CalTestBed

Entrepreneur Directory 2021

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CalTestBed

NEW ENERGY NEXUS

An Initiative to De-Risk Innovations and Accelerate Commercialization

UNIVERSITY OF CALIFORNIA

STATE OF CALIFORNIA ENERGY COMMISSION

BERKELEY LAB
Lawrence Berkeley National Laboratory

MOMENTUM

LACI

CalTestBed

NEW ENERGY NEXUS

Campuses Participating in CalTestBed

UC RIVERSIDE UNIVERSITY OF CALIFORNIA

BERKELEY LAB

UC San Diego

UC DAVIS UNIVERSITY OF CALIFORNIA

UC IRVINE

Berkeley UNIVERSITY OF CALIFORNIA

UCLA

UNIVERSITY OF CALIFORNIA MERCED

UC SANTA BARBARA

UC SANTA CRUZ

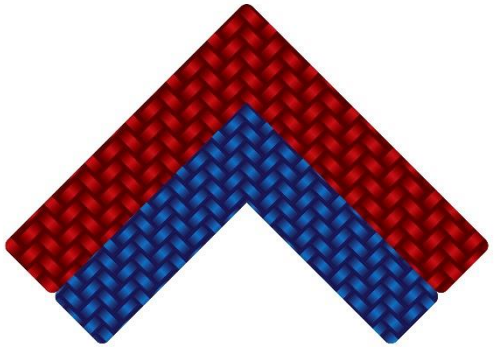
Technology Types

- Building Technologies
- Energy Efficiency
- Energy Storage
- Grid Technologies
- Industrial and Agricultural Innovation
- Internet of Things
- Material-Based
- Renewable Generation
- Transportation
- Water Technologies

Technology Types Definitions

CalTestBed

Building Technologies	Energy Efficiency	Energy Storage	Grid Technologies	Industrial & Agricultural Innovation	Internet of Things	Material-Based	Renewable Generation	Transportation	Water Technologies
Hardware or integrated solutions that support energy efficiency in buildings including occupancy-based controls and building management system optimization, after treatment coatings for fenestration, insulation, and building envelopes.	Hardware or integrated solutions that demonstrate energy efficiency including appliances, solid-state lighting, non-vapor compression cooling, advanced electric heat pumps that use refrigerants with low or zero GWP.	Hardware or integrated enabling technologies for lithium-metal and lithium-sulfur batteries, Flow batteries, Ultra- or super-capacitors, Non-lithium battery chemistries, enabling technologies for green hydrogen for long duration, energy storage (including technologies such as electrolyzers).	Hardware or integrated solutions that modernize the electric grid, through enabling more clean energy and energy efficiency such as demand response, distributed energy resource management systems, electric vehicle to grid integration, etc.	Hardware or integrated solutions that work in the industrial and/or agricultural context to enable clean energy and/or energy efficiency in industrial and agricultural processes.	Hardware or integrated solutions , that are used to enable clean energy or energy efficiency through the automatic acquisition, storage manipulation, management, movement, control, display, switching, interchange, transmission or reception of data.	Hardware or integrated solutions that utilize novel materials to enable clean energy generation or greater energy efficiency.	Hardware or integrated renewable energy technologies that advance electricity, heat, and/or fuel from renewable sources including solar, wind, heat-exchange, and bioenergy technologies.	Hardware or integrated technologies that enable electric and alternative fuel vehicles, and related electric charging and alternative fueling infrastructure.	Hardware or integrated technologies that embrace forward-thinking applications and solutions that utilize waterflow for energy generation including hydro, wave, and tidal while advancing clean and safe water goals.



ALD Technical Solutions

ALD Technical Solutions

UC Los Angeles

Contact Information

Point of Contact: Dr. Davoud Zamani
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E: davoud@aldtechnicalsolutions.com
W: https://aldtechnicalsolutions.com/research

Company Region
San Diego, San Diego County

Company Description
ALD Technical Solutions is a woman owned clean tech startup founded in 2018 in San Diego California to develop innovative applications of advanced composite materials in clean and renewables energies.

Designation Status
Woman Owned Small Business (WOSB)

ALD Technical Solutions

UC Los Angeles

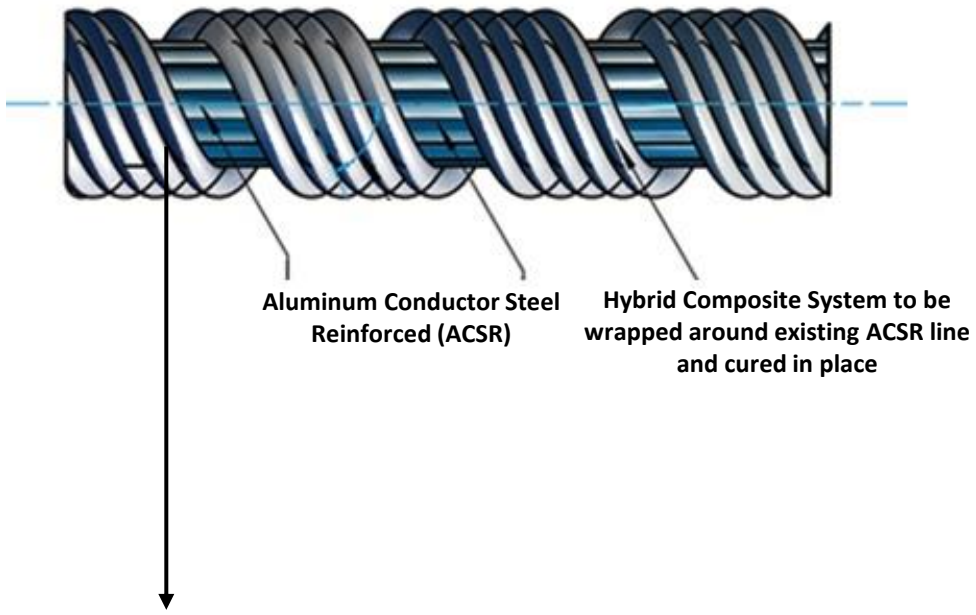
Technology Readiness Level
5

Technology Type
Grid Technologies

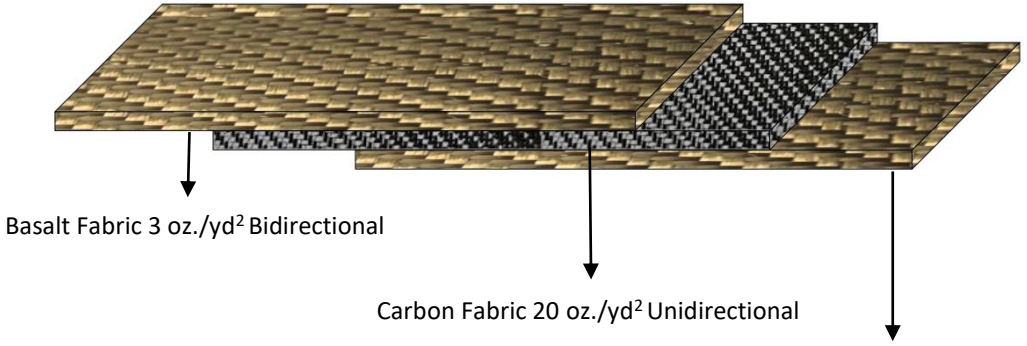
Innovation Description
ALD Technical Solutions Composite WiRE Wrap (CWW) technology is novel, lightweight, fast and easy to install. The long lasting, reliable, environmentally friendly and cost effective structural composite reinforcement system will be installed and cured in-place around existing Aluminum Conductor Steel Reinforced (ACSR) transmission lines. The purpose is to increase electric power capacity and decrease the sag of transmission lines.

The composite reinforcement system is a multilayer hybrid composite system consisting of high tensile strength carbon fiber as a structural reinforcement component embedded in basalt fiber as a barrier layer to prevent galvanic corrosion between the carbon fiber and metals with a low longitudinal coefficient of liner thermal expansion.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government officials wanting to learn more about the innovation
- Transmission line operators and contractors to partner on an onsite demonstration



Composite WiRe Wrap (CWW)



ALIONYX
ENERGY SYSTEMS

Alionyx Energy Systems

UC San Diego

Contact Information

Point of Contact: Mike Nagus
P: 403.689.0939
E: mnagus@alionyx.com
W: www.alionyx.com

Company Region

Los Angeles, Los Angeles County

Company Description

Alionyx Energy Systems (AES) has created a new class of batteries based on redox active polymers to store energy. These polymers, developed and manufactured by AES, are drop-in replacement energy storage materials for existing technologies. It is these proprietary polymers that allow AES to build batteries that set them apart from the competition.

The world is becoming more reliant on lithium, cobalt and other rare earth minerals to satisfy the ever increasing need to store and use energy. AES offers an opportunity to rid batteries of one of their metals which stabilizes the system, allowing for more cycles, longer life and decreasing costs as we replace an expensive, toxic and reactive metal for a polymer.

Mike Nagus
CEO co-founder

Zeiad Muntasser
CTO/President co-founder

Jasim Uddin
Principal Scientist

Andrew Stewart
Principal Scientist

Alionyx Energy Systems

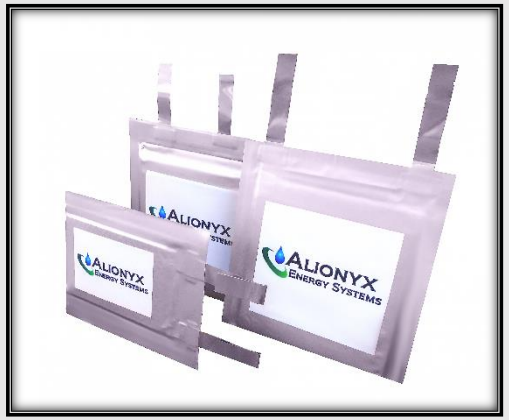
UC San Diego

Technology Readiness Level
6

Technology Type
Energy Storage

Innovation Description
AES has developed a novel organic aqueous battery system using our patent pending polymer energy storage materials. AES's first chemistry, Poly-K uses our patent pending Redox active polymer as a potassium ion receptor to store energy. Precursor materials for manufacturing the polymer are ubiquitous and abundant, which makes a material that is both supply chain independent and cost-effective. The system is aqueous and non-toxic so the manufacturing costs are significantly less than competing technologies and the system is inherently safe (non-flammable/no thermal-runaway). Projected costs of this new system at scale are < $100/kWh. The polymer is also extremely stable, allowing cycles in excess of 13,000 at 100% DOD and 3C rates.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies Interested in new clean energy tech for potential acquisition
- Investors interested in learning about new clean energy investment opportunities
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government officials wanting to learn more about the innovation



Alionyx currently produce D and pouch cells

R&D Lab in Monrovia CA

ALPINE
HYDROMET

Alpine Hydromet

UC Riverside CE-CERT

Contact Information

Point of Contact: Anne Heggli
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Company Region

Northern California, Placer County

Company Description

Alpine Hydromet's foundation is meteorology and water resource management with over 50 years of combined experience. Alpine Hydromet focuses on improving real-time monitoring solutions for increased reliability and ease of use by researching scientific and technological developments.

Since 2016, we have focused on the development of the Fluidless Snow Pillow (FSP) and Cosmic Ray Detector (CRD) for snow water content monitoring to enhance hydropower generation.

Alpine Hydromet

UC Riverside CE-CERT

Technology Readiness Level
5

Technology Type
Renewable Generation – Hydropower Optimization

Innovation Description
The Cosmic Ray Detector (CRD) is a unique technology that vastly improves the reliability of snow water content monitoring used for grid-scale energy management and reservoir operations.

Cosmic rays routinely enter the earth's atmosphere sending a shower of passive secondary cosmic radiation into the earth's environment. The cosmic rays penetrate many terrestrial objects including snow, where the signal is weakened based on the quantity of water in the snow, regardless of the phase of the water. The attenuation of the signal through the snowpack measures the quantity of water present in the snowpack.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies interested in new clean energy tech for potential acquisition

Battery Energy Storage Technologies, LLC (BEST)

Battery Energy Storage Technologies, LLC (BEST)

UC San Diego

Contact Information

Point of Contact: Sri Narayan
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E: sri.narayan@usc.edu
W: www.batteryenergystoragetechnologies.com

Company Region
Los Angeles, Los Angeles County

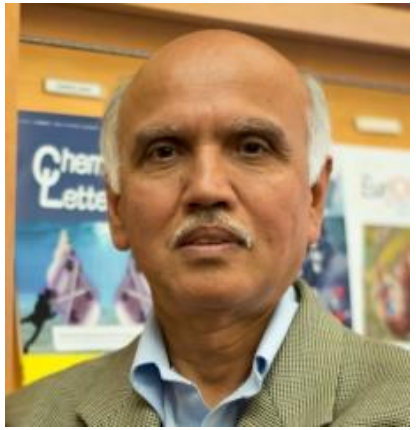
Company Description
Best Energy Storage Technologies (BEST) is a USC spin-off for the commercialization of durable, inexpensive and scalable organic/inorganic flow batteries for a wide range of energy storage applications.

