FULL-SPECTRUM OPTIMIZED COLLECTION AND UTILIZATION OF SUNLIGHT Teaming List

Updated: October 9, 2013

This document contains the list of potential teaming partners for the FULL-SPECTRUM OPTIMIZED COLLECTION AND UTILIZATION OF SUNLIGHT, solicited in RFI-0000005 and is published on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov), ARPA-E's online application portal. This list will periodically undergo an update as organizations request to be added to this teaming list. If you wish for your organization to be added to this list please refer to https://arpa-e-foa.energy.gov/ for instructions. **By enabling and publishing the FULL-SPECTRUM OPTIMIZED COLLECTION AND UTILIZATION OF SUNLIGHT Teaming List, ARPA-E is not endorsing or otherwise evaluating the qualifications of the entities that are self-identifying themselves for placement on this Teaming List.**

Organization	Name	Organization Type	Area of Expertise	Background	Website	Email	Phone	Address
A Better Focus Co.	Doug Simmers	Business < 500 Employees	None of the above	A Better Focus Co. manufactures point-focus concentrating dishes utilizing reflective film. Scaling to 8' diameter has been demonstrated, with a focal point of less than 10" (on-axis conditions). Newly developed films have demonstrated a life of over 20 years in accelerated life testing at NREL, and also of over 10 years in real conditions(and counting). This "best cost" concentrating technology offers the greatest hope for competing against traditional combustion-based energy production, and provides a good platform for evaluating hybrid methods of extracting the full electromagnetic spectrum of incident solar energy.	www.abetterfocus.com	doug@abetterfocus.com	330-309-2495	7485 Cheryl Ln. NW, Massillon, Ohio 44646
Adomani	Edward Monfort	Business < 500 Employees	Transportation	The patented ADOMANI Electric Driveshaft is a 21st Century innovation that combines gas and electric together forever. This Electric Driveshaft works as a powered driveshaft and as a supercharger on any rear wheel drive vehicle. Simply take your stock driveshaft out of your rear wheel drive vehicle and replace it with the ADOMANI Electric Driveshaft, a power controller, and a battery pack. Once you replace and install these components, you will have a hybrid vehicle that can get up to 220 mpg. ADOMANI has collaborated with Enviromatix GPS to develop and embed proprietary software and patented technology in its engines. ADOMANI offers a program to finance the conversion from gas to all electric or a hybrid electric.	www.adomanielectric.com	adomanielectric@gmail.com	8133752986	12157 West Linebaugh Ave Suite 235 Tampa, FL 33626

Organization	Name	Organization Type	Area of Expertise	Background	Website	Email	Phone	Address
APEI, Inc.	Dr. Ty McNutt	Business < 500 Employees	Technologies that facilitate low-cost, high-performance, and/or plug-and-play hybridization and integration of disparate devices	APEI, Inc. specializes in developing and manufacturing high performance, high temperature electronic products, packages and manufacturing processes. APEI, Inc.'s commercial ISO9001 and AS9100 certified Class 1000 manufacturing facility offers custom power substrate manufacturing, power module manufacturing, and microelectronics assembly manufacturing services. The manufacturing lines have been designed to deliver the highest quality product for those applications that need the best performance and reliability, including a specialization in high temperature electronics manufacturing processes to meet the high temperature needs of the solar industry. For technology development, APEI, Inc. offers multiple circuit design teams for high performance power circuits and systems from prototype through full mechanical integration, fully exploiting the performance advantages of wide bandgap technologies. In addition, full testing and qualification capabilities are available.	www.apei.net	tmcnutt@apei.net	4794435759	535 W. Research Center Blvd., Fayetteville, AR 72701
Arizona State University	Zachary Holman	University	Renewable power (non-bio)	The DOE- and NSF-funded Quantum Energy and Sustainable Solar Technology (QESST) ERC at ASU has four faculty members working on crystalline silicon photovoltaics and two working on III-V photovoltaics. QESST has a full pilot line for fabrication of both diffused-junction silicon solar cells and silicon heterojunction solar cells (like the Sanyo HIT cell), as well as extensive characterization capabilities. My expertise is in silicon heterojunction cells; I was a member of a team that fabricated a 22.1%-efficient silicon heterojuntion device at EPFL in Switzerland. I am particularly interested in proposals regarding photovoltaic/thermal hybrid devices where the photovoltaic component is a multi-junction cell comprised of III-V and silicon sub-cells that may or may not be monolithically integrated.	http://qesst.asu.edu/	zachary.holman@asu.edu	480.965.9959	PO Box 875706, Tempe, AZ 85827-5706
Beacon Power LLC	Richard Hockney	Business < 500 Employees	RAMPABLE INTERMITTENT DISPATCHABLE STORAGE TECHNOLOGIES	Flywheel Energy Storage Systems from 25 kWh to 5 MWh	www.beaconpower.com	hockney@beaconpower.com	978-661-2085	Tyngsboro, MA
C.G.I technology	Cyrous Gheyri	Individual	Building Efficiency	concentrating sun rays by the array of convex lenses on a black metal body and transfer the heat to body of water to create heated water for assisted water heater , radiant heat, electricity generation and water purification. also I have introduced the thermal conducting time delay (interchanging days and night temperature).	www.cgitechnology.net	cg@cgitechnology.net	408 600 4985	6346 felder dr San jose , CA 95123

