

# DOE SBIR & STTR PHASE I RECOVERY ACT AWARDS

## TOPICS:

- **ADVANCED BUILDING AIR CONDITIONING AND REFRIGERATION, THERMAL LOAD SHIFTING, AND COOL ROOFS**
- **WATER USAGE IN ELECTRIC POWER PRODUCTION AND INDUSTRIAL PROCESSES**
- **POWER PLANT COOLING**
- **ADVANCED GAS TURBINES AND MATERIALS**
- **SENSORS, CONTROL, AND WIRELESS NETWORK**
- **ADVANCED WATER POWER TECHNOLOGY DEVELOPMENT**
- **SMART CONTROLLERS FOR SMART GRID APPLICATIONS**
- **ADVANCED SOLAR TECHNOLOGIES**
- **ADVANCED INDUSTRIAL TECHNOLOGIES DEVELOPMENT**
- **ADVANCED MANUFACTURING PROCESSES**

### **TOPIC: ADVANCED BUILDING AIR CONDITIONING AND REFRIGERATION, THERMAL LOAD SHIFTING, AND COOL ROOFS**

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#### **Title**

Recovery Act - Novel Non-Absorbing, Visibly Transparent and Highly Reflective NIR Pigments for Cool Roofs Applications

#### **Company**

Chelix Technologies Corporation  
520 Mercury Drive  
Sunnyvale, CA 94085-4018

#### **Summary**

This project will develop novel roof paints that are highly reflective of the invisible solar heat radiation leading to significant reduction in cooling loads, global warming and greenhouse gases. The new paints will not alter the roofs' visual appearance which is a necessary requirement for their wide acceptance by the consumers.

#### **Title**

Recovery Act - Sub-Zero Refrigeration From Low Temperature Solar Thermal

#### **Company**

Ergenics, Inc.  
373 Margaret King Ave.  
Ringwood, NJ 07456-1432

#### **Summary**

This project will develop a new air conditioning and refrigeration system that operates on heat from the sun and does not use ozone damaging or global-warming-potential refrigerants. The technology lends itself to mass production and should be cost competitive with today's air conditioners.

#### **Title**

Recovery Act - Automated Production of Fire Resistant Insulating Roof Panels Incorporating Phase Change Materials for Thermal Load Shifting

#### **Company**

KaZaK Composites, Inc. (KCI)  
10F Gill Street  
Woburn, MA 01801-1721

#### **Summary**

This project will use a highly automated manufacturing process for producing mass market structural plastic building panels to provide an OSB sheathing replacement that will reduce energy required for heating and cooling by up to 70% by selectively storing and releasing heat as needed to smooth out daily highs and lows.

#### **Title**

Recovery Act - An Improved Design for Magnetocaloric Refrigeration

#### **Company**

MER Corporation (Materials and Electrochemical Research) 7960 South Kolb Road  
Tucson, AZ 85756-9237

**Summary**

An enhanced thermodynamic cycle to improve performance and simultaneously reduce cost of magnetic refrigerators and air conditioners will be tested in a breadboard prototype refrigerator. Results of the tests will be applied to design a new generation magnetic refrigerator that can compete favorably with modern commercial devices.

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**Title**

Recovery Act - Development of a Novel Air Conditioning and Refrigeration System Based on Bernoulli Effect, with Zero Direct Greenhouse Impact.

**Company**

Machflow Energy, Inc.  
950 Main St.  
Worcester, MA 01610-1400

**Summary**

This project will develop novel air conditioning and refrigeration technology that can be used for residential, commercial, and automotive cooling. Cooling systems built around the technology will be light, inexpensive, and environmentally friendly, producing no direct greenhouse gas effect.

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**Title**

Recovery Act - Recovery Act - Solar, Ejector-Based VCC Air-Conditioner Utilizing Natural Refrigerants

**Company**

Magnetic Development, Inc.  
170 Fort Path Rd. Suite #1  
Madison, CT 06443-2281

**Summary**

This project will develop a novel air-conditioning technology that is solar powered and uses natural refrigerants instead of Freons. It eliminates ozone depletion effect and greenhouse gas emissions and additionally cuts the electricity use by 90%. A residential air-conditioner best suited for Southern states will be developed first with other applications to follow.

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**Title**

Recovery Act - Phase Change Slurries for Residential Thermal Energy Storage

**Company**

Mainstream Engineering Corporation  
200 Yellow Place  
Rockledge, FL 32955-5327

**Summary**

This project will develop an active thermal energy storage that combines the best features of existing chilled water and ice-storage systems. The system will allow for significant shifting of the demand load from peak hours to off-peak hours resulting in substantial cost savings.

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**Title**

Recovery Act - Self Assembled TiO<sub>2</sub> UV Protection Layer for Cool Roof Pigment Application

**Company**

Nanotrons Corporation  
12A Cabot Road  
Woburn, MA 01801-1003

**Summary**

Current highly IR reflective roof paintings which reduce the energy cost to cool the building cannot last long due to UV radiation. This project will develop a clear UV protective coating that can increase the coating lifetime, but not add much cost.

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**STTR Project****Title**

Recovery Act - High-Efficiency Membrane Regenerator for Liquid Desiccant Air Conditioning

**Company**

PAX Scientific, Inc.  
1615 5th Ave.  
San Rafael, CA 94901-0000

**Summary**

This project will develop a novel air conditioning system that can cut electricity demand by up to 80%. The technology uses liquid desiccants – liquids that absorb water from the air – to dehumidify air prior to cooling, which can result in dramatic energy savings.

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**Title**

Recovery Act - High-Efficiency Absorption Cycle and Novel Mid-Temperature Solar Collector.

**Company**

Rocky Research  
1598 Foothill Drive  
Boulder City, NV 89005-1803

**Summary**

Appliances for cost-effective solar-powered building cooling are being developed. These appliances combine low-cost medium-temperature solar collectors with advanced high-efficiency heat-driven cooling systems, resulting in a truly cost-effective means for utilizing solar heat to provide building air conditioning.

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**Title**

Recovery Act - Unconventional Air Conditioning and Refrigeration System Based on Giant Electrocaloric Effect in Polar-Fluoropolymers

**Company**

Strategic Polymer Sciences, Inc.  
200 Innovation Blvd. Suite 237  
State College, PA 16803-6602

**Summary**

This project will develop and design high efficiency, low cost and environmentally friendly refrigeration systems using ECE materials. The technology can be used in various refrigeration systems for building air conditioning, food preservation and cryogenic equipment.

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**Title**

Recovery Act - Innovative Phase Change Materials

**Company**

TIAX LLC  
15 Acorn Park  
Cambridge, MA 02140-2301

**Summary**

A breakthrough in fire safety performance of thermal energy storage materials enables realization of peak load shifting potential, contributing to energy savings and emissions reduction. This project will develop innovative materials to help offset current demands for energy, as well as future projected net increases in energy demand driven by climate change.

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**Title**

Recovery Act - Shape-Stable and Highly Conductive Nano-Phase Change Materials

**Company**

Technova Corporation  
3927 Dobie Road  
Okemos, MI 48864-3480

**Summary**

Recent advances in nanotechnology will be employed towards development of lightweight and cost-competitive building components capable of storing the excess thermal energy through solid-state phase transformation. These components will enable shifting of the utility peak loads and effective use of solar energy for greatly lowering the heavy energy, environmental and economic demands associated with air conditioning of buildings.