"The extraordinary durability of the iron/AQDS battery combined with the low cost of materials, presents a unique opportunity for meeting the requirements of "mega"-scale energy storage applications"

– Journal of the Electrochemical Society 167 (2020) 060527: DOI: 10.1149/1945-7111/ab84f8

Managing Partners

Prof. Sri Narayan



Prof. Surya Prakash

Dr. Robert Aniszfeld

Battery Energy Storage Technologies, LLC (BEST)

UC San Diego

Technology Readiness Level
5

Technology Type
Energy Storage

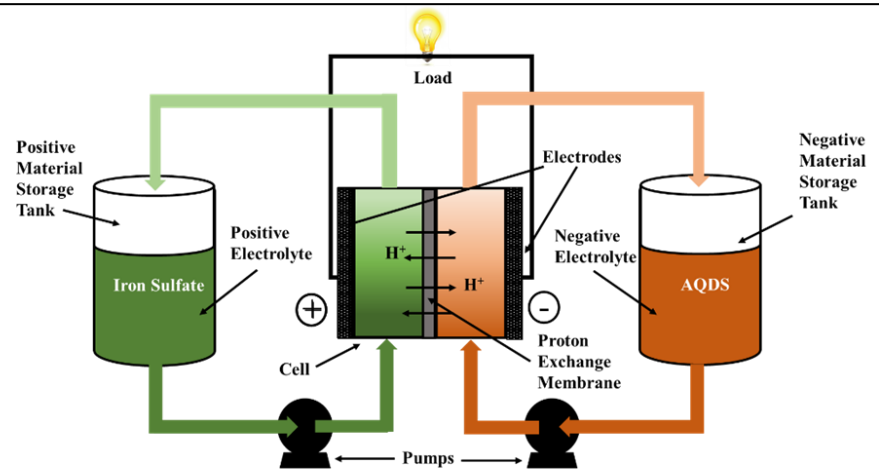
Innovation Description
Our innovation is an inexpensive, robust, inherently safe, and sustainable battery solution for long-duration energy storage. Central to this innovation is a water-based redox flow battery (RFB) that uses inexpensive and robust materials such as iron sulfate and an organic substance called anthraquinone disulfonic acid (AQDS).

This new RFB overcomes the principal limitations of lithium-ion batteries, vanadium RFB, and other technologies to deliver an affordable, safe, durable and sustainable solution for behind-the-meter use, microgrids and grid-scale applications.

Our laboratory tests project a lifetime of >20 years and a LCOS of $0.05/kWh, just 10% of that of SOA lithium-ion batteries.

Seeking These Next Level Partners
- Pilot/demonstration project partner
- Companies interested in new clean energy tech for potential acquisition
- Investors interested in learning about new clean energy investment opportunities

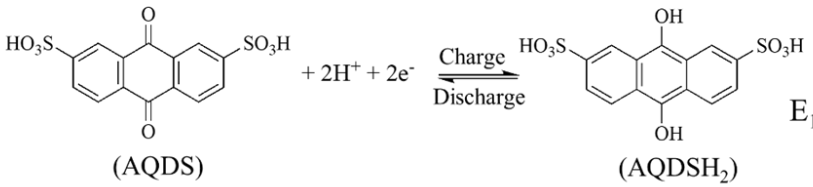
Iron-AQDS Flow Battery



Positive Electrode Reaction:

$$2FeSO_4 + HSO_4^- \underset{\text{Discharge}}{\overset{\text{Charge}}{\rightleftharpoons}} Fe_2(SO_4)_3 + H^+ + 2e^- \qquad E_{1/2} = +0.77 \text{ V vs NHE}$$

Negative Electrode Reaction:



$$E_{1/2} = +0.15 \text{ V vs NHE}$$

Blue Frontier

Blue Frontier

UC Davis, Western Cooling Efficiency Center

Contact Information

Point of Contact: Gregory Tropsa
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E: Gregory.Tropsa@bluefrontierac.com
W: https://bluefrontierac.com/

Company Region

Los Angeles, Orange County

Company Description

Blue Frontier is committed to reducing the carbon footprint of buildings and enabling the cost-effective adoption of sustainable energy. Blue Frontier and its industry thought-leading partners have reinvented human comfort to greatly improve occupant health and productivity while slashing the environmental impact of cooling on buildings – a top driver of global electricity demand. Blue Frontier's patented solutions include hyper-efficient compressorless comfort space conditioning, low-cost energy storage, and the Utility Managed Virtual Power Plant. Consumers can expect a 60%-90% reduction in their energy usage. Additionally, embedded energy storage soaks up low-cost and excess renewable energy, then intelligently shifts its use to cool buildings as the sun begins to set, avoiding peak demand charges.

The extraordinary flexibility of our product enables digital service solutions for the grid and behind the meter. These cloud enabled services are based on AI multi-level optimizations and Digital Twin technology. Blue Frontier's digital services leverage our unique capacity to independently control temperature, humidity, and outdoor air ventilation, such that the overall energy required to condition a space can be reduced while the comfort and health of tenants is optimized. Blue Frontier's low-cost, efficient, long-duration energy storage and control optimizes electricity consumption to augment building owner energy bill savings, while at the same time aggregating a dispatchable fleet of units for the benefit of the grid.

Dr. Daniel Betts, CEO

Greg Tropsa, President

Dr. Matt Tilghman, CTO

Matthew Graham, EVP Engineering

Blue Frontier

UC Davis, Western Cooling Efficiency Center

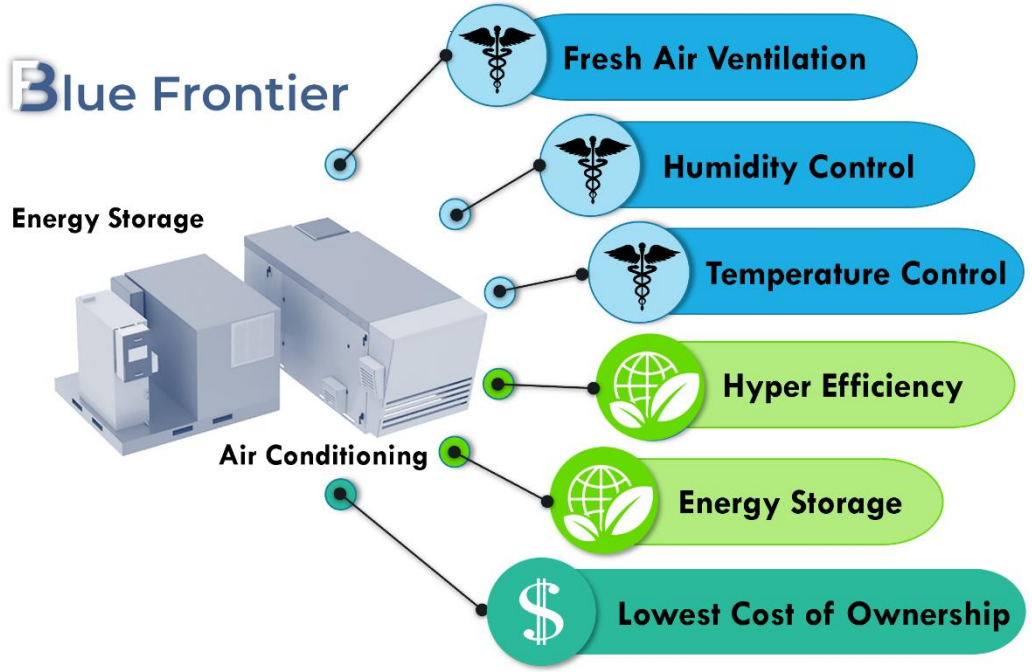
Technology Readiness Level
7-8

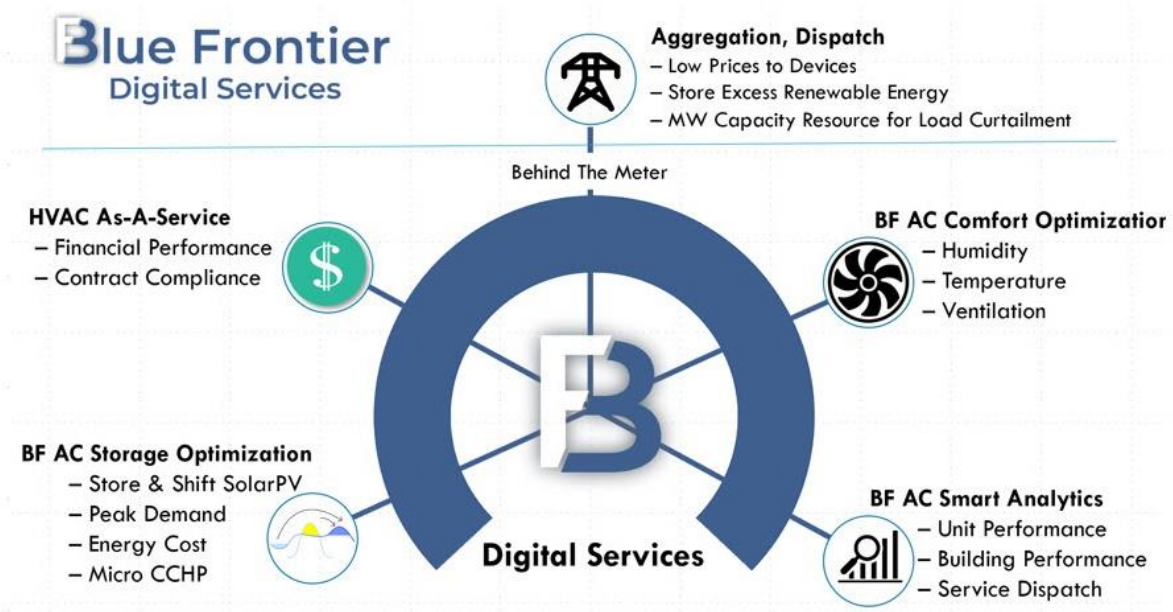
Technology Type
Energy Efficiency, Load Shifting Energy Storage

Innovation Description
Increasing human comfort and health with a novel hyper-efficient, compressorless commercial building packaged rooftop air conditioning unit with embedded low-cost, long duration energy storage.

Utility Managed Virtual Power plant digital services that optimize end user savings while being aggregated and dispatched for grid reliability.

Seeking These Next Level Partners
- Pilot/Demonstration Project Partner
- Companies Interested in new clean energy tech for potential acquisition
- Investors interested in learning more about new clean energy investment opportunities
- Government officials wanting to learn more about the innovation





Coreshell
TECHNOLOGIES

Coreshell Technologies, Inc.

Lawrence Berkeley National Lab

Contact Information

Point of Contact: Jonathan Tan
P: 415.314.9926
E: jonathan@coreshelltech.com
W: https://www.coreshelltech.com/

Company Region
San Francisco, Alameda County

Company Description
Coreshell is solving the key degradation issue in rechargeable batteries with our nanolayer electrode coating technology.

Our unique thin-film electrode coating process enables greater capacity, safer operation & up to 50+% lower cost/kWh batteries for the next generation of electric vehicles & energy storage.

Coreshell Technologies, Inc.

