Startup name: Hidrojen Reaktörü (Hydrogen Reactor)
URL: https://www.cordel.com.tr/

Description: This R&D project aims to improve the production of hydrogen, a clean energy source. Our project aims to develop an innovative electrolysis reactor. The project stages include design, prototype development, performance tests, optimization, industrial application, environmental impact analysis and training and information activities. As a result of this project, it is aimed to make a significant contribution to the green energy sector in order to support clean hydrogen production, increase energy efficiency and reduce greenhouse gas emissions.

Startup name: FlexIndustries-Bataryaların İkincil Kullanımlarının Analizi ve Şebeke Uygulamalarının Modellenmesi (FlexIndustries-Analysis of Secondary Uses of Batteries and Modeling of Grid Applications)
URL: https://sakaryateknokent.com/firmalar/DEPAR-ARGE-ENERJI-VE-BILISIM-TEKNOLOJILERI-SAN-TIC-LTID-STI

Description: FLEXIndustries is an EU project (Horizon Europe) built on a multidisciplinary approach to positively contribute to energy efficiency in various sectors. FLEXIndustries is a project created to present and develop the analysis and optimization of energy intensive industrial facilities with the Dynamic Energy and Process Management Platform.

The unique aspects of FLEXIndustries are,
i) Innovative energy production, storage and conversion assets (e.g. new HPs, ORC and thermoelectric-based BESS and waste heat recovery solutions) systems,
ii) Smart and digital tools for optimized operation and control,
iii) Market mechanisms for new business models and improved industrial flexibility.

Overall, FLEXIndustries has the potential to save in this specific project:
a) ≥ 159 GWh/y Total Primary Energy,
b) ≥ 6.0 M€/y life cycle costs at the demo scale and
c) ≥ 33,111 CO2-eq/y emissions at project level.

In order to demonstrate these studies, studies will be conducted in 6 reference countries (Turkey, Greece, Poland, Bulgaria, Germany, Italy) in different sectors. The study areas are;
a) Energy efficiency and operational flexibility,
b) Examination of increased levels of electrification, digitalization and automation,
c) Increased user satisfaction and grid flexibility services,
d) Reduction of carbon footprint,

A highly competent team of 16 large enterprises, 6 research institutes, 8 SMEs, 2 universities and 3 non-profit organizations have been brought together to support FLEXIndustries.
Within the scope of the FLEXIndustries project, SEDAŞ's field application will start with the delivery of batteries suitable for secondary use (with 65-70% charge capacity) together with their charging and control modules to SEDAŞ as safe and protected units by Ford Otosan. Before the field application, the most optimum point will be determined in the field with the support of academicians/consultants, and power quality issues will be examined and analyzed. With the field installation (positioning of batteries in the most suitable places in the network/energy storage system), SEDAŞ will ensure that the system comes on and goes off at certain intervals. Thus, the regional daily load curve in the distribution network can be brought closer to the desired level. By drawing power from the transmission network at similar values almost every hour of the day, the daily load curve of a region can be flattened. As a result; After the analyses and field installation, the effects and benefits of the energy storage system that will be added to the system with batteries suitable for secondary use (with 65-70% charge capacity) will be examined. In this project, DEPAR

ARGE will provide order-based R&D services to SEDAŞ, and the R&D activities and technical studies of the approved EU project within SEDAŞ will be carried out by DEPAR ARGE.

Startup name: İşletme ve yan sanayilerinin yeşil dönüşüm faaliyetlerinde kullanılacak veri toplama yazılımı geliştirilmesi (Developing data collection software to be used in green transformation activities of businesses and sub-industries)
URL: http://https://klina.com.tr/

Description: The main R&D subject of the project is the development of computer software for the provision and control of data needed from within the company and suppliers in carbon footprint and life cycle analysis. For this purpose, data collection methods within the company and in the supply chain will be examined and data losses and elements that negatively affect data security will be investigated. In addition, the contributions of important elements of information technologies such as artificial intelligence and expert systems to improve data collection and security will be examined and the necessary studies will be carried out to ensure the integration of these contributions into the program to be written.