Organization	Name	Organization Type	Area of Expertise	Background	Website	Email	Phone	Address
Clemson University	Rajendra Singh	University	Renewable power (non-bio)	In order to move silicon solar cells beyond current 25 percent devices, we propose Silicon based new device architecture. The second material on top of Silicon must be based on abundant materials. One such example is cooper oxide. Preliminary experimental results have been encouraging. Once proven for two material systems, the concept will be extended to 3 materials with an analogy of multi core microprocessors. The method used for depositing second material PV is based on photo thermal assisted chemical vapor deposition and has provided high performance, high reliability and high yield semiconductor devices. Our ultimate goal is to fabricate silicon based ultra-low cost solar cell with efficiency over 50 %.	http://www.clemson.edu/ces/departments/ece/faculty_staff/faculty/rsingh.html	srajend@clemson.edu	864-710-1311	112 Santee Trail, Clemson, SC 29631
ConSoleE	Jeffrey Citron	Business < 500 Employees	Renewable power (non-bio)	ConSolE is developing a new non-parabolic trough concentrator (patent pending) utilizing flat reflectors. Our new concentrator can be built in any concentration ratio for the generation of CPV electricity, thermal energy or hybrid CPV/T photovoltaic electricity & thermal energy. We are currently working on the development of a CPV/T collector. Partnering opportunities are sought with PV technology producers developing high efficiency, high thermal tolerance, temperature cells & thermal energy to electrical energy conversion technology developers.	none	jseeaz1@yahoo.com	520-304-3917	none
Consultant	John Wilcox	Individual	Renewable power (non-bio)	Detailed numerical modeling of multi-junction and single-junction PV device physics. PV device and module level optimization for the Very High Efficiency Solar Cell project, resulting in the current 38.5% efficient world record sub-module. Theoretical and material parameter based modeling of high temperature and very high temperature PV device performance.	www.linkedin.com/in/johnrwilcox	jrwilcox@gmail.com	801-830-4566	207 South Martin Jischke Drive. West Lafayette, IN 47907
Cool Sun Technologies	John Houldsworth	Business < 500 Employees	Renewable power (non-bio)	Cool Sun Technologies is an early stage company developing systems for collection, storage and conversion of renewable thermal energy. A key part of the development is a low temperature differential Stirling Engine/Heat-pump - in particular the use of electronic control to dynamically optimize the cycle for maximum efficiency or maximum power flow.	http://coolsuntechnologies.org/	johnh@ieee.org	7036278379	1331 Dasher Lane, Reston, VA 20190
DLR	Reiner Buck	Federally Funded Research and Development Center (FFRDC)	Renewable power (non-bio)	concentrating solar power solar tower systems heliostat design heliostat field layout heliostat control receiver design parabolic trough systems component and system testing solar power system modeling performance calculations (instantaneous, annual) storage integration solar insolation prediction	http://www.dlr.de/sf/en/desktopdefault.aspx	reiner.buck@dlr.de	+49 711 6862 602	Pfaffenwaldring 38-40, D-70569 Stuttgart, Germany

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Ecolode, Inc.	Ronald B. Foster	Business < 500 Employees	None of the above	Ecolode, Inc. is a spinoff of University of Arkansas. The company is focused on developing and commercializing thermal energy storage systems, especially in conjunction with concentrated solar power. The spinoff company has intellectual property (IP) related to work by Dr. Panneer Selvam's research group. The IP defines a new approach on low-cost, high temperature, thermal energy storage. http://www.cveg.uark.edu/701.php	N/A	ron.foster@victvd.com	479-236-0494	535 W. Research Center Blvd., Suite 135, Fayetteville, AR 72701
Emcore Corporation	Dr. Paul Sharps	Business 500-1000 Employees	Renewable power (non-bio)	Emcore Corporation supplies high efficiency III/V single and multi-junction solar cells to both the space and terrestrial concentrator markets. We have a strong R&D team that can develop solar cells for unique applications. We are developing 4 and 6 junction next generation high efficiency solar cells. We are also developing a growth template re-use capability. Our facilities include complete growth, fabrication, test, and integration capabilities. We have partnered with a number of small and large businesses, as well as with universities and government research laboratories.	www.emcore.com	paul_sharps@emcore.com	505-332-5022	Emcore Corporation 10420 Research Rd. SE Albuquerque, NM 87123
eM-TECH, Inc.	Paul Czubarow	Business < 500 Employees	None of the above	eM-TECH is developing a patent-pending solid-state, nanotechnology based thermoelectric (TE) generators that passively convert solar generated heat into electricity. The proposed TE generators will be flexible, scalable in size, and highly efficient, as well as cost effective to manufacture. Such devices would enable coverage and adaptability to large areas and variable geometries of hear sources, with 200%-300% greater energy conversion efficiency than existing technology.	www.em-tech.us	paul@em-tech.us	781-609-2722 ext. 6#	179 Bear Hill Rd. Waltham, MA 02451
EnergIndependence Battery and Research LLC	Dr. Alex Bistrika	Business < 500 Employees	None of the above	We have a technology that will increase the service life of redox flow batteries by a factor of 5. The breakthrough technology could potentially reduce manufacturers hardware cost by ca. $600/kW over the life of the system. This corresponds to an increased revenue stream and significantly reduced down time for end-users when using battery storage. Our technology makes RFB systems an ideal partner for solar generation. Our chemical pre-treatment of graphite electrodes uses abundant species, and our reagents can be synthesized using off-the-shelf chemicals. The stabilization chemistry has been validated for upwards of 4x the nominal operating current density in zinc/bromine RFB systems, which indicates the potential for reducing reactor size (i.e., increasing the power density). Preserving electrode activity reduces the risk of increased overpotentials, thereby mitigating the concern of increased hydrogen evolution and an added safety feature in large scale installations.	www.NRGindependence.com	alex@nrgindependence.com	(541) 829-3166	575 SE Goodnight Ave, Corvallis, OR 97333

