

**Teaming Partner List**  
**Buildings Energy Efficiency Frontiers & Innovation Technologies (BENEFIT) – 2020**  
**(DE-FOA-0002196)**

12/16/2020

Organization Name (alphabetical)	Contact Information	Organization Type	Topic Area(s)	Area of Technical Expertise	Capabilities
350Solutions, Inc.	Tim A. Hansen Founder – CEO 350Solutions, Inc. 919.438.0161 info@350Solutions.com www.350Solutions.com	Small Business	Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation Subtopic 2.2: Building Envelope Research, Development and Field Validation	Independent Field Validation of innovative clean technologies; Thermal storage; Distributed generation / combined heat and power; Technoeconomic evaluation;	350Solutions provides independent, third-party validation of innovative technologies in the energy & environmental space. 350 focuses on field validation in real world operating environments, performing independent measurement and verification of technology performance, as well as environmental benefits. Our staff have evaluated technologies for the XPRIZE Foundation (carbon utilization), Department of Defense (renewable power, HVAC), EPA (energy efficiency, CHP), and others. 350Solutions is an ANAB-accredited technology verifier under ISO 17020 / ISO 14034. 350 also provides independent technoeconomic evaluation, and supports technology development, engineering, research, field deployment, and program management.
Ames Laboratory	Julie Slaughter 128 Spedding Hall, 2416 Pammel Drive, Iowa State University, Ames, IA 50010 Julies1@ameslab.gov (515)294-4720	FFRDC	Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation	non-vapor compression cooling, magnetocaloric and elastocaloric materials and testing, caloric heat pump development	Development of new caloric materials, design and development of magnetocaloric and elastocaloric active regenerators, demonstration of magnetocaloric and elastocaloric cooling technologies, materials and system modeling, performance predictions for caloric heat pumps, scale-up of caloric technologies
Argonne National Laboratory	Ralph T. Muehleisen 9700 S. Cass Ave, Bldg 362, Lemont, IL 60439 rmuehleisen@anl.gov 630-252-2547	DOE FFRDC	Subtopic 1.1: Advancing Innovative Manufacturing and End-of-Life Processing of Efficient Building Energy Technologies Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms Subtopic 2.2: Building Envelope Research, Development and Field Validation	<ul style="list-style-type: none"> <li>•Advanced CFD, Building Energy Modeling, Building-to-Grid Modeling, AI/ML</li> <li>•Advanced Building Energy Modeling including AI/ML</li> <li>•Advanced heat transfer material development, modeling, and measurement (especially with phase change materials)</li> <li>•Advanced Manufacturing including scaleup of novel materials and new manufacturing process development</li> <li>•Nanofabrication and characterization</li> <li>•CHP measurement and characterization</li> <li>•Acoustics and Noise Control</li> </ul>	Patented High thermal conductivity foams for heat transfer (especially with phase change materials and Nanoparticle VO2 thermochromic films); Application of Artificial Intelligence/Machine Learning to modeling, simulation and process improvement; DOE Advanced Leadership Computing Facility for HPC modeling of combustion, multiphase flow, and heat transfer, collections of buildings, weather/atmosphere simulations, nanomaterial design and simulation; Advanced Photon Source, the world's highest performance x-ray imaging device for measuring combustion and multiphase flow and heat transfer in-situ on operating equipment, material failure mechanisms, and nanomaterial characterization. ; Center for Nanomaterials, a DOE user facility for modeling, fabricating, and characterizing nanomaterials; Materials Engineering Research Facility (MERF): A DOE user facility for manufacturing scale up of novel materials and developing new manufacturing processes
ATSP Innovations	Saifur Rahman 6762 Shadyvilla Ln Houston, Texas 77055 saifur.rahman@atspinnovations.com 409-600-4123	Small business	Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation	<ul style="list-style-type: none"> <li>• Polymer synthesis and processing</li> <li>• Advance bearing grade (Ultra-low friction and wear, high temperature resistance) polymer coating and composite development</li> <li>• High temperature polymer and composites</li> </ul>	ATSP innovation has the expertise in polymer synthesis and processing, tribo-mechanical contact design solution through a team of scientists consisting material engineers and tribologists with proficiency in high-temperature and harsh condition tribology. ATSP Innovations has the experience in R&D work on ultra-low friction coating development for air conditioning system in collaboration with a prominent industrial partner with the support of federal grant. ATSP Innovations specializes in special family of high-performance polymer, aromatic thermosetting copolyesters (ATSP), production for multiple usage in the form of bulk or coating. ATSP Innovations also provides customized solutions to customers including methodology development and chemical-mechanical characterization.

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Axiom	Robert Beachy/Mike Reiber 3800 American Blvd West Suite 1500 Bloomington, MN 55431 rbeachy@axiomcom.com mreiber@axiomcom.com (952) 224-2939	Small Business	Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 2.2: Building Envelope Research, Development and Field Validation	Development and installation of highly cost effective fly ash cements for vibration suppression in machine foundations. Fly ash substitute for zeolites in multiple applications for thermal storage to ceramics and desiccant cooling. Heat pump water heaters. Early development of two-stage heat pump cooling and heating ability. Extensive research with GTI on hot water heaters. Developed appliance insulation utilizing airgaps to maintain R factor with 25% less insulating materials. Preconstruction phase high performance building envelope design and testing methods. Construction phase building envelop testing and methodology concepting for air and moisture leaks. Construction phase creation of wall and envelope prototypes. Modified airgap preformed insulation. Using internal and external window. Window shutters and shades to reduce energy. Extensive research with GTI. Window films to eliminate thermal heat loss. Energy tracking analysis. Daylighting.	Axiom has deep new product development and launch experience in power generation, lighting, HVAC, appliances, windows, insulation, building automation, controls and energy conservation. Axiom has deep experience in architectural issues including: building envelopes, daylighting, moisture management, air testing and energy tracking Axiom has deep experience serving utilities and industry organizations in market and engineering evaluation for new technologies, power generation and energy conservation. Axiom services include: Market assessment and validation of new or existing products and technologies which save energy Market deficiency and gap analysis Economic feasibility, pricing and cost of manufacturing analysis Positioning and value proposition creation, testing and optimization Market sizing and opportunity analysis Channel strategy encompassing sales, warehousing, service and installation Commercialization modeling and launch execution plans Primary and secondary market research, customer segmentation, and business development The Axiom team includes marketers, engineers, and a former architect with deep backgrounds in energy efficiency and sustainability building technologies.
