

## Select ARPA-E Projects Demonstrating Market Engagement

ARPA-E measures the technical and market progress of its projects in a number of ways, including **private-sector investment**, **new company formation** and **government partnerships**.

The projects listed below are those with private-sector investment, new company formation and/or government partnerships as of **February 29, 2016**.

PRIVATE-SECTOR INVESTMENT *	
<a href="#">Agrivida</a>	Engineering Enzymes in Energy Crops (OPEN 2009)
<a href="#">AutoGrid</a>	Integration of Renewables Via Demand Management (GENI)
<a href="#">Avogy</a>	Vertical GaN Transistors (SWITCHES)
<a href="#">Calysta Energy</a>	New Bioreactor Designs for Rapid Methane Fermentation (REMOTE)
<a href="#">Chromatin</a>	Biofuels from Sorghum (PETRO)
<a href="#">City University of New York</a>	Flow-Assisted Alkaline Battery (GRIDS)
<a href="#">Dioxide Materials</a>	Converting CO <sub>2</sub> into Fuel and Chemicals (OPEN 2012)
<a href="#">Energy Storage Systems</a>	Iron Flow Battery (GRIDS)
<a href="#">Envia Systems</a>	Long-Range Electric Vehicle Batteries (OPEN 2009)
<a href="#">FastCap Systems</a>	High Energy Density Ultracapacitors (OPEN 2009)
<a href="#">FloDesign Wind Turbine</a>	Mixer-Ejector Wind Turbine (OPEN 2009)
<a href="#">Fluidic Energy</a>	High-Power Zinc-Air Energy Storage (GRIDS)
<a href="#">Foro Energy</a>	Laser-Mechanical Drilling for Geothermal Energy (OPEN 2009)
<a href="#">Gas Technology Institute</a>	Double-Reflector Hybrid Solar Energy System (FOCUS)
<a href="#">General Compression</a>	Fuel-Free Compressed-Air Energy Storage (GRIDS)
<a href="#">Georgia Tech Research Corporation</a>	Innovative Miniaturized Heat Pumps for Buildings (BEETIT)

<a href="#">Ginkgo Bioworks</a>	Biofuels from E. Coli (Electrofuels)
<a href="#">GreenLight Biosciences</a>	Cell-Free Bioconversion of Natural Gas (REMOTE)
<a href="#">Harvard University</a>	Slippery Coatings To Reduce Friction And Energy Loss (OPEN 2012)
<a href="#">Infinia Technology Corporation</a>	High-Efficiency Air Conditioner (BEETIT)
<a href="#">Lawrence Berkeley National Laboratory</a>	Oil from Tobacco Leaves (PETRO)
<a href="#">Massachusetts Institute of Technology</a>	Electroville: Grid-Scale Batteries (OPEN 2009)
<a href="#">Massachusetts Institute of Technology</a>	Efficient Heat Storage Materials (HEATS)
<a href="#">OPX Biotechnologies</a>	Engineering Bacteria for Efficient Fuel (Electrofuels)
<a href="#">Otherlab</a>	Small Mirrors for Solar Power Tower Plants (Open 2012)
<a href="#">Phononic Devices</a>	Improved Thermoelectric Devices (OPEN 2009)
<a href="#">Plant Sensory Systems</a>	Better Biofuel Feedstock From Beets (Open 2012)
<a href="#">Primus Power</a>	Advanced Flow Battery Electrodes (GRIDS)
<a href="#">QM Power</a>	Efficient, High-Torque Electric Vehicle Motor (REACT)
<a href="#">SAFCCell, Inc.</a>	Solid Acid Fuel Cell Stack (REBELS)
<a href="#">Sila Nanotechnologies</a>	Double Energy Density Anodes for Lithium-Ion Batteries (BEEST)
<a href="#">Sion Power</a>	Lithium-Sulfur Batteries (BEEST)
<a href="#">Smart Wire Grid</a>	Distributed Power Flow Control (GENI)
<a href="#">SolarBridge Technologies</a>	Efficient Power Converters for PV Arrays (Solar ADEPT)
<a href="#">Solid Power</a>	All Solid-State Lithium-Ion Battery (RANGE)
<a href="#">Stanford University</a>	The All-Electron Battery: A Quantum Leap Forward in Energy Storage (BEEST)
<a href="#">Sun Catalytix</a>	Energy from Water and Sunlight (OPEN 2009)