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**Title**

Recovery Act - Cost Effective Thermal Energy Storage for Small Commercial Air Conditioning Systems

**Company**

Trinity Thermal Systems  
110 Pembroke  
Wichita Falls, TX 76301-3932

**Summary**

This project will develop a novel thermal energy storage system that can be retrofitted onto air conditioning and heat pump systems in small to mid-sized commercial buildings. This cost effective technology will help utilities reduce peak demand, increase overall efficiency, and integrate renewable energy systems into a smart electric grid.

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**Title**

Recovery Act - Bio-Based Thermochromic Intelligent Roof Coating

**Company**

United Environment & Energy LLC  
111 Ridge Road  
Horseheads, NY 14845-1507

**Summary**

This project aims to develop a bio-based intelligent roof coating technology to reduce both heating and cooling loads of buildings, which will bring significant energy and cost savings to the end-users, protect the environment and improve human health, and reduce the use of petroleum based fuel.

**TOPIC: WATER USAGE IN ELECTRIC POWER PRODUCTION AND**

## INDUSTRIAL PROCESSES

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### **Title**

Recovery Act - High Flux Ultra Low Pressure BWRO Nanocomposite Membrane

### **Company**

NanOasis Technologies, Inc.  
4677 Meade Street, Suite 210  
Richmond, CA 94804-4603

### **Summary**

This project will develop a next generation, high permeability, chemically-robust membrane to be used for brackish water desalination. This membrane promises to significantly reduce energy and water costs for power generation as well as for drinking, agriculture and other uses.

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### **Title**

Recovery Act - Carbon Nanotube

### **Company**

Nanotrons Corporation  
12A Cabot Road  
Woburn, MA 01801-1003

### **Summary**

Water quality is an issue that affects industry, drinking water and the third world. This project will construct a water filter that can be inserted into existing filter systems and that can process water more than 100 times faster than the best technology available today. The implications for desalination of sea water and purification of polluted water around the globe is enormous.

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### **Title**

Recovery Act - A Solar-Assisted Seawater Desalination System

### **Company**

Nrgtek Inc.  
17120 Fremont Lane  
Yorba Linda, CA 92886-1784

### **Summary**

A low-cost, low-energy, solar-assisted seawater and produced water desalination system will be developed, and a 5 gallons per day plant will be demonstrated to show the efficiency and efficacy of the proposed technology. The process will exhibit capability of desalination at one-third the cost of conventional desalination processes.

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### **Title**

Recovery Act - Utilization of Immobilized Lipase System for Waste Water Reduction in the Bioenergy Industry

### **Company**

Piedmont Biofuels Industrial  
220 Lorax Lane  
Pittsboro, NC 27312-0661

### **Summary**

The biodiesel industry must develop processes which push deeper into the waste stream for feedstock sources while minimizing negative environmental impacts. This project will develop an enzymatically catalyzed biodiesel process, allowing the use of low quality and waste feedstocks, eliminate process waste water, and dramatically improve glycerin quality

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### **Title**

Recovery Act - Brackish and Wastewater Cleanup for Process Cooling

### **Company**

TDA Research, Inc.  
12345 W. 52nd Avenue  
Wheat Ridge, CO 80033-1916

### **Summary**

This project will develop a technology that will permit fossil fuel and nuclear power plants, as well as petroleum refiners and other industries that use large amounts of cooling water to significantly reduce their demand for fresh water by using non-fresh water resources for cooling that are currently unsuitable because of their inherent levels of contamination.

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### **Title**

Recovery Act - Economical Sequestering of Heavy Metals Dissolved in Acidic Water

### **Company**

Tusaar Inc.  
1900 15th. Street  
Boulder, CO 80302-5414

### **Summary**

This project will apply a developed relatively simple, economical and low capital intensive method of removing dissolved heavy metal contaminants from water. This method will be applied and optimized for process and waste waters generated by coal fired power plants enabling water recycling and reducing environmental pollution.

## TOPIC: POWER PLANT COOLING

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### **Title**

Recovery Act - Microcomposite Coatings for Advanced Heat Exchangers

### **Company**

MesoCoat, Inc  
24112 Rockwell Drive  
Euclid, OH 44117-1252

### **Summary**

This project will demonstrate the use of self-lubricating nanocomposite cermet advanced coatings to produce a 10X life improvement in zinc galvanizing rolls.

## TOPIC: ADVANCED GAS TURBINES AND MATERIALS

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### **Title**

Recovery Act - Vaporization Cooling for IGCC Turbines

### **Company**

Aerodyne Research, Inc.  
45 Manning Road  
Billerica, MA 01821-3976

### **Summary**

Improved gas turbines for power generation will provide decreased power cost and atmospheric emissions. This project will lead to demonstration of advanced cooling of the performance limiting turbine components, enabling improved efficiency, and directly impacting emissions and cost.

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### **Title**

Recovery Act - Advanced Technology High Efficiency Low Cost Small Turbine for DG and CHP

### **Company**

Candent Technologies, Inc.  
6107 West Airport Blvd, Suite 190  
Greenfield, IN 46140-9122

### **Summary**

This project will develop an advanced technology, low cost, high efficiency, multi-fuel, small gas turbine engine, which is suitable for power generation and propulsion (marine, aviation) applications, and which will greatly reduce fossil fuel consumption as well as green house gas emissions.

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### **Title**

Recovery Act - Spar-Shell Cooling Technology Verification and Manufacturing and Development

### **Company**

Florida Turbine Technologies, Inc.  
1701 Military Trail, Suite 110  
Jupiter, FL 33458-7887

### **Summary**

This project will verify and validate testing of innovative new Spar-Shell turbine component designs to clear the technology for full engine test and to eventually facilitate revolutionary advances of power plant performance, efficiency and clean operation.

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### **Title**

Recovery Act - A Very Low Cost Process for the Manufacture of Ti Heat Exchanger Components for Desalination

### **Company**

MER Corporation (Materials and Electrochemical Research)  
7960 South Kolb Road  
Tucson, AZ 85756-9237

### **Summary**

The very low cost titanium manufacturing developed in this program will provide a dramatic reduction in the cost of heat exchangers used for desalination. In addition to the increased availability of potable water, this will provide a major commercial advantage for domestic corporations for the sale and operation of these plants

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### **Title**

Recovery Act - Nanocomposite Coatings for Life Extension in Zinc Pot Rolls

### **Company**

MesoCoat, Inc.  
24112 Rockwell Drive  
Euclid, OH 44117-1252

### **Summary**

This project will demonstrate the use of self-lubricating nanocomposite cermet advanced coatings to produce a 10X life improvement in zinc galvanizing rolls.

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**Title**

Recovery Act - Electrochemical Processing of Niobium Silicide In-Situ Composites

**Company**

Modumetal, Inc.  
1443 N. Northlake Way Suite 2B  
Seattle, WA 98103-8994

**Summary**

This project will develop structural materials for operation well above the melting points of most metals.

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**Title**

Recovery Act - High-Temperature Material Microstructure Nondestructive Evaluation Compton Imaging Tomography System

**Company**

Physical Optics Corporation  
20600 Gramercy Place, Building 100  
Torrance, CA 90501-1821

**Summary**

This project will develop new nondestructive evaluation (NDE) methods to assess materials' microstructures used in high temperature applications. MicroCITO is a new one-sided 3D imaging tomography system for the NDE of these materials *in situ*, in one pass, providing accurate identification of internal microstructures using 3D high-resolution X-ray imaging.

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**Title**

Recovery Act - Advanced Laser Machining Techniques for Cooling Holes in Gas Turbines

**Company**

Physical Sciences Inc.  
20 New England Business Center  
Andover, MA 01810-1077

**Summary**

Guided laser drilling of small holes will help maintain American leadership in gas turbine technology by enabling production of engines with higher efficiency and lower greenhouse gas emissions. The technology will additionally benefit the automotive and electronics industries, enabling improved fuel economy and competitive advantages in next generation handheld devices.

