

Project acronym	Project title	Project abstract	Funding organisation	Involved countries	Project lead
<b>ADHERE</b>	Development of Advanced Composite Pressure Vessels for Hydrogen Storage	Efficient storage of hydrogen is crucial for the success of emerging hydrogen energy markets & is strongly connected to the performance & safety of the components of the supply chain. Currently, hydrogen is stored & transported in a compressed form to satisfy the safety & weight regulations for high pressure gases. Alternatively, composite storage vessels offering high strength & low weight addresses this largely unmet problem with a multi-disciplinary team that aims at developing cost-competitive lightweight composite cylinders with improved mechanical & barrier properties for hydrogen storage using the additive manufacturing technology. Such 3D printed liners with barrier coatings make them impermeable to gases. Further, novel chemo-chromic material-based sensors will be developed & integrated into these structures for real-time monitoring of the diffusion of gas. The 3D printed hydrogen storage vessels will then be incorporated into wind turbines to evaluate their performance.	SWEA - Swedish Energy Agency TÜBITAK - The Scientific and Technological Research Council of Turkey MOE - Ministry of Energy Israel DST - Department of Science and Technology India	Sweden Turkey Israel India	Jyothy Institute of Technology
<b>AISTOR</b>	SMART AI BASED STORAGE SYSTEM	AISTOR will develop an innovative artificial intelligence controlled lithium-ion based smart storage system of size 0-2 KW for residential units, public and private buildings and offices for electricity cuts, especially for disaster (earthquakes, floods and fire risks) management and recovery purposes. AISTOR is an artificial intelligence energy storage and management system that provides the needed energy and management in emergency situations such as a power outage, earthquake, flood and fire in houses, offices and hospitals. Compared to existing products (e.g., Tesla Powerwall), AISTOR will be much cheaper, will have a modular design energy efficiency and remote control via embedded AI based decision-making capabilities. AISTOR will be piloted in two disaster risky areas: a public/residential buildings in Istanbul and in BEIA building in Bucharest, Romania for renewable energy integrated innovative smart storage system where an 30 kWp roof-top solar panel is already installed.	TÜBITAK - The Scientific and Technological Research Council of Turkey UEFISCDI - Executive Agency for Higher Education, Research, Development and Innovation Funding	Turkey Romania	BATRON ENERJI Anonim Sirketi
<b>BIO-NRG-STORE</b>	Bio-Based Phase Change Materials in Lignocellulose Matrix for Energy Store in Building	Energy consumption in residential buildings is one of the biggest energy-demanding sector and recent studies report that 40% of the energy generated in the EU is consumed in buildings. Thermal-powered storage technologies have the potential to offer a flexible and reliable way to store heat by means of renewable, bio-based phase change materials (BPCM) encapsulated into lignocellulose matrix. The project objective is to develop and validate insulation materials based on incorporated BPCM into lignocellulose fibers, charcoal, veneer and solid wood and aiming at increasing heat storage and conduction while retaining strength and improving thermal insulation properties and biological durability of the initial materials. Specific aim of the project is to use lignocellulose micro/macro structure (e.g. wood cell wall and lumen) as low-cost porous structures (storage cell) for encapsulation of BPCM for use in "green" building products for energy saving.	FFG - Austrian Research Promotion Agency SWEA - Swedish Energy Agency MIUR - Ministry of Education, Universities and Research TÜBITAK - The Scientific and Technological Research Council of Turkey	Sweden Turkey Italy Austria	Swedish University of Agricultural Sciences
<b>CrossChargePoint</b>	CrossChargePoint - Integrated Multi-Energy Storages Coupling the Power Network to the Transportation Sector	This project aims at providing solutions for the optimised allocation of surplus energy to long- or short-term energy storages as well as transportation supply. Particular concerns of different regions with differing geographical, climatic and economic conditions are taken into account to develop a CrossChargePoint (CCP). The CCP is a new type of charging station functioning as virtual power plant (VPP), combining fast charging capabilities with energy generation, transformation and storage. The CCP provides fast charging simultaneously for multiple electric vehicles (EV) in periods of heavy transit traffic, as well as demand-side management capabilities covering fluctuating demands from transportation and consumption in the local electricity grid. Energy transformation by electrolysis and power-to-gas (P2G) enables the CCP to support gas/hydrogen vehicle fuelling and to operate as energy storage for the local grid, using different carriers for short-term and seasonal energy storage.	FFG - Austrian Research Promotion Agency PtJ - Forschungszentrum Juelich GmbH DETEC - Federal Department of the Environment, Transport, Energy and Communications – Swiss Federal Office of Energy SFOE MOE - Ministry of Energy Israel	Austria Switzerland Germany Israel	Technische Hochschule Deggendorf

