awarded in the Status Indicator for Downed Power Lines topic area. The awardee, Integrated Solutions for Systems (Huntsville, AL) utilized a very small single chip communication device connected to a micro controller and a GPS receiver to create a network of rugged, inexpensive, very small pole mounted devices. These devices or "nodes" are able to determine and report which phase line is disconnected and also which end of the lines are down. The exact location of the node that detects a break can also be reported along with the date, time and an indication of whether or not the line is energized. A computer at the nearest sub-station is capable of actively sending an email and/or text message to one or more power company contact points to ensure that the closest responder is dispatched. A message can also be sent to the central power management facility where a downed indication can be seen on a map display.

### *Procedures and mechanisms DHS used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects AND specific actions DHS has taken to promote and support energy efficiency and renewable energy research projects*

The mission of the Homeland Security Advanced Research Projects Agency (HSARPA) within the S&T Directorate is to focus on identifying, developing, and transitioning technologies and capabilities to counter chemical, biological, explosive, and cyber terrorist threats, as well as protecting our nation's borders and infrastructure. In addition, the Directorate's First Responder Group (FRG) has a mission to strengthen the response community's abilities to protect the homeland and respond to disasters. Program managers within HSARPA and FRG develop topics in support of their missions and stakeholders. When appropriate, topic areas consider energy efficiency and renewable energy.

## Department of Transportation (DOT)

In fall 2009, the 2010.1 DOT SBIR Program solicitation contained a research topic submitted and funded by the Federal Transit Administration (FTA) to explore the economical and durable technologies and devices for improving safety for riders and transit agency employees, reducing noise and energy consumption, or improving the rider experience. In the research statement, FTA indicated that the innovations must be adaptable to existing bus and rail transit vehicles and systems. Three Phase I awards were granted exploring three distinct approaches to addressing the FTA's research statement. In March of 2012, the FTA awarded a Phase II contract to Bevilacqua-Knight Inc., project titled, Air-Steam Hybrid Engine: An Alternative to Internal Combustion – Cleaner, More Efficient, Multi-fuel compatible, Retrofittable. Work on this Phase II continues in FY2014; the project is expected to end in FY2015. Additionally, a Federal Highway Administration (FHWA) 2009 Phase I project entitled Self-Sustaining Intelligent Pavement Systems was awarded a Phase II to Solar Roadways in FY2011. The Phase II was completed in early FY2015 and plans to submit a proposal for a supplemental Phase II award. Solar Roadways is developing technology that covers asphalt and concrete surfaces with Solar Panels that will generate electricity and reduce the use of fossil fuels.

## Environmental Protection Agency (EPA)

### *Examples of EPA SBIR and STTR projects related to energy efficiency or renewable energy*

In FY 14, EPA awarded 21 new SBIR Phase I awards and 9 new Phase II awards. Five Phase I awards and three Phase II awards are energy efficiency and renewable energy related awards under P.L. 110-140. These awards (listed below) are for technologies that improve energy efficiency or address provide solutions for the renewable energy industry.

Firm Name	Topic Number	Proposal Title	Phase
NEI Corporation	EP-D-14-009	Lithium-ion Batteries Based on Aqueous Electrolyte: A New Generation of Sustainable Energy Storage Devices	I
Sustainable Bioproducts, LLC	EP-D-14-014	Direct Conversion of Municipal and Agricultural Wastes to Biodiesel and Ethanol Utilizing a Unique Extremophilic Fungus	I
Environmental Fuel Research, LLC	EP-D-14-019	Biofuel Production from Grease Trap Waste	I
Lucid Design Group	EP-D-14-020	Software Framework for Enabling Innovation in Behavior-based Energy Conservation in Commercial Buildings	I
UltraCell Insulation, LLC	EP-D-14-024	UltraCell - Advanced Cellulose Insulation	I
Imaging Systems Technology, Inc.	EP-D-15-008	Water Purification using TiO <sub>2</sub> and Novel Activation Method	II
EP Purification, Inc.	EP-D-15-006	Low Cost, Efficient Microchannel Plasma Ozone System for Point of Use Water Treatment	II
Providence Photonics, Inc.	EP-D-15-012	Development of a Real-Time Flare Combustion Efficiency Monitor	II

### *Procedures and mechanisms EPA used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

EPA's SBIR Program includes energy as an overall criterion in selecting which environmental technologies it funds because EPA cares about the lifecycle environmental impacts of the technology and energy demand and usage are major factors in the environmental impact of a technology.