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**Title**

Recovery Act - Computational Design of Advanced Oxide-Dispersion Strengthened Steels for High Temperature Nuclear Power Generation Applications

**Company**

QuesTek Innovations, LLC  
1820 Ridge Avenue  
Evanston, IL 60201-3621

**Summary**

This project will use its *Materials by Design*® technology to develop a novel new oxide dispersion strengthened steel composition that can withstand the extremely high temperatures (>650°C) and service conditions relevant to next-generation ("Generation IV") nuclear power generation (fission and/or fusion) applications.

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**Title**

Recovery Act - High-Temperature Industrial Insulation Utilizing Aerogels

**Company**

Touchstone Research Laboratory, Ltd.  
The Millennium Centre  
1142 Middle Creek Road  
Triadelphia, WV 26059-1139

**Summary**

This project will develop a new industrial high-temperature furnace insulation material that will dramatically decrease heat loss and reduce energy and maintenance costs.

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**Title**

Recovery Act - Large Silicon Nitride Blisks for High-Efficiency Gas Turbines

**Company**

Wilson TurboPower, Inc.  
55 Sixth Road  
Woburn, MA 01801-1746

**Summary**

This project will develop a low-emissions, breakthrough-efficiency engine to replace diesel engines and to enable economic small-scale generation of electricity from many kinds of fuel, including bio-fuels and solar energy.

## **TOPIC: SENSORS, CONTROL, AND WIRELESS NETWORK**

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### **Title**

Recovery Act - A Holistic Approach for In-Situ Cable Condition Monitoring in Nuclear Power Plants

### **Company**

Analysis and Measurement Services Corporation  
9111 Cross Park Drive, Building A  
Knoxville, TN 37923-4510

### **Summary**

As nuclear power plants apply for license renewals for 60-year operation, management of aging assets has become a growing concern. This project will develop a holistic approach for cable aging management which includes comprehensive condition monitoring of aging wires and cables to reduce mishaps due to unexpected failures.

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### **Title**

Recovery Act - Real-Time Continuous Monitoring of Flare Combustion Efficiency and Emissions

### **Company**

Argos Intelligence, LLC  
3417 Chartley Lane  
Roswell, GA 30075-6135

### **Summary**

This project will develop the Advanced Remote Combustion Efficiency Monitoring (ARCEM) System to remotely measure are combustion efficiency and to identify and quantify the emission products from are. The ARCEM System combines image processing and models to monitor are combustion efficiencies and their resulting gas emissions in real-time.

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### **Title**

Recovery Act - Terahertz Imaging in Kraft Recovery Boilers

### **Company**

Enertechnix Inc.  
23616 SE 225th Street  
PO Box 469  
Maple Valley, WA 98038

### **Summary**

This project will develop a novel terahertz imaging system that will provide improved control capability to boiler operators in the Pulp & Paper, Electric Utility, and Petrochemical industries. This technology offers substantial energy, economic, and environmental benefits.

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### **Title**

Recovery Act - Multi-Function Sensor Platform for Real-Time Smart Grid Power Line Measurements

### **Company**

FieldMetrics Inc.  
13352 82nd Avenue  
Seminole, FL 33776-3126

### **Summary**

The multi-function integrated sensor platform is an enabling technology for the smart grid. The project creates sensors for immediate deployment on the power grid to detect energy theft, improve energy delivery efficiency, provide early warning of grid instability and accurately monitor renewable energy resources

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### **Title**

Recovery Act - Radiation Tolerant, Ultra-High Temperature Sensors for In-Core Use

### **Company**

Luna Innovations Incorporated  
1 Riverside Circle  
Suite 400  
Roanoke, VA 24016-4962

### **Summary**

This project will develop a high stability temperature sensor with materials characterization capabilities for nuclear reactor use which supports the Gen-IV and Nuclear Hydrogen Initiatives. This sensor will enable safe operation of these new reactors at peak efficiencies, which in turn will reduce the U.S. dependency on foreign oil while simultaneously reducing emission of green house gasses.

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### **Title**

Recovery Act - Web-Based, Plug & Play, Wireless Remote Monitoring, Diagnostic and System Health Prediction System for Residential AC and Heat Pump Applications

### **Company**

Mainstream Engineering Corporation  
200 Yellow Place  
Rockledge, FL 32955-5327

**Summary**

This project will develop a wireless Remote Monitoring System that automatically monitors and detects problems in residential air conditioning systems thereby saving valuable energy, reducing homeowner expenses, avoiding unexpected failures, and creating jobs in Florida.

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**STTR Project**

**Title**

Recovery Act - Nonintrusive Utility Monitor

**Company**

NEMOmetrics Corp.  
28 Constitution Road  
Boston, MA 02129-2008

**Summary**

This project will develop an inexpensive, easy to install system to measure accurately, monitor and optimize utility usage individually in each of the many devices and appliances used in a home or industrial facility without needing to put sensors on each of the devices being monitored.

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**Title**

Recovery Act - Imaging-Based Optical Caliper for Objects in Hot Manufacturing Processes

**Company**

OG Technologies, Inc.  
4300 Varsity Drive, Suite C  
Ann Arbor, MI 48108

**Summary**

To improve the efficiency of dimension control and the safety of the steel workers, a new product will be developed with innovations in the areas of imaging, software algorithms and wireless communication. The expected benefits include enhanced safety, energy savings, improved yields, and reduced carbon dioxide release in the steel industry, as well as job creation.

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**Title**

Recovery Act - A Transparent Distributed Demand Management System

**Company**

SmallFoot LLC  
1805 29th Street, Suite 2054  
Boulder, CO 80301-1068

**Summary**

This project will develop a low cost solution for reducing peak energy demand in commercial buildings. The wireless system is simple to install and automatically lowers peak demand, utility costs, power grid stress, and utility generation needs without affecting occupant comfort or productivity.

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**Title**

Recovery Act - Real-time Remote Detection of HR-VOC Content in Flares

**Company**

Spectral Sciences, Inc.  
4 Fourth Avenue  
Burlington, MA 01803-3304

**Summary**

This project will develop a spectral imager that will enable the continuous, autonomous and real-time monitoring and control of combustion flare emissions. This monitoring and control technology will optimize flare performance and minimize the emission of ozone-producing volatile organic compounds and human carcinogens.

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**Title**

Recovery Act - New Process Control Sensors for Improved Efficiencies in the Power Industry

**Company**

SyntroTek Corporation  
6655 Lookout Road, Ste 100C  
Boulder, CO 80301-3371

**Summary**

This project will develop new, in-situ process control sensors for enabling up to \$4 billion in annual savings to the U.S. Power Industry by improving the energy efficiency of critical power plant equipment (i.e., boilers, steam turbines and cooling towers).

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**Title**

Recovery Act - Inexpensive, Robust, Wireless, Fourier-Transform Sensor to Improve the Energy Efficiency of



Petroleum Refineries

**Company**

Translume, Inc.  
655 Phoenix Drive  
Ann Arbor, MI 48108-2201

**Summary**

The U.S. petroleum refining industry is the largest in the world and employees over 65,000 personnel. This project will manufacture an in-line, real-time spectrometer to monitor refining process, helping the petroleum refinery industry to remain competitive by lowering its fuel consumption and by reducing its environmental impact.

