

**U.S. Department of Energy
American Recovery and Reinvestment Act
Advanced Energy-Efficient Building Technology and Training Project Selections - June 2010**

Organization	City, State	Project Title	DOE Funding	Total Project Value	Project Description
Advanced Building Control Strategies, Communications and Information Technologies for Net-Zero Energy Buildings: 12 selections					
University of California	Berkeley, CA	Distributed Intelligent Automated Demand Response (DIADR) Building Management System	\$1,987,674	\$2,363,148	This project aims to demonstrate an innovative demand response management system on a typical commercial building to achieve 30% demand reduction while still maintaining the building as a healthy, productive, and comfortable environment for the building occupants. The development of this system will take into account a multitude of factors affecting cost, including comfort, HVAC, lighting, and other building systems, climate, and usage/occupancy patterns.
University of Southern California	Los Angeles, CA	Building-Level Energy Management Systems (BLEMS)	\$1,987,025	TBD	The Building-Level Energy Management Systems (BLEMS) project will focus on integrated plug-and-play capability for legacy and newly-developed energy management systems for buildings of any size. It aims to develop practical solutions make energy management systems more interoperable, secure, reliable, and extendable. The project will focus on bring new products to market, to make a positive impact on energy consumption in buildings.
United Technologies Research Center	East Hartford, CT	Plug and Play Distributive Power Systems for Smart-Grid Connected Building	\$1,866,627	\$2,333,284	The United Technologies Research Center and Architectural Energy Corporation are focusing on developing a whole-building energy management system that integrates real-time energy fault detection and diagnostics (FDD) for refrigeration, HVAC, lighting, and on-site power generation subsystems with the building's control platform; and to demonstrate the system at a SuperTarget store.
United Technologies Research Center	East Hartford, CT	Integrated Whole Building Energy Diagnostics	\$1,998,766	\$2,498,457	This project aims to advance and demonstrate a cost-effective architecture for stable "plug and play" integration of electrical energy storage, loads and sources in a building or a group of buildings that will provide a path to net-zero energy buildings. This will be done through a wider use of renewable energy, regenerative energy and energy storage in buildings, while also enabling building energy management, smart grid connectivity and improved security through the possibility to seamlessly operate in grid-parallel or islanding modes.
Emerson Electric Company	St. Louis, MO	Water Heater ZigBee Open Standard Wireless Controller	\$1,650,838	\$2,110,965	The goal of this project is to commercialize a new product that incorporates a predictive algorithm that learns energy usage patterns and reduces unnecessary water heating during times when there is a history of peak grid usage. This product will also include an interactive user display that supplies the consumer with a tool to manage the costs and energy used by the water heater.
National Semiconductor Corporation	Annapolis Junction, MD 20710-1118	Battery-Powered, Wireless, Networked Sensors for Energy Efficient HVAC Control	\$1,998,125	\$4,297,045	This project aims to prove the feasibility of new sensor technology and to develop a clear path to manufacturing. Prototype development and sample production for the complete sensor node will follow and will include development, test and manufacturing of each component; optimized packaging of components into modules and low volume manufacturing levels of the entire sensor node for external field trials.
Honeywell International, Inc.	Golden Valley, MN	Context Aware Smart Home Energy Manager (CASHEM)	\$1,828,261	\$2,285,326	The project aims to create a system that dynamically schedules major home appliances according to conditions and homeowner convenience of service (CoS) preferences. The project will focus on appliances such as space conditioning, water heaters, and pools, and will monitor and analyze energy consumption, recommend further energy saving actions, and motivate the homeowner to adopt the resulting recommendations.
Siemens Corporate Research	Princeton, NJ	Advanced, Integrated Control for Building Operations to Achieve 40% Energy Savings	\$1,418,847	\$1,773,574	The goal of this project is to develop an advanced, integrated control for a building's cooling, heating, lighting, ventilation, and window/blind operation to achieve 40% energy savings over standard energy use while providing a healthy, productive, and comfortable environment for the building occupants with reduced operating and equipment costs for the building owners.