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Energy Compression Inc.	Timothy F. Havel	Business < 500 Employees	RAMPABLE INTERMITTENT DISPATCHABLE STORAGE TECHNOLOGIES	Low cost, extremely safe, environmentally benign, very long life cycle energy storage for long-duration applications.	energycompression.com	tim@energycompression.com	617-717-4945	Greentown Labs, 337 Summer St., Boston, MA 02210
Etaphase	Ruth Ann Mullen	Business < 500 Employees	Renewable power (non-bio)	spectral splitting, light trapping, and frequency upconversion	4440 139th Ave SE	ruthann.mullen@gmail.com	4256437017	Bellevue, WA
Evolving Vital Engineering	Stormy Vowels	Individual	Technologies that offer new control capabilities via advanced models, mechanisms, or actuators	Currently enrolled in a rurral aerospace training program and am interested primarily in opportunities for individuals to supply ideas and designs for developing renewable and alternative energy technologies. Are there any pathways i can pursue to develop my interest in science, mathematics and advanced technologies that would likewise make good use of my bright innovative mind. Making use of modern materials such as liquid flouride and molten salt enable our country to find solutions to old problems like mobile energy systems and modularity. New technologies like additive manufacturing would also allow creation of advanced energy transmission technologies like ultra-efficient heat exchangers. Understanding of new alloys through projects like the materials genome initiative will expand the effective temperature range of liquid thermal storage, effective designs might facilitate electrolysis, thermal storage, energy production, and manufacturing operations all in one.	NA	stormy.vowels@yahoo.com	(509)675-4913	715 Charles Graham Rd. Colville, WA 99114
General Atomics	Aaron Sathrum	Business > 1000 Employees	STORAGE TECHNOLOGIES FOR UBIQUITOUS DEPLOYMENT BY CUSTOMERS	General Atomics Energy Group is a diversified R&D private company located in San Diego, CA. Areas of expertise that are relevant include: Solar Thermal Cycles, Thin Film Solar, Thermal Photovoltaics, Alternative Energy Generation, Thermochemical cycles, Hydrogen Production Processes, Advanced Power Electronics, High Power Laser, Energy Storage, Advanced Engines, and Electromagnetics. Engineering teams include design, modeling, test and evaluation. Facilities include machine shop, clean room, characterization, power/energy testing, wet and dry labs.	http://www.ga.com	aaron.sathrum@ga.com	8584553548	3550 General Atomics Court

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Halotechnics, Inc	Justin Raade, PhD	Business < 500 Employees	Other	An ARPA-E awardee under the High Energy Advanced Thermal Storage (HEATS) program, Halotechnics is the industry leader in high temperature fluids and engineering systems for thermal storage. Our molten salt and molten glass materials are operable over 250-750 and 400-1200 °C, respectively, and are thus well matched to temperature ranges of interest in the FOCUS program. By synthesizing and characterizing over 22,000 distinct candidate fluids, Halotechnics has developed expertise in finely tuning materials to meet a wide array of physical property requirements. We have subsequently leveraged our breakthrough materials science technology to design and test custom-built storage tanks, pumps, heat exchangers, piping, and sealing. Halotechnics is seeking FOCUS partnerships with which to apply our proficiency in high temperature heat transfer fluids and thermal storage systems.	www.halotechnics.com	jraade@halotechnics.com	(510) 547-2634	5980 Horton St, Suite 450, Emeryville, CA 94608
Institute of Energy Conversion/University of Delaware	Rober Birkmire	University	Renewable power (non-bio)	The Institute of Energy Conversion, IEC, has been involved in the development of thin film photovoltaic technology for over 40 years with the mission to develop the fundamental science and engineering base required to improve PV device performance, develop processing technologies, and effectively transfer these laboratory results to large-scale manufacturing. IEC has programs in a-Si and c-Si, polycrystalline CdTe and CuInGaSe2-based devices and has complete facilities for deposition, characterization and fabrication of thin film and c-Si solar cells and devices. IEC has three pilot scale deposition systems representing typical manufacturing prototypes: 1) a roll-to-roll multisource evaporation system for depositing Cu(InGa)Se2 films on 10” wide moving web; 2) a 6 chamber plasma-CVD system for deposition of a-Si and nc-Si based devices on substrates up to 1 ft. sq.; and 3) a vapor transport deposition system for depositing CdTe and related II-VI alloys on moving 4” X 4” substrate.	www.udel.edu/iec	rwb@udel.edu	302 831 6220	University of Delaware, Institute of Energy Conversion 451 Wyoming Road, Newark, DE 19716
ITN Energy Systems, Inc	Chris Wolf	Business < 500 Employees	Other	ITN has capabilities in thin film deposition,roll-to-roll manufacturing, material science, plasmonics, ceramics and nano scale fabrication. We have spun out two thin film CIGS companies, a micro satellite company and a solid state lithium ion battery company. We have a 50,000 sqft facility with our own equipment design and build team.	http://www.itnes.com/	cwolf@itnes.com	303-285-1739	8130 Shaffer Pkwy, Littleton CO