**TOPIC: ADVANCED WATER POWER TECHNOLOGY DEVELOPMENT**

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**Title**

Recovery Act - High Torque, Low Cost, Direct-Drive Rotary Generator

**Company**

Columbia Power Technologies, LLC  
236 East High Street  
Charlottesville, VA 22902-5178

**Summary**

Present technology requires gears or hydraulics to address low drive shaft speeds in renewable energy systems, but operation and maintenance for gears and hydraulics are costly. This project will develop a high torque, low speed and low cost direct connected rotary generator for renewable energy applications to reduce cost of energy.

**Title**

Recovery Act - Advanced Manufacturing Technologies for Composite Tidal Turbine Blades

**Company**

Composite Technology Development, Inc.  
2600 Campus Drive, Suite D  
Lafayette, CO 80026-3359

**Summary**

Energy harvesting from our ocean's tides and river's currents will be an important part of the future renewable energy portfolio of the United States. This project will develop reliable, cost-effective, manufacturing techniques that will improve the economic viability of these systems for the generation of renewable power.

**Title**

Recovery Act - Development of a Wave NREC Energy-Responsive, Self-Actuated Blade Articulation Mechanism for an OWC Turbine

**Company**

Concepts ETI, Inc d.b.a. Concepts  
39 Olympia Avenue  
Woburn, MA 01801-2073

**Summary**

This project will develop a means of significantly improving the efficiency of the high speed air turbine that is used with a water wave energy recovery system. The improvement uses the actual aerodynamic forces that are caused by the air flow across the turbine blades to provide the motive force to rotate the blade into an optimum position to affect maximum energy recovery from the wave while also eliminating the secondary, electrical feedback controls that are typically used in such applications. A total system cost per kWe reduction of as much as 30% is predicted.

**Title**

Recovery Act - Centipod Wave Energy

**Company**

Dehlsen Associates, LLC  
6430 Via Real Converter, Suite 8  
Carpinteria, CA 93013-2913

**Summary**

The 4.5MW Centipod ocean wave generating system, a horizontally stable floating platform, optimally yawed (active) to wavefront exposure has 56 80kW flotation pods driving hydraulic rams. Fluid drives the hydroelectric generating system providing cost competitive electric power. Inherent survivability in extreme seas uses methodologies from offshore oil production. This project will provide complete detailed engineering of the commercial prototype.

**Title**

Recovery Act - Advanced Modular Brazed Aluminum OTEC Optimized Heat Exchangers

**Company**

E3Tec Service, LLC  
11865 Tall Timber Drive  
Clarksville, MD 21029-1203

**Summary**

OTEC should be an important part of the portfolio of future U.S. energy supply. This project will develop advanced

modular heat exchangers and their innovative integration with the OTEC platform are crucial for commercialization of OTEC plants.

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**Title**

Recovery Act - Power Pipe, Goshen Powerhouse Project

**Company**

Lucid Energy Technologies, LLP  
118 East Washington Street, Suite 2  
Goshen, IN 46528-3727

**Summary**

This project will develop a renewable energy system that will generate electricity by extracting energy from the excess head pressure in water transmission pipelines. The innovative technology has the capacity to generate millions of kilowatt-hours from an abundant source of energy which, to date, has been wasted.

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**Title**

Recovery Act - Conceptual Design and Modeling of an Offshore 100MW Mist Lift Open Cycle OTEC Plant to Determine Overall Economic Benefits, Risks, and R&D Requirements

**Company**

Makai Ocean Engineering, Inc.  
P.O. Box 1206  
Kailua, HI 96734

**Summary**

Ocean Thermal Energy Conversion (OTEC) can supply massive quantities of renewable and clean energy but costs are too high for the continental U.S. market. This project will evaluate whether a unique Mist Lift Open Cycle process in a large OTEC plant can significantly lower OTEC costs.

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**Title**

Recovery Act - Optimization of Blade Design for the Low Head Schneider Linear Hydroengine

**Company**

Natel Energy, Inc.  
2175 Monarch Street  
Alameda, CA 94501-5096

**Summary**

This project will optimize the blade design of a novel low head hydropower technology that has the potential to cut the capital cost of low head hydromachinery in half.

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**STTR Project****Title**

Recovery Act - Refinement of Cross Flow Turbine Airfoils

**Company**

Ocean Renewable Power Company  
2 Portland Fish Pier, Suite 307  
Portland, ME 04101-4696

**Summary**

This project will perform testing of tidal power generator devices in the university's water tow testing tank. Testing of scale models will allow the company to optimize its design of full scale units which will generate electricity from tidal currents.

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**Title**

Recovery Act - A Variable-Geometry Oscillating Wave Surge Converter Paddle for Maximum Power Output and Survivability

**Company**

Resolute Marine Energy, Inc.  
3 Post Office Square - 3rd floor  
Boston, MA 02109-3905

**Summary**

This project will develop an innovative means of adjusting the geometry of wave energy converters to improve their performance and safety.

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**Title**

Recovery Act - Development of a Scalable, Low-Cost Power Generation Water Turbine

**Company**

Rotating Composite Technologies, LLC  
49 Cambridge Heights  
Kensington, CT 06037-2310

**Summary**

An innovative water turbine power system is being developed that is anticipated to produce constant electrical power

(does not vary output based on wind/sun/wave availability) that is competitive with coal and can provide substantial "green" energy when installed in rivers or ocean currents (e.g. Gulf Stream). The design, making use of both existing and patent pending technology, can create thousands of high value jobs in America and supports the country's goal of achieving energy independence.

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**Title**

Recovery Act - In-Line Counter-Rotating Drive Mechanism for a Hydrokinetic Turbine

**Company**

Synkinetics, Inc.  
5 Whittier Street, 4th Floor  
Framingham, MA 01701-0170

**Summary**

This project will allow more efficient power generation from moving water by capturing additional energy that would otherwise escape, and by permitting turbine blades to rotate more slowly. Slower rotation is correlated with increased fish survival rates through the turbine and combines environmental with efficiency benefits.

**TOPIC: SMART CONTROLLERS FOR SMART GRID APPLICATIONS**

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**Title**

Recovery Act - Multi-Protocol Energy Management Gateway for Home-Area Networks

**Company**

Coincident, Inc.  
12 Reservoir Avenue  
Lakeville, MA 02347-1516

**Summary**

This project will develop an energy management product for consumers and small businesses to help them realize the financial, social, and environment benefits promised by smart grid and smart metering initiatives.

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**Title**

Recovery Act - Smart Low-Cost Controller Chip for Grid-Friendly Household Appliances

**Company**

Encryptor, Inc.  
1900 Preston Road #267-303  
Plano, TX 75093-3604

**Summary**

This project will develop a semiconductor chip to be embedded inside all electrical consumer appliances automatically reducing the power consumption of this appliance during times of peak electrical demand each day. This almost billion-unit (yearly) sub-\$1.00 chip will directly impact electrical generation infrastructure investment and reduce pollution.

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**Title**

Recovery Act - Developing an Agent-Based Distributed Smart Controller for Plug-in Electric Vehicles and Distributed Energy Resources

**Company**

Infotility, Inc.  
2060 Broadway, Suite 320  
Boulder, CO 80302-5224

**Summary**

This project will develop intelligent software applications that provide plug-in electric vehicle (PEV) owners and grid operators with Smart Controllers that managing large numbers of PEVs on the grid, based on both local and grid conditions. The software will run at distributed locations on the energy network to improve the reliability, efficiency, security, and stability of the U.S. electrical transmission and distribution network.

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**Title**

Recovery Act - The Device Behavioral Model Product Operates on a Scalable Communications Platforms Which Allows it to be Used Anywhere in the World to Control Electricity Usage Automatically or on Command.