<a href="#">Transphorm</a>	Transistors for Electric Motor Drives (ADEPT)
<a href="#">United Technologies Research Center</a>	Breakthrough Flow Battery Cell Stack (GRIDS)
<a href="#">University of Minnesota</a>	Iron-Nitride-Based Magnets (REACT)
<a href="#">University of Texas at Austin</a>	Single-Piston Natural Gas Compressor (MOVE)
<a href="#">Varentec</a>	Dynamic Power Flow Controller (GENI)
<a href="#">Vorbeck Materials</a>	High-Performance, Low-Cost Lithium-Sulfur Batteries (Open 2012)
<a href="#">1366 Technologies</a>	Cost-Effective Silicon Wafers for Solar Cells (OPEN 2009)
<a href="#">24M Technologies</a>	Semi-Solid Flowable Battery Electrodes (BEEST)

**\* IPOs were also issued by ARPA-E awardees [Ceres](#) (2012), [Ideal Power Converters](#) (2013) and [Arcadia Biosciences](#) (2015).**

**\*[Allylix](#) (2014), [Arkansas Power Electronics International](#) (2014), [Enperion / VA Tech](#) (2013), [Makani Power](#) (2013), [OPX Biotechnologies](#) (2015), [SolarBridge Technologies](#) (2014), [Sun Catalytix](#) (2014) were acquired.**

NEW COMPANY FORMATION	
<a href="#">Alveo Energy</a>	Prussian Blue Dye Batteries (OPEN 2012)
<a href="#">Blackpak</a>	Sorbent-Based Natural Gas Tank (MOVE)
<a href="#">Boston University</a>	Decision-Support Software for Grid Operators (GENI)
<a href="#">California Institute of Technology</a>	Scalable Distributed Automation System (GENI)
<a href="#">City University of New York</a>	Flow-Assisted Alkaline Battery (GRIDS)
<a href="#">Energy Storage Systems</a>	Iron Flow Battery (GRIDS)
<a href="#">Georgia Tech Research Corporation</a>	Autonomous, Decentralized Grid Architecture (GENI)
<a href="#">Harvard University</a>	Slippery Coatings to Reduce Friction and Energy Loss (OPEN 2012)
<a href="#">Massachusetts Institute of Technology</a>	Electroville: Grid-Scale Batteries (OPEN 2009)
<a href="#">Michigan State University</a>	Shockwave Engine (OPEN 2009)
<a href="#">North Carolina State University / University of Massachusetts at Amherst / University of California Los Angeles</a> <sup>1</sup>	Jet Fuel From Camelina / Enhanced Carbon Concentration In Camelina / Efficient CO <sub>2</sub> Fixation Pathways (PETRO)
<a href="#">OnBoard Dynamics</a>	On-Vehicle Engine-Compressor System (MOVE)
<a href="#">Otherlab</a>	Small Mirrors for Solar Power Plants (OPEN 2012)
<a href="#">Otherlab</a>	Intestinal Natural Gas Storage (MOVE)
<a href="#">Pacific Northwest National Laboratory</a>	High-Efficiency Adsorption Chillers (BEETIT)
<a href="#">Sila Nanotechnologies</a>	Double Energy Density for Lithium-Ion Batteries (BEEST)
<a href="#">Stanford University</a>	Behavioral Initiatives for Energy Efficiency (OPEN 2009)

<sup>1</sup> A single firm was created to further develop technical concepts from three separate ARPA-E projects within the PETRO program.