Organization	Name	Organization Type	Area of Expertise	Background	Website	Email	Phone	Address
LOGICOUL SOLUTIONS	Dr. VICTOR STANCOVSKI	Business < 500 Employees	Technologies that offer new control capabilities via advanced models, mechanisms, or actuators	LogiCoul Solutions has developed a unique, patented technology called Interfacial Process Stimulation ("IPS"). IPS has the ability to improve the performance of a rechargeable battery without modification to the battery itself. LogiCoul's most recent test data show that IPS lowers battery impedance which translates into 25% to 45% more usable energy from the battery during a single discharge cycle. The technology was found to be effective on lead-acid, lithium-ion nickel-metal hydride batteries, and had been validated by independent testing.	www.logicoul.com	victor@logicoul.com	8609841064	1924 KLINGENSMITH RD. SUITE 72, BLOOMFIELD HILLS, MI 48302
Los Alamos National Laboratory	Stephen Obrey	Federally Funded Research and Development Center (FFRDC)	Renewable power (non-bio)	Los Alamos National Laboratory has multiple investigators with technical expertise that can contribute to a multidisciplinary team designed to address the challenges outlined in the ARPA-E FOCUS program. Core areas of expertise applicable to this problem are found in photophysics, chemistry, materials design/development as well as thermal control and management. Unique materials include unique silicon architectures, metastable InGaN thin films fabricated utilizing the low-temperature ENABLE process, design and fabrication of wavelength selective multi-layer interference coatings and meso-photonic materials, metamaterials, photon up-conversion and down conversion. Other areas of technical expertise are chemical energy storage, flow batteries, fuel cells and heat transport and management.	www.lanl.gov	sobrey@lanl.gov	505-695-5000	Bikini Atoll Rd, Los Alamos, NM 87544
Mark O'Neill, LLC	Mark O'Neill	Business < 500 Employees	Renewable power (non-bio)	I'm an engineer (B.S., Notre Dame) with 40 years of experience in solar energy technology. I've authored or co-authored over 160 technical publications, including U.S. Patents on 15 inventions with several more patent applications currently pending. My specialties are solar optics, daylighting, and simulation of solar energy system performance, either down here on the ground or up in space. I've proposed, won, and managed many significant contracts funded by DOE, NASA, Sandia Labs, NREL, MDA, utility companies, aerospace companies, and others. My specialties are: Solar concentrators (refractive or reflective) Photovoltaics (one-sun or concentrating) Solar power system simulation (optical, thermal, electrical, economics -- hour by hour throughout the year) Daylighting (design, simulation, economics) Custom ray trace programs (refractive or reflective) My one-page resume is available here: http://markoneill.com/MJOResume.pdf	www.markoneill.com	markoneill@markoneill.com	8173785930	P.O. Box 2262, Keller, TX 76244-2262

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MicroLink Devices	Jessica Adams	Business < 500 Employees	Renewable power (non-bio)	MicroLink Devices produces high-efficiency III-V multijunction solar cells based on GaAs and InP. Our proprietary epitaxial lift-off and substrate reuse process facilitates a path to lower cell cost. Full MOVPE growth, fabrication and test facilities are housed at our headquarters in Niles, IL. We have extensive experience on working on PV-related government-funded programs in partnership with other businesses, universities and national laboratories. We also have >10 years' manufacturing experience for the heterojunction bipolar transistor market.	www.mldevices.com	jadams@mldevices.com	8475883001	6457 W Howard St.
National Renewable Energy Laboratory	David Ginley	Federally Funded Research and Development Center (FFRDC)	Other	NREL is a DOE National Laboratory with a core competence and focus on renewable energy technologies, spanning the spectrum from basic science to hardware validation for renewable technologies including solar, wind, biofuels, vehicles, grid integration, etc. With reference to FOCUS, NREL has activities in the basic and applied science of photovoltaic technologies, concentrated solar power, thermoelectrics, solar fuels, energy storage and grid integration. Other capabilities of potential relevance are a significant effort in computational materials design using a combination of high throughput theory (petaflop machine available) and high throughput experimentation to accelerate materials and device development in inorganic, organic and hybrid materials. NREL also has extensive capabilities in reliability and lifetime test for devices and modules. In addition, NREL has extensive capabilities in the resource and economic analysis for new energy conversion technologies.	www.nrel.gov	David.Ginley@nrel.gov	303-384-6573	15313 Denver West Pkwy Golden, CO 80401
New Frontier Technology Group	Milan Krupa	Business < 500 Employees	STORAGE TECHNOLOGIES FOR UBIQUITOUS DEPLOYMENT BY CUSTOMERS	NFTG has devised a simple, ultra-efficient, pure rotary turbine like motion, positive displacement, rotary device which has the potential to displace all internal combustion engines, turbines, compressors, pumps, expanders, and similar devices with tremendous energy savings and emission reduction. * Features: 90-98% mechanical efficiency; 60-80% thermal efficiency as an IC engine which is 2-3 times better than piston tech; low cost, friction & parts count(10 fold lower. No head, crank, valves): ability to operate at any velocity up to 100,000rpm; Specific Power, Power Density, & Specific Torque 10-20 times better than piston tech; fully expanded gases mean 100% energy utilization and no noise or heat in exhaust; simple straight lines and circular curves without compound curves allow for low cost injection molding manufacture for most applications. *	http://www.ninesights.com/docs/DOC-4817	NFTG_MK@FRONTIER.COM	4062538656	432 E Idaho St. #239, Kalispell, MT
Nitride Crystals Inc	Heikki Helava	Business < 500 Employees	Other	HVPE growth of AlInGaN high efficiency solar cells on AlN substrates using LLO to separate the cell structure for reuse of the AlN substrate	www.nitride-crystals.com	heikki.helava@nitride-crystals.com	631-242-8853	181 E Industry Ct Ste B, Deer Park, NY 11729