The data collection software proposed in the prepared project does not have a domestic and national equivalent that can be used effectively and in this respect, an important deficiency will be eliminated. In addition, there are important differences and innovative elements between some foreign software and the proposed system. It can be said that the most innovative aspects of the program to be written are that it ensures that the company and its suppliers are integrated into the data collection process and that the reliability test of the entered data is carried out within the program. In addition, there are significant differences in the data types used in the carbon footprint calculations of businesses in different sectors. For example, in some businesses, energy is directly provided from boilers using fossil fuels, while in others, only electricity provided from the grid is the energy source. This situation causes significant confusion in systems and forms where predetermined and fixed data can be collected. Another innovative element is that the program to be written will consist of data collection modules that can be shaped according to different sectors and new needs of businesses and will be usable by all sectors.

In line with this basic purpose, the objectives sought to be achieved with the project are listed below.
• Ensuring that the internal and external data needed for carbon footprint calculation are collected quickly and accurately
• Increasing the sensitivity of carbon footprint calculation by optimizing data collection and data security processes
• Minimizing data losses between the main business, supplier / sub-industry
• Supporting carbon footprint calculation studies, especially for small and medium-sized businesses
• Reducing the cost of carbon footprint calculation processes

Startup name: Akıllı Enerji Depolama Sistemleri için Basılmış Süperkapasitörler ve Piller (Printed Supercapacitors and Batteries for Smart Energy Storage Systems)
URL: https://nesstec.com.tr/

Description: The new generation high energy density lithium-based batteries to be produced will be optimized primarily for electric scooter and electric bicycle manufacturers. However, it is aimed to meet the needs of companies operating in areas such as drone manufacturers, electronics sector, toy sector with special productions according to the need. Many companies operating in this field in Sakarya and its surroundings have been interviewed and deficiencies have been identified. All companies in our country that need lithium-ion batteries meet their needs from abroad. This brings with it import expenses and loss of time. At the same time, the solution of possible negative situations that may arise is also quite problematic. In the interviews we have conducted in order to fill this gap in our country, very positive feedback has been received from companies. To explain the

seriousness of the situation a little more, only 1 company sold 32,000 electric scooters and electric bicycles in 2020. The number of cells used in these vehicles is more than 1 million. The cost of these cells to the company is close to 100 million liras. While only 1 company has such a high battery need, the increasing prevalence of electric vehicles in our country increases this need even more. The global battery market, which was 532 billion dollars in 2017, is expected to be around 700 billion dollars in 2024. Unfortunately, our country is only a consumer in this market at this stage. With this initiative, it is aimed to enter the market as a manufacturer, create a customer portfolio and increase production capacity over the years.

Startup name: Avrupa'nın Lityum İyon Pil Değer Zinciri İçin Yeni Bir Dairesel Ekosistem Yoluyla Kritik Ham Maddelerin Uygulanabilir Geri Kazanımı (Viable Recovery of Critical Raw Materials through a New Circular Ecosystem for Europe's Lithium-ion Battery Value Chain)
URL: https://nesstec.com.tr/

Description: The negative environmental impacts of the linear 'take, make, dispose' model, which is the dominant economic model of our time, are not yet green enough to reduce the carbon footprint of mobility to the lowest levels. It has become necessary to develop new recycling processes to achieve higher efficiencies and recovery rates to re-introduce Critical Raw Materials from used lithium-ion batteries to the market. The recycling technology of lithium-ion batteries is still at the laboratory level due to the complex structure of their waste. Currently, pyrometallurgy is the most applied method in the industry. Although this process does not require pre-treatment, it is energy wasting, the equipment investment is large and will cause serious pollution. In response to these problems, many companies are developing hydrometallurgical processes that can recover lithium and aluminum with low energy consumption. However, this process requires pre-treatment, leaching, purification and other steps and may be a long way off. On the other hand, direct recycling may be an alternative due to its environmental advantages and can recover cathode materials while preserving their chemical structure, but it is still in the development stage. FREE4LIB aims to develop 6 new, sustainable and efficient process technologies at TRL 5-6 level to recycle used lithium-ion batteries (disassembly, pretreatment and 4 material recovery processes). The project, which offers very innovative recycling solutions to achieve high efficiency, is based on the main concept of material recovery (metal oxides, metals and polymers) improving the supply of secondary resources at EU level. FREE4LIB will also present technologies to improve 3 processes targeting the reuse of metals and polymers and electrode synthesis in the same value chain as secondary raw materials for the remanufacture of greener batteries and will explore options to utilize non-reusable elements in other areas. FREE4LIB will also present a methodology based on the Battery Passport principles to improve traceability of processes.

