



EXPRESSION OF INTEREST

1. Contact details

Country	Türkiye
Name of the organisation	EnerPower Enerji Teknoloji Yatırım San. ve Tic. A.Ş.
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2. Short description of the organisation

For renewable energy sources; Solar (SPP), Wind (WPP), Hydroelectric (HEPP) and all other power generation plant projects; we operate in the renewable energy sector as a business partner with more than 20 years of experience in; project development, feasibility, engineering, technology development, R&D, academic and sectoral consultancy, licensing, permits, installation, assembly, certification, testing and commissioning processes.

3. Specific skills related to the project

CLUSTER 5; Destination 2 with the Mobility area under the Climate, Energy and Mobility cluster; An application will be made for the topic «**Post-Li-ion technologies and relevant manufacturing techniques for mobility applications (Generation 5) (Batt4EU Partnership) (HORIZON-CL5-2024-D2-02-02)**» under "Competitive and Sustainable European Battery Value Chain" under the Cross-Sectoral Solutions for Climate Transition destination. In this regard, in order for battery technologies, which are one of the indispensable elements of the renewable energy field in which our Company operates, to find a place for itself under competitive market conditions and to have a sustainable structure in the market; it is planned to carry out R&D, technology and product development, design and mass production activities. Our company has been active in renewable energy technologies for more than 20 years and there are many international projects that it has completed and is carrying out.

4. Proposed activities for the project

As it is known, environmental degradation and climate change problems caused by fossil wastes around the world bring many more environmental problems. In order for the world we live in to offer us a sustainable living environment, we need to be sensitive to environmental impacts. Within the scope of these sensitivities, especially European Countries, many Unions and Countries have set emission targets for themselves and aim to achieve these targets in the very near future.

Renewable energy technologies are the most promising technology for reducing emissions and synthetic waste. In order for these technologies to be widely used, it is necessary to store electricity in a suitable environment. This storage need is also met with chemical reaction batteries today. In this context, the most commonly used battery type is Li-Ion batteries. However, this technology, which has been used for decades, has left us with a world that we cannot handle both environmentally and financially. The materials used are not environmentally friendly ; their disposal is subject to a separate



serious process ; and serious cost increases due to the fact that the supply-demand balance is disrupted due to limited production opportunities are just a few of the biggest handicaps of these Li-Ion batteries.

Therefore, our main goal in this project will be to pave the way for the replacement of traditional Li-Ion batteries with new technologies. In this context, proper Na-Ion battery technology will be developed and this improved technology will be adapted in renewable energy applications. The advantages of Na-Ion batteries are their environmental friendliness, ease of disposal and relatively low cost due to their widespread availability. However, this type of battery cannot give the full performance technology with the current studies. This deficiency was seen in the preliminary studies we carried out and the need to conduct such a study is emerged.

5. References

Project acronym / starting date	Main objectives	Main activities	Role in the project
2030.5 Gateway / 06.01.2024	With the project proposal, different communication equipment used in the existing electricity distribution network, electric vehicle charging stations and renewable energy plants; Standards and protocols such as IEC 104, MODBUS, OCP, the increase in renewable energy sources, our country is 12th in the world in renewable energy. 5th in Europe The target of exceeding 30GW in solar energy by 2030 (Presidency's Directorate of Communications), the announcement by EMRA that an investment of 1.5 billion USD is targeted in storage-based RES-SPP investments, the electricity network is gradually turning into a distributed structure, and in the future, just like in the USA, a domestic IEEE2030.5 compatible gateway will be developed for the central monitoring and management of this structure and the communication of systems with each other without using transformative hardware.	With the proposed project, the central hardware and protocol serving on IEEE 2030.5 will be developed. - It is aimed to create a large management platform that allows distributed systems to run the same protocol algorithms in the electricity distribution network. In this context, it is aimed to carry out a pilot application in the ADM EDAŞ Region.	Within the scope of the project; - Literature review and search of similar products - Mechanical Modeling, - Electronic Design, - Embedded Software design - Interface Software Design, - Testing of the prototype product in the laboratory and 3rd party Test Company - Field Tests processes will be carried out. all these studies will be carried out with the support of an Academic Advisor from Samsun University.
Super Alert / 06.02.2024	Our country has a climate that lives together in all four seasons. Changing weather conditions in recent years have led to the differentiation of climatic conditions in our country and an increase in uncertainty. This situation causes serious damage to all electricity facilities in terms of generation, transmission, distribution and consumption. The increase in the frequency and duration of climate-related outages (SAİDi/SAİFi values) has led to the necessity for Electricity Distribution Companies (EDAŞ) to focus on these problematic issues and take precautions or find solutions.	In order to increase the learning capacity of the network to be created within the scope of the project studies, a genetic algorithm will be used to optimally select the hyperparameter values of LSTM and other artificial neural networks. The training will be done multiple times with different numbers of hidden neurons and the number of hidden neurons of the network with the lowest error value of the obtained output values will be optimally selected. Hyper-parameters such as the number of training rounds (epoch), the number of hidden neurons, the learning rate and the number of updates will be determined at optimal values. The maximum values of the parameters, the optimal value of which will be investigated in the later stages of the project, will be determined in the studies to be carried out.	It is planned to use an ARM-based 32-bit STM microprocessor in the hardware interface. The basic requirements of the software will be determined as in the previous slides. The library and development environments and hardware to be used in the development process will be listed. Embedded system software is planned to be written in C language. It is planned to use Altium software for open-circuit and printed circuit drawings of hardware units. The product will also have isolated Rs-485 serial connection and micro USB 2.0 serial connection and Ethernet interface for local programming and different applications. Within the scope of communication, it is aimed to use mBioT and LoraWAN in rural areas. In the project studies, researches will be carried out and the systems to be used will be tested and the most stable systems will be continued.