Organization	Name	Organization Type	Area of Expertise	Background	Website	Email	Phone	Address
Northwestern University	Koray Aydin	University	Other	Our group is an expert in the field of plasmonics, nanophotonic light-trapping architectures, metamaterials and metasurfaces. We have strong background in optical and electrical modelling of different solar-cell architectures including plasmonic solar cells and nanostructured solar cells. We are equipped with the state of the art optical and optoelectronic characterization tools and have access to the shared facilities at Northwestern University and Argonne National Laboratory for the nano and micro fabrication of solar cells. We are currently working on proof-of-concept designs for full-spectrum solar cells based on optical metasurfaces.	http://www.eecs.northwestern.edu/~aydin/	aydin@northwestern.edu	(847) 491-3055	2145 Sheridan Rd. Dept. of EECS Evanston, IL 60208
Oklahoma State University	Raj N. Singh	University	Other	Processing and properties of Diamond Thin Films for Thermal Management and wide band gap semiconductor devices	http://www.osu-tulsa.okstate.edu/helmerich/mse/singh.php	rajns@okstate.edu	918-594-8650	700 N. Greenwood Avenue, HRC-200, Oklahoma State University, Tulsa, OK 74106-0700
Otherlab	Leila Madrone	Business < 500 Employees	Technologies that offer new control capabilities via advanced models, mechanisms, or actuators	An ARPA-E awardee under the 2012 Open FOA, Otherlab is developing extremely low-cost 1-axis and 2-axis actuation for concentrated solar. Our heliostats and trough trackers utilize mass manufacturing and innovative control topologies.	www.otherlab.com	leila@otherlab.com	415.483.5268	3101 20th St, San Francisco, CA 94110
PARC	Sean Garner	Business < 500 Employees	None of the above	PARC is a multidisciplinary research center with deep expertise in system integration, solar optics, solar economic analysis, and thermal and electrochemical devices and systems. PARC is highly experienced in government contracting and is currently a performer on two ARPA-E contracts. PARC has developed novel device and system concepts for the FOCUS program, and is seeking partners with complementary technologies and capabilities. PARC is skilled in the design, analysis, modeling, and development of imaging and non-imaging optics for both high- and low-concentration PV systems. Capabilities include the development of microoptical films that collect and redirect sunlight and novel concentrating reflector designs and architectures for solar thermal systems. PARC is currently engaged in a variety of research efforts in novel electrochemical and thermal energy conversion systems, and has experience integrating systems from bench-top to manufacturing.	http://www.parc.com	Sean.Garner@parc.com	6508124732	3333 Coyote Hill Road, Palo Alto, CA 94304
PEL Associates LLC	Dr. Mort Wallach	Business < 500 Employees	Other	Energy Absorption, Concentrattion of Sunlight, Spectrum Splittuing, Smart Sensors, Smart Coatings	www.pelassociates.com	mlwallach@pelassociates.com	860 536-4155	107 Wilcox Rd, Stonington, CT 06378

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Proton OnSite	Katherine Ayers	Business < 500 Employees	RAMPABLE INTERMITTENT DISPATCHABLE STORAGE TECHNOLOGIES	Proton OnSite produces commercial onsite gas generators, including hydrogen generators based on proton exchange membrane electrolyzers, our core technology. We are a profitable company with 17 years of experience in design of electrochemical cells and balance of plant, and also have experience in ancillary equipment such as containerization, compressors, storage, and other components. We combine strong technical background in flow and stress analysis and materials expertise in ion exchange membranes, catalysts, and flow fields with a high level of manufacturing and commercialization experience. We also are well-versed in hydrogen management and safety systems and have competencies that can be leveraged for fuel cells, flow batteries, and electrochemical compression.	www.protononsite.com	kayers@protononsite.com	203-678-2190	10 Technology Drive, Wallingford, CT 06492
Prism Solar Tecnology	Paul Hauser	Business < 500 Employees	Renewable power (non-bio)	Prism Solar specializes in manufacturing high efficiency bifacial N type mono-silicon modules. We manufacture both holographic and non-holographic modules in Highland NY. We have capabilities and experience in holographic spectral splitting and holographic spatial splitting. Prism has also used traditional optical methods of the concentration of sunlight onto silicon cells such as Fresnel lens arrays and mirrored reflective surfaces. The company is split into two divisions a research and development center located in Tucson, AZ and the manufacturing facility located in Highland, NY. Our focus is on using sunlight in the most efficient manor while trying to balance electrical power generation and thermal management. Prism employs electrical, optical and mechanical engineers which allow us to achieve fully integrated in house solutions for the renewable energy sector.	prismsolar.com	p.hauser@prismsolar.coom	520-624-3876	3450 S Broadmont Suite 128, Tucson AZ 85713
Purdue University	Jeffery L. Gray	University	Renewable power (non-bio)	Detailed numerical modeling of semiconductor PV devices; Modeling of single and multijunction PV systems; high temperature operation of PV devices	https://engineering.purdue.edu/ECE	grayj@purdue.edu	765-494-3390	EE Building/ 465 Northwestern Ave/ West Lafayette, IN 47907
Rutgers University	Dunbar P. Birnie, III	University	Renewable power (non-bio)	Tandem device and system design. Chemical synthesis of compound semiconductor particles and coatings. Hybrid PV+Thermal systems and modeling.	607 Taylor Road Dept of Material Science and Engineering	dunbar.birnie@rutgers.edu	8484455605	607 Taylor Rd., Piscataway, NJ 08854-8065

