

What can ARPA-e do For You?

The projects funded by ARPA-E are developing entirely new ways to generate, store, and use energy. Early-stage technologies supported by ARPA-E have the potential to support energy independence, reduce emissions, improve energy efficiency and our economy, bolster national security, and improve the resiliency and reliability of our grid.

What is a stationary energy storage system?

The program aims to establish new paradigms for increasing stored energy and extending duration of stationary electrical energy storage systems. Stationary electrical energy storage plays several important roles in the U.S. electricity system, and these are expected to grow as the grid continues to evolve.

What is a long-duration energy storage system?

Long-duration energy storage systems are those that address grid needs beyond those covered by daily cycling. They can provide backup power for several days or allow the integration of even larger amounts of intermittent renewable sources like wind and solar.



On July 9, ARPA-E and the National Academies of Sciences hosted a ceremony to celebrate the talent and creativity of remarkable early-career innovators recognized through the Inspiring Generations of New Innovators to Impact Technologies in Energy 2024 (IGNIITE 2024) program. The 23 IGNIITE 2024 selectees will receive approximately \$500,000 to advance a?|



The U.S. Secretary of Energy (DOE) announced the 2023 recipients of the ARPA-E program Seeding Critical Advances for Leading Energy technologies with Untapped Potential (SCALEUP). ION Storage Systems (ION), a University of Maryland (UMD) startup, is the latest recipient of a \$20M SCALEUP award.



Storage Apoorv Agarwal, T2M Advisor Halle Cheeseman, Program Director Katharine Greco, Fellow John Jennings, Government Partnership Advisor Jack Lewnard, Program Director Jo Melville, Fellow Othon Monteiro, T2M Advisor Laurent Pilon, Program Director Jim Seaba, Program Director



ARPA-E hosted a workshop on Transformational Energy Storage Solutions for the Electrification of Planes, Trains & Ships (ESS-1K) on May 10-11, 2023, at The Westin Alexandria Old Town in Alexandria, VA. ARPA-E sought input from stakeholders in the heavy-duty transportation sector (planes, trains, and ships) on the following topics: Within each sector, where could a?



Form Energy will develop a long-duration energy storage system that takes advantage of the low cost and high abundance of sulfur in a water-based solution. Previous MIT research demonstrated that aqueous sulfur flow batteries represent the lowest chemical cost among rechargeable batteries. However, these systems have relatively low efficiency. a?|



WASHINGTON, D.C. a?? The U.S. Department of Energy (DOE) Advanced Research Projects Agency-Energy (ARPA-E) today announced \$18 million for 9 projects to enable the growth of hydrogen as a replacement for fossil fuels. Hydrogen is increasingly seen as a clean energy source and decarbonization agent for industry and transportation. Current global a?|



ARPA-E announced approximately \$11.5 million in funding through its new Inspiring Generations of New Innovators to Impact Technologies in Energy 2024 (IGNIITE 2024) program focused on early-career scientists and engineers converting disruptive ideas into impactful energy technologies. Each IGNIITE 2024 awardee will receive approximately \$500,000 to advance a?|



MIT is developing a thermal energy storage device that captures energy from the sun; this energy can be stored and released at a later time when it is needed most. Within the device, the absorption of sunlight causes the solar thermal fuel's photoactive molecules to change shape, which allows energy to be stored within their chemical bonds. A trigger is applied to a?



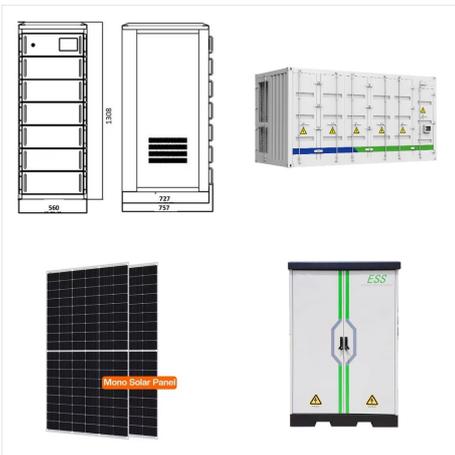
Long-duration electricity storage (LDES) a?? storage systems that can discharge for 10 hours or more at their rated power a?? have recently gained a lot of attention and continue to be a technology space of interest in energy innovation discussions. The increased interest stems from a growing appreciation and acknowledgement of the need for "firm" low-carbon energy a?]



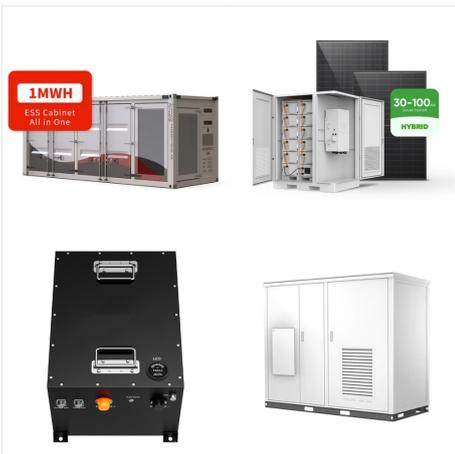
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Electrified Thermal Solutions is developing Firebrick Resistance-heated Energy Storage (FIREs), a new energy storage technology that converts surplus renewable electricity into heat. Once stored, the renewable heat can be used to (1) replace fossil fueled heat sources in industrial processes such as steel and cement production or (2) run a heat engine to produce a?



On May 19a??20, 2011, ARPA-E and the Office of the Assistant Secretary of Defense for Research and Engineering [ASD(R& E)] held a workshop in Arlington, VA to explore advanced scientific and technical challenges to the development of a Hybrid Energy Storage Module (HESM). The vision for HESM is to store electrical energy with high energy density, variable charge and discharge a?