Lawrence Berkeley National Lab

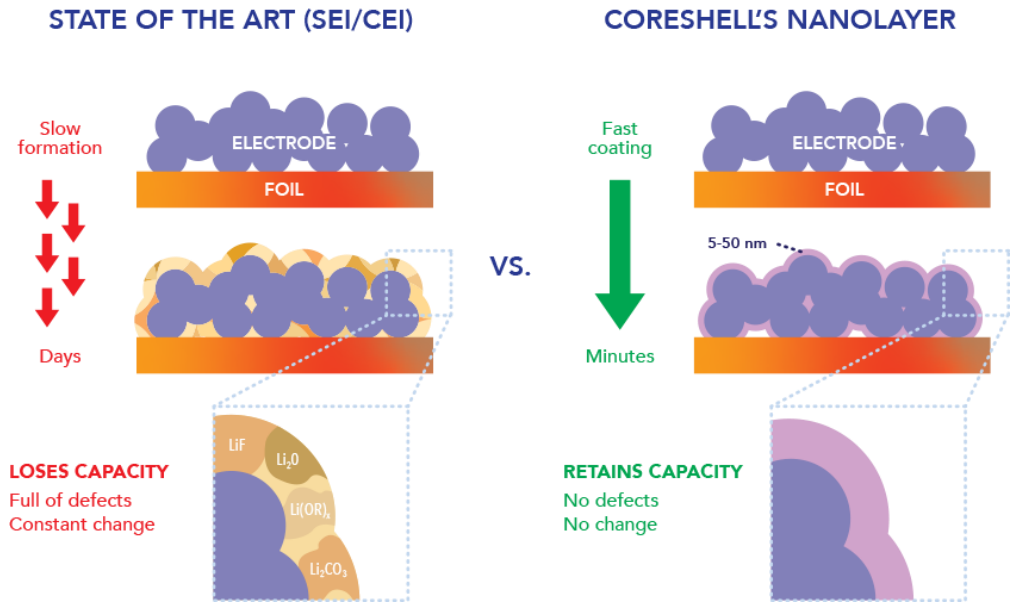
Technology Readiness Level
5

Technology Type
Energy Storage

Innovation Description
Coreshell Technologies is solving a fundamental issue in all rechargeable batteries: electrode surface instability. We view this problem as the biggest technical barrier to battery performance improvement – regardless of the chemistry of the anode or cathode. By preventing internal degradation resulting from electrode instability, our technology will enable batteries with significantly reduced cost/kWh, increased lifetime, and improved safety. This would provide the impetus needed for wider deployment of electric vehicles and energy storage, both at utility and residential scale.

Coreshell's unique solution to the problem is a liquid-phase deposition of protective coatings on battery material surfaces to passivate these degrading reactions.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Investors interested in learning about new clean energy investment opportunities
- Government officials wanting to learn more about the innovation



ELEMENT
ENERGY

Element Energy, Inc.

UCSD Center for Energy Research – Energy Storage Integration Lab

Contact Information

Point of Contact: Seth Kahn
P: 650.814.9983
E: seth@elementenergy.com
W: https://elementenergy.com/

Company Region
San Francisco, San Francisco County

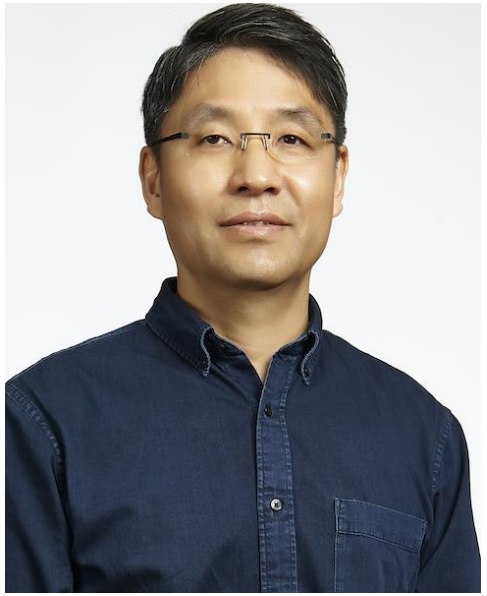
Company Description
Element Energy's Cell-Level BMS (CLB) utilizes adaptive cell-learning algorithms to improve the safety, energy throughput and lifetime of large lithium-ion battery packs.

We aim to make grid-tied energy storage safer and more dependable, with levelized cost of storage up to 50% lower than is possible with conventional battery management systems (BMS).

Anthony Stratakos, Ph.D., CEO

Seth Kahn, COO

Rainer Fasching, Ph.D., CSO



Yves Saw, Ph.D., CTO

Element Energy

UCSD Center for Energy Research – Energy Storage Integration Lab

Technology Readiness Level
5-6

Technology Type
Energy Storage

Innovation Description
Element Energy's Cell-Level BMS (CLB) utilizes adaptive cell-learning algorithms to improve the safety, energy throughput and lifetime of large lithium-ion battery packs. This is achieved by providing innovative, independent software control of the charge and discharge of each cell using a proprietary hardware platform that distributes the traditional pack-level DC-DC converter and BMS function out to all cells.

No longer must every cell in the pack be charged or discharged at the same rate, or the pack ceases discharging when the weakest cell is depleted, or energy be wasted from fully charged cells so that the others may continue charging.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies interested in new clean energy tech for potential acquisition
- Investors interested in learning about new clean energy investment opportunities
- Government official wanting to learn more about the innovation

More Energy Throughput

Battery packs with conventional BMS are limited by the weakest cell. CLB fully utilizes each cell's available capacity, providing the full runtime and total energy capability of the pack. This advantage only grows with time as the cells in packs with conventional BMS age differentially.

Enhanced Lifetime

Our cell management algorithms iteratively monitor, model and manage the operation of each cell in the pack independently, reducing wear and extending the life of each cell and the entire pack.

Improved Safety

Weak or failed cells are isolated while the pack continues to operate. Fault response is up to 100x faster than conventional BMS, providing a quicker and safer resolution to prevent cascading failures.

Feasible

Feasible Inc.

UC Davis, Green Technology Laboratory

Contact Information

Point of Contact: Shaurjo Biswas
P: 734-757-0131
E: shaurjo@feasible.io
W: https://www.feasible.io/

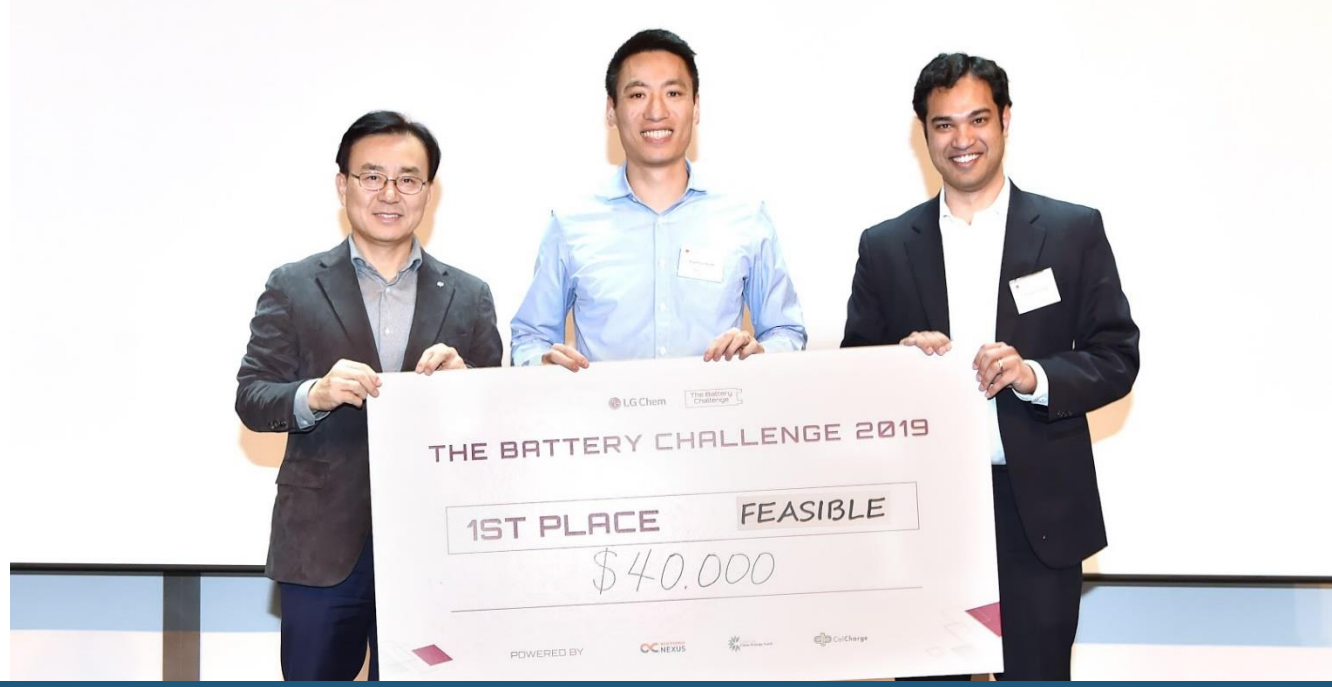
Company Region

Bay Area, Alameda County

Company Description

Feasible, a pioneer in advanced battery diagnostics using ultrasound and machine learning, was founded and is led by top technologists from Princeton University and moved to the Bay Area in 2016.

We are now accelerating the massive shift to electrified mobility by commercializing a technology that will have a significant, near-term impact on the cost of batteries. This is crucial for our clean energy future and it's an opportunity to create billions of dollars per year in economic value.



Feasible Inc.

UC Davis, Green Technology Laboratory

Technology Readiness Level
5

Technology Type
Energy Storage

Innovation Description
Feasible's EchoStat Ultrasonic Battery Inspection Platform consists of (1) Production-Grade Hardware that integrates into any battery production line

(2) Electronics and Sensors for quickly collecting rich ultrasound data on any type of battery, and

(3) Software Analytics that deliver valuable insights based on data streams from across the production process.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies Interested in new clean energy tech for potential acquisition
- Investors interested in learning about new clean energy investment opportunities
- Government officials wanting to learn more about the innovation

flux technology

Advanced materials for gas separations.

Flux Technology

Lawrence Berkeley National Lab

Contact Information

Point of Contact: Jonathan Bachman, Ph.D.
P: 630.677.2961
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Company Region
Bay Area, Alameda County

Company Description
Flux was founded in 2017, by Jonathan as a graduate student at U.C. Berkeley alongside Prof. Jeffrey Long, based on the development of metal-organic framework/polymer composites for membrane-based gas separations. Flux can produce large area thin-film composite membranes that can be fabricated into standard spiral-wound membrane elements.

We have identified a biogas producer in Oroville, CA who we can partner with and install a membrane system for biogas upgrading. Using a Flux separation process, our customer can produce carbon-negative bio-CNG for a local trucking company while generating lucrative Low Carbon Fuel Standard credits.

Jonathan Bachman
CEO

Ever Velasquez
Chief Scientist

Jeffrey Long
Co-founder

Flux Technology

Lawrence Berkeley National Lab

Technology Readiness Level
6, preparing milestones to reach TRL-7 full-scale test

Technology Type
Renewable Generation

Innovation Description
Flux's innovative membrane technology has achieved a breakthrough in gas separation performance and productivity, enabling high yield and energy efficient separations. Flux has achieved this through the development of a unique polymer/metal-organic framework composite material that has incorporated simple and repeatable membrane elements.