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Solar Vant-Hull, consultants	Lorin Vant-Hull	Individual	STORAGE TECHNOLOGIES FOR UBIQUITOUS DEPLOYMENT BY CUSTOMERS	Forty years experience in the analysis, design, and cost effective optimization of central receiver systems, specializing in the optics of heliostat fields and their interaction with receivers. Analysis and optical design of concentrating solar power systems. Understanding of non-imaging optics, where the objective is to collect energy from the sun at a required concentration, not to generate an image. Director of the group of physicists who developed the RCELL family of codes, and applied them in the design of a 100 MWe water steam system with storage, of which Solar One was a 10 MWe scale model. We also participated in the US sponsored Utility Study for a 100-200 MWe central receiver facility. 10 MWe Solar Two resulted-which incorporated the first successful large scale molten salt storage system. A massively parallel multi-processor gaming based code is also available for studies. Professor of Physics Emeritus, PhD from California Institute of Technology.	NA	solarvanthull@aol.com	512 581 9921	128 N. Red Bud Trail, Elgin, TX, 78621, USA
sollector systems	Raj Banerjee	Business < 500 Employees	None of the above	Sollector Systems is developing the world's first concentrated solar power (CSP) system based on a dual axis tracking solar dish with a fixed focus. CSP systems such as power towers and troughs throw away 20-40 % of sunlight collected which lowers their overall efficiency. Sollector combines the high optical efficiency of a dish, the stationary hot spot and energy storage advantage of the tower, and the low cost of a trough. Notably, due to its unique fixed focus, Sollector enables thermal storage and base load/off peak power generation at distributed scales. Unlike pole mounted dishes the design is scalable to 1000 sq meters.	www.sollecsys.com	banrjeer@sollecsys.com	4088578296	5235 harvest estates, san jose, CA
Sunlight Photonics Inc.	Allan Bruce	Business < 500 Employees	Renewable power (non-bio)	Designs & Develops Specialty PV & Hybrid Power SYS, INCL PV–Solar Thermal Hybrid Power Systems. Has identified & modeled PERF of such SYS, INCL novel PV cells, operating at high TEMP in CPV CONFIGs, enabling efficient XFER of unused solar thermal energy to complementary storage &/or a dispatchable power sub-SYS. Has proprietary DSGNs for M-J PV devices, operating at HE in both direct & diffuse Illumination & can enhance PERF of PV & hybrid power SYS. Modeling predicts net solar CNV efficiencies >40% with >50% of this power being generated thermally at TEMPs >300oC. Additionally, our high temperature PV devices may also be integrated, as topping devices, in existing Concentrated Solar Power SYS DSGNs with substantially same benefits. This provides a cost-effective, fast-track for implementing the new technology. Has a team of EXP scientists & ENGNs w/ EXT EXP in materials, Design, modeling, prototyping, testing, SYS DEV & MFG with avail facilities & capabilities to SUP work in Program.	www.sunlightphotonicscom	jodi.ciongoli@sunlightphotonics.com	908-753-9800 x112	600 Corporate Court, South Plainfield, NJ 07080-2410

Organization	Name	Organization Type	Area of Expertise	Background	Website	Email	Phone	Address
Sun Synchrony	Mark Perlin	Business < 500 Employees	Technologies that enable active cell-level balancing and control	The OptifoldTM reflector is a purely reflective high concentration mirror reflector that embeds four receivers in its walls at the four cardinal positions facing the reflector's axis. T he aperture is obstruction-free and secondary optics are not required. When aligned with the solar axis, parabolic mirrors focus sunlight symmetrically on the receivers, which then produce a symmetrical output. Misaligned receivers will produce an asymmetrical output pattern. Tracking control uses the receiver symmetry to guide adjustments. VISUAL seen art www.Optifold.com Company has received two grants awards from the California Energy Commission	sunsynchrony.com	m.perlin@sunsynchrony.com	5105176378	602 Kearny St, Sn Francisco, CA 94960
SRI International	Barbara Heydorn	Non-Profit	None of the above	SRI International brings broad expertise materials science, engineering, and process scale-up. Specific expertise includes technologies for the production, purification, casting, and crystal growth of silicon, titanium, gallium arsenide, and other compounds for use in the solar and semiconductor industry. In addition we have deep expertise in corrosion coatings and corrosion analysis appropriate for molten salt energy storage systems; we have developed an AC impedance spectroscopy technique as a quick screening process to determine materials corrosion. SRI has developed and tested electrochemical storage systems. SRI has experience in design, fabrication, and testing of advanced optical structures; development of novel optical materials; and scaling up processes for low-cost production. Our staff of 2,100 work in partnership with clients to invent, scale-up and commercialize promising technologies developed by SRI, brought to us by clients, or developed in partnership with clients.	http://www.sri.com/	barbara.heydorn@sri.com	650 859 5717	333 Ravenswood Ave., Menlo Park, CA 94025
SSS Optical Technologies, LLC	Sergey Sarkisov	Business < 500 Employees	Renewable power (non-bio)	1) Concentration of sunlight, 2) Sun tracking 3) Efficient sun light convertors for photovoltaic cells based on rare earth phosphors	sssopticaltechnologies.com; www.sarkitech.com	mazillo@hotmail.com	256-489-0081	515 Sparkman Drive, Huntsville, AL 35816
Suncore Photovoltaics, Inc.	James Foresi	Business 500-1000 Employees	Renewable power (non-bio)	Suncore designs and builds CPV receivers, modules and trackers. We have R&D capabilities in the U.S. and 200MW manufacturing capacity in China. We have deployed over 50MW of CPV systems.	www.suncorepv.com	jsforesi@gmail.com	(505) 323-3429	1600 Eubank Blvd, Se, Albuquerque, NM 87123
Tennessee Technological University	John Zhu	University	None of the above	Our research group at Tennessee Tech has expertise in solid oxide fuel cell, large-scale energy-storage battery based on Zinc-air system, as well as high temperature structural materials and coatings for oxidation and corrosion protection.	http://www.tntech.edu/people/jzhu?Itemid=928	jzhu@ttnech.edu	931-372-3186	Department of Mechanical Engineering, Box 5014, Tennessee Tech University, Cookeville, TN 38505