**Company**

M2M Communications Corporation  
12554 West Bridger, Suite 100  
Boise, ID 83713-1582

**Summary**

This project will develop a device that will allow farmers to turn their equipment off and on based on preset parameters or on demand. This device will work anywhere in the world and allows access from a phone, smart phone, or computer to receive status reports or turn equipment off or on.

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**Title**

Recovery Act - The Lean Green Energy Controller Machine-A clustered Smart Controller for the Household Market

**Company**

People Power Company  
620 Lowell Avenue  
Palo Alto, CA 94301-3817

**Summary**

This project will provide household energy management controller that will enable automated energy management and conservation within the residential community.

---

**Title**

Recovery Act - Controller for Charging/Storage System

**Company**

Peregrine Power, LLC  
27350 SW 95th Avenue, Suite 3022  
Wilsonville, OR 97070

**Summary**

This project will develop a smart, programmable controller that enables the charging of PEVs when it is advantageous in terms of price and grid stress. The controller and associated charging/storage system also will add significant energy storage, which encourages the use of renewables and which can be used to provide support for the grid and the customer's onsite loads.

---

**Title**

Recovery Act - Springboard Engineering's Smart Grid Controller for Non-Smart Household Electricity-Consuming Appliances

**Company**

Springboard Engineering, Inc.  
3020 1st Avenue East  
Newton, IA 50208-2705

**Summary**

This project will research smart devices that would enable the millions of existing appliances to connect with the Smart Grid. This device will disable and/or discourage appliance use during peak demand times in order to reduce the need to expand the power generation infrastructure and to reduce electricity costs.

---

**STTR Project**

**Title**

Recovery Act - Performance Monitoring and Actionable Alert Messaging for Building Integrated Photovoltaics

**Company**

Wattminder  
1153 Bordeaux Drive, Suite 199  
Sunnyvale, CA 94089-1223

**Summary**

This project will entail the fault detection and estimation of building integrated photovoltaics systems and provide an alert notification for maintenance scheduling.

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**TOPIC: ADVANCED SOLAR TECHNOLOGIES**

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**Title**

Recovery Act - Nanoscale Probe System for Organic Photovoltaics

**Company**

Asylum Research Corporation  
6310 Hollister Ave  
Santa Barbara, CA 93117-3115

**Summary**

Micro- and nanoscale probing and testing is essential to rapid evaluation and development of candidate photovoltaic materials and cells. This project will develop a Nanoscale Probe System to quickly evaluate these materials for their potential for increasing solar cell efficiency and for monitoring and performing quality and failure analysis in the production environment.

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**Title**

Recovery Act - Design and Demonstration of a Solar Array for a Modular Distributed Concentrating Solar Power (CSP) System

**Company**

Cobb Design Inc  
2595 27th Avenue North  
Saint Petersburg, FL 33713-3934

**Summary**

The project will refine the design for components of a solar energy system that generates power at a cost competitive with fossil-fuel sources. Commercialization of this system will generate new green jobs to expand use of technology that reduces both energy imports and greenhouse gases.

---

**Title**

Recovery Act - Organic Solar Concentrators for Low-Cost Solar Power Generation

**Company**

Covalent Solar, Inc.  
1 Broadway, 14th Floor  
Cambridge, MA 02142-1187

**Summary**

This project will develop a technology that uses a sheet of coated glass to concentrate sunlight onto a very small area of solar cells situated at the edges of the glass. Using fewer solar cells greatly reduces the cost of solar power and can make solar power competitive with the retail grid.

---

**Title**

Recovery Act - Enhanced Charge Transport towards High Efficiency Organic Photovoltaics

**Company**

Fractal Systems Inc.  
108 4th Street  
Belleair Beach, FL 33786-3213

**Summary**

Low cost solar power based on organic materials has the potential to reduce security and reliability risks and to reduce environmental impacts and will find uses in homes and commercial buildings as well as in military gear and equipment.

---

**Title**

Recovery Act - Advanced Membrane Technology for the Hybrid Sulfur Process Electrolyzer

**Company**

Giner Electrochemical Systems, LLC  
89 Rumford Avenue  
Newton, MA 02466-1311

**Summary**

Inexpensive, renewable hydrogen production is crucial to the strategy of efficiently powering our vehicles with clean fuels. This project plans to advance solar hydrogen development efforts by further improving Hybrid Sulfur electrolyzer components and, thereby, enhance the efficiency and economic viability of this thermochemical cycle for concentrated solar power applications.

---

**Title**

Recovery Act - Nanostructured Photovoltaic Device

**Company**

InnoSense, LLC  
2531 West 237th Street, Suite 127  
Torrance, CA 90505-5245

**Summary**

This project will support the emphasis on stimulating the U.S. economy by accelerating the development of cost-effective, clean and renewable solar energy technologies for our nation by 2015. Solar energy is also a key element in combating global climate change.

---

**Title**

Recovery Act - Solar Photovoltaic Holographic Cogeneration System

**Company**

Luminit, LLC  
1850 W. 205 Street  
Torrance, CA 90501-1526

**Summary**

DOE is seeking advances in hybrid solar technologies for the co-generation of heat and electrical power. This project will effectively split the solar spectrum into two spectral bands using Holographic Optical Elements, and increasing conversion efficiency of the PV cells two to three fold without heating up the PV cell modules.

---

**Title**

Recovery Act - Advancement of Nano-Material Production for OPV Acceptors

**Company**

Luna Innovations Incorporated  
1 Riverside Circle, Suite 400  
Roanoke, VA 24016-4962

**Summary**

This project will develop a new manufacturing process that will make organic solar cells more efficient and affordable.

---

**Title**

Recovery Act - Nanocomposite Structures for OPV Devices

**Company**

Nano-C, Inc.  
33 Southwest Park  
Westwood, MA 02090-1524

**Summary**

This project will improve the efficiencies of printable, flexible Organic Solar Cells, using a novel approach to creating the active layer of these devices allowing for their commercialization.

---

**Title**

Recovery Act - Segmented Fresnel CSP for Community and Business

**Company**

Phasiks, Inc.  
10842 Noel St., Suite 106  
Los Alamitos, CA 90720

**Summary**

The project will lead to the development of a technology for deployment of safe, economical, and efficient concentrating solar power systems in distributed applications. The technology will substantially reduce the cost and increase the deployment of rooftop, parking lot, and other community-based solar power systems.

---

**Title**

Recovery Act - Thermally Assisted PhotoElectrochemical Hydrogen Generation using a Holographic Concentrator

**Company**

Physical Optics Corporation  
20600 Gramercy Place, Building 100  
Torrance, CA 90501-1821

**Summary**

This project will address the problem of the need for an efficient and economical method to convert solar energy to fuel that can be stored by improving the efficiency of hydrogen generation from sunlight by using both the light and heat energy to drive the reaction.

---

**Title**

Recovery Act - Hybrid Electrical And Thermal Energy System

**Company**

Physical Optics Corporation  
20600 Gramercy Place, Building 100  
Torrance, CA 90501-1821

**Summary**

This project will develop a new Hybrid Electrical And Thermal Energy (HEATE) system. By combining holographic concentrating solar PV cells and thermoelectric generator technology, highly efficient and cost-effective electric power can be supplied, together with the cogeneration of heat (< 5 ¢/kWhr). The proposed HEATE system offers solar energy and heat conversion with much higher efficiency, as well as reduced overall weight and size of current electrical power systems.