Buck Boost, LLC	Praneet Athalye, Ph.D., LC 1205 Gopher Ln, Apex, NC 27502 info@buckboostllc.com (919) 650 1838	Small Business	Subtopic 1.7: Lighting Technology Research, Development and Field Validation	Power Electronics, SSL, LED Drivers, Solar PV. Lighting Certification (NCQLP), Lighting Design, Lighting Controls. Intellectual Property Development.	Buck Boost, LLC, established in 2015, provides technical consulting and services related to solid-state (LED) lighting and solar PV. Services include research and development of analog and digital power electronics circuits (LED Driver), i.e., design, simulations, prototyping, and bench testing of power supplies from 1W to 1kW power levels as well as novel lighting fixtures. In-house power electronics and lighting laboratory offers small-scale reliability and field testing of LED drivers, luminaires, and light fixtures. EMC and safety testing is supported. Lighting design services include lighting calculations, light level / spectral measurements, lighting-building integration, energy management, and lighting science. Finally, solar PV services include analysis, string and system sizing, component selection, and optimization.  IP development service mainly offers innovation and assistance with writing / filing a patent application, prior art search, and patent prosecution. IP subject areas, based on our founder's extensive experience as an inventor on 48 US utility and design patents, include LED COB components, optics, color science, driver electronics, system integration, thermal design, lamps, troffers, and fixtures.

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Cushing Terrell	Rick DeMarinis, PE Director, Energy Services Principal, Mechanical Engineer 316 N. Last Chance Gulch Helena, MT 59601 (w) 406.324.7382 rickdemarinis@cushingterrell.com	For Profit Business - A/E Firm	Subtopic 1.2: Thermal Storage Research, Development, and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Verification Subtopic 1.7: Lighting Technology Research, Development and Field Validation	<ul style="list-style-type: none"> <li>•Building energy use simulation</li> <li>•Performance-based code compliance</li> <li>•Parametric energy and daylight optimization</li> <li>•Quality of space analysis, including daylight, views, thermal and visual comfort, air quality</li> <li>•Embodied carbon calculations</li> <li>•Detailed HVAC and Refrigeration system simulation and control sequence optimization</li> <li>•Passive heating and cooling systems design</li> <li>•Ground source heating and cooling systems</li> <li>•Measurement and verification</li> <li>•Post occupancy evaluation</li> <li>•Life cycle cost analysis</li> <li>•Net Zero Energy buildings</li> <li>•BIM to BEM interoperability</li> <li>•Script development for automation and quality control of BEM tasks</li> <li>•Building performance benchmarking</li> <li>•Custom performance curves for refrigeration and HVAC systems</li> <li>•Energy impacts of COVID response</li> <li>•Use of thermally massive materials as a load reduction strategy</li> <li>•Energy efficient lighting design and lighting control design</li> <li>•Microgrid integration with lighting</li> <li>•Advanced refrigeration systems utilizing natural refrigerants that reduce energy consumption</li> <li>•Hot water heat reclaim systems utilizing the waste heat from refrigeration system</li> <li>•Absorption chillers driven by waste heat off of CHP system</li> <li>•Microgrid technology that utilizes PV, battery storage and fuel driven generators to run refrigeration systems to increase resiliency during power load management or utility disruptions.</li> <li>•Thermal storage generated during off peak demand hours to be used to reduce required grid power during peak demand.</li> <li>•Heat Pump air handlers which utilize waste heat from a Refrigeration system by utilizing a condenser water loop connected between the heat pump and the refrigeration system.</li> </ul>	Cushing Terrell (formerly CTA Architects Engineers) is a full service architectural and engineering firm that has been providing a wide range of building services throughout the United States for over 80 years. We have extensive engineering design, energy analysis and commissioning experience in the system types listed in the Area of Technical Expertise. We have designed simulations and authored white papers for the Northwest Concrete Masonry Association using DOE Prototype buildings to quantify the benefits of thermally massive wall construction in the Pacific Northwest. Cushing Terrell has collaborated with NREL to develop EnergyPlus algorithms for refrigeration system simulations and has led the industry in the simulation of natural refrigerant performance and refrigeration heat reclaim systems. We have in house NCQLP LC lighting designers who have a wealth of experience with energy efficient lighting design and application of advance lighting controls including integration with building automation systems and microgrid systems. Experience includes design of microgrid and combined heat and power systems. Also, as part of the EPA's Green Power Partnership, Cushing Terrell invests in Renewable Energy Certificates for 100% of our operational power needs — accounting for all 13 of our offices and every remote team member.