Philips Electronics North America Corporation	Briarcliff Manor, NY	Energy Efficient and Comfortable Buildings through Multivariate Integrated Control (ECoMIC)	\$2,192,713	\$2,740,892	This project aims to reduce energy consumption in retrofit and new commercial buildings by developing integrated energy optimization control systems for electric lighting, daylight and local HVAC, and by exploiting the interdependencies among these systems. Projected energy savings will address a range of climate zones and building types within the commercial buildings space, and will be quantified under different scenarios and settings.
Verified Energy, LLC	Rochester, NY	Harmonization of ZigBee, BacNet and Dali in Wireless Dimming Lighting Control	\$1,568,957	\$2,562,781	Verified Energy LLC., LUMEnergy Inc., Lawrence Berkley National Laboratory, Air Products and Chemicals, Inc. and Converge Inc. will demonstrate cost effective energy savings for lighting by as much as 66 percent. By launching a wireless lighting control project, the team will enable a building system to gain real-time visibility and control over the demand and consumption of a building's lighting.
Johnson Controls, Inc.	Milwaukee, WI	Integrated Building Management System (IBMS)	\$2,000,000	\$3,211,800	This project will develop an Open Integration Framework that allows multivendor systems to interoperate seamlessly using internet protocols. Johnson Controls will create a platform for implementing new integrated control strategies and to enable additional enterprise control applications such as demand response.
Johnson Controls, Inc.	Milwaukee, WI	Integrated Predictive Demand Response Controller	\$2,000,000	\$3,317,734	The objective of this project is to ensure reliable and affordable electricity by taking advantage of the significant potential to reduce demand in buildings and give building owners and occupants an automated means to respond to real time pricing signals or curtailment events to minimize their energy costs while maintaining occupant comfort and productivity. Johnson Controls will perform the necessary applied research, development, and testing to provide a communications interface using industry standard open protocols and emerging NIST standards to receive real time pricing signals from utilities or power retailers.
Analysis, Design and Technical Tools: 5 selections					
University of Central Florida	Orlando, FL	Modeling Variable Refrigerant Flow Heat Pump and Heat Recovery Equipment	\$552,338	\$690,428	This project will provide a detailed computer model for a Variable Refrigerant Flow (VRF) AC system in the EnergyPlus™ building energy simulation tool. This project aims to fully understand the complex interactions of VRF AC systems from an HVAC system perspective, and investigate the interactions of this HVAC system type within a real world building environment. Detailed laboratory testing of this advanced HVAC system will provide invaluable performance information which does not currently exist in the form required for proper analysis.

U.S. Department of Energy
Advanced Energy Efficient Building Technologies Recovery Act Selections
June 17, 2010

Cornell University	Ithaca, NY	Advanced Interaction, Computation, and Visualization Tools for Sustainable Building Design	\$1,660,468	TBD	Cornell's Program of Computer Graphics is developing interactive graphical design and energy analysis tools for the next generation of computing environments. New novel user-interfaces techniques being developed can reduce computation time by three orders of magnitude. The accelerated computation will allow analytical feedback at early stages of design when critical decisions can have the greatest long-term effect, as well as providing performative means for regulating and assessing energy utilization.
Syracuse University	Syracuse, NY	Development of an Integrated Computer Simulation Environment for Performance-Based Design of Very-Low Energy and High IEQ Buildings	\$560,296	\$702,354	The Syracuse Center of Excellence in Environmental and Energy System plans to develop a "Virtual Design Studio" which is a knowledge-based expert system that integrates a suite of performance simulation models, a "virtual building" database, and a knowledge base of architectural design principles to help achieving a fully coordinated, integrated, and optimized building design.