<a href="#">Stanford University</a>	The All-Electron Battery (BEEST)
<a href="#">Texas A&amp;M Agrilife Research</a>	Fuel from Tobacco and Arundo Donax (PETRO)
<a href="#">Texas A&amp;M University</a>	Stimuli-Responsive Metal Organic Frameworks (IMPACCT)
<a href="#">University of California, Berkeley</a>	Rapid Building Energy Modeler – RAPMOD (OPEN 2012)
<a href="#">University of California, Berkeley</a>	Metal Organic Framework Research (IMPACCT)
<a href="#">University of California, Los Angeles</a>	Efficient CO <sub>2</sub> Fixation Pathways (PETRO)
<a href="#">University of California, Los Angeles</a>	Liquid Fuel from Renewable Electricity and Bacteria (Electrofuels)
<a href="#">University of California, Santa Cruz</a>	Efficient Collection of Concentrated Solar (OPEN 2012)
<a href="#">University of Delaware</a>	Affordable Hydrogen Fuel Cell Vehicles (OPEN 2009)
<a href="#">University of Florida</a>	Solar Thermochemical Fuel Production (HEATS)
<a href="#">University of Houston</a>	Low-Cost Superconducting Wire for Wind Generators (REACT)
<a href="#">University of Maryland</a>	Elastic Metal Alloy Refrigerants (BEETIT)
<a href="#">University of Maryland</a>	Solid-State Lithium-Ion Battery with Ceramic Electrolyte (RANGE)
<a href="#">University of Minnesota</a>	Iron-Nitride-Based Magnets (REACT)
<a href="#">University of Notre Dame</a>	Phase-Changing Ionic Liquids (IMPACCT)
<a href="#">University of Texas at Austin</a>	Smart Window Coatings (OPEN 2012)
<a href="#">Virginia Commonwealth University</a>	Carbon-Based Magnets (REACT)
<a href="#">Xiletric</a>	Reinventing the Edison Battery (BEEST)
<a href="#">24M Technologies</a>	Semi-Solid Flowable Battery Electrodes (BEEST)

<b>GOVERNMENT PARTNERSHIPS</b>	
<a href="#">ABB</a>	Magnetic Energy Storage System (GRIDS)
<a href="#">ADMA Products</a>	Membrane Dehumidifier (BEETIT)
<a href="#">Alliant Techsystems (ATK)</a>	Supersonic Technology for CO <sub>2</sub> Capture (IMPACCT)
<a href="#">Applied Materials</a>	New Electrode Manufacturing Process Equipment (BEEST)
<a href="#">Architectural Applications</a>	Energy Efficient Building Ventilation Systems (BEETIT)
<a href="#">Arkansas Power Electronics International</a>	Powerful, Efficient Electric Vehicle Chargers (ADEPT)
<a href="#">Bettergy Corp.</a>	Beyond Lithium-Ion Solid-State Battery (RANGE)
<a href="#">Blackpak</a>	Sorbent-Based Natural Gas Tank (MOVE)
<a href="#">Boston University</a>	Decision-Support Software for Grid Operators (GENI)
<a href="#">Cadenza</a>	Low-Cost Electric Vehicle Battery Architecture (RANGE)
<a href="#">City University of New York</a>	Flow-Assisted Alkaline Battery (GRIDS)
<a href="#">Cree</a>	Utility-Scale Silicon Carbide Power Transistors (ADEPT)
<a href="#">DAIS Analytic Corporation</a>	Dehumidifying Air for Cooling and Refrigeration (BEETIT)
<a href="#">Det Norske Veritas</a>	Gas-Based Battery Monitoring System (AMPED)
<a href="#">Dioxide Materials, Inc.</a>	Converting CO <sub>2</sub> into Fuel and Chemicals (OPEN 2012)
<a href="#">Danforth Center</a>	Improved Light Utilization in Camelina (PETRO)
<a href="#">FastCap Systems</a>	High Energy Density Ultracapacitors (OPEN 2009)
<a href="#">Foro Energy</a>	Laser-Mechanical Drilling for Geothermal Energy (OPEN 2009)
<a href="#">General Electric</a>	Thin-Film Temperature Sensors for Batteries (AMPED)
<a href="#">General Electric</a>	CO <sub>2</sub> Capture with Liquid-to-Solid Adsorbents (IMPACCT)
<a href="#">Georgia Tech Research Corporation</a>	Innovative Miniaturized Heat Pumps for Buildings (BEETIT)