# RegSys Joint Call 2019 - Funded projects

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<b>DEVISE</b>	Different Energy Vector Integration for Storage of Energy	<p>DEVISE will develop a comprehensive storage system that enables efficient and rational end use of all forms of energy by having a heterogeneous storage facility for diverse forms of energy and to facilitate conversion from one form to another for optimal catering of diverse loads.</p> <p>Energy from various renewable sources is converted primarily into electrical energy due to ease of transportability. The storage of energy is predominantly electrical. This prevents the efficient and rational end-use of its diverse sources, especially where the energy is available as heat and is supposed to be used in the same form. A holistic approach ensures efficient integration/transformation of different forms of energy for rational end-use and storage of all forms of renewable energy to facilitate the optimal interchange. The developed energy bank will be demonstrated for typical demand-supply scenarios in India that will also lead to developing a decision support system for planning in EU and India.</p>	<p>NER - Nordic Energy Research            MIUR - Ministry of Education, Universities and Research            DST - Department of Science and Technology India</p>	<p>Italy            India            Northern Baltic Eight</p>	<p>Indian Institute of Technology Roorkee</p>
<b>H2 CoopStorage</b>	Development of tools enabling the deployment and management of a multi-energy Renewable Energy Community with hybrid storage	<p>H2 CoopStorage responds to the challenges posed by the deployment of renewable energy production means, by improving local balancing, by reducing renewable intermittences and by intensifying the production of renewable energy.</p> <p>More specifically, the project aims to develop methodological tools and software allowing the deployment and management of a multi-energy (electric, heat, hydrogen) energy community (EC) integrating hybrid storage (electrochemical and fuel cell) to be able to respond to the storage of daily and seasonal energy needs. The tools will be developed on the real Mortsel pilot site, responding in a global manner to the challenges posed by technological, societal and legal barriers.</p> <p>The project is also innovative in its approach because the actors of the EC will participate in the development of tools through a co-construction process. This is fundamental to ensuring that the tools developed meet the needs of all stakeholders.</p>	<p>NER - Nordic Energy Research            SPW - Public Service of Wallonia            VLAIO - Flanders Innovation and Entrepreneurship</p>	<p>Flanders            Wallonia            Northern Baltic Eight</p>	<p>Coopérative pour Les Energies du Futur sclr</p>
<b>HED-LiS</b>	High Energy Density Lithium Sulfur Batteries for Stationary Applications	<p>LiS batteries are commercially available in niche applications. The present market for LiS batteries is therefore dominated by the aerospace industry, specifically high altitude long endurance unmanned aerial vehicles (UAV). The proposed battery cell will initially target these UAV applications. In its maturity, it will expand into wider markets, including electric cars, electric ferries, and stationary storage systems. The project aims to prototype Li-S cells with energy density of ~400 Wh/kg and a cycle life of at least 500. This claims the highest energy density/highest life cycle for a commercial LiS battery. We will develop a novel Li-S battery cell based on a cheap and readily available carbon sponge in the cathode, LixSi/rGO anode and a unique solid state electrolyte. The cell performance will meet the requirements of various applications and extends the adoption of LiS batteries. Studies can be equally applied to existing Li-ion battery systems to obtain higher energy density.</p>	<p>NER - Nordic Energy Research            BF OY - Business Finland            TÜBİTAK - The Scientific and Technological Research Council of Turkey</p>	<p>Northern Baltic Eight            Finland            Turkey</p>	<p>Graphene Batteries AS</p>
<b>IFAISTOS</b>	Intelligent electroFuel production for An Integrated STorage System	<p>Environmental and energy policies over the last years lead to different and fragmented national energy systems with increasing shares of renewable energy sources. The non-programmability of some of these clean technologies and the limited capacity of the power grid require innovative storage devices to decouple production and utilization and synergies between energy domains to be exploited.</p> <p>IFAISTOS aims to provide a long-term energy storage solution based on Power-to-gas that can integrate the electricity from renewables into the whole energy system, from gas to heating, transportation and chemicals, by means of a smart management approach.</p> <p>The technology will be demonstrated in four different contexts fostering its market readiness and proving its integrability in processes with a high carbon intensity. This activity, together with thorough assessments of the business model and the social acceptability, will provide a solid background for the scalable replication of this solution.</p>	<p>SWEA - Swedish Energy Agency            MIUR - Ministry of Education, Universities and Research            DETEC - Federal Department of the Environment, Transport, Energy and Communications – Swiss            Federal Office of Energy SFOE</p>	<p>Sweden            Italy            Switzerland</p>	<p>University of Parma</p>