Specific language from the 2013 solicitation addressing lifecycle and energy is as follows and is used repeatedly in outreach about the program:

SBIR proposals should directly pertain to EPA's mission of protecting human health and the environment and should consider the lifecycle environmental impacts of the technology itself

including (if applicable) minimizing resource use, minimizing toxicity of materials, **efficient use of water and energy**, minimizing pollution and minimizing impacts of disposal.

EPA also uses energy in specific topic descriptions to give priority to projects that address energy efficiency and renewable energy. For example, the EPA SBIR program solicitation includes energy efficiency and renewable energy criteria in almost all its environmental topics including Water, Manufacturing and Waste. Specific language from the 2013 solicitation related to energy demand within the water topic is as follows:

EPA recognizes the need to develop and bring to market innovative water technologies that address the removal of contaminants from drinking water and wastewater, **decrease energy demands** and costs of treatment, and provide solutions to infrastructure challenges.

*Specific actions EPA has taken to promote and support energy efficiency and renewable energy research projects*

EPA's SBIR program continues to emphasize energy efficiency and renewable energy related topics and priorities at national, regional and state SBIR conferences and includes energy efficiency and renewable energy as criteria for other topic areas including water, waste and manufacturing. Emphasis has been placed on opportunities for small businesses to submit new technology proposals which emphasize energy efficiency (and therefore reduction of carbon emissions) in almost all topic areas in the EPA solicitation. This is emphasized to demonstrate the lifecycle environmental benefits of the proposed technology.

## National Aeronautics and Space Administration (NASA)

### *Examples of NASA SBIR and STTR projects related to energy efficiency or renewable energy*

For FY14 NASA's SBIR/STTR program had twelve subtopics (H8.01, H8.02, H8.03, H8.04, S3.01, S3.02, S3.03, S3.04, T3.01, Z1.01, Z1.02, and Z20.01) that actively solicit for technology in energy generation and storage in the form of photovoltaics, advanced batteries, and nuclear technology. Phase I awards made in FY 2014 associated from these topics include:

Firm Name	Proposal Title	Contract #
NexTech Materials, Ltd.	High Efficiency Direct Methane Solid Oxide Fuel Cell System	NNX14CC81P
MO-SCI Corporation	Development of Hermetic Sealing Glasses for Solid Oxide Fuel Cells	NNX14CC43P
Yanhai Power, LLC	Fabrication of T-SOFC via Freeze Cast Methods for Space and Portable Applications	NNX14CC37P
Paragon Space Development Corporation	Integrated Electrolysis & Sabatier System for Internal Reforming Regenerative Fuel Cells	NNX14CJ11P
Thermacore, Inc.	Additive Manufacturing of Heat Pipe Wicks	NNX14CC90P
Advanced Cooling Technologies, Inc.	Titanium-Water Heat Pipe Radiator for Spacecraft Fission Power	NNX14CC27P
MicroLink Devices, Inc.	High-Efficiency, Radiation-Hard, Lightweight IMM Solar Cells	NNX14CC62P
Honeybee Robotics, Ltd.	Flywheel Energy Storage for Lunar Rovers & Other Small Spacecraft	NNX14CC95P
PolyK Technologies, LLC	Wide Temperature DC Link Capacitors for Aerospace Power Electronics	NNX14CC79P
QorTek, Inc.	High Radiation Tolerant Ceramic Voltage Isolator (Non-Optical Gate Driver)	NNX14CC77P
GridBridge, Inc.	Isolated Bidirectional DC Converters for Distributed Battery Energy Applications	NNX14CC69P
American Energy Technologies Company	High Energy Density Lithium Battery System with an Integrated Low Cost Heater Sub-System for Missions on Titan	NNX14CC68P
TH Chem, Inc.	All-Solid, High-Performance Li-Ion Batteries for NASA's Future Science Missions	NNX14CC46P
Gridquant Technologies, LLC	Holomorphic Embedded Load Flow for Autonomous Spacecraft Power Systems	NNX14CC34P
CFD Research Corporation	High-Efficiency Rad-Hard Ultra-Thin Si Photovoltaic Cell Technology for Space	NNX14CC40P
NEI Corporation	High Energy Density Solid State Li-Ion Battery with Enhanced Safety	NNX14CC88P

In addition, the following Phase II awards were made:

