

NGS – New generation storage

Summary

Scope – The New Generation Storage (NGS) Innovation Pact is completely aligned with the European Union's energy transition strategy until 2040, along with the challenge for the complete electrification of mobility by 2035. Based on a model structured in 8 Work Packages that cover the entire value chain of component production, battery packs and recycling, NGS proposes to add value to each stage of the process, culminating in a common goal: the creation of a new technological ecosystem in the area of batteries that will make the national industry stand out in the global market. Through the cooperation of 47 partners, the aim is to structurally transform the national productive fabric, creating the necessary conditions - at the technological level and human resources - for an industrial ecosystem capable of mass production of innovative technologies, and a complete value chain that allows the management of end-of-life of world reference.

Main objectives

- Installation of a lithium refinery with an innovative and improved industrial line;
- Installation and operation of battery module manufacturing lines;
- Installation of three production assembly lines for battery modules for the automotive industry;
- Creation of five pilot lines for connecting batteries to the grid to manage the electricity network;
- Training human resources in the companies involved in the NGS;
- Develop and implement a Technology Platform, with the main objective of supporting market innovation;
- Communicate and disseminate the overall objectives and results of the NGS.

Project activities and expected results

NGS is composed of complementary technological Work Packages (WP), with the capacity to autonomously generate Products, Processes, or Services (PPS) for the international market, incorporating innovative technologies that can increase the value over the life of the project. Individually, each WP can operate independently in a specific area of the value chain. However, together they interconnect and build a meaningful circular chain.

The WP1 "Advanced Refining and Valorization" aims to install a large refinery and actions related to sustainable refining and valorization processes, aiming to implement an innovative

and improved industrial line for lithium processing, through sustainable technology based on membrane electrolysis.

The WP2 "Cells, Modules and Components" aims at the installation and operation of cell/module manufacturing lines and the development of new and safer and more sustainable electrodes, ligands, electrolytes and separators, in close connection with the WP1 and the WP5.

The WP3 "Battery Assembly" foresees the installation of three productive assembly lines for stationary battery modules for the automotive industry. It also provides for the integration of cabling, connectors and casings, as well as energy management systems and control electronics, modelling and development of the proposed product.

The WP4 "Integration and Application" includes five pilot lines related to: the connection of batteries to the grid for power grid management; the use of batteries for different purposes - residential, commercial and industrial; battery integration into fast charging stations; battery integration in vehicles. These pilot lines will allow the definition of technology and knowledge that will be applied to the use of batteries in a wide range of situations.

The WP5 "Recycling and Second Life" includes lines of action related to the recycling of battery materials and components, battery disassembly and second-life batteries. Furthermore, recycling the battery elements will enable the WP1 to be powered, creating a fully closed circular design.

The WP6 "Advanced Training and Courses" is transversal to the entire NGS Innovation Pact and aims to train human resources in companies involved in the NGS, as well as provide highly specialized training for future master's and doctoral students, promoting technical and university qualifications in companies.

The WP7 "Technological Platform and Entrepreneurship" is also transversal to the entire Innovation Pact and includes lines of action with the objective of developing and implementing a Technological Platform, which will support the national industry to position itself as an important international actor in the sector of batteries. The main objective of this Platform is to support market innovation (from laboratory to factory) for the full development and market adoption of technological solutions, supporting them in all necessary stages of development along the value chain.