University of Washington	Seattle, WA	Advanced Energy Efficient Building Technologies for High Performance Hospitals	\$1,196,580	\$1,317,616	University of Washington has developed detailed energy simulation models and analyzed how to integrate hospital buildings and systems to produce high performance hospitals that utilized 60% less energy than typical operational hospitals in Pacific Northwest. The goal of this project is to apply knowledge learned in this process to the six most populous DOE climate zones and most populous sub-zones of the United States.
Eaton Corporation	Milwaukee, WI	Advanced Load Identification and Management for Buildings	\$2,000,000	\$2,500,000	This team proposes to develop advanced load identification and management technologies and solutions to reduce building energy consumption by providing fine granular visibility of energy usage information and safety protection of miscellaneous electric loads (MELs) in commercial and residential buildings. The objectives of the proposed research are to: develop intelligent load modeling, identification and prediction technology that will automatically determine the type, location, energy consumption, power quality, operation status and performance status of MELs, using electric waveforms at a power outlet level; and to prototype "smart eOutlet", an advanced power outlet / strip concept, which provides embedded load identification intelligence, low-cost power line carrier (PLC) communication, remotely-controllable relay, universal interface to building management systems, and arc fault, ground fault and surge protection.
Building Envelope and Windows: 14 selections					
Soladigm, Inc.	Milpitas, CA	Low-Cost, High-Energy Savings, Solid State Dynamic Windows	\$3,467,541	\$5,779,236	Soladigm, Inc. will manufacture low-cost, dynamic windows that will exceed the Department of Energy's 2020 performance and reliability targets within 10 years. Soladigm, Inc. will transition its lab-scale process to a scalable manufacturing process, using existing manufacturing tools to achieve a commercially attractive cost. These windows will provide an energy savings of 39% compared to buildings fitted with low-emissivity (Low-E), insulated glass units.
Southwall Technologies, Inc.	Palo Alto, CA	Low-Cost R10/High SHGC Heat Mirror® Window Development	\$1,429,326	\$1,786,656	A key technical obstacle to highly insulated windows is that as performance improves, the less effective it is at blocking the heat from the sun. Southwall will develop the technology to dramatically increase the effectiveness of highly insulated windows at blocking heat—helping buildings save money and energy. The company will use its Heat Mirror technology for the project. The Heat Mirror is a thin film that fits inside of glass. It lets visible energy in while reflecting infrared energy out. This energy-saving technology will give highly insulated windows the ability to keep homes, offices, and cars comfortably cool at a lower cost.
Applied Materials, Inc.	Santa Clara, CA	Technology for Low-Cost Electrochromic Dynamic Windows	\$1,999,515	\$3,999,330	The overall long-term goal for this project is to develop a market viable electrochromic glass technology and a corresponding dynamic window manufacturing technology with a cost structure that encourages rapid and widespread adoption. The goal of this project is to develop high rate coating techniques for key layers and to demonstrate the feasibility of high throughput process.
EverSealed Windows, Inc.	Evergreen, CO	High Reliability R10 Windows Using Vacuum Insulating Glass Units	\$2,169,327	\$2,521,257	The proposed project seeks to prove the feasibility of incorporating the EverSealed Windows (ESW) vacuum insulating glass units in R10 windows, a key element of zero-energy buildings. The project seeks to prove the marketplace feasibility of windows with energy-efficiencies approaching R10, to support of the goal of 40% reduction in whole house energy use for new residential buildings
Dow Chemical Company	Midland, MI	Advanced Insulation for High-Performance, Cost-Effective Wall, Roof and Foundation Systems	\$2,955,156	\$5,910,312	The Dow Chemical Company will develop high performing insulation with increased R value of 7.5 per inch or more. This innovative project will enable the design and construction of highly insulating building envelope systems with more durable performance and lower overall system cost than available today. The building envelope typically accounts for 36 percent of the overall energy use in the U.S. Half of this amount is energy lost through the walls, roofs, and foundations. This new insulation will result in a significant reduction of these energy losses.