These low cost and modular membrane elements are the building blocks for any gas separation process and can be scaled to any size application.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
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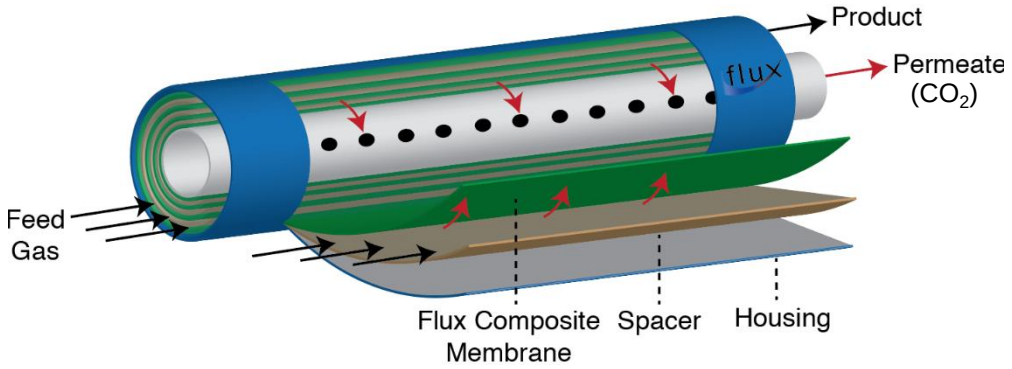
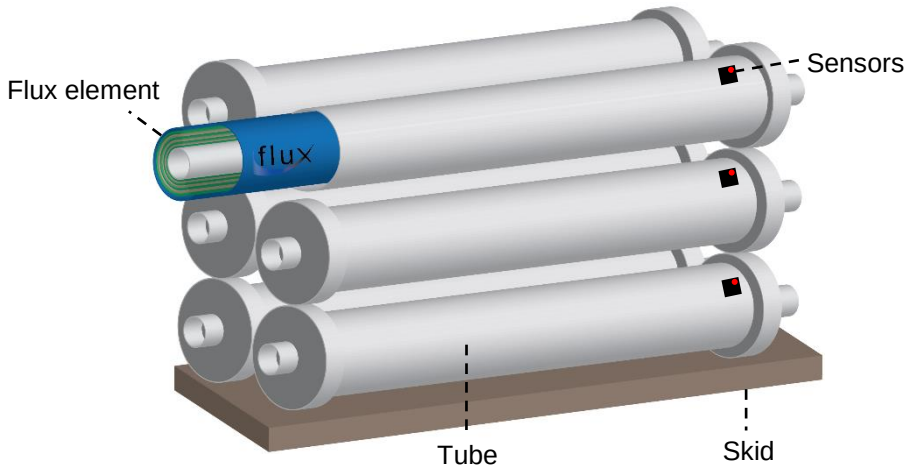
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government officials wanting to learn more about the innovation





Future Motors LLC

Future Motors LLC

UC Riverside CE-CERT

Contact Information

Point of Contact: Reginald Garcia
P: 760.951.6927
E: goreggie2@verizon.net

Company Region

San Diego, San Bernadino County

Company Description

Future Motors strives to discover new and innovative ways of providing 100% green energy to a world that sorely needs it.

Using new progressive technologies, we strive to replace current inefficient motors with our new patented green motors and batteries.

Future Motors has engineered “A Switch Reluctance Motor” (SRM) that enhances machine performance both at low and high speeds.

Future Motors LLC

UC Riverside CE-CERT

Technology Readiness Level
5

Technology Type
Energy Efficiency

Innovation Description
Our motor, software, and battery can make a motor run at minus 67% less energy than today's motor doing the same amount of work. We look forward to testing it thoroughly and introducing it to the world as quickly as possible.

The way the technology works is when the current goes through the coil and the power is disconnected, a radiant energy field is created. An electro-radiant event occurs on the collapsing of the electric motor coil. This is a second field that combines with the electric field which gives our motor its efficiencies.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
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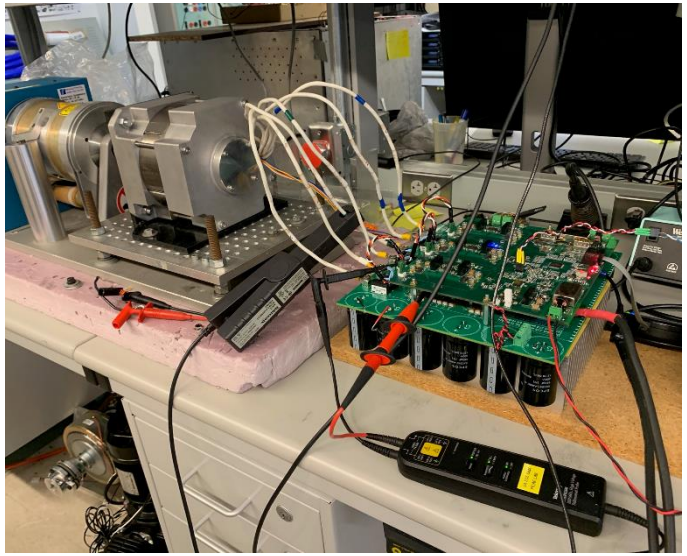
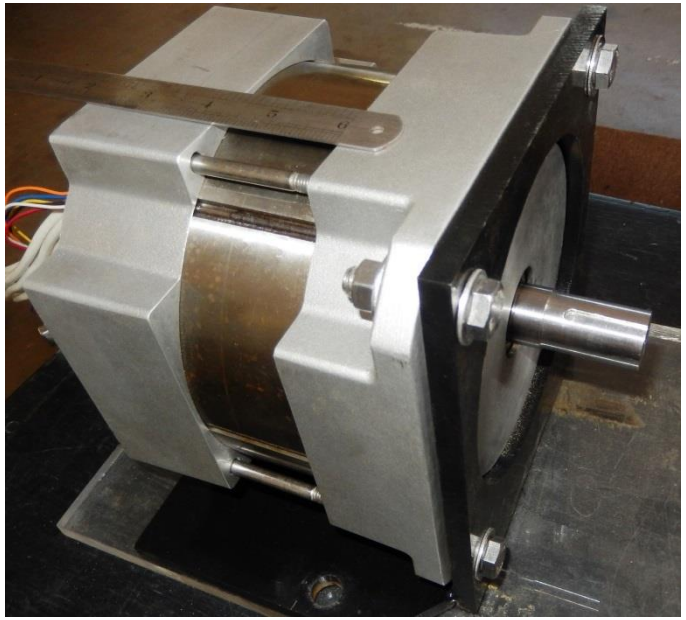
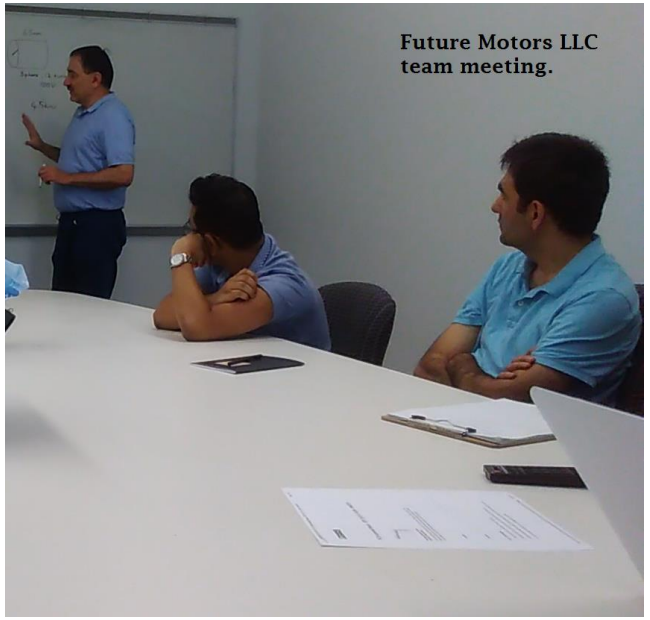
- Government officials wanting to learn more about the innovation







GreenTech™ Motors

GreenTech Motors Corporation

UC Riverside CE-CERT/EMSTL

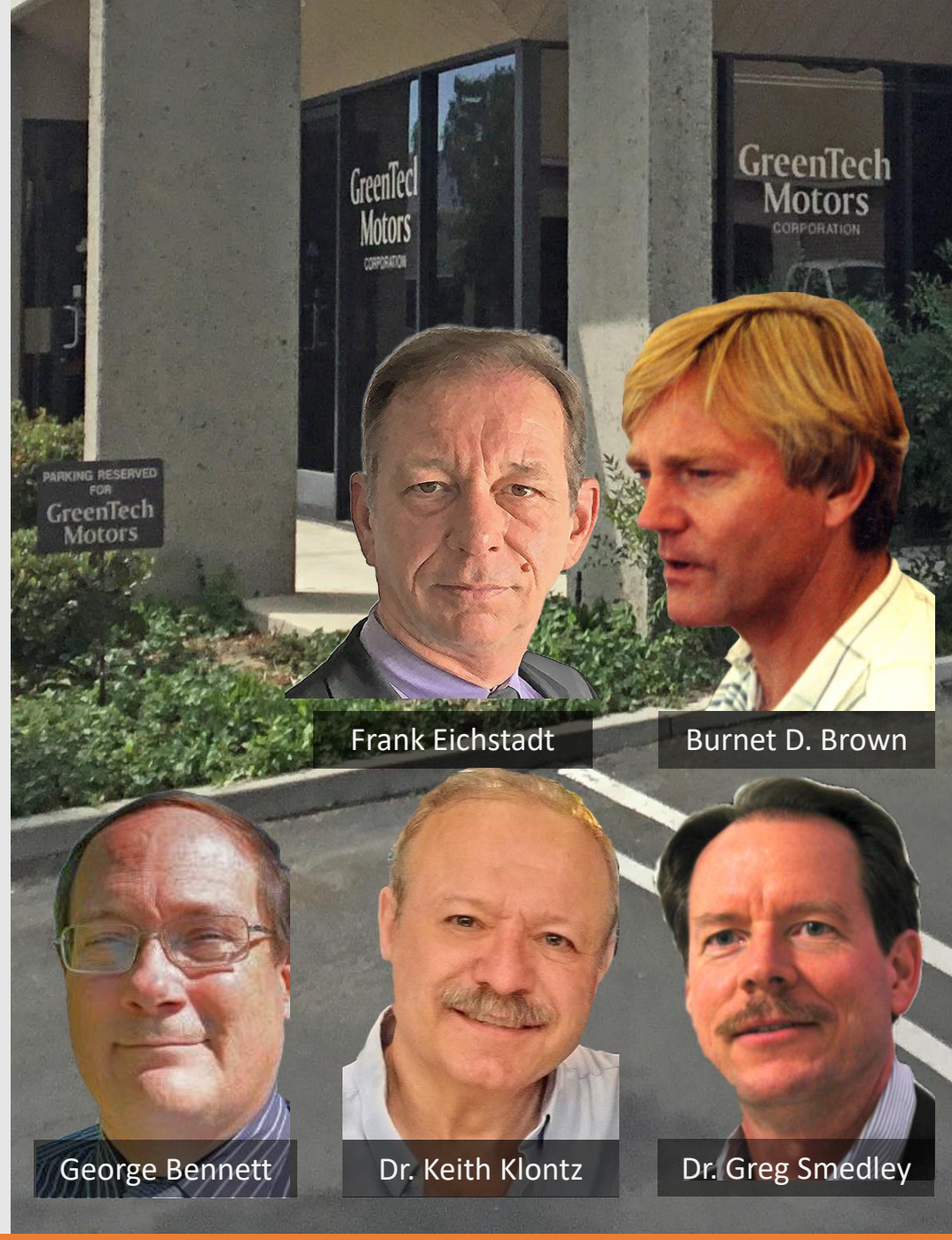
Contact Information

Point of Contact: Burnet D. Brown
P: 805.405.8199
E: burnet@greentechmotors.com
W: https://www.greentechmotors.com/

Company Region
Central Valley, Humboldt County

Company Description
GTM is a California clean energy company developing high efficiency density (HED) integrated electric motor and drive technologies.

Using advanced aerospace engineering originally developed by engineers at Boeing's Phantom Works research and development test facility, GTM has designed a plug-and-play, drop-in-replacement technology that solves the problem of dimensional incompatibility, a problem that has impeded wider efficiency gains and prevented the strengthening of motor efficiency standards.