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The Pennsylvania State University	Serguei N. Lvov	University	Renewable power (non-bio)	The Electrochemical Technologies Program at the Penn State Energy Institute has substantial expertise in the development and characterization of a number of electrochemical energy conversion systems such as CuCl/HCl electrolysis, proton exchange membrane fuel cells, and solid oxide fuel cells. We have a unique set of equipment that enables us to build and characterize different electrochemical energy conversion systems operating in a wide range of parameters including elevated temperatures and pressures. Also, we have all necessary capabilities for studying the durability and degradation of the electrochemical energy conversion systems and their components while operating for a long time period. In addition, electrochemical impedance spectroscopy and electrochemical frequency modulation techniques as well as the corresponding equivalent circuit analysis are well-established and routine tools in our laboratory.	http://www.eme.psu.edu/faculty/lvov	lvov@psu.edu	8148832327	207 Hosler Bldg., University Park, PA 16802
The Southern California Research Initiative for Solar Energy at the University of California, Riverside	Alfredo Martinez-Morales	University	Conventional Generation (Non-renewable)	In a collaborative environment based at UC Riverside's College of Engineering - Center for Environmental Research and Technology, the Southern California Research Initiative for Solar Energy is developing materials for solar energy, new photovoltaic devices, solar-thermal technologies and theoretical models to simulate the performance of novel device structures, as well as the integration, demonstration and validation of solar energy systems. Specific to the FOCUS FOA, we have expertise in the design and optimization of solar troughs, dish/stirling engine systems; solar-to-electricity devices with high efficiency in the temperature range from 100 – 600°C; solar energy absorption materials and architectures; bonding of electronic devices for effective heat transfer; electrochemical energy storage; thermal energy storage; and systems integration.	www.scrise.ucr.edu	alfmart@cert.ucr.edu	951-781-5652	Southern California-Research Initiative for Solar Energy Center for Environmental Research and Technology University of California, Riverside 1084 Columbia Avenue Riverside, CA 92507
The University of Toledo	Yanfa Yan	University	Renewable power (non-bio)	Fabrication high efficiency thin film solar cells based on CdTe (band gap > 1.5 eV). Density functional theory of wide bandgap semiconductor (bandgap engineering and doping). Photo-electrolysis	http://astro1.panet.utoledo.edu/~yyan/	yanfa.yan@utoledo.edu	419 530 3918	2801 Bancroft Street, Toledo, OH 43606
The University of Tulsa	Todd Otanicar	University	Other	Concentrating solar thermals systems design, enhanced heat transfer, fluid-based spectral filtering, hybrid CPV/T systems design and analysis.	www.personal.utulsa.edu/~tpo011	todd-otanicar@utulsa.edu	9186313148	800 S Tucker Dr, Tulsa OK 74104
Timmy Green	Timmy Green	Individual	Renewable power (non-bio)	US7797939 Concentrating solar energy receiver	timmygreen9@yahoo.com	timmygreen9@yahoo.com	615-275-9543	343 Alden Cove Drive, Smyrna, TN 37167

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Tulane University	Matthew Escarra	University	Renewable power (non-bio)	This team has extensive background in spectrum splitting optical design for PV at the module level, including planar and non-planar spectrum splitting design approaches that incorporate concentrator design, simulation, and characterization along with tracking and electrical considerations. The team has worked with several III-V technologies (photovoltaics, lasers, and metamaterials), with experience in design, simulation, fabrication, and characterization (including thermal performance).	http://tulane.edu/sse/pep/faculty-and-staff/faculty/matthew-escarra.cfm	escarra@tulane.edu	9857882638	6400 Freret Street, 2001 Percival Stern Hall, New Orleans, LA 70118
University of Arizona	Raymond K. Kostuk	University	None of the above	Optical system design, fabrication, and characterization of low to medium concentration ratio PV systems. In particular the design and fabrication of low-cost holographic spectrum splitting optics for high efficiency PV systems. Holographic planar concentrator design and implementation. Specialized simulation programs for modeling of PV systems under direct and diffuse illumination conditions.	http://www2.engr.arizona.edu/~psl/	kostuk@email.arizona.edu	520-621-6172	Electrical and Computer Engineering Department University of Arizona Tucson, AZ 85721
University of Arizona	Dr Roger Angel	University	Renewable power (non-bio)	Our group at the University of Arizona is developing 1) advanced manufacturing capability for self-supporting glass solar reflectors, and 2) advanced designs for solar concentrating optics and 3) novel designs for low-cost dual axis trackers. Our manufacturing technology can be used to make inexpensive paraboloidal dish reflectors, from square 2.5m^2 self-supporting glass panels. The dishes are suitable for smaller hybrid solar converters and storage systems that can be deployed in lucrative entry markets. Our advanced optical designs include a way to drive CPV cells at 1000X using conventional trough collectors. Our dual axis tracker design, suitable for collecting areas of up to 50m^2, more than halves the specific weight of steel used in conventional trackers.	www.arizona.edu	angelj@email.arizona.edu	(520) 621-6541	933 N. Cherry Ave, Tucson, AZ 85721
University of Arkansas	Omar Manasreh	University	Renewable power (non-bio)	Growth of nanocrystals including iron pyrite, InP, and many of the II-VI materials. Device fabrication and testing including IV, EQE, and spectral response. Materials characterization and evaluation including optical, electrical, and structural characterization tools.	http://www.uark.edu/ua/manasreh/	manasreh@uark.edu	479-966-5965	3217 Bell Eningeering Center, ELEG, U of A, Fayetteville, AR 72701
University of Arkansas	R. Panneer Selvam	University	RAMPABLE INTERMITTENT DISPATCHABLE STORAGE TECHNOLOGIES	Developed and tested two or three thermal energy storage system in the last 5 years. One method is to store thermal energy up to 600C using concrete and molten salt. The heat is stored as thermocline system in one tank. We also developed another thermocline system with gravel and air for much higher temperature. The IP is disclosed to the University. The IP defines a new approach on low-cost, high temperature, thermal energy storage.	http://www.cveg.uark.edu/701.php	rps@uark.edu	479-575-5356	BELL 4190 University of Arkansas, Fayetteville, AR 72701