Earth Advantage	Anthony Roy 623 SW Oak #300, Portland, OR 97205 aroy@earthadvantage.org 503-968-7160	501c3 non-profit organization	Subtopic 2.3 (Quality Installation Training and Certification Programs; Continuing Education for Design and Construction Professionals) Subtopic 1.6 (Field Validation) Subtopic 2.2 (Field Validation)	High performance residential construction	<p>Earth Advantage is an Oregon-based non-profit organization that works to address the environmental impacts of residential buildings in three ways:</p> <ul style="list-style-type: none"> <li>•Providing technical support to leading regional high performance home builders.</li> <li>•Training the broader residential building industry and the real estate professionals that serve that industry.</li> <li>•Linking available green home data to the residential real estate market.</li> </ul> <p>Earth Advantage's team possesses deep technical field expertise that is shared with leading regional high performance home builders. Earth Advantage's training team transforms this technical field expertise into accessible curriculum for the broader residential building industry. The Earth Advantage training team has educated over 12,000 professionals across the country on a range of residential energy and green building topics. Earth Advantage also provides several professional designations for the residential building industry, including the Sustainable Homes Professional (SHP) designation.</p>
Ecotope, Inc.	Mark Frankel 1917 1st Ave., Suite 300, Seattle, WA 98101 mark@ecotope.com 206-596-4710	Incorporated small Business	Subtopic 1.1: Advancing Innovative Manufacturing and End-of-Life Processing of Efficient Building Energy Technologies Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.9: Comprehensive Electric Load Optimization	Energy efficiency research, design and engineering; heat pump water heater technology; multifamily sector; load shift and demand response; grid integration.	Building on decades of cutting-edge building science and equipment research, Ecotope helps fill the national emerging technology pipelines in the residential and commercial sectors. Ecotope staff live at the intersection of innovative engineering and advanced analysis of new and promising equipment. We realize that the integration of emerging and more efficient technologies with careful design and control can have a symbiotic effect on the performance of buildings. Ecotope prioritizes a high-context approach by focusing on the "systems" the technologies will operate in, such as interactions with occupants and other technologies that influence savings.
ENERGY SHRINK, LLC	Jennifer Jang 2200 Pennsylvania Ave NW, Suite 400 East Tower #4017, Washington D.C., 20037 jennifer@energy-shrink.com (202)556-3369	Consulting firm, women-owned small business, SBA WOSB	Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 2.3: Advanced Workforce for Advanced Technology	Building Science and Analytics, Content for Education for Design Professionals, energy simulations	With a system-level understanding of building science from ECMS to Grid Response and DSM, we have provided energy modeling services and data analytics; and developed and delivered AIA-accredited training on building science concepts and demystifying energy modeling for building designers. We have worked with DOE, World Bank, and the private sector on both academic and implementation projects. We offer subject matter expertise and a quantitative approach to teams who may need energy modeling/analytical support, or content for educational training.

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ENERlite Consulting, Inc	Dr. Ladan Ghobad 4750 J Street, # 19941, Sacramento, CA 95819 Lghobad@enerlite-consulting.com 360-324-2941	Small, woman-owned business	Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.7: Lighting Technology Research, Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.2: Building Envelope Research, Development and Field Validation	Building energy efficiency, Building energy modeling, Building daylighting design and simulation, Parametric design analysis and optimization, Thermal and visual comfort studies	ENERlite Consulting, Inc., is a sustainable design consulting firm that focuses on innovative design solutions for energy conservation and provides daylighting design and analysis in buildings. Capabilities include: Solar Radiation Study, Building Shading Study, Parametric Design Analysis, Façade optimization, Thermal and Daylight Zoning Optimization, Electrical and Mechanical Systems Modeling and Energy Comparison, Daylight Optimization, Energy Modeling, ZNE Building Consultation, Thermal and Visual Comfort Studies, Life Cycle Cost Analysis, Measurement and Verification Plan, and Energy Master Plans
FSEC Energy Research Center/University of Central Florida	Kevin Schleith 1679 Clearlake Road Cocoa, FL 32922 kschleith@fsec.ucf.edu 321-638-1486	University Research Center	1.2: Thermal Storage Research, Development and Field Validation 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation 1.4: Refrigeration, Water Heating Research, Development and Field Validation 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation 1.6: Appliances Research and Development and Field Validation 1.8: Energy and Demand Data, Modeling, and Analytics 1.9: Comprehensive Electric Load Optimization 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms 2.2: Building Envelope Research, Development and Field Validation 2.3: Advanced Workforce for Advanced Technology	Affordable housing, Building energy efficiency, Building HVAC, Building Indoor Air Quality, Building opaque envelope, Building/Solar/Storage/Utility Integration, Detailed field measurements, Developing simulations, Efficient window evaluation, Electric Vehicles, Energy codes and standards, EnergyPlus algorithm development, Floating photovoltaics, Fuel cells, Green building standards, Grid enabled buildings, Hot water systems, Hydrogen from renewables, Manufactured housing, Passive cooling/heating, Photovoltaics applications, Photovoltaics reliability, Portable classroom efficiency, Renewable natural gas, Residential energy rating standards, Residential retrofits, School energy solutions, Teacher education, Ventilation of buildings, Workforce training	FSEC Energy Research Center is a research Institute of the University of Central Florida and has full time dedicated researchers averaging over 20 years of experience in building science, photovoltaics, fuel cells and training. Research expertise includes simulations, field measurements and laboratory. Facilities include full scale residential side-by-side buildings, a manufactured housing lab with 4 different duct systems, a building science laboratory capable of small commercial scale building research, a hot water laboratory, an HVAC test facility, a roofing test facility, night sky side-by-side test structures, solar evaluation fields and measurements, fuel cell testing lab, electric vehicle to grid test center, and a building science training center equipped with 7 mini-house structures for student hands-on testing.