<a href="#">Glint Photonics</a>	Self-Tracking Concentrator Photovoltaics (OPEN 2012)
<a href="#">Halotechnics</a>	Molten Glass for Thermal Storage (HEATS)
<a href="#">Infinia Technology Corporation</a>	High-Efficiency Stirling Air Conditioner (BEETIT)
<a href="#">Inventev LLC</a>	Commercial Truck Transmission-Integrated Utility-Grade Power Generation from Natural Gas (IDEAS)
<a href="#">ITN Energy Systems</a>	Electrochromic Film for More Efficient Windows (OPEN 2009)
<a href="#">Lawrence Livermore National Laboratory</a>	Wireless Sensor System for Battery Packs (AMPED)
<a href="#">Massachusetts Institute of Technology</a>	Electroville: Grid-Scale Batteries (OPEN 2009)
<a href="#">Monolith Semiconductor</a>	Advanced Manufacturing for Sic MOSFETS (SWITCHES)
<a href="#">Oak Ridge National Laboratory</a>	Magnetic Amplifier for Power Flow Control (GENI)
<a href="#">Ohio State University</a>	Syngas into Fuel (OPEN 2009)
<a href="#">OnBoard Dynamics</a>	On-Vehicle Engine-Compressor System (MOVE)
<a href="#">Otherlab</a>	Intestinal Natural Gas Storage (MOVE)
<a href="#">Otherlab</a>	Small Mirrors for Solar Power Plants (OPEN 2012)
<a href="#">Pacific Northwest National Laboratory</a>	High-Efficiency Adsorption Chillers (BEETIT)
<a href="#">Pacific Northwest National Laboratory</a>	Metal Hydride Thermal Storage (HEATS)
<a href="#">Palo Alto Research Center</a>	Innovative Manufacturing Process for Li-Ion Batteries (OPEN 2012)
<a href="#">Pellion Technologies</a>	Rechargeable Magnesium Batteries (BEEST)
<a href="#">PolyPlus Battery Company</a>	Rechargeable Lithium-Air Batteries (BEEST)
<a href="#">Porifera, Inc.</a>	Carbon Nanotube Membranes (OPEN 2009)
<a href="#">Pratt &amp; Whitney Rocketdyne</a>	Continuous Detonation Engine Combustors (OPEN 2012)

<a href="#">Pratt &amp; Whitney Rocketdyne</a>	Efficient Conversion of Natural Gas (OPEN 2012)
<a href="#">Primus Power</a>	Advanced Flow Battery Electrodes (GRIDS)
<a href="#">QM Power</a>	Efficient, High-Torque Electric Vehicle Motor (REACT)
<a href="#">Research Triangle Institute</a>	Biofuels from Pyrolysis (OPEN 2009)
<a href="#">Research Triangle Institute</a>	CO <sub>2</sub> Capture and Regeneration at Low Temperatures (IMPACCT)
<a href="#">Sandia National Laboratory</a>	Probability-Based Software for Grid Optimization (GENI)
<a href="#">SiEnergy Systems</a>	Hybrid Fuel Cell-Battery System (REBELS)
<a href="#">Sion Power</a>	Lithium-Sulfur Batteries (BEEST)
<a href="#">Smart Wire Grid</a>	Distributed Power Flow Control (GENI)
<a href="#">Solid Power</a>	All Solid-State Lithium-Ion Battery (RANGE)
<a href="#">Sustainable Energy Solutions</a>	Capturing CO <sub>2</sub> From Exhaust Gas (IMPACCT)
<a href="#">University of California, Berkeley</a>	Metal Organic Framework Research (IMPACCT)
<a href="#">University of California, Los Angeles</a>	Cost-Effective Solar Thermal Energy Storage (OPEN 2009)
<a href="#">University of Houston</a>	Low-Cost Superconducting Wire for Wind Generators (REACT)
<a href="#">University of Maryland</a>	Multiple-Electron Aqueous Battery (RANGE)
<a href="#">University of Minnesota</a>	Ultra-Thin Membranes for Biofuels Production (OPEN 2012)
<a href="#">University of Texas at Austin</a>	Smart Window Coatings (OPEN 2012)
<a href="#">Utah State University</a>	Dynamic Cell-Level Control for Battery Packs (AMPED)
<a href="#">1366 Technologies</a>	Cost-Effective Silicon Wafers for Solar Cells (OPEN 2009)