Startup name: Sürdürülebilir Avrupa Sabit Enerji Depolama Uygulamaları İçin Düşük Maliyetli Sodyum İyon Piller (Low-Cost Sodium-Ion Batteries for Sustainable European Stationary Energy Storage Applications)
URL: https://nesstec.com.tr/

Description: SIBER is planned to produce new active materials with a low-cost process, focus on developing integrated solutions for Na-Ion batteries and provide solutions for the European sustainable stationary energy storage future. In addition to producing active materials for cathode and anode, new processes and technologies will be developed in the design of Na-Ion battery electrodes. SIBER was planned as a result of preliminary discussions and studies between TORRECID from Spain and NESSTEC from Turkey, aiming to develop solutions to European energy storage problems. SIBER will compare the performance of electrodes to be produced with traditional methods in Na-Ion cells in addition to ink printing electrode production to obtain new and low-cost cells. In addition, solid, liquid and gel type polymer-based electrolytes will be developed. The most important application area is designed as the storage of energy sources such as solar energy and the creation of hybrid charging stations with Li-Ion batteries transferred to stand-alone or secondary use

in future charging stations of electric vehicles. A 12V-20Ah Na-Ion battery pack will be created with the pouch-type cells to be developed within the scope of the project. Within the scope of the project, cheap (30-40 Euro/Kg) solutions will be provided that do not contain critical raw materials in the entire value chain with anode, cathode and electrolyte active components. In addition, economic and environmental sustainability analyses covering all these processes will be carried out.

Startup name: Endüstriyel Isıtma Sistemlerinde Enerji Verimliliğini Arttırmak (Germony IoT) (Improving Energy Efficiency in Industrial Heating Systems (Germony IoT))
URL: https://maenso.com/

Description: Germony IoT aims to provide a solution to increase the efficiency of heating systems used in industrial facilities and optimize energy consumption.
This project envisages the design and development of an online IoT device. This device will continuously monitor the temperature values of heating equipment used in industrial facilities and collect and analyze this data. In this way, the performance of heating systems in facilities can be accurately evaluated and intervened when necessary. The IoT device to be developed within the scope of the project will combine smart sensors and remote access capabilities. Thanks to these sensors, important data such as the operating status of heating equipment, temperature values and energy consumption can be continuously monitored. In addition, the software platform to which the device will be integrated will be developed to collect, store, analyze this data and provide an interface that users can access. This interface will enable users to remotely control the heating systems of facilities and take the necessary measures to increase efficiency.
The goal of the Germony IoT project is to increase the energy efficiency of industrial facilities and reduce their carbon footprint. In this context, the project will not only monitor energy consumption, but also provide energy-saving suggestions and develop strategies to reduce the environmental impact of facilities. In this way, facility owners and operators will be able to reduce operating costs while also contributing to environmental sustainability goals.
As a result, the Germony IoT project aims to make the management of heating systems in industrial facilities more effective and optimize energy consumption in accordance with sustainability principles. This project will be an important step in the fields of technology and environmental sustainability, because increasing energy efficiency will provide significant benefits to both businesses and the environment.
Today, the market for industrial heating systems is shaped by increasing regulations and awareness on energy efficiency and environmental sustainability. In this context, innovations such as IoT technologies, artificial intelligence and big data analysis have started to play an important role in the sector. Businesses are turning to smarter and more connected systems to reduce energy costs, increase operational efficiency and comply with environmental regulations. IoT-based solutions in particular stand out with features such as real-time monitoring and control of systems, improvement of data-based decision-making processes and optimization of energy consumption. These trends reflect the market's need for more sustainable and efficient solutions. The project aims to create a direct synergy with these technological and market trends. Our IoT-based control and management solution for industrial heating systems responds to the energy efficiency and environmental sustainability needs of the sector by instantly monitoring the energy consumption of facilities and automatically making the necessary adjustments. This approach has the potential to increase the operational efficiency of industrial facilities by offering innovative solutions to problems such as high energy costs and carbon emissions in the market.