GS Research LLC	Mark Isaacs POB 2592, Bay St Louis, MS 39521 mark@wonderwindow.net 228 363 2529	Small business, for profit	Subtopic 2.1 Mass Produced Highly Efficient Manufactured Homes & Portable Classrooms	window & envelope technology by architect, builder and real estate developer, now inventor turned start-up entrepreneur	I am completing NFRC 102 & AAMA 101 testing of my R5, R7, & R9 windows in the next 30-45 days with ICC-ES listings permitting code-approved use early next year. These windows eliminate most of the sash & frame, and all of the headers, jack and cripple studs of conventional construction and integrate well with 24" on center framing.
Houston Advanced Research Center (HARC)	Gavin Dillingham, PhD 8801 Gosling Road, The Woodlands, TX gdillingham@harcresearch.org 281-216-7147	Non-profit research institute	Subtopic 1.9: Comprehensive Electric Load Optimization	Plug load optimization; building system controls optimization via algorithm development and deployment; building system integration; power electronics field validation and testing	HARC has significant expertise in developing and deploying building control systems and algorithms to optimize building performance. Our team has developed multi building system optimization models that allow for the testing of a variety of power systems in different load conditions, as well as incorporate load flexibility in management strategies to optimize load shaping and shedding opportunities. HARC owns and works in a 20,000 square foot LEED Platinum, Net-Zero commercial building that it uses as a test bed to validate the latest building system components, control system and strategies, including the latest plug load technologies. The outcome is a optimized energy management systems and building performance.

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IBACOS, Inc.	Ari Rapport 2214 Liberty Avenue, Pittsburgh, PA 15222 arapport@ibacos.com 412-889-7074	Incorporated Small Business	Subtopic 1.1: Advancing Innovative Manufacturing and End-of-Life Processing of Efficient Building Energy Technologies Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.7: Lighting Technology Research, Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms Subtopic 2.2: Building Envelope Research, Development and Field Validation Subtopic 2.3: Advanced Workforce for Advanced Technology	Innovation & Product Development, Residential New Construction, Space Conditioning Systems (HVAC), Building Enclosures (Opaque Envelopes), Offsite Construction, Building Systems Integration, Building Science Research & Development, Building Energy Efficiency, Construction Quality Curricula Development, Software, and Training, Modeling, Data Collection & Analysis (Field and Lab Settings), Deep Energy Retrofits	IBACOS drives innovation in the housing industry and for almost 30 years has collaborated with leading production homebuilders, manufacturers, and government and industry groups to improve residential building quality and performance. IBACOS specializes in residential building science research and development, industrial design, architecture, engineering, and construction; homebuilding business optimization, including quality assurance, risk mitigation, and code compliance; building performance education and field training; market intelligence; and product and material innovation and development. Our research and development capabilities extend from lab research and prototyping, to full scale mockup construction, to applied field evaluation and testing, and product commercialization support. Our unique relationship with large production homebuilders, suppliers, and research organization enables collaborative relationships well suited to identify, characterize and address critical market opportunities and needs.
Interstate Renewable Energy Council	Laure-Jeanne Davignon 125 Wolf Road, Albany, NY 12205 laurejeanne@irecusa.org 518-578-4718	Non-profit	Subtopic 2.3: Advanced Workforce for Advanced Technology	Energy efficiency and renewable energy workforce development and regulatory reform	Online and in-person training development, certification development, workforce strategy development, development of career maps and other workforce solutions for the energy efficiency and renewable energy industries.
Julia Computing, Inc	Dr. Viral Shah, 24 Bay State Rd, Cambridge, MA 02138 viral@juliacomputing.com 617-487-9366	Incorporated Small business	Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics	Modeling and Simulation, high performance computing, optimization, differential equation solvers, scientific machine learning and AI technologies, improving engineer productivity in simulating complex systems, visualization, cloud deployment,	Julia Computing was founded by all the creators of the Julia language. Julia solves the two language problem in modelling and simulation by providing the ease of use of systems like Python, matlab, modelica along with the speed of C and Fortran. Having received several grants for R&D in the area of modeling, simulation, and HPC, Julia Computing has significant experience in executing complex R&D projects with a clear focus on commercialization of technologies. The company is comprised largely of PhDs with expertise in areas of compiler and language design, parallel computing, machine learning, statistics, optimization, and data science. Julia Computing products have demonstrated speedups of 10x-100x over traditional simulation techniques through a combination of new algorithms, solvers, and ability to run on distributed systems and GPUs.  The Julia community is now over a million users worldwide, and Julia is used in over 10,000 enterprises and 1,500 universities. Julia programs scale from the Raspberry Pi to the world's largest supercomputers. The creators of Julia were awarded the SIAM J.H.Wilkinson Prize for Numerical Software in 2019 and the IEEE Sidney Fernbach Award in 2019.

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Lawrence Berkeley National Laboratory	Jessica Granderson 1 Cyclotron Rd., Berkeley CA 94704 JGranderson@lbl.gov 510-486-6792	FFRDC	Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation Subtopic 1.7: Lighting Technology Research, Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms Subtopic 2.2: Building Envelope Research, Development and Field Validation	Lighting, HVAC, Thermal Storage, Systems and Grid Integration, Demand Flexibility, Energy Modeling and Data Analytics, Windows, Demonstration Design and Measurement and Verification, Miscellaneous Electric Loads, Indoor Air Quality	Berkeley Lab has over 40 years of experience in R&D for energy efficient buildings. We develop physical and informational technologies, with a portfolio ranging from systems to whole-building strategies, to urban systems. Our capabilities include: ventilation technologies and other indoor air quality (IAQ) control approaches; windows and glazing systems, thermal and optical bench top characterization, simulation and full-size testbeds; energy use and control of miscellaneous devices, electronics, lighting, and networks; simulation modeling with EnergyPlus and Modelica; advanced data analytics and fusion for building and energy applications, and; field validation design, ad performance evaluation.  FLEXLAB and FLEXGRID offer a whole building integrated systems test facility to study and validate systems level EE and DER solutions. FLEXLAB provides feedback on energy performance (energy use, peak reduction, demand flexibility metrics) as well as thermal and visual comfort, and other indoor environmental metrics. FLEXGRID offers opportunity to test solutions that span both the supply and demand sides of the grid. FLEXGRID's installed hardware includes Opal-RT grid simulation, Ametek regenerative power supply, and programmable load banks.