---

**Title**

Recovery Act - SolarFlex (Surface Plasmon Energy Trapping on Organic Solar Cell)

**Company**

Physical Sciences Inc.  
20 New England Business Center  
Andover, MA 01810-1077

**Summary**

This project will incorporate nanostructures on organic thin film solar cells that will allow for increased power conversion efficiency beyond the 10% threshold necessary for commercialization. Successful commercialization of thin-film organic solar cell technology will allow for solar energy harvesting on residential and commercial rooftops. Due to their flexibility, organic solar cells are being considered for insertion into every day objects such as windows and fabric.

---

**Title**

Recovery Act - High Performance Organic Photovoltaics via Novel Materials Combinations

**Company**

Plextronics, Inc.  
2180 William Pitt Way  
Pittsburgh, PA 15238-1357

**Summary**

This project will develop high performing, low-cost solar cells based on organic photovoltaic technology, which is expected to have tremendous potential as a low-cost renewable energy source.

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### **STTR Project**

#### **Title**

Recovery Act - Parallel Tandem Organic Solar Cells with Carbon Nanotube Sheet Interlayers

#### **Company**

Solarno Inc.  
153 Hollywood Drive  
Coppell, TX 75019-7306

#### **Summary**

This project will develop innovative nanotechnology for manufacturing of high efficiency, flexible photovoltaic cells (OPVs). Furthermore, the proposed technology is cost-effective and resolves limitations in device lifetime. The numerous commercial applications include power generating rooftops, charging of portable electronic devices and light weight space exploration devices

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#### **Title**

Recovery Act - Hybrid Slat-Array PV System with Thermal Co-Generation

#### **Company**

SVV Technology Innovations, Inc.  
10027 E Taron Dr  
Elk Grove, CA 95757-8190

#### **Summary**

This project will develop and demonstrate a new approach for making inexpensive modular systems for co-generation of heat and electricity from sunlight. It will make viable the large-scale, distributed energy production from renewables and help meet the national goals of energy independence, reduction of carbon emissions and fostering the job growth and economic progress.

---

#### **Title**

Recovery Act - ZnO/ZnS/P3HT Core-Shell Heterostructure Organic Hybrid Solar Cells

#### **Company**

Structured Materials Industries, Inc.  
201 Circle Drive North Unit 102/103  
Piscataway, NJ 08854-3723

#### **Summary**

A new relatively lower cost, more environmentally friendly high efficiency solar cell will be fabricated and commercialized, which will greatly improve the nation's energy independence.

---

#### **Title**

Recovery Act - Electret Field Enhanced Organic Solar Cells

#### **Company**

Versatilis LLC  
488 Ridgefield Road  
Shelburne, VT 05482-6311

#### **Summary**

This project will develop the world's first electretic solar cells based on incorporating electrets with permanent electric charge (the electrical analog to magnets), into organic solar cell structures to dramatically improve their efficiency.

---

### **STTR Project**

#### **Title**

Recovery Act - Energy System for Photovoltaic, Thermoelectric, and Heat Utilization

#### **Company**

Weidlinger Associates, Inc.  
375 Hudson Street  
New York, NY 10014-3656

#### **Summary**

Solar panels have not achieved market penetration due to high initial costs and inefficiency, but the hybrid building integrated panels from this project will be part of the building's skin and significantly more efficient. These less costly and more durable panels are suitable for residential and commercial projects for new construction and renovations.

**TOPIC: ADVANCED INDUSTRIAL TECHNOLOGIES DEVELOPMENT**

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#### **Title**

Recovery Act - Real-Time Process Control and Modeling for the Manufacturing of More Efficient Thin-Film Solar Panels

#### **Company**

Accustrata, Inc.  
387 Technology Drive, Suite 3110  
College Park, MD 20742-0001

#### **Summary**

This project will develop a real time optical control system to improve the thin film solar panel manufacturing process. This technology will reduce the time it takes for solar energy to reach grid parity by increasing the conversion efficiency and reducing product cost of the solar panels.

---

### **STTR Project**

#### **Title**

Recovery Act - Scale-up of the Nano-Manufacturing of Coated Powders for Superior Battery Electrode Materials

#### **Company**

ALD NanoSolutions, Inc.  
580 Burbank Street, Unit 100  
Broomfield, CO 80020-7166

#### **Summary**

This project will develop a high-throughput powder coating reactor to scale-up a process known to significantly improve the quality of battery materials, while using lean manufacturing techniques. This process is easily scalable, energy efficient and can ultimately be used to supplant coating processes in many industries where precision is paramount.

---

#### **Title**

Recovery Act - Nano-Structured Dispersion Strengthened Aluminum Alloy

#### **Company**

Aspen Systems, Inc.  
184 Cedar Hill Street  
Marlborough, MA 01752-3017

#### **Summary**

This project will develop a new class of lightweight, ultrahigh strength and ductile aluminum alloy based nano composite in bulk form for automotive, aerospace and defense applications (and will be very much effective in fuel saving) by utilizing a novel nanophase processing route and low cost bulk consolidation technology.

---

#### **Title**

Recovery Act - Scale-Up of Nano-Catalyst Membrane Reactors

#### **Company**

Compact Membrane Systems, Inc.  
335 Water Street  
Newport, DE 19804-2410

#### **Summary**

This project will develop and commercialize stable nanoparticle catalysts for enhancing production of industrial chemical while reducing energy and capital costs for production.

---

#### **Title**

Recovery Act - High-Efficiency, Economical GHG/CO<sub>2</sub> Reduction

#### **Company**

GR Silicate Nano-Fibers and Carbonates, LLC  
32918 6th Ave SW  
Federal Way, WA 98023-6104

#### **Summary**

This project will develop technologies to capture GHG/CO<sub>2</sub>/industrial waste from power, steel, and cement plants and convert them into value added products for energy-efficient building materials and composites for fuel-efficient automobiles. This will increase energy efficiency, reduce the environmental footprint, improve the economy, and create "green" jobs.

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#### **Title**

Recovery Act - Use of Lignin to Fire Lime Kilns in the Pulp and Paper Industry

#### **Company**

Houghton Cascade Holdings, LLC  
1145 Broadway Plaza, Suite 1500  
Tacoma, WA 98402-3583

#### **Summary**

This project will help the pulp and paper industry become more competitive and reduce their greenhouse gas emissions. The success of project will further transform the industry into a green workforce.

---

#### **Title**

Recovery Act - Reducing Energy and Carbon Intensity in Oil Refining

#### **Company**

Innovative Energy Solution  
9839 Industrial Court, Suite C  
Highland, IN, IN 46322-2660

#### **Summary**



This project will improve a technology to recover free hydrogen from the toxic waste gas, hydrogen sulfide, found in oil and natural gas processing. Using the hydrogen for combined electricity and steam generation will reduce the carbon emissions and increase the energy efficiency and competitiveness of refineries and gas plants while creating jobs.

---

**Title**

Recovery Act - Electrokinetic Sorting of Carbon Nanotubes

**Company**

Lynntech, Inc.  
7610 Eastmark Drive  
College Station, TX 77840-4023

**Summary**

This project is to design an enabling system to make significant improvements to the countries capability to compete in nanomaterials manufacturing. As a result of this technology new jobs will be generated in a range of fields energy storage and conversion, medical sensors and products, defense technology, and new electronics.

---

**Title**

Recovery Act - Radiant Barriers to Improve the Development of Composite Refractory Materials with Thermal Efficiency of Kiln Operations

**Company**

Mainstream Engineering Corporation  
200 Yellow Place  
Rockledge, FL 32955-5327

**Summary**

Cement manufacturing is inefficient, consumes large amounts of energy, and emits large volumes of greenhouse gases. This project will demonstrate an environmentally-friendly, cost-effective, commercially-viable manufacturing improvement to reduce energy loss, reduce emissions, and make the U.S. cement industry (third in the world) more competitive while creating additional U.S. jobs.