GreenTech Motors Corporation

UC Riverside CE-CERT/EMSTL

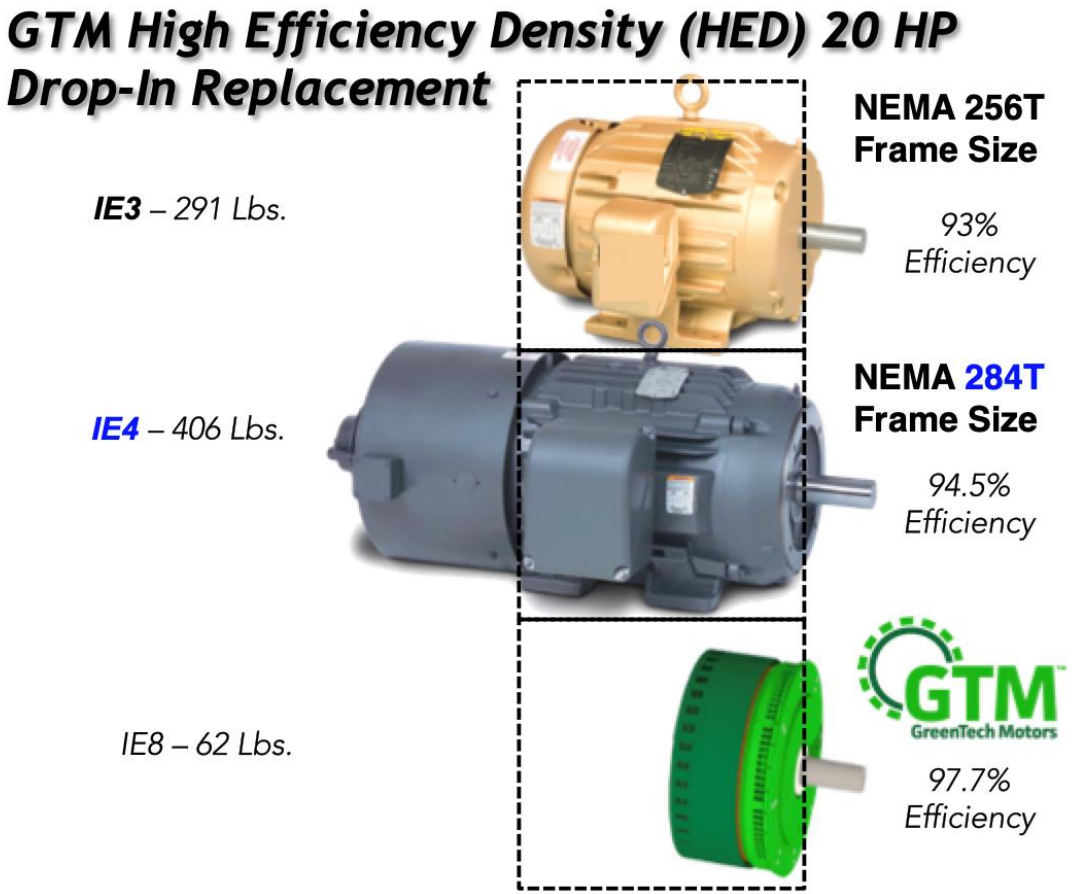
Technology Readiness Level
5

Technology Type
Renewable Generation

Innovation Description
GTM HED motors utilize a combination of proprietary windings, magnetics, and power electronics to produce drop-in-replacement motors that provide unprecedented efficiency (>97.5%) in a smaller (up to 70%), lighter (up to 70%) package compared to conventional motors.

To enhance electrical power efficiency and address other power demand challenges, GTM HED motors facilitate retrofit integration into existing systems as well as OEM applications that demand the combined advantages of high efficiency, small size and light weight. GTM technology is scalable across a wide output range and addresses multiple pain points for customers, energy providers, and societal stakeholders.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies Interested in new clean energy tech for potential acquisition
- Investors interested in learning about new clean energy investment opportunities
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government officials wanting to learn more about the innovation
- Electric utilities with efficiency incentive and rebate programs that may benefit from our technology



HELICOID

INDUSTRIES INC.

Helicoid Industries Inc.

UC Irvine

Contact Information

Point of Contact: Chad Wasilenkoff
P: 604.816.7888
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W: https://www.helicoidind.com/

Company Region

San Diego, Riverside County

Company Description

Helicoid Industries emulates the incredible strength of the Mantis shrimp and as a result makes composites lighter, stronger, more impact resistant, and all at a lower production cost.

Helicoid is focusing on a Leading-Edge Protection technology that will reduce weight, increase life cycles and increase energy output of wind turbine blades.

Chad Wasilenkoff
CEO

A proven leader of a variety of technology companies coupled with an extensive background in capital markets globally.

Pascal Joubert des Ouches
President

With over 25 years' experience in the composites industry, including leading roles in Sales, Marketing, R&T and Innovation.

Doug McCarville
CTO

Over 35 years of experience working at Boeing. One of Boeing's most prolific inventors, holding 64 composite-related patents.

William Spathelf
CFO

40 years' experience with Citi as a senior international banker. Focus on building and growing businesses, strategy, credit risk mitigation, and financial models.

Anita Beishuizen
Marketing & Communications Director

Over 15 years' experience including project management, marketing, finance, investor relations, and communications.

Pascal Scaramuzzino PhD.
Defense Technology Director

20 years' experience in industrial applications, mechanical and ballistic protection, including regional and global leading roles in Sales, R&D, Tech Marketing and Innovation.

Helicoid Industries Inc.

UC Irvine

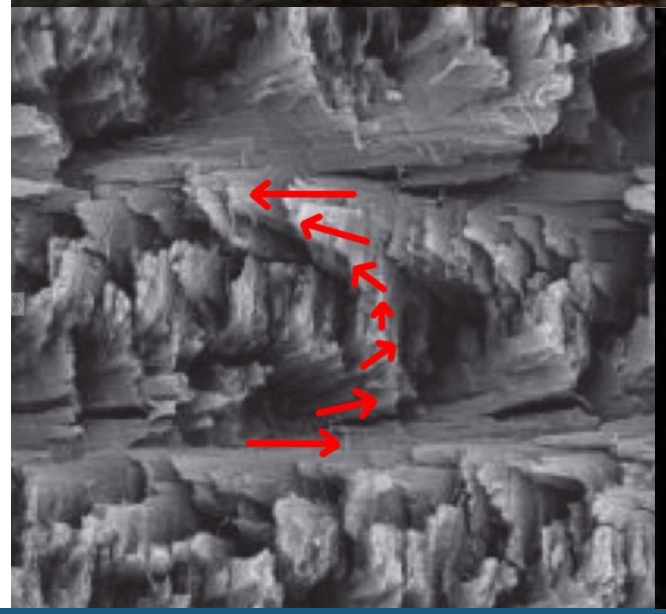
Technology Readiness Level
5

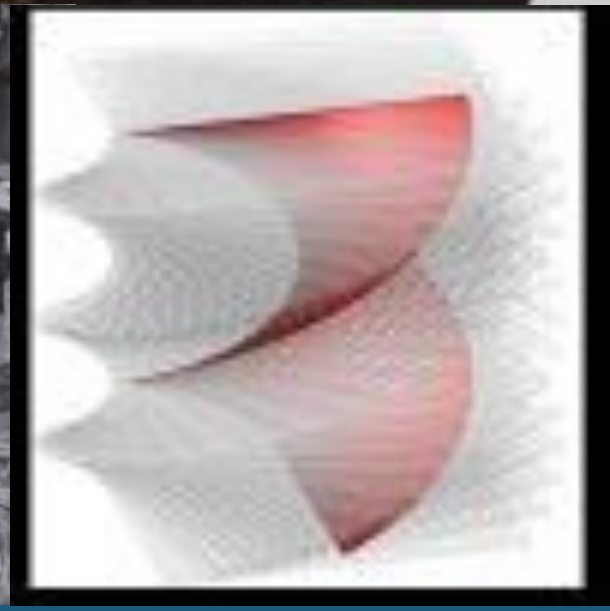
Technology Type
Material-Based

Innovation Description
Mantis shrimp have an internal structure to protect its hammer-like club that pulverizes prey with incredible speed and force. University of California has spent >11 years and >$10 million dollars reverse engineering the club and has determined that it is not the material, but the architecture that provides the strength and toughness. The material is organized in sheets of locally parallel fibers that are stacked, and each layer is rotated.

This unique patented architecture is called a helicoid and is ready to commercialize in numerous composite materials. Our first target market will be Leading Edge protection for wind turbine blades.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Companies interested in new clean energy tech for potential acquisition
- Investors interested in learning about new clean energy investment opportunities





HyperBorean

HyperBorean

UC Davis, Western Cooling Efficiency Center

Contact Information

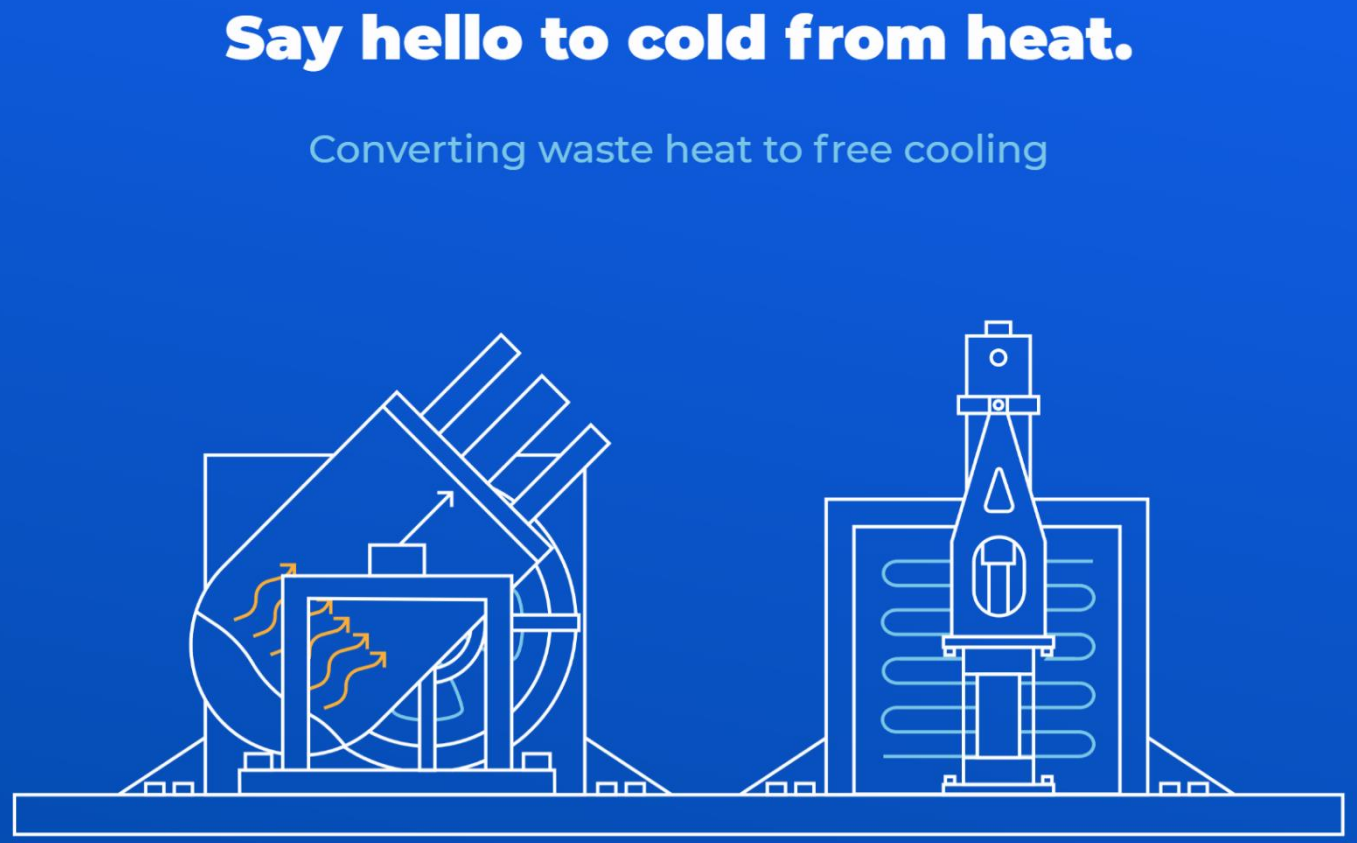
Point of Contact: Todd Gentry
P: 620.229.0001
E: todd.gentry@coldfromheat.com
W: www.coldfromheat.com

Company Region
Central Valley, Fresno County

Company Description
HyperBorean has developed a novel air-conditioning compressor that is powered by heat rather than by electricity. Our compressor provides off grid cooling powered by concentrated solar or other no-cost sources of heat.

Our technology is built on the vapor compression platform which makes our heat powered compressor compatible with all vapor compression air-conditioning equipment.

This compatibility also makes the compressor serviceable by HVAC technicians with only minimal additional training.



HyperBorean

UC Davis, Western Cooling Efficiency Center

Technology Readiness Level
5

Technology Type
Building Technologies

Innovation Description
Hyperborean has developed a novel air-conditioning compressor that operates with heat as its energy input rather than being powered by an electric motor.

The compressor is designed to either replace the electrically powered compressor in a standard vapor compression A/C unit, or alternatively, to be integrated into a standard vapor compression unit in parallel with an electrically powered compressor.

By operating from a source of heat like concentrated solar (CSP), the compressor can operate off-grid, which dramatically reduces the energy required for producing cooling. An advanced control system has been developed which provides real-time energy savings data to our customers.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies interested in new clean tech for potential acquisition
- Investors interested in learning more about new clean energy investment opportunities
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government officials wanting to learn more about the innovation

KIGT

KIGT

UC Riverside CE-CERT

Contact Information

Point of Contact: Paul Francis
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W: www.KIGTinc.com

Company Region

San Diego, San Bernadino County

Company Description

KIGT designs, engineers, and manufactures the pound for pound smallest, smartest, fastest, and most flexible Level 2 Electric Vehicle Charging Station for home, commercial, and fleets.