Dow Corning Corporation	Midland, MI	Contributing to Net-Zero Building: High Energy Efficient EIFS Wall Systems	\$1,241,120	\$1,551,399	The goal of this project is to develop an innovative solution to fill the need for improved energy efficiency of building envelopes in commercial construction through a significantly improved form of insulated cladding material. The project is focused on achieving Clear Wall R-40 values in Exterior Insulation and Finish Systems ("EIFS") by incorporating high efficiency Vacuum Insulated Panel (VIP) insulation into the building envelope. Testing will validate the viability of VIP insulation usage within EIFS as applied to the commercial construction industry in both retro-fit and new construction applications.
Pleotint, LLC	West Olive, MI	Demonstration with Energy and Daylighting Assessment of Sunlight Responsive Thermochromic (SRTTM) Window Systems	\$402,547	\$805,095	This project specifically addresses testing a new building technology product based on thermochromics, for energy savings, versus the industry standard for commercial buildings, that of a fixed tint double pane window. This project will demonstrate that a variable tint thermochromic window, can provide: reduced need for sun induced cooling, saving on air conditioning costs; and enhanced daylighting, minimizing artificial lighting demands – and associated energy savings from reduced usage of artificial lighting.
SAGE Electrochromics, Inc.	Faribault, MN	Electrochromic Glazing Technology: Improved Performance, Lower Price	\$1,633,301	\$2,041,627	This project will address two major areas: Improving the energy performance of electrochromic glazing and lowering the price to achieve greater market penetration. The goals for these activities are: (i) to improve the solar heat gain coefficient range, (ii) initially reduce the price of electrochromic windows through lower cost materials and enhanced processing, (iii) introduce Ag (silver) low-e transparent conductors to lower the U-value and even more aggressively reduce price, and (iv) ensure that the proposed changes have no detrimental effect on the durability of the window.
3M Company	St. Paul, MN	Polymeric Multilayer Infrared Reflecting Mirrors	\$1,966,611	\$3,575,657	The goal of this project is to develop a polymeric multilayer infrared reflecting film that is essentially clear and colorless, while reflecting 90-95% of the infrared energy. This film can then be used as a component of other building products.

Syntroleum Corporation	Tulsa, OK	Development of Low-Cost Bio-Based Phase Change Material	\$1,009,300	\$1,261,600	Studies have shown that incorporation of phase change material (PCM) in building envelopes (i.e. walls and roof) can reduce peak energy demand by 40% (alone) to 90% (in combination with advance insulation material). High cost and limited availability have so far prevented use of PCM in construction applications. This project will investigate the use of low cost, domestically produced bioproducts for phase change materials.
Traco Delaware, Inc.	Cranberry Township, PA	Production Engineering for R5 and Higher Windows	\$1,317,819	\$2,635,638	This project proposes to engineer the production of commercial grade R5 windows, in a cost effective manner. The project has identified improvements in labor time for the manufacture and assembly of glazing, sashes/vents, and frames since it represents a major portion of the overall cost to manufacture the window.
Quanta Technologies, Inc.	Malvern, PA	Low-E Retrofit Demonstration and Educational Program	\$853,962	\$1,912,537	Quanta Technologies will demonstrate the applicability of low-emissivity storm windows and retrofit glazing systems to significantly improve the energy efficiency of residential and commercial building stock. The team will track installation of low-e storm windows on homes weatherized in one state weatherization assistance program and conduct a residential case study on the use of low-e storm windows in a warm / mixed southern climate to expand upon a previous case study for cold climates. The team will also conduct a case study to determine yearround heating and cooling energy savings.
Industrial Science & Technology Network, Inc.	York, PA	Advanced Building Insulation by CO ₂ Foaming Process	\$2,005,139	\$2,709,647	This project proposes to develop a new generation of thermal insulation with substantially higher insulating power (higher R/inch) at an affordable cost. The technology development of this project will lead to manufacturing a 3rd generation of insulation with insulating power 50% - 100% higher than current products (R-7-10/inch versus current R-3.2 -5/inch), yet with cost comparable to present market demands.