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**Title**

Recovery Act - Organic Rankine Cycle Waste Heat Recovery System Utilizing an Environmentally-Sustainable Working Fluid

**Company**

Mainstream Engineering Corporation  
200 Yellow Place  
Rockledge, FL 32955-5327

**Summary**

New distributed power systems produce waste heat that is either not used or combined with a waste heat recovery system, which uses a working fluid with high global warming potential. This project will develop a new commercially-viable system that increases efficiency, reduces pollutant emissions, and uses an environmentally-sustainable fluid.

---

**Title**

Recovery Act - Oil-Free Steam Turbine Generator for Energy Recovery

**Company**

Mechanical Solutions, Inc.  
11 Apollo Drive  
Whippany, NJ 07981-1432

**Summary**

This project will convert steam energy wasted in thousands of steam plants (industrial plants, manufacturing facilities, universities, hospitals, process plants, commercial buildings, and government complexes) into useful electric power by developing an oilfree, high speed, compact radial steam turbine generator that operates on foil (air) bearings. 1,000 of these generators will save enough energy to eliminate the need for 41 Exxon Valdezsize tanker shipments of imported oil annually. There are tens of thousands potential installation sites.

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**Title**

Recovery Act - Development of Advanced Transport Membrane Condenser for Energy/Water Recovery from Industrial Waste/Process Streams

**Company**

Media and Process Technology Inc.  
1155 William Pitt Way  
Pittsburgh, PA 15238-1368

**Summary**

Heat and water vapor losses in industrial gas exhaust streams are estimated to be on the order of 1,800 trillion BTU/year. The proposed Transport Membrane Condenser technology can potentially save ~ 25% of this energy while simultaneously recovering several 100million gallons of water per year.

---

**Title**

Recovery Act - Scaleup of the In-Situ Growth Process for Energy Storage Applications

**Company**

NanoLab, Inc.  
55 Chapel Street  
Newton, MA 02458-1060

**Summary**

This project will scale up the ISG process from a batch mode to a continuous roll to roll process.

---

**Title**

Recovery Act - Scale-up of Production of Active Nanoparticles-Based Novel Lubricant Additives to Improve Energy Efficiency and Durability

**Company**

NanoMech, LLC  
535 Research Center Boulevard, Suite 135  
Fayetteville, AR 72701-6948

**Summary**

This proposal addresses scale-up and commercialization of novel nanoparticles-based lubricant additives for harsh boundary lubrication regimes (ball bearings, gears, and other related equipment) saving hundreds of millions of dollars from fuel savings, reduced vehicle exhaust emission, reduced friction and wear to improve energy efficiency and durability of U.S. industries.

---

**Title**

Recovery Act - Scale-Up of Nanopowder Manufacturing Via Cost-Effective, Low Carbon-Footprint Process

**Company**

nGimat Co.  
5315 Peachtree Boulevard  
Atlanta, GA 30341-2107

**Summary**

This project will scale-up a versatile nanomaterials fabrication process to enable high-volume materials manufacturing for energy-storage and energy conversion. Nanomaterials enabled by this process will reduce our dependence on foreign energy sources, decrease harmful green-house gas emissions and forge a resurgence of the U.S. manufacturing sector.

---

**STTR Project****Title**

Recovery Act - Nanomaterials for Batteries and Supercapacitors

**Company**

Shakti Technologies, Inc.  
728 Garland Drive  
Palo Alto, CA 94303-3603

**Summary**

A new technology for manufacture of nanomaterials and fabrication of batteries and super-capacitors will re-establish the domestic manufacturing capability to serve the automobile, power tools and electronics industry. Our energy and defense security will be enhanced by the development of this technology.

---

**Title**

Recovery Act - Data Center Energy Efficiency Increase using DSP Arrays

**Company**

Signalogic, Inc.  
9617 Wendell Rd  
Dallas, TX 75243-5510

**Summary**

This project will develop software to adapt Signalogic DSP arrays to parallel processing software methods for heterogeneous CPU environment based on OpenCL (from Apple) and Chimera (from Lockheed-Martin Advanced Technology Laboratory), with an objective to produce a combined hardware and software demonstration.

---

**Title**

Recovery Act - Production Scale-up of Nanoporous Carbons for Ultracapacitors

**Company**

TDA Research, Inc.  
12345 W. 52nd Avenue  
Wheat Ridge, CO 80033-1916

**Summary**

For ultracapacitors to be used as high-power energy sources for electric and hybrid vehicles, inexpensive nanoporous carbons (the key component of the devices) are needed. To reduce the cost of ultracapacitors, inexpensive sugars will be used to make nanoporous carbons that cost less and outperform the best materials currently available.

---

**Title**

Recovery Act - Lignin Recovery and Purification

**Company**

Techfish, LLC  
109 Smith Street  
Charleston, SC 29403-6009

**Summary**

This project will increase production rates of papermaking operations and allow power companies to achieve renewable energy goals, both for low-capital and operating expense. These new facilities distributed around the country will increase jobs nationwide. This technology also applies to enzymatic biomass-to-ethanol plants under development.

---

**Title**

Recovery Act - Large-Scale, Low-Cost, Nano-Structure Fabrication For High Efficiency Solid State Lighting

**Company**

TelAztec, LLC  
15 A Street  
Burlington, MA 01803-3404

**Summary**

This project will investigate various nano-structure designs that have the potential to yield dramatic increases in light efficiency, reducing energy costs for industrial and residential lighting. Applications include industrial and commercial lighting, residential lighting, computer, automotive, and video displays, and solar cells based on similar PV materials.

---

**STTR Project****Title**

Recovery Act - Large-Scale SWNT Purification and Solubilization

**Company**

TetraGchem, LLC  
110 8th Street, J Bldg.  
Troy, NY 12180-7224

**Summary**

This project will develop a new enabling technology for carbon nanotubes that employs a new medium that is simple to prepare, easy to remove, reusable, scalable, economical, biocompatible and tunable.

---

**Title**

Recovery Act - Scale-Up of Nano-Crystalline Fiber Aluminum Composite for Ground Vehicle Wear Components

**Company**

Triton Systems, Inc.  
200 Turnpike Road  
Chelmsford, MA 01824-4053

**Summary**

This project will research the transition of the material and weight savings of lightweight composite that is currently being evaluated in as a 1:1 replacement to steel in aerospace applications offering a 60% weight savings to automotive applications.

---

**Title**

Recovery Act - Scale-up of Green Nanoscience Pathway for Optically Transparent Nanocomposites

**Company**

Vision Dynamics LLC  
10106 Bluegrass Parkway  
Louisville, KY 40299-2202

**Summary**

This project details a nanomanufacturing scaling up nanocomposite production applying green nanoscience principals through the complete process.

---

**Title**

Recovery Act - Scale-Up of Tunable Nanoporous Carbon Production

**Company**

Y-Carbon, Inc.  
900 First Ave, Building 4, Suite 242  
King of Prussia, PA 19406-1308

**Summary**

This project will develop large scale manufacturing of advanced nanomaterials to be less expensive to manufacture than currently used materials while offering breakthrough performance. Nanomanufacturing of such tunable nanoporous carbon is expected to have a major impact on fields ranging from electrical energy storage to medicine and water desalination

## TOPIC: ADVANCED MANUFACTURING PROCESSES

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### **Title**

Recovery Act - Unique Alcohol Extraction Process Based on Jojoba Oil

### **Company**

Applied Colloids  
11080 Industrial Circle NW  
Elk River, MN 55330-4729

### **Summary**

This project will develop technology to improve biofuel production, such as ethanol. It will also help to reduce greenhouse gas emissions.