KIGT's vertically integrated network software Charge Cloud™ Operating features an intuitive user interface and seamless billing software, with power throttling and Vehicle to Grid (V2G) capability.

Designation Status

Minority Business Enterprise (MBE)

KIGT

UC Riverside CE-CERT

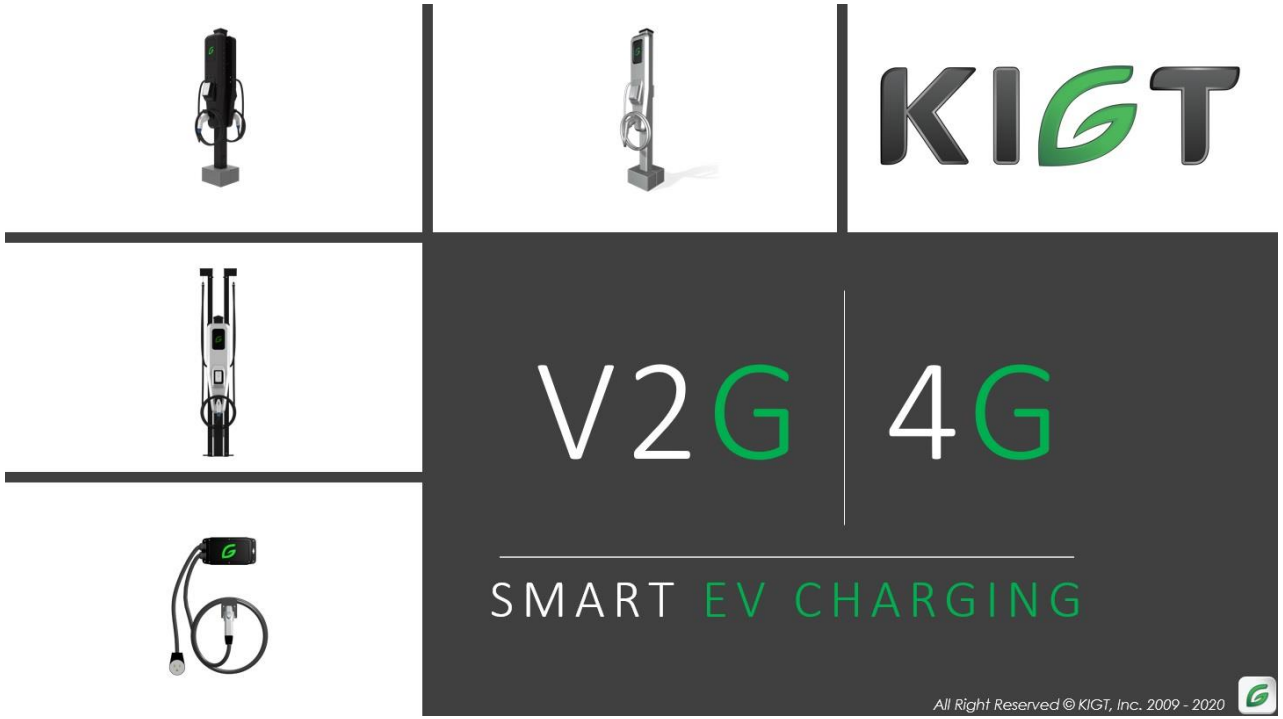
Technology Readiness Level
9

Technology Type
Transportation

Innovation Description
KIGT Smart EV Charging Stations include a vertically integrated software platform, which features KIGT's Charge Cloud Operating System Software Network. KIGT created an easy-to-use intuitive user interface, seamless billing software, and mobile app, with back-end grid management administrative software for property owners and utilities.

KIGT's Level 2 hardware is also Vehicle to Grid (V2G) capable, meaning KIGT eChargers can facilitate the bi-directional flow of power from V2G capable EVs back to the grid. KIGT manufactures in Southern California, and we have the capacity to produce several thousand EV charging stations monthly.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Investors interested in learning about new clean energy investment opportunities
- Government officials wanting to learn more about the innovation



lucent optics

Lucent Optics

Lawrence Berkeley National Lab

Contact Information

Point of Contact: Sergey Vasylyev
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W: www.lucentoptics.com

Company Region
Central Valley, Sacramento County

Company Description
Lucent Optics is dedicated to creating impactful technology solutions for energy efficiency and renewable energy.

Our products include ultra-thin and flexible LED lighting panels, daylight harvesting window films, and high efficiency signage.

Lucent Optics

Lawrence Berkeley National Lab

Technology Readiness Level
5

Technology Type
Building Technologies

Innovation Description
Our novel solar control window film uses printed optical micro-structures to angularity redirect the incident sunlight, rejecting >60% of heat while preserving the view and redirecting the transmitted light deep into the space, enhancing natural lighting levels by 30-50%.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies Interested in new clean energy tech for potential acquisition
- Investors interested in learning more about new clean energy investment opportunities
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government official wanting to learn more about the innovation

NEXT

NEXT ENERGY TECHNOLOGIES, INC

NEXT Energy Technologies

UC Santa Barbara

Contact Information

Point of Contact: Jeffrey Horowitz
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E: jeff@nextenergytech.com
W: https://www.nextenergytech.com/

Company Region
Los Angeles, Santa Barbara County

Company Description
NEXT is developing game-changing transparent photovoltaic glass that allows architects and building owners to transform windows and glass facades into producers of low-cost, on-site, renewable energy for commercial buildings.

NEXT's technology is enabled by proprietary organic semiconducting coatings that are earth-abundant, low-cost, and non-toxic, and are printed in a high-speed, low-cost, low-energy process to produce beautiful energy-harvesting windows.

Cost competitive with conventional energy sources, NEXT’s photovoltaic window technology delivers uncompromised aesthetics while generating low-cost, renewable power at compelling efficiencies. No other BIPV window technology can match NEXT’s transparency, aesthetics, cost, and performance attributes.

NEXT Energy Technologies

UC Santa Barbara

Technology Readiness Level
5

Technology Type
Material-Based

Innovation Description
NEXT Energy makes it easy – and financially attractive – for architects and building owners to specify windows and glass facades that produce near no-cost, on-site, renewable energy for commercial and residential buildings.

NEXT's game-changing photovoltaic window technology delivers architecturally approved color, clarity and aesthetics while generating renewable power at compelling efficiencies not achieved by other solar technologies.

Seeking These Next Level Partners
- Pilot/demonstration project partner
- Companies interested in new clean energy tech for potential acquisition
- Investors interested in learning about new new clean energy investment opportunities

OnTo
Technology
LLC

OnTo Technology LLC

Lawrence Berkeley National Lab

Contact Information

Point of Contact: Steve Sloop
P: 541.410.9029
E: ssloop@onto-technology.com
W: www.onto-technology.com

Company Region
Bay Area, Alameda County

Company Description
OnTo develops methods to recycle advanced lithium-ion batteries. This comprehensive, patented suite of technologies improves safety and efficiency in the developing circular economy.

Innovations include deactivation/de-powering of batteries to improve safety and cost of transportation and storage; and cathode-healing™, which is the most efficient recycling method applicable to any electric vehicle chemistry.

Designation Status
Women Owned Small Business (WOSB)

OnTo Technology LLC

Lawrence Berkeley National Lab

Technology Readiness Level
5-6

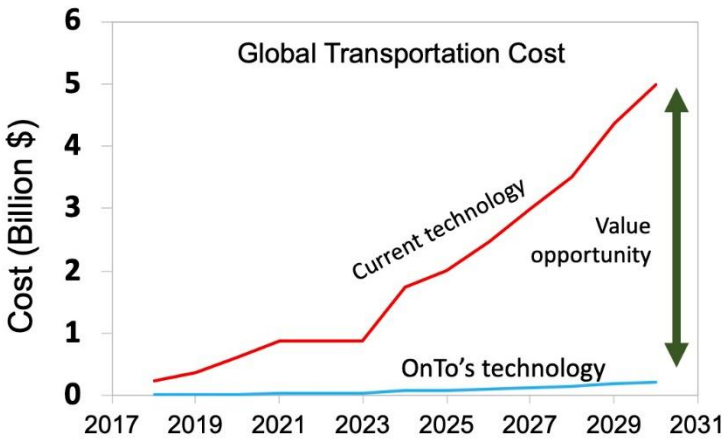
Technology Type
Energy Storage

Innovation Description
OnTo's battery deactivation innovation eliminates flammability and reactivity risks in lithium-ion batteries at their end-of-life, or at any time they may be considered a danger. The process can be applied in the field to address identified hazardous batteries, or at a destination facility to eliminate fire and storage risks.

The process uses low cost, benign material to eliminate reactivity inside lithium-ion, lithium metal, alkaline, and metal-hydride batteries. Batteries deactivated with this technology do not react when exposed to heat or other abusive conditions.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies interested in new clean energy tech for potential acquisition
- Investors interested in learning about new clean energy investment opportunities
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government officials wanting to learn more about the innovation

Battery Deactivation Opportunity



In 2030*:

$5B vs. **$250M**

*Est. global waste tonnage x Class-9 Cost/ton =~ $5B

opus 12

Opus 12 Inc.

Lawrence Berkeley National Lab

Contact Information

Point of Contact: Etosha Cave
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E: operations@opus-12.com
W: www.opus-12.com

Company Region
Bay Area, Alameda County

Company Description
Opus 12 has developed a device that recycles CO_2 into cost-competitive chemicals and fuels.

Our technology bolts onto any source of CO_2 emissions, and with only water and electricity as inputs, transforms that CO_2 into some of the world's most critical chemical products.

We can reduce the carbon footprint of the world’s heaviest emitters, while creating a new revenue stream from what is discarded today as a waste product.

Opus 12 Inc.

Lawrence Berkeley National Lab

Technology Readiness Level
5

Technology Type
Energy Storage

Innovation Description
CO_2 electrolysis combines just three inputs: CO_2, water, and electricity, and converts them into cost-competitive fuels and chemicals. At a high level, CO_2 electrolysis can be thought of as reversing combustion: it combines CO_2, water, and energy to produce higher-energy products and pure oxygen.

CO_2 electrolysis can directly convert waste CO_2 emissions to useful fuels and chemicals enabling deeper penetration of renewable electricity into the electrical grid, reducing air, land, and soil pollution associated with conventional chemical and fuel production, and generating revenue in order to lower ratepayer costs.

Seeking These Next Level Partners
- Pilot/demonstration project partner
- Government officials wanting to learn more about the initiative

ReJoule, Inc.

ReJoule, Inc.

UC Riverside CE-CERT SIGI

Contact Information

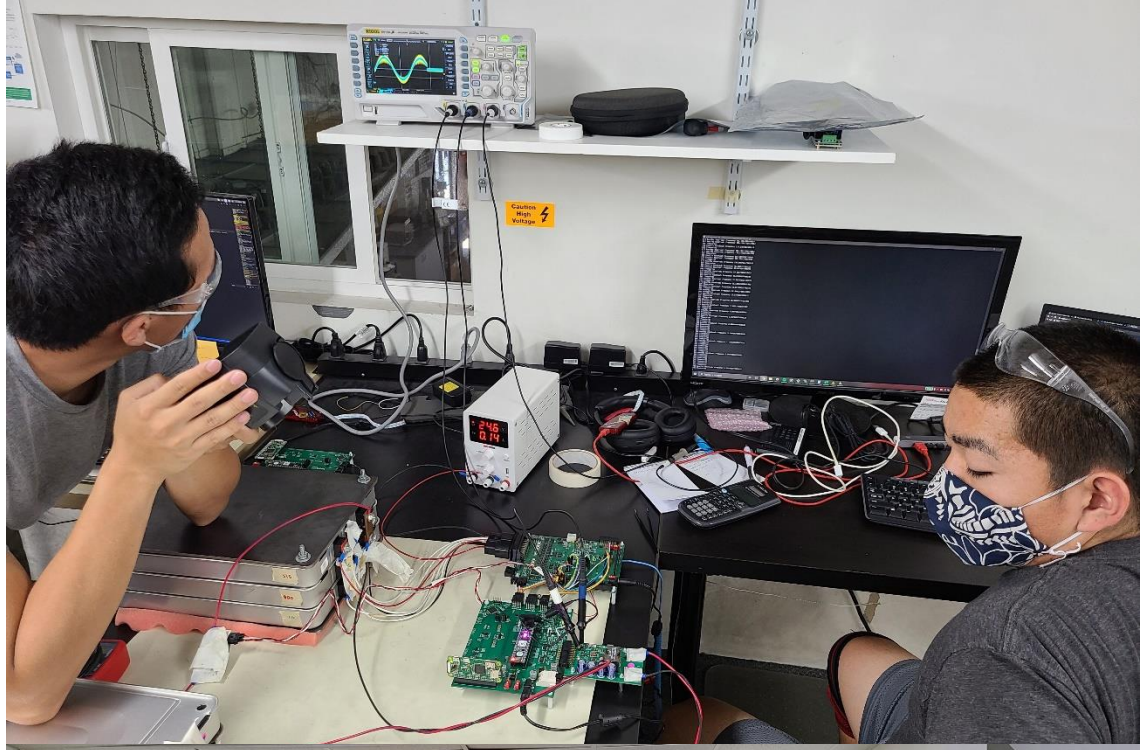
Point of Contact: Zora Chung
P: 805.395.9268
E: zora@rejouleenergy.com
W: https://www.rejouleenergy.com/

Company Region
Los Angeles, Los Angeles County

Company Description
ReJoule's advanced diagnostic platform enables automakers to maximize the value of their electric vehicle batteries.