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<b>I-Greta</b>	Intelligent FIWARE-based Generic Energy Storage Services for Environmentally Responsible Communities and Cities	The goal of I-Greta is to develop solutions for planning and operation of highly flexible energy systems benefitting from storage capacities. These will be capable of integrating high shares of renewables in regional and local energy networks through integrated demand flexibility and forecasting on building level as well as large-scale optimization-based control of electrical, heating and cooling consumption. The consortium intends to build a real-world digitalized and decentralized energy system. I-Greta will connect 5 trial sites in 4 countries via a professional ICT platform benefitting from FIWARE components. Occupants, owners and system operators as key need owners will participate and assess the operation of the respective systems in a Virtual Smart Grid (VSG) based on the platform. A key use case will be the trading of storage capacities via the platform. Individual storage solutions will additionally provide high value and immense impact potential in the local perspective.	FFG - Austrian Research Promotion Agency SWEA - Swedish Energy Agency PtJ - Forschungszentrum Juelich GmbH UEFISCDI - Executive Agency for Higher Education, Research, Development and Innovation Funding	Germany Austria Sweden Romania	RWTH Aachen University
<b>MESH4U</b>	Multi Energy Storage Hub For reliable and commercial systems Utilization	A fundamental transformation of energy systems towards a low carbon economy provide the key challenges for the energy storage concept. The MESH4U has taken as a goal to develop and test multi energy storage hub solutions for flexibility operation from end customers in the local grids, via SMEs/Industry up to the Energy/Distribution System Operator. The objective is to enhance the reliability and economic advantage of energy supply as well as to offer more flexibility and cost efficiency to the modern distribution power grids. The MESH4U solutions will be implemented in 4 demonstrators in different countries in order to test several use cases and applications of multi energy storage hubs within different infrastructures, size of the systems, regulatory and market conditions. With these new concept the added value for each region can be calculated and it will be practically tested, taking into account the technical-economic-sociological triangle and framework conditions.	PtJ - Forschungszentrum Juelich GmbH MIUR - Ministry of Education, Universities and Research DETEC - Federal Department of the Environment, Transport, Energy and Communications – Swiss Federal Office of Energy SFOE MIUR - Ministry of Education, Universities and Research NCBR - National Centre for Research and Development	Germany Switzerland Poland Italy	Electrum sp. z o.o.
<b>MOBISUB</b>	Mobile Substation and Grid Storage System	MOBISUB is researching, designing, developing, testing and piloting a dual function mobile sub-station maintenance system which can also be deployed as a modular, grid-scale storage asset. The project will develop and pilot a containerised solution, based on cutting edge battery technology (including research into both flow and solid state options) along with hardware, software and test protocols to test the dual function system in situ in India. The project aims to show the potential of the system to support a dual use business case at scale in the Indian market. The dual use case mitigates the weak business case in the Indian market for a grid scale storage. Developing these assets as part of a substation maintenance strategy however both meets this immediate need and creates a scalable storage platform for a smarter more flexible grid which can help meet the need for storage and flexibility as renewable assets increase and India moves toward electric vehicles over the next decade.	SCOTENT - Scottish Enterprise DST - Department of Science and Technology India	Scotland India	Cleantech International
<b>New STEPS</b>	New energy storages promoting sustainable energy transition in societies	This project gathers a complete entity around new energy storages fulfilling the objectives of the MCall19. The project encompasses all the three layers in the three-layer research model: technology, market and stakeholders. At core of the technology layer are a pumped hydro storage and a seasonal heat storage. The pumped hydro storage demonstration is partly funded with this scheme while the heat storage's funding focuses on feasibility studies. The effects of the storages to the energy system are comprehensively studied. System analysis is combined with a research on multi-objective business models of the storages, and with replicability and scalability analyses in other locations. The storage analyses are combined to other storage technologies as well. With skillful communication and dissemination, the project aims to establish a positive attitude among the stakeholders making the execution of the project easier and making the efforts against climate change visible to the public.	BF OY - Business Finland SWEA - Swedish Energy Agency	Finland Sweden	Flexens Oy Ab