Startup name: Enerji Verimliliğinin İyileştirilmesine Yönelik Isil Performansi Geliştirilmiş İnovatif Bir Endüstriyel Kombi Firini Tasarimi Ve Prototip İmalati (Design and Prototype Manufacturing of an Innovative Industrial Combi Oven with Improved Thermal Performance for Improving Energy Efficiency)

Description: There are also various domestic manufacturers (Inoksan, Empero etc.) in the field of industrial combi ovens. However, the products in our country are inadequate in terms of standards and certification processes in terms of reaching large markets in the international arena (especially North America etc.).
Imported industrial combi ovens stand out with their higher cooking energy efficiency (at least 55% in steam mode and at least 76% in convection mode) compared to existing domestic products and their lower average energy consumption, as well as their environmental friendliness. In order to be able to overcome similar imported products and increase our competition, the development of an innovative prototype with high commercialization potential will be provided with significant contributions from the supplier organization.
The development of the innovative industrial combi oven prototype, which will be developed by Team-San with its R&D activities and has a ready potential customer, together with Öztiryakiler, will both increase cooperation in this field and ensure more effective use of public resources allocated for R&D support. With the R&D studies, a high value-added product will be added to Öztiryakiler's product group with an innovative prototype with a unique design and high commercialization potential, and the commercialization process of the product to be obtained by Öztiryakiler will be carried out.

Startup name: Multidisipliner Optimizasyon Yaklaşimi İle Yüksek Verimli Ve Düşük Enerji Tüketime Sahip Elektromanyetik Filtre Tasarimi Ve İyileştirilmesi (Design And Improvement Of High Efficiency And Low Energy Consumption Electromagnetic Filter With Multidisciplinary Optimization Approach)
URL: http://www.runengineer.com

Description: The aim of this project is to develop a new design to improve the performance of electromagnetic filters used in ore enrichment processes in the mining sector. The new filter design will be optimized to provide high efficiency and low energy consumption.
The targets for the electromagnetic filter to be optimized within the scope of the project are as follows.
- High magnetic field strength,
- Low electricity consumption,
- High metal separation rate,
- Less heating.

The expected result of the project is to create a prototype of the electromagnetic filter used for ore enrichment in the mining sector with a new core region design, providing high efficiency and low energy consumption.

The electromagnetic filter to be developed within the scope of the project will have less electricity consumption, lower heating, higher magnetic field strength and therefore higher metal separation rate than its current counterparts.

Startup name: %100 Güneş Enerjili Tarım Robotu (100% Solar Powered Agricultural Robot)

Description: This project has been awarded support by TÜBİTAK within the scope of the BİGGFAST program carried out within Sakarya Teknokent. Within the scope of the project, an agricultural robot that works with 100% solar energy and can perform bottom filling, local irrigation, fertilization, spraying, weed cutting, seed planting and plant health monitoring operations will be developed.

Startup name: Karbon Bazlı Organik Atıkların Kompostlaştırılmasına Yönelik 50/100/250/500/1000 Litre Kapasiteli Sıcak Kompost Makinaları Geliştirilmesi (Development of Hot Compost Machines with 50/100/250/500/1000 Liter Capacity for Composting Carbon-Based Organic Wastes)
URL: http: //www.demircioglurobotik.com.tr/

Description: Composting is a more intensive (and often faster) version of the natural decomposition and recycling process that has been going on on planet Earth for millions of years. In short, composting is the process of creating the ideal conditions for organic matter to decompose quickly.

Hot Composting is an accelerated form of composting where waste is reduced by 70-80% in volume and compost is obtained within 24 hours, instead of the 3-6 months required for natural composting. Hot Composting Machine is specially designed for both residential and commercial establishments to convert all organic waste into compost (organic fertilizer) within 24 hours. The machine can compost all organic waste including kitchen food waste, fish and animal waste, leaves, grass clippings, weeds, seeds, diapers, sewage sludge, shredded meat bones and palm leaves etc.