Our platform enables a fast and more accurate measurement of the battery's health and can dynamically adjust for optimal performance even as it ages. This will help automakers scale their operations from the beginning to the end of the battery's life.

Designation Status
Minority Business Enterprise (MBE)



ReJoule, Inc.

UC Riverside CE-CERT SIGI

Technology Readiness Level
5

Technology Type
Transportation – Battery Diagnostics

Innovation Description
Our innovation streamlines health diagnostics across the battery life cycle to dramatically improve long-term life prediction of battery systems. This provides clarity where there was uncertainty and reduces the cost of battery validation, both during development and maintenance.

Our technology leverages a powerful battery characterization technique called electrochemical impedance spectroscopy that, currently, can only be used in a lab setting for single cells. Our solution makes this powerful technique possible at the module and pack level in real-world applications. The technology reveals unprecedented physical insights into the battery in its end application, allowing for a more accurate assessment of battery state-of-health.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies Interested in new clean energy tech for potential acquisition
- Investors interested in learning more about new clean energy investment opportunities
- Government officials wanting to learn more about the innovation

SMARTVILLE

Smartville Inc.

UC Irvine

Contact Information

Point of Contact: Dr. Antoni Tong
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E: antoni@smartville.io
W: smartville.io

Company Region
San Diego, San Diego County

Company Description
Smartville is a clean energy technology company developing hardware, software, and advanced control solutions to enable used electric vehicle batteries to be repurposed for stationary energy storage applications in a manner that overcomes the four primary challenges of this market: cost, scalability, reliability, and safety.

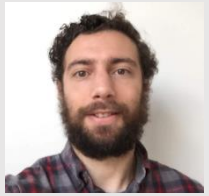
Dr. Antoni Tong
CEO

Mike Ferry
President

Bill Torre
Senior Engineer

Charlie Botsford, PE
Bus Dev & Engineer

Grant Berman
CFO



David Weisbach, PE
Design Engineer

Smartville Inc.

UC Irvine

Technology Readiness Level
6

Technology Type
Energy Storage

Innovation Description
Smartville Inc. has completed component-level research and proof-of-concept testing for its Heterogenous Unifying Battery (HUB) system and is currently ready to demonstrate a 100kW/100kWh pilot system using Nissan and Tesla batteries.

The CalTestBed program will provide crucial support in validating key functions of the integrated HUB system including self-learning of battery health parameters, battery life balancing, and energy storage service capabilities. Smartville will achieve these results through innovative modular power converter control, life balancing to optimize battery cell group life cycles, and life cycle extension via improved cell-to-cell uniformity enabled through industry-first hardware functions and battery management algorithm software.

Seeking These Next Level Partners
- Expert partners to help prepare for scaled-up product manufacturing
- Initial commercial customers for product sales and service: commercial and industrial customers for behind-the-meter energy storage installations and independent power producers seeking low-cost, large-scale energy storage assets
- Investors to provide working capital to achieve manufacturing scale-up

STASIS
ENERGY GROUP

Stasis Energy Group

UC Riverside CE-CERT

Contact Information

Point of Contact: Nick Brown
P: 714.984.3397
E: nick@stasisenergygroup.com
W: https://www.stasisenergygroup.com/

Company Region
Los Angeles, Los Angeles County

Company Description
Stasis Energy Group is bringing thermal energy storage solutions to commercial HVAC systems.

Stasis develops bio-based thermal energy storage systems (TESS) that retrofit existing roof-top-mounted packaged HVAC systems to replace air conditioning with TESS-cooling during the highest peak demand periods of 4-6 p.m. for small and medium commercial buildings.

Designation Status
Minority Business Enterprise (MBE)

Stasis Energy Group

UC Riverside CE-CERT

Technology Readiness Level
7

Technology Type
Energy Storage

Innovation Description
Stasis's first-of-its-kind Thermal Energy Storage System (TESS) is a thermal battery made of plant-based Phase Change Materials (PCM) that is bolted into the supply ductwork of HVAC systems.

Paired with our proprietary controller, it shifts heating and cooling energy use out of peak periods, saving business owners money on their electric bills.

Our system targets peak demand energy use and reduces cooling-related peak demand charges by up to 50%, costs about $6,500 for a 5-ton RTU and pays for itself in 5-6 years and provides savings for the life of the unit.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Government officials wanting to learn more about the innovation

System Z

System Z

UC Irvine

Contact Information

Point of Contact: Paul Donahue
P: 949.400.6393
E: paul@neworld.energy

Company Region

Los Angeles, Orange County

Company Description

System Z has partnered with Neworld Energy to support the lab testing of *The Energy Quarterback* and *Microgrid in a Meter*.

The Energy Quarterback and patented Microgrid in a Meter enable a fast low-cost upgrade to any solar system.

It unlocks a fully resilient self-sustaining solar microgrid that safely powers a home or building from its installed solar (with or without batteries).

System Z

UC Irvine

Technology Readiness Level
7

Technology Type
Internet of Things

Innovation Description
The Microgrid in a Meter ("MIM") is a patent pending, easy to install device that plugs directly into buildings' Smart meter socket.

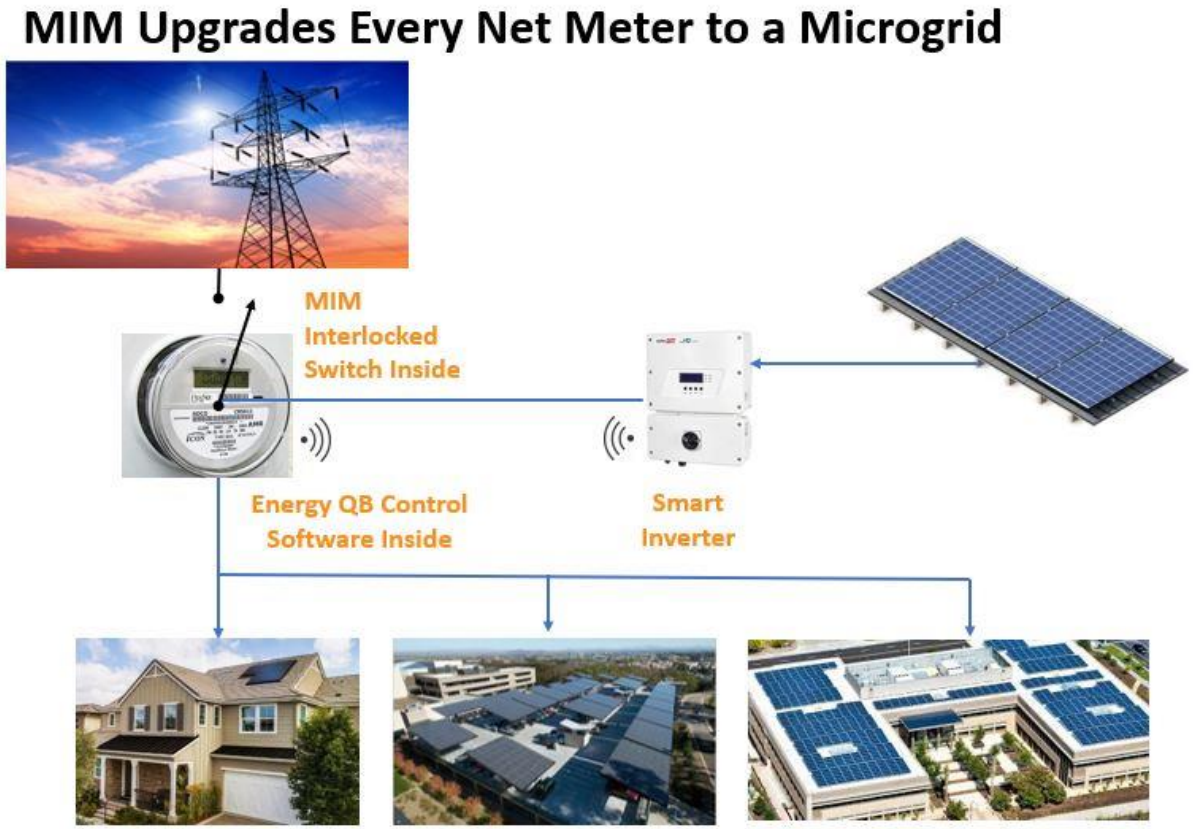
MIM immediately transforms the facility's solar and/or battery system into a resilient microgrid that addresses and meets the following California energy challenges:

1) Solar systems automatically shut down during grid outages, wildfires, and PSPS events;

2) Solar often over-generates on the grid creating costly grid imbalances and

3) Current backup battery systems require expensive hybrid inverters and electrical rewiring to deliver just a few hours of backup power to a limited number of circuits, devices, and appliances.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Government official wanting to learn more about the innovation



TAKACHSR

Takachar

UC Santa Barbara

Contact Information

Point of Contact: Kevin Kung
P: 857.600.0981
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W: https://www.takachar.com/

Company Region
Los Angeles, Los Angeles County

Company Description
Takachar is focused on dramatically increasing the amount of waste biomass economically transformed into marketable products around the world.

Most crop and forest residues (biomass) are loose, wet, and bulky, making them difficult to collect and centralize. Imagine small-scale, low-cost, portable systems that can be latched onto the back of tractors and pick-up trucks to deploy to rural farms and hard-to-access logging landings to process the locally available residues into higher-value, densified bioproducts before transportation.

This can save up to 90% of the logistical costs, dramatically altering the unit economics of biomass conversion.