CPFilms, Inc.	Fieldale, VA	Low-Emissivity Energy-Control Retrofit Window Film	\$356,591	\$564,982	The goal of the project is to develop, validate, and commercialize a range of cost effective, low-emissivity, energy-control, retrofit window films. The proposed work will allow technologies similar to those utilized in high performance low emissivity glass coatings to be incorporated into retrofit window films, while keeping costs in line with current high performance window films.
Residential and Commercial HVAC, and Crosscutting Air Conditioning and Refrigeration Research: 10 selections					
University of Alaska	Fairbanks, AK	Experimental and Numerical Investigation for Heating and Cooling Buildings	\$617,583	\$771,988	The University of Alaska will measure the thermo physical properties, such as viscosity, thermal conductivity, specific heat and density of various nanofluids, because they influence the heat transfer and pumping power characteristics. From the measurements of thermo physical properties new correlations will be developed. The goal is to develop general correlations that apply for several nanofluids rather than individual equations for specific nanofluids, as is the case in the research literature at present.
PAX Streamline, Inc.	Novato, CA	Development of a Water-Based, Critical Flow, Non-Vapor Compression Cooling Cycle	\$2,000,000	\$3,689,397	This project will focus on the development of a novel water based, critical flow, non-vapor compression cooling cycle for air conditioning. This cycle has the potential to significantly improve cycle coefficient of performance (COP) compared to a traditional vapor compression system. The novel new cycle relies on principles of sonic multi-phase flow in a supersonic/hypersonic nozzle to provide cooling. The PAX cooling system also utilizes pressurized water, critical flow, and a small footprint to develop high efficiency cooling.
United Technologies Research Center	East Hartford, CT	Natural Refrigerant Very-High Efficiency HVAC System	\$1,998,439	\$2,498,049	United Technologies Research Center (UTRC) will design, develop, and demonstrate a safe low Global Warming Potential (GWP) Very High Performance Air-Conditioning system. This residential ducted system will reduce system direct GWP by a factor of approximately 200, and has the potential to achieve a net 4 percent reduction in overall annual energy consumption of residential buildings.
Chemtura Corporation	Middlebury, CT	Next-Generation Refrigerant Lubricants	\$1,452,140	\$1,930,540	Chemtura Corporation will develop, test and bring to market new synthetic lubricants that are highly compatible with new low ozone depleting and low global warming potential refrigerants and offer improved performance over current lubricant technologies. The project will seek to reduce overall energy requirements for refrigeration and cooling systems by as much as 2% based solely on using newly developed, highly compatible lubricants. Ensuring optimal energy efficiency through the development and use of lubricants that are highly compatible with these new refrigerants could save U.S. consumers as much as \$3.7 billion per year at present electricity rates.
University of Central Florida	Orlando, FL	Improving Best Air Conditioner Technology by 20%-30% through a High Efficiency Fan and Diffuser Stage Coupled With an Evaporative Condenser Pre-Cooler	\$256,461	\$320,576	The University of Central Florida is seeking to develop the best residential HVAC condenser technology currently available on the market by retro-fitting the unit with both a high efficiency fan system and an evaporative pre-cooler. The system will be adapted for high performance condensers using variable frequency drives and rotary compressors to achieve superior efficiency. Previous tests of a high efficiency fan and diffuser stage developed by researchers at the Florida Solar Energy Center have shown to reduce overall condenser power by 4%. Evaporative pre-cooling is known to improve efficiency.
Creative Thermal Solutions, Inc.	Urbana, IL	High Energy Efficiency R-744 Commercial Heat Pump Water Heaters	\$1,010,611	\$1,263,268	Creative Thermal Solutions will develop a high efficiency R-744 heat pump water heater (HPWH) with effective utilization of the cooling capability for air-conditioning and/or refrigeration. This next generation R-744 HPWH unit will be targeted at commercial use where some cooling load is typically needed year round, such as restaurants, hotels, care centers and hospitals.