---

### **Title**

Recovery Act - Ultra-Thin Antifouling Surface Treatments for Heat Exchangers

### **Company**

Applied Thin Films, Inc.  
1801 Maple Ave., Suite 5316  
Evanston, IL 60201-3135

### **Summary**

Fouling and corrosion of heat exchangers is a major source of energy consumption and efficiency loss in many industries. This project will develop a revolutionary and unique coating material that will be used to mitigate these effects.

---

### **Title**

Recovery Act - Recovery of Solvent from Solvent-Deasphalting Process by Novel Solvent-Resistant Nanofiltration Membranes

### **Company**

Compact Membrane Systems, Inc.  
335 Water Street  
Newport, DE 19804-2410

### **Summary**

Solvent recovery by distillation is the most energy and capital intensive chemical unit operation in chemical, petrochemical, pharmaceutical and food processing industries. This project will develop novel technology to significantly reduce the energy and capital costs of solvent recovery processes.

---

### **Title**

Recovery Act - Novel Membrane Reactor for the Manufacture and Purification of THF

### **Company**

Compact Membrane Systems, Inc.  
335 Water Street  
Newport, DE 19804-2410

### **Summary**

Acid dehydration by distillation is the most energy and capital intensive chemical unit operation. This project will dramatically reduce the energy and capital costs of acid dehydration.

---

### **Title**

Recovery Act - Novel Membranes for Dehydration of Organic and Inorganic Acids

### **Company**

Compact Membrane Systems, Inc.  
335 Water Street  
Newport, DE 19804-2410

### **Summary**

This project will develop a membrane process that will save significant amounts of energy and reduce the generation of greenhouse gases. The technology can serve many areas, such as the drying of alcohols and other azotropes, drying of other organics, drying of process fluids and water removal to enhance chemical reactions. It is estimated that implementation of the proposed concept will reduce the energy consumption in specific applications by about 50% relative to the conventional process.

---

### **Title**

Recovery Act - Process Intensification by Enhanced Performance of Multi-Effect Evaporators and Crystallizers

### **Company**

E3Tec Service, LLC  
11865 Tall Timber Drive  
Clarksville, MD 21029-1203

### **Summary**

U.S. process industry is at a turning point to be competitive and energy efficient on a global market. This project will address thermal separation processes that are capital intensive and the workhorses of the process industry that

require a paradigm shift for achieving DOE's energy efficiency goals.

---

**Title**

Recovery Act - Electromechanical Dewatering of Paper Pulp for Increased Energy Efficiency

**Company**

Eltron Research & Development, Inc.  
4600 Nautilus Court South  
Boulder, CO 80301-3241

**Summary**

This project will develop a novel process, electroosmotic-assisted mechanical dewatering, that reduces the energy requirement in paper production by as much as 40%. The process can be adopted by paper manufacturers without significant equipment modification, and enhances the global competitive position of U.S. papermakers.

---

**Title**

Recovery Act - Manufacture of Poly(Vinyl Butyral) by Reactive Distillation

**Company**

KSE, Inc.  
665 Amherst Road  
Sunderland, MA 01375-9420

**Summary**

Poly (vinyl butyral) (PVB) is a key component in laminated safety glass used in essentially every automotive vehicle produced. Current production of PVB is highly energy intensive and costly, primarily due to a complex manufacturing process requiring extensive purification steps. Great energy savings can be realized by utilizing a novel reactive distillation process for the production of PVB. This project will achieve energy savings of up to 10 trillion BTU's per year, reduce greenhouse gas emissions, reduce costs for U.S. automotive manufacturers for laminated safety glass, and improve employment in the U.S. chemical industry.

---

**Title**

Recovery Act - Energy Efficient Reactive Dehydration of Acetic Acid by Hybrid Reactive Distillation and Membrane Separation

**Company**

KSE, Inc.  
665 Amherst Road  
Sunderland, MA 01375-9420

**Summary**

Production of acetic acid is highly energy intensive, due to the energy required to dehydrate the acetic acid. This project, utilizing energy-efficient dehydration methods, will achieve energy savings of 10 trillion BTU's per year, reduce greenhouse gas emissions, extend the use of energy efficient membranes, and improve employment in the U.S. chemical industry.

---

**Title**

Recovery Act - A No Phase Change Process to Replace Distillation in Biodiesel Production

**Company**

Media and Process Technology Inc.  
1155 William Pitt Way  
Pittsburgh, PA 15238-1368

**Summary**

Distillation is required to meet the proposed cold soak test specification for biodiesel in the U.S., resulting in tremendous energy consumption on the order of 1.6 trillion BTU/year per billion gallons of biodiesel produced. This project will deliver on-spec biodiesel, replace energy intensive distillation, save biodiesel producers hundreds of millions of dollars per year, and promote job growth in this green industry.

---

**Title**

Recovery Act - Distillation Revisited: New Approaches to Energy Savings Using Integrated Distillation-Membrane Processes

**Company**

Membrane Technology and Research, Inc.  
1360 Willow Road, Suite 103  
Menlo Park, CA 94025-1524

**Summary**

Refinery/petrochemical distillation separations use 5 to 6 quads of energy annually in the United States. The new combination distillation membrane separation processes to be developed in this project could cut the energy used in these separations in half.

---

**Title**

Recovery Act - Rollable Solar Thermal Concentrator

**Company**

Optical Physics Company  
26610 Agoura Road, Ste 240  
Calabasas, CA 91302

**Summary**

Solar energy is the ultimate renewable source, but so far solar panels have been too expensive for the great majority of consumers. This project will bring the cost of going solar down from 14 cents per kilowatt hour to less than 2 cents per kilowatt hour.

---

**STTR Project**

**Title**

Recovery Act - Novel Method for Dewatering Using Lateral Displacement Array

**Company**

Phycal, LLC  
51 Alpha Park  
Highland Heights, OH 44143

**Summary**

This project will demonstrate the feasibility of manufacturing arrays for a novel separation technology cost-effectively such that they can be used economically to remove algae and other particles from aqueous suspension. This technology has the potential to significantly reduce production costs of algal biofuels and other industrial processes requiring particle separation.

---

**Title**

Recovery Act - Compact Polymeric Heat Exchanger

**Company**

PoroGen Corporation  
6 C Gill Street  
Woburn, MA 21401

**Summary**

This project will develop a lightweight and efficient plastic heat exchanger. Improved efficiency and weight reduction will provide large energy and fuel savings for chemical process industries, aviation and automotive sectors.

---

**Title**

Recovery Act - Novel Carbon Nanotube Containing Media for Water Separation from B-100 Biodiesel

**Company**

Seldon Technologies, Inc.  
31 Depot Avenue  
P. O. Box 710  
Windsor, VT 05089-0710

**Summary**

The solution to the problem of inseparability of water from biodiesel is very important for the development of biodiesel market. This project will use its proprietary technology of carbon nanotube containing media (nanomesh), also utilized in other Seldon filtration products, to develop a cost-effective solution to this problem.

---

**Title**

Recovery Act - Reactive Distillation Biodiesel Process

**Company**

TDA Research, Inc.  
12345 W. 52nd Avenue  
Wheat Ridge, CO 80033-1916

**Summary**

This project will develop a new process for making biodiesel that can use any oil or fat feedstock, including unrefined vegetable oils and waste greases. The use of low-cost feedstocks will reduce the price of biodiesel and expand the nation's production beyond what is possible from refined soybeans or canola.

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