This Exploratory Topic seeks to develop a set of publicly available planning tools for identification, evaluation, and prioritization of energy storage-related technology developments whose deployment would significantly reduce GHG emissions from the rail freight sector. Projects will be informed by, and consistent with, the economic and logistical constraints of the rail freight a?



If successful, developments made under the IONICS program will increase the energy storage content for vehicle batteries by >30% compared to today's Li-ion batteries, significantly reduce battery system costs (for the grid) to about \$150/kWh (for a 5-hour discharge time), and reduce the cost of fuel cells for vehicles by 25% through a reduction of precious a?]



ARPA-E is the Department of Energy's high-risk, high-potential early-stage R& D agency. ARPA-E's mission is to help disruptive, impactful energy technologies reach proof-of-concept. At that point, other funding sources get involved to help bring these technologies to market. These sources can include private funding, government agencies, and other aspects a?]



Fervo Energy has developed proprietary geothermal technology??FervoFlexa?ca??capable of delivering in-reservoir energy storage and dispatchable generation attributes. At the same time, the team will develop a fiber optics-based diagnostic platform to monitor and optimize dynamic subsurface processes that currently pose major a?]



Electric Grid Energy Storage . Initial ARPA -E . Area of R& D . 9 . Advanced Research Projects Agency a?c Energy . Characteristics of Renewable Electricity Balancing Reserves Firm Wind Generation for High Renewable Penetration. HYDROPOWER RANGE 1600-2000MW WIND CAPACITY 3372 MW .



ARPA-E was initially conceived by a report by the National Academies entitled Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future. The report described a need for the US to stimulate innovation and develop clean, affordable, and reliable energy. [2] ARPA-E was officially created by the America COMPETES Act, authored by a?]



Long Duration Stationary Energy Storage December 7-8, 2017 Chicago, IL ARPA-E held a workshop entitled "Beyond the Hour and the Day: Long Duration Stationary Energy Storage" on December 7-8, 2017 in the Chicago, IL area. Stationary energy storage currently plays an important role in the modern electrical grid, and it has the potential to play a much greater role.



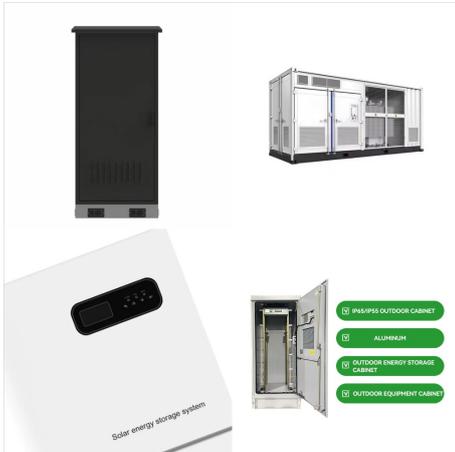
Wednesday, August 21, 2013 New \$36 Million "RANGE" Program Seeks to Develop Innovative Electric Vehicle Battery Chemistries, Architectures, and Designs Washington, D.C. a?? Advanced Research Projects Agency-Energy (ARPA-E) Deputy Director Cheryl Martin today announced that 22 projects across 15 states will receive a total of \$36 million to develop transformational a?]



The Echogen Power Systems team will develop an energy storage system that uses a carbon dioxide (CO2) heat pump cycle to convert electrical energy into thermal energy by heating a "reservoir" of low-cost materials such as sand or concrete. During the charging cycle, the reservoir will store the heat that will be converted into electricity on demand in the a?]



Quidnet is using ARPA-E funding to bring our modular geomechanical energy storage to market and launch more sites. The funding will support our first commercial development in San Antonio, Texas, anchored by the largest municipal utility in the U.S., CPS Energy. Quidnet's modular geomechanical energy storage builds upon the existing U.S



ARPA-E ANNOUNCES \$30 MILLION TO USE QUANTUM COMPUTING FOR GROUNDBREAKING CHEMISTRY AND MATERIALS SCIENCE . The Quantum Computing for Computational Chemistry (QC 3) program aims to develop quantum algorithms to revolutionize diverse areas of energy research, such as designing new and sustainable industrial catalysts, a?|



The Quidnet Energy team will develop a modified pumped hydro energy storage system that stores energy via high-pressure water in the subsurface. To charge, the team will pump water into confined rock underground, creating high pressures. When energy is needed later, the pressure forces water back up the well and through a generator to produce a?|



Update: October 19, 2021 ESS began trading publicly on the New York Stock Exchange on October 11, 2021. ESS" (NYSE: GWH) batteries provide a new tool for decarbonizing the grid and further ARPA-E's mission of changing what's possible in how we generate, use, and store energy. For a look back at ESS" time as an ARPA-E project, check a?|



The projects that make up ARPA-E's HEATS program, short for "High Energy Advanced Thermal Storage," seek to develop revolutionary, cost-effective ways to store thermal energy. HEATS focuses on 3 specific areas: 1) developing high-temperature solar thermal energy storage capable of cost-effectively delivering electricity around the clock and



Overview of ARPA -E Vehicular Energy Storage Programs May 8, 2013 . ARPA-E Mission 1 . Evolution of ARPA -E 2 2007 RISING ABOVE THE GATHERING STORM PUBLISHED 2007 AMERICA COMPETES ACT SIGNED 2009 AMERICAN RECOVERY & REINVESTMENT ACT \$400M Appropriated 2011 FY2011 BUDGET \$180M Appropriated 2012 FY2012 BUDGET a?|