Purdue University	West Lafayette, IN	Development of a High Performance Cold Climate Heat Pump	\$1,331,435	\$1,606,435	Purdue will develop the technology to yield a cold climate, high performance prototype heat pump unit. Researchers will develop, test, and evaluate a high performance and cost-effective vapor compression heat pump for use in cold climate regions. This technology will be applicable to any vapor compression cycle for air conditioning, refrigeration, and heating, which will have economic impacts beyond just the low temperature heat pump market.
TIAX, LLC	Cambridge, MA	An Innovative Reactor Technology to Improve Air Quality	\$760,383	\$950,478	TIAX will seek to efficiently remove Volatile Organic Compounds (VOCs) from residential buildings using the TIAX photocatalytic air purifier (TPAP), which incorporates an innovative reactor and light source design. The purifier breaks down VOCs to their principal components of CO ₂ and H ₂ O instead of diluting VOCs to outdoor air or transferring them to a sorbent filter, which requires disposal and replacement maintenance.
General Electric	Niskayuna, NY	Advanced Magnetic Refrigerant Materials	\$1,471,291	\$1,961,723	GE Global Research, in collaboration with team members George Washington University and GE Appliances, will develop new magnetic refrigerant materials that will enhance the efficiency of residential refrigeration technology by up to 30 percent.
University of Wisconsin	Madison, WI	Optimization of Regenerators for AMRR Systems	\$246,249	\$326,927	The University of Wisconsin will address two fundamental challenges that currently limit the commercial success of the Active Magnetic Regenerative Refrigeration (AMRR) cycle, a high performing non-vapor compression cooling system. This proposal will address the development of an optimal magnetocaloric material and the development of the optimal configuration for the material in the AMRR bed.
Water Heating, Residential and Commercial Appliances and Miscellaneous Electric Loads: 4 selections					
TIAX, LLC	Cambridge, MA	Energy Efficient Commercial Refrigeration with Carbon Dioxide Refrigerant and Scroll Expanders	\$954,931	\$1,193,662	TIAX will modify and adapt the design of an existing, prototype CO ₂ expander for refrigerant. Successful development of the expander will improve efficiency in some refrigeration applications, while helping eliminate the use of HFC refrigerants.

U.S. Department of Energy
Advanced Energy Efficient Building Technologies Recovery Act Selections
June 17, 2010

Whirlpool Corporation	Benton Harbor, MI	Advanced Sequential Dual Evaporator Cycle for Refrigerators	\$2,042,700	\$3,963,600	Refrigerators account for seven percent of home energy use, even though gains in energy efficiency in the last 10 to 15 years have been significant. Therefore, efforts to increase the operating energy efficiency have a large impact on total residential energy footprint. Whirlpool Corporation will develop the technology to significantly increase the energy efficiency of domestic refrigerators; reducing it by 50 percent relative to Federal minimum efficiency standards.
Porticos, Inc.	Morrisville, NC	Next Generation Clothes Dryer	\$1,682,532	\$2,118,427	Porticos, Inc. will develop a Next-Generation Clothes Dryer, which will consume about half as much energy per cycle as a conventional dryer and dry clothes in significantly less time. The proposed technology will consume less than 50 percent of the energy of a conventional dryer, induce virtually no HVAC energy burden on home heating and air-conditioning systems, and represent a purchase-price that will be acceptable to U.S. consumers.