Midwest Energy Efficiency Alliance (MEEA)	Molly Graham 20 N. Wacker Drive, Suite 1301 Chicago, IL 60606 mgraham@mwalliance.org 312-587-8390	Nonprofit	Subtopic 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms Subtopic 2.2: Building Envelope Research, Development, and Field Validation Subtopic 2.3: Advanced Workforce for Advanced Technology	Cost-effective energy efficiency solutions; developing and delivering workforce development initiatives; convening energy efficiency organizations and stakeholders; research; market transformation; connected devices; grid-interactive efficient buildings; building policies such as energy codes, benchmarking and performance standards	The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network advancing energy efficiency for sustainable economic development and environmental stewardship. MEEA has deep expertise of the energy efficiency landscape in the Midwest, which we leverage to identify gaps, foster collaboration, develop tools and resources and implement cost-effective policies and programs. MEEA has run workforce trainings in the region for more than 15 years, training over 10,000 professionals including building operators, HVAC installers, residential retrofit contractors, Realtors and Appraisers, code officials and other construction trades. MEEA has served as the lead organization for several DOE-funded projects and with over 160 member organizations, has established relationships with utilities, research institutions and technology providers throughout the Midwest.
Neothermal Energy Storage Inc.	Louis Desgrosselliers 77 Greenwood St, Bridgewater, Nova Scotia, Canada, B4V2M8 Louis.D@neothermal.ca 902-237-4513	Foreign Incorporated Entity	Subtopic 1.2: Thermal Storage Research, Development and Field Validation	R&D and engineering design expertise in the areas of thermal energy storage using salt hydrates, especially in the utilization of supercooling, and high capacity heat exchanger design for use with phase change heat storage materials. Also thermodynamic and heat transfer modelling of thermal energy storage systems using PCMs.	Neothermal has specialized in-house phase change thermal storage IP and possesses engineering design expertise for lab evaluation, prototype development, and field evaluation of thermal energy storage systems (namely using salt hydrates), specifically, for electric thermal storage systems (ETS) for use in residential central heating and hot water heating systems. Neothermal has achieved TRL 7 in the development and evaluation of its ETS system and has also been developing a suitable supply chain and relationships with contract manufacturers. Neothermal has also developed numerical modelling tools (Matlab and TRNSYS) for the evaluation of energy performance of the ETS system and the resulting indoor comfort in building energy simulations.

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New Buildings Institute	Alexi Miller, Associate Technical Director 623 SW Oak St, Third Floor / Portland OR 97205 alexim@newbuildings.org 541-344-4465	Domestic Entity – 501(c)(3) nonprofit	Subtopic 1.1: Advancing Innovative Manufacturing and End-of- Life Processing of Efficient Building Energy Technologies Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation Subtopic 1.7: Lighting Technology Research, Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms Subtopic 2.2: Building Envelope Research, Development and Field Validation Subtopic 2.3: Advanced Workforce for Advanced Technology	Research on and guidance for zero energy / zero carbon buildings and the technologies and processes that make them cost-efficient more widely achievable	New Buildings Institute (NBI) is a national nonprofit that drives better buildings that achieve zero energy, zero carbon and beyond. NBI has over 20 years’ experience leading research, testing, and market transformation strategies to scale emerging technologies and best practices through their national policy, program and market-based efforts. NBI has become a trusted and independent resource for policy makers, efficiency programs and the market.  Under its Building & Program Innovation program, NBI researches and develops the technical analysis, tools and guidance for building owners, practitioners, and facility staff. NBI’s work helps them enhance program opportunities for new technologies in commercial and multifamily buildings. Examples of activities include building science research, technology assessment, building standards and tools, training and services, and best practice guidelines including the New Construction and Multifamily Guides. Some of its current regional and national initiatives include the GridOptimal Buildings Initiative, the Advanced Water Heating Initiative (for heat pump water heating), and the upcoming Building Electrification Technology Roadmap (BETR).