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University of California, Davis	Cristian Heredia	University	Renewable power (non-bio)	Novel designs of concentrator-based hybrid photovoltaic-photothermal systems are planned. In building upon the robustness of GaP and Si, we propose a system that combines a GaP photovoltaic cell in tandem with a Si selective absorber to drive a heat engine. We have developed a model to account for temperature dependencies of both components and determined that system efficiencies over 55% can be reached when operating at moderate temperatures. The benefit to this approach is in a simplified design that does not require ultra-high concentration and eliminates the need for passive or active cooling mechanisms.	http://woodall.ece.ucdavis.edu/	caheredia@ucdavis.edu	415 742 1618	Electrical and Computer Engineering, University of California Davis, One Shields Ave, Davis, Ca 95616
University of California, Merced	Roland Winston	University	Renewable power (non-bio)	Non imaging optics characterize solar thermal collectors 250Celsius, test selective coatings make thin film solar cell coatings make evacuated tube collectors make reflective coatings	http://www.ucsolar.org	rwinston@ucmerced.edu	209 201 2863	5200 N. Lake Rd. Universty of California, Merced, CA 96343
University of Idaho	Fatih Aydogan	University	Renewable power (non-bio)	We have experience on design and analysis of power plant systems. In our house, we use several computational tools to analyze the systems and design new generation systems. We have several facilities in Center of Advanced Energy Studies Complex: https://inlportal.inl.gov/portal/server.pt?open=512&objID=281&mode=2	https://inlportal.inl.gov/portal/server.pt?open=512&objID=281&mode=2	fatih@uidaho.edu	4128182067	Center for Advanced Energy Studies Office:281, 995 University Blvd., Idaho Falls, ID, 83401
University of Michigan	Nicholas A. Kotov	University	Other	Nanomaterials, inexpensive plasmonics, self-organization of nanomaterials, nanocomposites	http://www.umkotov.com/	kotov@umich.edu	734-763-8768	2300 Hayward University of Michigan, Ann Arbor, MI, 48109
University of Utah	Rajesh Menon	University	Other	We have the capability to design, fabricate and characterize thin, planar optics for spectrum splitting and concentration of sunlight. These optics can have very high efficiencies (over 90%) across the entire solar spectrum. They provide excellent flexibility in terms of number of spectral bands, concentration factors and geometries. We have already demonstrated the feasbility of these optics with 2 bands and performed clear simulations that indicate their extensibility to 10 or more spectral bands with low to high concentration factors. These optics can be scaled to large areas and can be fabricated at low cost using roll-to-roll processes. A good reference is: G. Kim, J-A. Dominguez-Caballero, H. Lee, D. Friedman and R. Menon, “Increased photovoltaic power output via diffractive spectrum separation,” Phys. Rev. Lett. 110, 123901 (2013).	http://lons.utah.edu	rmenon@eng.utah.edu	8015851058	50 Central Campus Drive, Salt Lake City, UT 84112
University of Virginia	Mool C. Gupta	University	Renewable power (non-bio)	Solar thermal receivers Low cost manufacturing of solar cells Silicon solar cells	www.seas.virginia.edu/lam	mgupta@virginia.edu	434-924-6167	University of Virginia

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Voxtel, Inc.	Debra Ozuna	Business < 500 Employees	Technologies that facilitate low-cost, high-performance, and/or plug-and-play hybridization and integration of disparate devices	Multi-junction solar concentrators	www.voxtel-inc.com	debrao@voxtel-inc.com	971-223-5646	debrao@voxtel-inc.com
Yale University	Minjoo Larry Lee	University	Renewable power (non-bio)	Our group specializes in the growth, characterization, and fabrication of novel metamorphic solar cells. Recently, we have demonstrated 2.2 eV direct-gap InGaP solar cells that are suitable for high-temperature operation. Specific capabilities include: MBE growth of III-AsP materials; materials characterization via HRXRD, TEM/STEM, AFM, EPD, Hall effect, PL; solar cell fabrication; solar cell testing with AM1.5G simulator, EQE system, and SEM-EBIC.	http://seas.yale.edu/faculty-research/faculty-directory/minjoo-larry-lee	minjoo.lee@yale.edu	2034324298	PO Box 208284 New Haven, CT 06520-8284