The resulting compost is rich in plant nutrients, both macro and micro nutrients with more than 80% organic matter content, therefore when applied to the soil it increases agricultural crop production, increases the water retention capacity of the soil and the microbial biodiversity of the soil.

With hot compost, the composting process helps mitigate climate change as it is aerobic and thus eliminates methane production that aggravates climate change.

Hot compost machines with a capacity to receive 50/100/250/500/1000 liters of solid waste will be developed in the project.

Startup name: Karbon Bazlı Organik Atıkların Kompostlaştırılmasına Yönelik Yoğuşturma ve Bulut Tabanlı Veri Depolama/Yönetim Sistemleri Geliştirilmesi FAZ 1 (Development of Condensation and Cloud-Based Data Storage/Management Systems for Composting Carbon-Based Organic Wastes PHASE 1)

URL: //www.demircioglurobotik.com.tr/

Description: This project is presented as a continuation of our company's previous successful R&D study "Development of 50/100/250/500/1000 Liter Capacity Hot Composting Machines for Composting Carbon-Based Organic Waste" project. The hot composting machines developed in the previous project focused on the efficient conversion of carbon-based organic waste into compost. This new project aims to carry the achievements of the previous study even further and includes innovative elements such as the integration of ventless-condensing composting systems and cloud-based data management systems. In this context, we aim to contribute to future waste management models by providing technological solutions for the sustainability and efficiency of carbon-based organic waste composting processes and strengthening the successes of previous projects.

In this new project, our aim is to develop a ventless and condensing composting system to process waste organic material more effectively and to provide high-quality compost production in a short time. The condensing system will be designed to include features such as temperature control, energy recovery and optimization of water content, which will provide significant advantages in terms of environmental sustainability and energy efficiency. This R&D project will allow us to take a further step in the field of waste management, reflecting our commitment to our environmental responsibilities as a company.

Another important R&D goal of our project is the development of a cloud-based database and management system that includes the collection and storage of critical parameters, especially temperature, weight and humidity, that occur during the operation of our ventless-condensing composting system. This system will be an important tool for daily monitoring and analysis of the process. The cloud-based infrastructure aims to store data securely and provide users with remote access from any geographic location. In addition, the remote configurability feature will enable

remote adjustment of system parameters, thus optimizing system performance and increasing energy efficiency. This comprehensive data management system will support effective monitoring and development of the system, as well as providing operators and researchers with valuable information to support more effective decision-making.

The project is presented in 2 phases. The first phase covers the "Condensing System Development" and the second phase covers the "Cloud Based Data Storage/Management Systems Development" work items. Depending on the progress of the project, the phases can be combined and the project can be finalized.

Startup name: Yenilenebilir Enerji Kaynaklı İklimlendirme Sistemleri Geliştirilmesi (Development of Renewable Energy Source Air Conditioning Systems)

URL: http://www.eta4.com.tr

Description: This project primarily covers the determination of the necessary research, development and infrastructure components for the heating of the most important cost item of chicken breeding farms, which are widespread in Sakarya and the surrounding provinces, with heat pumps, which are environmentally friendly, clean, easy to use and can be controlled with automation systems. Thanks to this system, not only efficient heating is guaranteed, but also cooling can be provided to the coops when necessary.

As a hot heat source, the hot fluid obtained from the indoor heat discharged outside and solar collectors will be used to refresh the indoor air in chicken farms. Thus, it is aimed to obtain high COP values. At the same time, many chicken breeding farms have recently benefited from the incentives given and have their roofs covered with photovoltaic solar panels and have started to produce their own electricity. If the heat pump system operates with the electricity obtained from these panels, a completely zero-waste and zero-cost heating system will be achieved. The development of both heat pump application and photovoltaic solar panel systems together for farms will also be a part of the project. Another element is the use of a solar collector supported heat pump, photovoltaic solar panels as well as a heat recovery system. In addition, this system to be developed will also ensure that the high humidity inside the chicken farms, which brings many problems with it at certain periods, is eliminated. During the operation of these high humidity ventilation fans, the air drawn from outside will be passed directly through radiators and/or intermediates, its humidity will be reduced and sent inside, and this low humidity air will be circulated inside with the apparatus systems. Hot water will also be used thanks to the heat pump.