Stone Mountain Technologies, Inc.	Unicoi, TN	Development and Validation of a Gas-Fired Residential Heat Pump Water Heater	\$1,353,083	\$1,756,184	Stone Mountain Technologies, Inc. plans to develop a Gas-Fired Residential Heat Pump Water Heater (GHPWH) with a primary fuel efficiency 2.4 times higher than conventional gas storage water heaters, and 2.1 times higher than electric heat pump water heaters. The end result of the project is a gas-fired absorption heat pump residential water heater with an approximate 3 kW (10,000 Btu/hr) heating capacity, combined with a conventional residential water storage tank (60 – 80 gallons) to provide a first hour rating of at least 50, with an installed cost less than \$1,800. The heat pump will utilize a simple NH ₃ -H ₂ O cycle and high efficiency heat and mass exchangers to keep the footprint small and the refrigerant charge very low.

U.S. Department of Energy
Advanced Energy Efficient Building Technologies Recovery Act Selections
June 17, 2010

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Building Equipment Technicians: 4 Selections					
International Union of Operating Engineers	Washington, DC	Development of a Model Energy Conservation Training Program	\$748,744	\$748,744	A team of subject matter experts from the International Union of Operating Engineers local union training programs, industry, and trade organizations will conduct a curricula deficiency/development needs analysis. This will be submitted to DOE for a decision to go forward with curriculum development and will be the content basis for the Energy Conservation training program. The training program will be 75-hours and consist of classroom, hands-on, simulation, and web-based learning. A commercialization plan will be developed as part of the effort to ensure a long-term training program.
Gas Technology Institute	Des Plaines, IL	Development of a Training Program for Commercial Building Technicians	\$448,405	\$473,405	The Gas Technology Institute will develop a training curriculum for commercial building technicians, with particular focus on high-efficiency building technology and systems. The project team will identify energy efficiency knowledge gaps in existing programs and develop plans to address the gaps with either modified or new curricula. The project would also develop appropriate training material to meet project objectives. This material will be available as lecture materials, e-learning elements, video segments, exercises, and hands-on training elements
Texas A&M University	College Station, TX	Training Program Development for Commercial Building Equipment Technicians	\$749,037	\$749,037	The Texas A&M team will develop a new training program to bring new and existing buildings up to their optimal energy performance level. Participants will learn how to best operate commercial buildings to ensure they reach their expected energy performance level. The training will be a combination of classroom, online, and on-site lessons. The team will develop curricula using subject matter and adult learning experts and meet appropriate certification requirements and accreditation standards. The project will meet the needs, specialized expertise, and perspectives of the commercial building equipment technicians.
Northwest Energy Efficiency Council	Seattle, WA	Building Operator Certification (BOC) For Building Technicians	\$549,169	\$927,300	This project focuses on expanding the capacity of the existing national Building Operator Certification (BOC®) program by enhancing the energy efficiency subject matter content of existing curriculum and by developing a commercialization strategy for extending the BOC program's reach to new and underserved markets. Based on a gap analysis, the Northwest Energy Efficiency Council will develop a curriculum modules with new or updated subject matter content addressing the energy efficiency knowledge gaps and design the new content into a blended learning platform comprised of classroom, online, and on-site training.
Building Operators: 4 Selections					
University of North Carolina at Charlotte	Charlotte, NC	Net-Zero Energy Building Operator Training Program	\$589,843	\$589,843	This project will develop accredited certificate level training programs for commercial building operators. The outcome will be a multi-faceted mechanism for developing the skill-based competency for building operators, owners, architects/engineers, construction professionals, tenants, brokers and other interested groups in energy efficient building technologies and best practices. When fully implemented, the project will increase the pool of qualified professionals. The training program will utilize existing, modified, and newly developed curricula from the Department of Engineering Technology (ET) at UNC-Charlotte.
The Research Foundation of the City College of New York	New York, NY	Benchmark Green: Commercial Building Operator Certificate Program via Advanced Online Instruction	\$422,528	\$472,528	The overall objective of this project is to create and deliver a certificate program specifically designed for Commercial Building Operators, Property Managers, and Portfolio Asset Managers. The certificate program will consist of three 15-hour courses to instruct students on how planning a path to net zero energy can be an effective element in creating asset value. This program will be offered online through an advanced online educational portal which will facilitate instructor feedback on a timely basis.