Northeast Energy Efficiency Partnerships (NEEP)	Jennifer Wassan 81 Hartwell Avenue, Lexington, MA 02421 jwassan@neep.org 781-860-9177 x 152	Non-profit	Subtopic 1.1: Advancing Innovative Manufacturing and End-of- Life Processing of Efficient Building Energy Technologies Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation Subtopic 1.7: Lighting Technology Research, Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms Subtopic 2.2: Building Envelope Research, Development and Field Validation Subtopic 2.3: Advanced Workforce for Advanced Technology	<ul style="list-style-type: none"> <li>•Building decarbonization</li> <li>•Appliance standards</li> <li>•Clean heating and cooling</li> <li>•Air source heat pumps</li> <li>•Smart energy homes</li> <li>•Strategic energy management</li> <li>•Energy codes/Zero energy codes</li> <li>•High Performance/Zero Energy Schools and Buildings</li> <li>•Workforce development</li> <li>•Building operations and maintenance</li> <li>•Building energy rating and labeling policies and programs</li> <li>•Cost-effectiveness testing</li> <li>•HVAC systems and controls</li> <li>•Efficient, high performance refrigerants and the refrigeration cycle</li> <li>•Comprehensive energy retrofits</li> <li>•LEED and Passive House design principles</li> <li>•Grid interactive efficient buildings</li> <li>•Energy efficiency evaluation, measurement, verification, and planning</li> </ul>	NEEP facilitates collaboration, education, and enterprise to overcome barriers and transform markets by: <ul style="list-style-type: none"> <li>•Advancing regional market transformation strategies</li> <li>•Providing independent research and analysis</li> <li>•Advancing knowledge and best practice</li> <li>•Engaging and empowering stakeholders</li> </ul> <p>We have experience in collaborating and partnering with multiple organizations to research gaps and barriers, gather best practices and learnings, develop essential tools and resources that meet the needs of stakeholders, and disseminate work throughout our regional network. We have hosted, managed, and served as a sub-recipient on multiple DOE funded projects.</p>

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Oak Ridge National Laboratory	Melissa Lapsa 1 Bethel Valley Road, Oak Ridge, TN, 37831-6324 lapsamv@ornl.gov (865) 576-8620	DOE FFRDC	Subtopic 1.1: Advancing innovative manufacturing and end-of-life processing of efficient building energy technologies Subtopic 1.2: Thermal storage research, development and field validation Subtopic 1.3: Heating, ventilation and air conditioning research, development, and field validation Subtopic 1.4: Refrigeration, water heating research, development, and field validation Subtopic 1.5: Integrated HVAC, refrigeration and water heating research, development, and field validation Subtopic 1.6: Appliances research and development and field validation Subtopic 1.7: Lighting technology research, development, and field validation Subtopic 1.8: Energy and demand data, modeling, and analytics Subtopic 1.9: Comprehensive electric load optimization Subtopic 2.1: Mass produced highly efficient manufactured homes and portable classrooms Subtopic 2.2: Building envelope research, development, and field validation Subtopic 2.3: Advanced workforce for advanced technology	<ul style="list-style-type: none"> <li>•Building envelopes and advanced manufacturing—Exploring new and emerging materials, components, systems, and automation and the fundamental science of heat, air, and moisture transfer for walls, attics, foundations, sheathings, membranes, and coatings.</li> <li>•Building systems integration—Testing new components, equipment, and systems in realistic environments, such as a research house and commercial flexible research platforms, before market introduction and using computer modeling, visualization, and analytics.</li> <li>•Buildings-to-grid—Pursuing advanced wireless sensor technologies, building energy modeling, communications and controls, and energy optimized solutions for neighborhoods of the future.</li> <li>•Energy-efficient equipment—Launching energy-efficient building equipment technologies including heat pumps, heating ventilation and air-conditioning, dehumidifiers, appliances, water heaters, and refrigeration systems.</li> <li>•Energy storage—Developing new technologies that integrate advanced energy storage in equipment and envelope systems, flexibility in building loads, complex design in building facades, and thermal energy storage in materials.</li> </ul>	<ul style="list-style-type: none"> <li>•The Building Technologies Research and Integration Center (BTRIC) is the Department of Energy's only designated user facility dedicated to performing early-stage research and development in building technologies. With the aim of improving the energy efficiency and environmental compatibility of residential and commercial buildings, research focuses on building envelopes, equipment, building systems integration, energy storage and building-to-grid interactions, sensors, transactive controls, and data modeling and simulation.</li> <li>•The BTRIC comprises a 60,000 sq. ft. research campus and includes the flagship Maximum Building Energy Efficiency Research Laboratory (MAXLAB), a multi-purpose laboratory to advance the energy efficiency and durability of building envelopes (e.g., large-scale wall assemblies), equipment, and appliances.</li> <li>•Envelope and Equipment Laboratories provide a range of test chambers and capabilities for developing new components that are more resistant to heat flow, airtight, and moisture-durable than existing technologies. Flexible Research Platforms offer the opportunity to plug-and-play, placing technologies into real-world, highly instrumented buildings for evaluation. From benchtop wind tunnels to computational fluid dynamics modeling to large-scale environmental chambers, BTRIC provides a range of capabilities to advance building technologies.</li> </ul>
OikoLab Ltd.	Joseph Yang Rm 1405, 135 Bonham Strand Trade Centre, 135 Bonham Strand, Sheung Wan, Hong Kong joseph.yang@oikolab.com 617-245-0878	Foreign Incorporated Entity	Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics	Weather Data, Building Physics, Numerical Simulation, Big Data, Utility Analytics, API Development, Time-Series Forecasting, Urban Heat Island, HVAC sizing, EnergyPlus	<p>OikoLab Ltd. (<a href="https://oikolab.com">https://oikolab.com</a>) lies at the unique intersection of building-physics, weather-data, utility analytics and web-based software development. Past &amp; current projects include:</p> <ul style="list-style-type: none"> <li>•Historical &amp; Forecast Weather API built on hundreds of terabytes of the weather reanalysis dataset for fast time-series query.</li> <li>•HVAC load disaggregation engine developed with support from Electric Power Research Institute (EPRI), validated with Residential Building Stock Assessment (RBSA) and Salt River Projects (SRP) data.</li> <li>•Developed core physics engine for urban heat island simulation that has since been ported to a popular Python based open-source building energy simulation library (Ladybug Tools - <a href="https://www.ladybug.tools/">https://www.ladybug.tools/</a>).</li> </ul>