Designation Status
Minority Business Enterprise (MBE)

Takachar

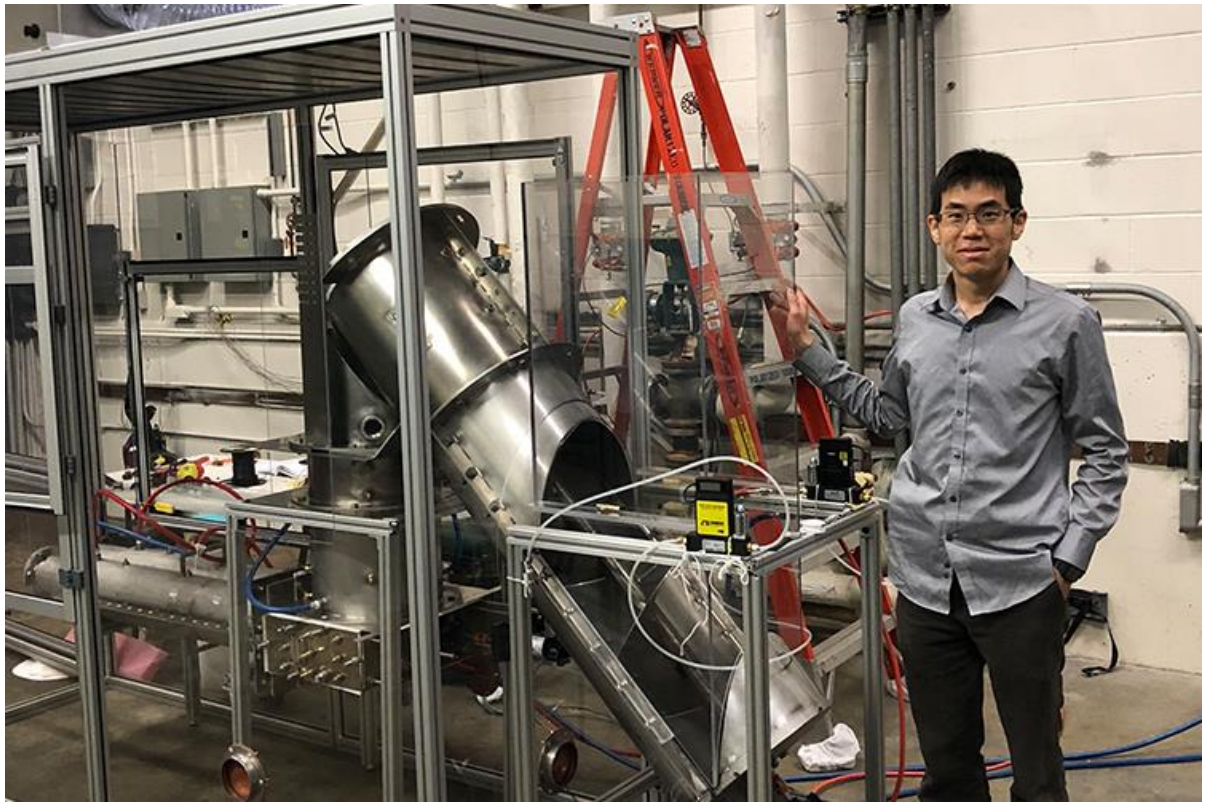
UC Santa Barbara

Technology Readiness Level
5

Technology Type
Renewable Generation

Innovation Description
Takachar's reactor is based a new chemical variant called oxygen-lean torrefaction, explored during co-founder Kevin Kung's doctoral research, supported by the MIT Tata Center for Technology and Design.

We demonstrated that this process could yield a new class of simplified continuous biomass torrefaction reactors that can operate at steady state and can be tuned to produce products of different qualities desired by different end users.



Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Companies Interested in new clean energy tech for potential acquisition
- Investors interested in learning more about new clean energy investment opportunities
- Government officials wanting to learn more about the innovation
- Regulatory agencies to help facilitate the certification process

UmidaAG

Umida AG

UC Riverside CE-CERT

Contact Information

Point of Contact: Joseph Gallegos
P: 562.301.5598
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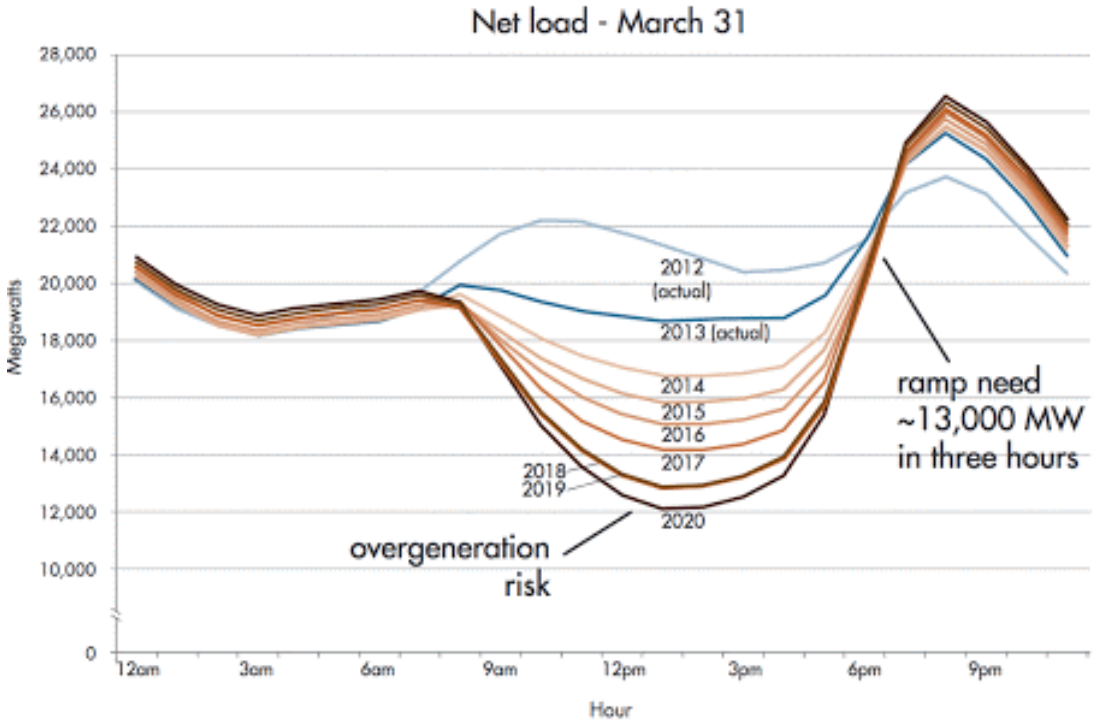
W: www.UmidaAG.com

Company Region
Central Valley, Fresno & Stanislaus County

Company Description
Umida AG reduces farm irrigation power and water use. We are enabling flexible demand load on 240 terawatt hours of capacity in California alone, a $7.2 billon dollar untapped overcapacity in the energy wholesale market.

Think of our A.I solution as a marketplace where overcapacity of renewable power can be sold instead of curtail anytime of the day, essentially using the soil as a form of battery or capacitor at a .0125 KWh cost.

Designation Status
Minority Business Enterprise (MBE)



Umida AG

UC Riverside CE-CERT

Technology Readiness Level
7

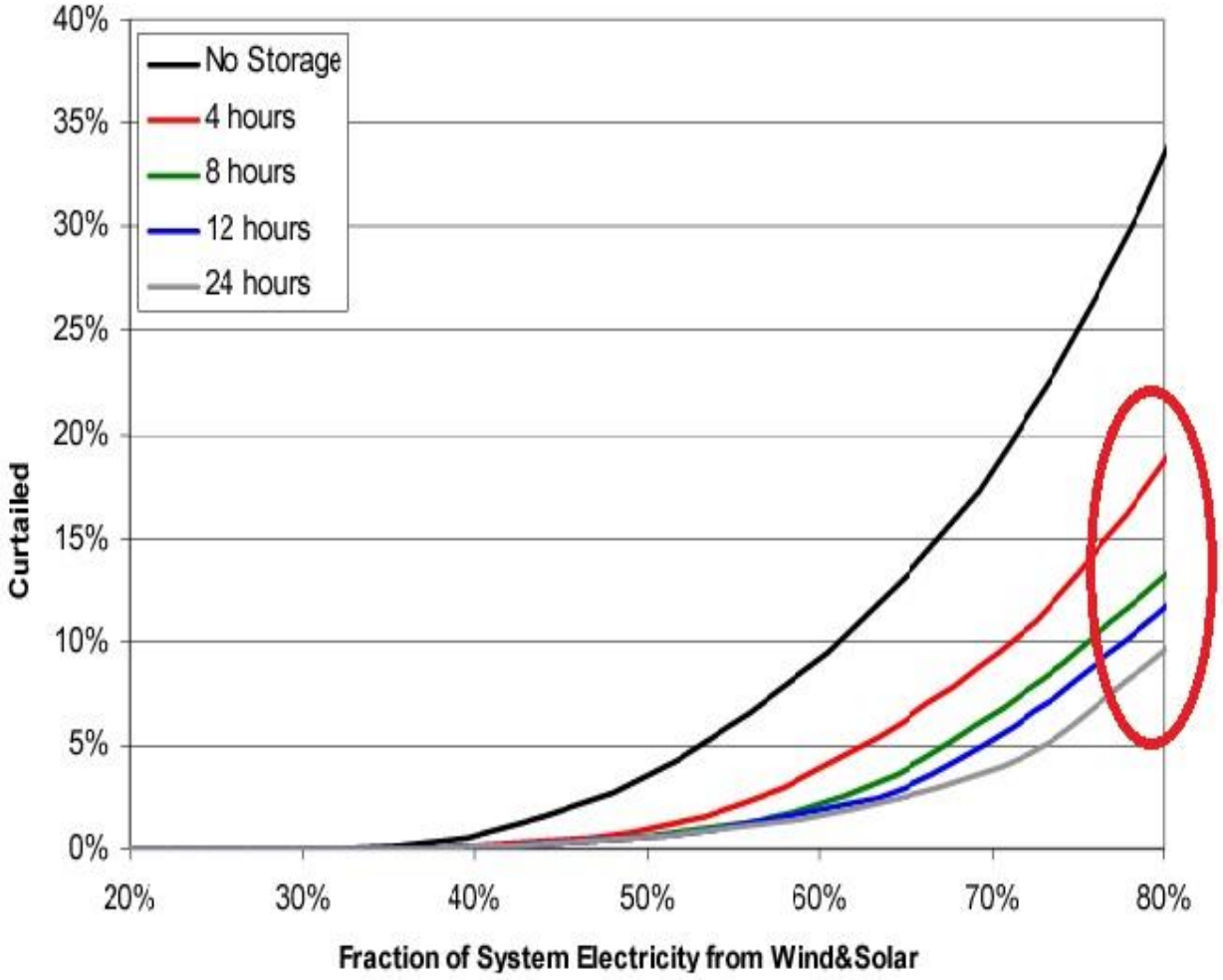
Technology Type
Industrial & Agriculture Innovation

Innovation Description
We take farm irrigation's heavy 24 to 72 hours of uninterrupted power demand footprint and change it to three 5-minute bursts anytime of the day (Flexible on demand load).

Our CAL-ISO energy grid tool smooths out variable generation spikes and avoids overcapacity curtailment losses.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Investors interested in learning more about new clean energy investment opportunities
- Government officials wanting to learn more about the innovation
- Renewable energy utility plant or off taker with overcapacity/curtailment issues
- Grid balancing authority with overcapacity / curtailment losses
- Investors interested in negative wholesale price market arbitrage
- Offtaker with overcapacity/curtailment financial risk / losses

10% to 20% curtailment even with grid storage



Impact of Storage on Curtailment as a Function of Wind and Solar
NREL TP-6A20-68960

WestBiofuels

West Biofuels

UC San Diego Renewable Natural Gas Development Laboratory

Contact Information

Point of Contact: Michael Long
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W: http://www.westbiofuels.com/

Company Region

Central Valley, Yolo County

Company Description

West Biofuels is a provider and developer of thermochemical systems for the conversion of biomass to power, fuels, and chemicals since 2007. In collaboration with national and international R&D partners, such as NREL, CSM, UC San Diego, UC Davis, BEST (Austria), PSI (Switzerland), and TUM (Munich), West Biofuels boasts low-carbon renewables pathways including biomass-based hydrogen, synthetic natural gas, diesel, aviation fuels and chemical alcohol production.

Commercial developments include two community-scale facilities that are currently under construction. West Biofuels offers advanced technologies for reaching a zero-carbon future, reducing threat of wildfires, utilizing agricultural waste biomass, and achieving community and sustainable development goals.

West Biofuels

UC San Diego Renewable Natural Gas Development Laboratory

Technology Readiness Level
5-8

Technology Type
Renewable Generation

Innovation Description
Advanced biomass gasification technology produces high quality producer gas (39% H_2, 29% CO, 20% CO_2, 9% CH_4) suitable for conversion into renewable natural gas (RNG). Fluidized-bed methanation catalyst technology converts all the CO and H_2 in producer gas to RNG without additional H_2 and reduces plant costs.

Adding H_2 from the electrolysis of water (solar power to gas) all the CO_2 in the producer gas can be converted to RNG and output doubled, increasing efficiency and the GHG reduction potential. Optimizing methanation catalyst and operating conditions are required to maximize RNG production from the CO and CO_2 in producer gas.

Seeking These Next Level Partners
- Testbed facilities interested in partnering
- Pilot/demonstration project partner
- Investors interested in learning more about new clean energy investment opportunities
- Accelerator/incubator that supports the commercialization of clean energy technologies
- Government officials wanting to learn more about the innovation

CalTestBed

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e: info@caltesbed.com
w: www.caltestbed.com

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STATE OF CALIFORNIA ENERGY COMMISSION SINCE 1975

Directory Created in Collaboration With MOMENTUM