The WP8 "Dissemination and Management" is structural for the entire project and aims to communicate and disseminate the global objectives and results of the NGS, intending to widely promote this Pact among sector



Project Reference

02/C05-i01.01/2022.PC644936001-00000045

Leading Institution

DST Solar S.A. (Portugal)

Partners

Bondalti Chemicals S.A. (Portugal), LIN – Laboratório Ibérico Internacional de Nanotecnologia (Portugal), CeNTI – Centro de Nanotecnologia e Materiais Técnicos, Funcionais e Inteligentes (Portugal), IEP – Instituto Eletrotécnico Português (Portugal), EDMTECH Lda. (Portugal), Lux Optimeyse Energy Lda. (Portugal), Universidade NOVA de Lisboa (Portugal), INEGI – Instituto de Ciência e Inovação em Engenharia Mecânica e Engenharia Industrial (Portugal), ISEP – Instituto Superior de Engenharia do Porto (Portugal), UMinho – Universidade do Minho (Portugal), PACT – Parque do Alentejo de Ciência e Tecnologia S.A. (Portugal), Virtual Power Solutions S.A. (Portugal), DTx – Associação Laboratório Colaborativo em Transformação Digital (Portugal), UA – Universidade de Aveiro (Portugal), U.Porto – Universidade do Porto (Portugal), ENFORCE – Engenharia da Energia S.A. (Portugal), PALMIRESDUOS – Combustíveis e Resíduos Lda. (Portugal), INESC TEC – Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência (Portugal), Beneficalendar S.A. (Portugal), Vasco da Gama CoLAB – Energy Storage (Portugal), IST-ID – Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento (Portugal), Energykeme Lda. (Portugal), Addvolt S.A. (Portugal), Voltalia Portugal S.A. (Portugal), LNEG – Laboratório Nacional de Energia e Geologia I.P. (Portugal), INESC MN – Instituto de Engenharia de Sistemas e Computadores para os Microsistemas e as Nanotecnologias (Portugal), ISQ&CTAG Automotive Technologies S.A. (Portugal), PIEP – Pólo de Inovação em Engenharia de Polímeros (Portugal), Innovation Point – Investigação e Desenvolvimento S.A. (Portugal), (continued)

stakeholders (scientific community and market). It also includes the technical management of the NGS Pact.

The NGS pact will deliver **14 PPS**, namely:

- PPS1 – Sustainable Technology for Lithium Refinement
- PPS2 – Predictive Machine Learning based Platform
- PPS3 – New recovery process to value HCl (by-product) for LiCl production
- PPS4 – New processes for pilot-production of novel types of batteries namely, flexible battery cells, thin-film-based solid-state batteries, and structural batteries
- PPS5 – New service for research testing and validation of the novel cathode solution developed
- PPS6 – New cylindrical and prismatic cell battery modules
- PPS7 – New processes for battery testing and certification
- PPS8 – New fast-charging battery pack technology
- PPS9 – Modular Energy Management System
- PPS10 – New sustainable processes for recycling of Li-ion batteries
- PPS11 – New industrial processes and services for 2nd life applications
- PPS12 – New training modules for the battery sector
- PPS13 – NGS Platform and Network
- PPS14 – Digital energy management systems

Partners (continued)

BATPOWER – Associação Portuguesa para o Cluster das Baterias (Portugal), Itecons – Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente e Sustentabilidade (Portugal), ATEC – Associação de Formação para a Indústria (Portugal), GLNPlast S.A. (Portugal), Universidade de Évora (Portugal), Watt-IS S.A. (Portugal), INOVA+ – Innovation Services (Portugal), Beta-i Collaborative Innovation Lda. (Portugal), CEVE – Cooperativa Eléctrica do Vale d'Este C.R.L. (Portugal), DST – Domingos da Silva Teixeira S.A. (Portugal), Centro de Investigação em Energia REN – State Grid S.A. (Portugal), CTCV – Centro Tecnológico da Cerâmica e do Vidro (Portugal), Vista Alegre Atlantis S.A. (Portugal), MCG – Manuel da Conceição Graça Lda. (Portugal), APA – Administração do Porto de Aveiro S.A. (Portugal), PRIO Energy S.A. (Portugal), Valorcar – Sociedade de Gestão de Veículos em Fim de Vida Lda. (Portugal)

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PRR – Plano de Recuperação e Resiliência

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194 801 930.98€

CERIS

Coimbra Hub: 525 043.75€

Project Website

<https://www.itecons.uc.pt/services/projects/123>