Pecan Street Inc	Scott Hinson 3924 Berkman Drive, Austin, TX 78751 info@pecanstreet.org 512-940-4701	501c3 Non-Profit	Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.2: Building Envelope Research, Development and Field Validation	Residential or neighborhood scale system design for distributed energy resources; systems integration; hardware-in-the-loop and software-in-the-loop testing for residential or small-commercial scale products	Pecan Street is positioned to facilitate the development and demonstration of building efficiency solutions through our lab, community testbeds, and data resources. Pecan Street owns and operates a cleantech innovation lab in Austin, TX with specialized testing facilities for smart inverters, energy storage, rooftop and ground-mount PV, electric vehicles and grid-tied vehicle-to-grid solutions. Pecan Street's team includes data engineers, software and hardware developers, power systems engineers and a Master Electrician. Pecan Street created and manages the world's largest residential energy research database that can be applied to solution design, model development and verification, and used to program load banks at its lab for hardware- and software-in-the-loop testing. In home data collected includes direct measurement of real power, current harmonics, reactive power, voltage, and current phase angle at a one second interval for up to 30 circuits per home, we collect 2.6 billion records daily. Pecan Street manages residential energy research testbeds in Austin, TX; California; and upstate New York - all containing concentrations of households with PV and EV's



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Propane Education & Research Council (PERC)	Gokul Vishwanathan, Director of Research and Sustainability 1140 Connecticut Ave NW, Washington DC 20036 gokul.vishwanathan@propane.com 202-452-8975	Non-profit	Subtopic 1.1: Advancing Innovative Manufacturing and End-of-Life Processing of Efficient Building Energy Technologies Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation	* Building and commercial technologies * Agriculture * On-road and off-road application * Power generation * Engines, combustion, emissions, propane	PERC provides leading propane safety and training programs and invests in R&D of new propane-powered technologies. PERC is operated and funded by the propane industry. PERC programs benefit a variety of markets including transportation, agriculture, commercial landscaping, residential, and commercial building. PERC partners with a variety of trade associations, advocacy groups, and government agencies to promote safety and the adoption of propane as a clean, American fuel source. PERC works with manufacturers, researchers, and government partners to strengthen technical knowledge and investments in developing new propane products. We encourage proposals for projects that align with the Council's strategic needs.
Signetron Inc.	A. Zakhor 936 Creston Road, Berkeley, CA 94708 info@signetron.com (510) 384 3272	Small business	Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 2.2: Building Envelope Research, Development and Field Validation	Robotics, 3D Computer vision, signal and image processing; BIM; CAD modeling; Virtual and augmented reality;	Extensive experience in performing on DoE contracts
Slipstream Group, Inc.	Scott Hackel 431 Charmany Dr, Madison, WI 53719 SHackel@slipstreaminc.org or opportunities@slipstreaminc.org 608-210-7129	Non-profit organization	Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.7: Lighting Technology Research, Development and Field Validation Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.2: Building Envelope Research, Development and Field Validation Subtopic 2.3: Advanced Workforce for Advanced Technology	* "Third-party" field validation of energy efficiency and demand flexibility of emerging technologies * Building energy modeling and building codes * Grid-interactive efficient buildings * Building energy systems, sensors, and controls integration * Commercial building lighting system design and controls * Education and training for advanced building technologies	Slipstream's Research and Innovation team has a deep bench of experienced researchers, field testers, and building energy simulators provide third-party, unbiased measurement and field validation of various emerging technologies for building energy efficiency and demand flexibility. We also conduct market research and partner with utilities, building owners, building designers, university and national lab researchers and start-up companies in conducting R&D projects and in promoting the commercialization of promising emerging building technologies. Our Education and Training team delivers 50 in-person seminars and online webinars every year, training thousands of commercial and industrial building professionals across the country. Slipstream staff has expertise in handling all event logistics; from speaker engagement to curriculum development, accreditation, marketing, registration, site logistics, and post-training surveys and evaluations. We are accredited by more than 20 continuing education bodies, allowing customers to apply credits to licensure requirements. Slipstream has provided educational programming, convening or educational consulting to the U.S. DOE, DoD, state and local governments, and utilities.
SyracuseCoE at Syracuse University	Dr. Eric Schiff, interim Executive Director SyracuseCoE 727 East Washington St Syracuse, NY 13224 315-443-4445	Educational Institution	Subtopic 1.3: Heating, ventilation and air conditioning research, development and field validation Subtopic 1.5: Integrated HVAC, refrigeration and water heating research, development and field validation Subtopic 1.7: Lighting technology research, development and field validation (beginning on p. 19 of attached FOA) Subtopic 1.8: Energy and demand data, modeling and analytics Subtopic 1.9: Comprehensive electric load optimization Subtopic 2.2: Building envelope research, development and field validation Subtopic 2.3: Advanced workforce for advanced technology	Building Systems Engineering, Building Energy Efficiency, Building System Integration, Indoor Environmental Quality, Building Envelope Materials, Thermal Management, Green Infrastructure, Technology Demonstrations, Commercialization Assistance, Technology to Market	SyracuseCoE is New York State's Center of Excellence for Environmental and Energy Systems. It is headquartered in a 55,000-square-foot building designed by Toshiko Mori for RD&D of building technologies at multiple scales, from individual occupants to the entire building. The building incorporates the Willis H. Carrier Total Indoor Environmental Quality (TIEQ) Laboratory. One large room has a dozen workspaces, each with individual HVAC facilities in addition to the room's HVAC. It is designed for air quality, productivity/comfort, and energy efficiency studies. A BEES Lab on campus is for evaluating building materials, construction technologies, and furnishings for energy efficiency and indoor air quality. The BEST Lab is a two-story field test facility capable of evaluating the performance of up to 34 building envelope systems side-by-side. A brochure is available describing these and other specialized facilities.