Firm Name	Proposal Title	Contract #
ITN Energy Systems, Inc.	Advanced Manufacturing of Intermediate Temperature, Direct Methane Oxidation Membrane Electrode Assemblies for Durable Solid Oxide Fuel Cell	NNX14CS60C
Storagenergy Technologies, Inc.	Advanced Li/S Batteries Based on Novel Composite Cathode and Electrolyte System	NNX14CS59C
Creare LLC	Turbo-Brayton Power Converter for Spaceflight Applications	NNX14CC09C
Advanced Cooling Technologies, Inc.	Low Cost Radiator for Fission Power Thermal Control	NNX14CC03C
Deployable Space Systems, Inc.	Automated High-Volume Manufacturing of Modular Photovoltaic Panel Assemblies for Space Solar Arrays	NNX14CC17C
MicroLink Devices, Inc.	Cost Reduction of IMM Solar Cells by Recycling Substrates Using Wet Chemical Etching	NNX14CS57C
Vanguard Space Technologies, Inc.	Low Cost Automated Manufacture of PV Array Technology (PNASA12-007-1)	NNX14CC02C
MicroLink Devices, Inc.	Development of Advanced Anti-Reflection Coatings for High Performance Solar Energy Applications	NNX14CC06C
Applied Nanotech, Inc.	CarbAI(TM) Based Thermal Management for Space Flight Systems Application	NNX14CC23C
QorTek, Inc.	Striction-based Power Monitoring in Space Environment	NNX14CC10C

*Procedures and mechanisms NASA used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

NASA searches—via various wide-ranging research endeavors (including SBIR/STTR) — for novel concepts and technologies that provide advanced capabilities at ever improving levels of efficiency in missions and projects across all Mission Directorates. At the heart of NASA’s needs are advanced technologies for energy/power generation and storage – touching areas from photovoltaics, batteries, to nuclear technology for space exploration. NASA missions require maintaining power far from the Earth, for long periods of time, with no means of repair or refueling. Further, NASA technology must be resilient to survive the launch environment, as well as be light enough to be launched by existing launch vehicles. Therefore, there is no special priority required for technology associated with energy efficiency, as it is a critical thrust to all of NASA’s missions.

*Specific actions NASA has taken to promote and support energy efficiency and renewable energy research projects*

NASA’s projects associated with renewable energy include green aviation, environmental protection, clean energy, and sustainable systems. Information about these projects can be found at: <http://www.nasa.gov/centers/ames/greenspace/index.html>. NASA’s efforts in energy innovation associated with responses to climate change can be found at: [http://climate.nasa.gov/energy\\_innovations](http://climate.nasa.gov/energy_innovations).

## National Science Foundation (NSF)

### *Examples of NSF SBIR and STTR projects related to energy efficiency or renewable energy*

In FY14, NSF funded approximately 100 awards where energy efficiency and/or renewable energy were a major thrust of the proposal. The table below contains five examples of the results of recent Phase II awards that reflect many of the important components of energy efficiency and renewable energy research.

Firm Name	Award Title	Phase	Award Amount
Halotechnics, Inc.	Advanced Molten Salt for Solar Thermal Power Generation with Supercritical Steam Turbines	II	\$599,999
Filter Sensing Technologies, Inc.	Vibration-Based Cleaning for Ash Removal from Diesel Particulate Filters	II	\$733,994
Persimmon Technologies Corporation	SBIR Phase II Spray-Formed Soft Magnetic Material for Efficient Hybrid-Field Electric Machines	II	\$1,027,658
Ferric Semiconductor, Inc.	Integrated DC-DC Converters Using Thin-film Magnetic Power Inductors	II	\$1,250,000
ThermoAura Inc.	Development and manufacture of a new class of high-figure-of-merit bulk thermoelectric nanomaterials	II	\$758,000

### *Procedures and mechanisms NSF used during the reporting fiscal year to give priority in the SBIR/STTR programs to energy efficiency and renewable energy projects*

Research in energy efficiency Research in energy efficiency and renewable energy systems has been a significant component of 2014 NSF SBIR/STTR solicitations in the topic areas including Chemical Technologies, Electronic Hardware, Robotics and Wireless Technologies, Advanced Materials and Instrumentation, Advanced Manufacturing and Nanotechnology and Photonic Devices.

### *Specific actions NSF has taken to promote and support energy efficiency and renewable energy research projects*

NSF has used energy efficiency and renewable energy as a tiebreaker in making funding decisions for the solicitations mentioned in the next section. This has allowed the program to fund energy efficiency and renewable energy projects without compromising the quality standards or established criteria of the program.