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<b>Power-2-Transport</b>	Energy storage for sustainable regional development: Optimized integration of renewables in transport systems	The project intends to assess electric storage with batteries, conversion to e-methane via electrolysis of water and methanation of H2 at a bus terminal in order to optimize the utilization of variably produced electricity from solar PV cells in a transport system with electric and gas vehicles. Specific methods and models will be developed for techno-economic evaluations and climate impact assessment for optimization of different operational strategies. The tools are developed to be adaptable and used in other regions in different countries. The Uppsala Region and Uppsala Vatten in Sweden are "need owners" and academic partners from Switzerland and Sweden will be main performer of the work plan, thus including academia and public companies in the consortium. The project has the potential to increase the number of electric buses by 30%, and to allow an increase by 50% in CH4 production for transport sector, resulting in 25% less greenhouse gas emissions than the current scenario.	SWEA - Swedish Energy Agency DETEC - Federal Department of the Environment, Transport, Energy and Communications – Swiss Federal Office of Energy SFOE	Switzerland Sweden	Swedish University of Agricultural Sciences
<b>USC - Flex Store</b>	Underground Sun Conversion - Flexible Storage	The "Underground Sun Conversion – Flexible Storage" proposal aims at an inter-seasonal storage solution. Hydrogen deriving from electrolysis and CO2 are injected in depleted natural gas reservoirs. These gases are converted to renewable methane using a natural metabolic process accomplished by archaea already present in the pore space of the storage. The generated methane can be stored in the same reservoirs in TWh-scale and will be utilized via the existing infrastructure in all energy demanding sectors. The technology was developed and basically tested in previous projects Underground Sun Storage, Underground Sun Conversion. A field test facility established in those projects is integral part of this proposal. The combination of the power to methane process with geological storage of flexible shares of feed and product gases provides flexibility and storage capacity for the future energy system. The development of related services together with need-owners complete the project.	FFG - Austrian Research Promotion Agency DETEC - Federal Department of the Environment, Transport, Energy and Communications – Swiss Federal Office of Energy SFOE	Switzerland Austria	RAG Austria AG

## ERA-Net SES funding partners



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