Terrafore Technologies	Anoop Mathur 300 Harbor Lane Shoreview, Minnesota 55126 anoop.mathur@terraforetechnologies.com 951-313-6333	for Profit Business	Subtopic 1.2: Thermal Storage Research, Development and Field Validation	Thermal Energy Storage Technology Development and Product	Terrafore has decades of technology expertise in storing thermal energy from to very high temperatures. We have used phase change materials including inorganic salt mixtures, organic material heat of transition to store energy for use in power generation, for use in industrial processes, and for use in commercial and residential hot water for HVAC and hot water use. For this solicitation, we are specifically interested in providing innovative thermal storage solution and partnering with companies that have a strong market presence in the commercial and residential heating and hot water market and with companies providing next generation heat pump technologies.

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Ultrasonic Technology Solutions (UTS)	Dr. Ayyoub Momen 10820 Murdock Dr, Suite 104, Knoxville, TN, 37932 ayyoubmomen@ultratechsol.com 352-870-3714	Small Business	Subtopic 1.1: Advancing Innovative Manufacturing and End-of-Life Processing of Efficient Building Energy Technologies Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.4: Refrigeration, Water Heating Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.6: Appliances Research and Development and Field Validation	Building Equipment, HVAC, Appliance, Drying, Sensors, Heat Recovery, Heat, and Mass Transfer, Commercialization	Ultrasonic Technology Solutions (UTS) is a fast-growing engineering firm located in Knoxville, TN with a track record of partnership with fortune 500 companies, government, universities, and national laboratories. We specialize in prototyping and technology commercialization. We also have 20+ years of experience in advanced building equipment and appliances technologies, non-vapor compression systems (i.e. Magnetocaloric refrigeration), building construction material manufacturing as well as expertise in heat mass transfer and process simulation. UTS team has the capabilities to design, fabricate, and extensively test many different technologies for varying industries. UTS also has resources to contribute to the cost-share as required by the call.
University of Houston	Xingpeng Li 4800 Calhoun Rd, Houston, TX 77004 xli83@central.uh.edu 713-743-9881	University	Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics; Subtopic 1.9: Comprehensive Electric Load Optimization	Power grid, demand response.	Power system/microgrid operations and planning, day-ahead scheduling, real-time dispatching, frequency regulation, grid ancillary service, microgrid optimal sizing and energy management, optimization, HVAC modeling and quantification of HVAC-enabled demand response.
University of Minnesota Duluth, Natural Resources Research Institute (NRRI)	Matthew Aro 5013 Miller Trunk Highway Duluth, MN 55811 maro@d.umn.edu 218-216-4107	Academic Organization	Subtopic 2.1: Mass Produced Highly Efficient Manufactured Homes and Portable Classrooms Subtopic 2.2: Building Envelope Research, Development and Field Validation	Wood products, thermally modified wood	Thermal modification of wood is a chemical-free treatment for increasing wood durability, enhancing resistance to rot and decay, and improving dimensional stability. This emerging, chemical-free technology has the potential to create and expand forest products markets through development of new wood-based materials, particularly from traditionally underutilized and low-value species. Thermally modified wood produces sustainable value-added wood products with extended service life and reduced environmental impacts. The NRRI has a unique Thermal Modification Pilot Plant, which is available to prototype thermally modified wood products. We also have an advanced analytical chemistry laboratory and Mechanical Testing Laboratory for evaluating the mechanical and physical performance of a range of wood materials.
University of Nevada, Reno	Poria Fajri 1664 North Virginia Street, Reno, NV 89557-0260 pfajri@unr.edu 775-682-6864	University	Subtopic 1.8: Energy and Demand Data, Modeling, and Analytics Subtopic 1.9: Comprehensive Electric Load Optimization Subtopic 2.3: Advanced Workforce for Advanced Technology	Household load demand optimization Power electronics and electronic components Peak shaving with solar and energy storage Grid-interactive efficient buildings Energy storage integration into buildings	Energy management systems for smart building, day-ahead scheduling, real-time load demand control and optimization in buildings equipped with solar panels and energy storage, energy storage optimal sizing and energy management, optimization and control of plug-in electric vehicle smart charging, household peak load shaving using connected energy storage devices such as batteries and plug-in electric vehicles, peer-to-peer energy management of connected systems for efficient building energy consumption.
Verdigris Technologies, Inc.	Thomas Chung NASA Ames Research Park, Building 19, RM 1073, Moffett Field, CA 94035 thomas@verdigris.co 512-784-6431	Small business	Subtopic 1.1: Advancing Innovative Manufacturing and End-of-Life Processing of Efficient Building Energy Technologies Subtopic 1.2: Thermal Storage Research, Development and Field Validation Subtopic 1.3: Heating, Ventilation and Air Conditioning Research, Development and Field Validation Subtopic 1.5: Integrated HVAC, Refrigeration and Water Heating Research, Development and Field Validation Subtopic 1.9: Comprehensive Electric Load Optimization	Design and manufacturing of advanced energy monitoring equipment. Specialty in AI and Machine Learning software focused on energy applications.	Verdigris designs and manufactures advanced energy monitoring equipment. Verdigris energy data is available via BMS integration or API. Its proprietary hardware design enables AI-enriched data streams for forecasting and predictive analytics. Verdigris has developed an adaptive and autonomous building controls solution called Adaptive Automation. Verdigris Adaptive Automation optimizes a building's energy usage based on changing operating conditions. Adaptive Automation can make hundreds of control changes each month. This makes it more responsive to dynamic conditions than traditional approaches. These dynamic conditions include weather, utility rate schedules, occupancy and more. Adaptive Automation can coordinate a BMS with other connected equipment for efficient building energy consumption. This equipment may include: - connected in-room thermostats - electrical vehicle charging stations - solar and battery energy storage systems

Designates a foreign entity. See eligibility requirements in section III.A - Eligible Applicants (III.A.iii - Foreign Entities). Additionally, see section IV.I.iii - Performance of Work in the United States (Foreign Work Waiver).