University of Turabo	Gurabo, PR	UT/GTKS Training Program Development for Commercial Building Operators	\$335,745	\$335,745	The University of Turabo, in collaboration with Global Turn Key Services, Inc, will develop a Commercial Building Equipment Technician accredited training program. The team will develop and implement a commercialization and sustainability plan that details marketing, deployment, financial characterization, job placement, and other goals required for long-term sustainability of the project. After program development and deployment, the team will provide potential candidates with the knowledge and skill sets to obtain employment in the commercial building green energy job market.
University of Wisconsin	Madison, WI	Development of a Total Energy, Environment and Asset Management (TE2AM) Curriculum	\$934,712	\$934,712	The University of Wisconsin Department of Engineering Professional Development will organize and manage a Development of a Total Energy, Environment and Asset Management (TE2AM) Curriculum. The TE2AM program targets operations staff in existing commercial buildings. The primary objective of the TE2AM program is to equip building operations staff to effectively manage total building energy consumption, building environmental impacts, and total building assets/infrastructure for facilities they manage or operate. Additionally, the course will increase understanding of new approaches and encourage adoption of proven energy saving strategies
Building Energy Commissioning Agents/Auditors: 5 Selections					
Association of Energy Engineers	Atlanta, GA	Training Programs for Commercial Building Energy Commissioning Agents/Auditors	\$462,000	\$462,000	The Association of Energy Engineers will focus on utilizing and extending existing industry recognized Certified Energy Auditor (CEA) and Certified Building Commissioning Professional (CBCP) programs.
University of Nebraska	Lincoln, NE	Veterans Commissioning Training Program for Commercial-Healthcare Facilities	\$405,741	\$405,741	University of Nebraska will create a training program for the development of an energy commissioning workforce to ensure that new and existing U.S. buildings reduce energy use, while improving occupant comfort and safety. The project will also focus on creating immediate and long-term job opportunities for veterans as energy commissioning agents within both public and private sectors; and provide specialty training in retro-commissioning of healthcare facilities.
New Jersey Institute of Technology	Newark, NJ	Energy Commissioning Agent/Auditor Training in the New York Metro Region	\$468,495	\$468,495	The New Jersey Institute of Technology Center will create a comprehensive "Training Toolkit" for licensed professionals focused on energy auditing, commissioning, and retro-commissioning. The team will create a comprehensive "train-the-trainer" program, including in-person and online modules, for teaching the Toolkit to other educators. Additionally, the team will develop a plan for implementing a new certificate program, based on the Toolkit.
Portland Energy Conservation, Inc.	Portland, OR	Curriculum for Commissioning Energy Efficient Buildings	\$749,153	\$1,573,189	This project will improve the quality of education for future commercial building auditors. The goal is to train future commercial building auditors and operators to operate buildings to be energy efficient. The team will provide materials for participants to proactively find cost and energy savings opportunities in small to medium size commercial buildings. The team will revise materials of existing popular PG&E classes and create new teaching resources. Participants will be responsible for finding energy efficiency opportunities and for achieving and maintaining a building's high energy efficiency performance rating.
Milwaukee Area Technical College	Milwaukee, WI	Master Curriculum Development for Energy Auditors, Commissioning Agents and Energy Engineers	\$740,364	\$960,364	The Milwaukee Area Technical College (MATC) will further develop existing training program for commercial energy commissioning agents and energy auditors. MATC and the University of Wisconsin-Milwaukee (UWM) will work together to develop an integrated workforce training model, as well as collaborative curriculum. The project will also provide a career ladder for MATC graduates to continue their education at UWM, preparing students to advance to engineers and managers. The project includes installation of an intelligent lighting lab, a microturbine, and solar thermal heating devices that will provide students with hands-on experience with these new technologies