

The logo features the word "xplore" in a bold, sans-serif font. The "x" is a teal color, while "plore" is black. Below "xplore" are two lines of teal text: "TECHNOLOGY AWARD 2023" and "FOR A SUSTAINABLE WORLD".

**xplore**  
**TECHNOLOGY AWARD 2023**  
**FOR A SUSTAINABLE WORLD**

# The sectors

1. Smart Technology



2. Education



3. Environment



4. Smart Energy



5. Social & Health



# Sector Smart Technology



Project	Team name	Education partner / Company	Country	Short summary
Pioneer-Marine Exploration Equipment	Dream Boys	Harbin Engineering University	China	To support the development and protection of marine resources, we have developed the "Pioneer" - an instrument for marine research. The "Pioneer" can be carried on submersibles to perform preliminary three-dimensional measurements and biological mineral sampling in the ocean.
Synchronized Cranes	Synchrono-X	Berufsbildende Schule 1 Mainz	Germany	In this project, two self-sufficient cranes are connected via radio. The movements of the cranes can be synchronized as needed to perform complex lifting tasks. With the help of energy recovery from the drives, it is possible to increase energy efficiency and profitability. The aim is to operate the cranes more intelligently and energy-efficiently.
Ice-Based Gripping Automation for Handling Textiles	cryotec@ic3	TH Wildau	Germany	Wildau University of Applied Sciences is currently working on a project to develop an automated system for gripping, lifting and transporting textiles. The aim is to create an effective solution that enables the safe picking up and placing of textiles using an innovative technology. Given the significant carbon footprint of the textile industry and the projected increase in global textile consumption, it is crucial to develop efficient solutions for handling flexible components to enable more sustainable production sites.

# Sector Smart Technology



Project	Team name	Education partner / Company	Country	Short summary
AQUA - "Water Management at Home for Sustainable World Using IOT"	Aqua	Federal Institute of Science and Technology (FISAT) , Mookkannoor, Kerala, India	India	In the project, a system was developed that controls and monitors the water consumption of a building in order to prevent water waste. The trend of daily, weekly and monthly consumption can be monitored in an app and a warning message is sent when the daily consumption limit is exceeded.

# Sector Education



Project	Team name	Education partner / Company	Country	Short summary
Model of a water treatment plant for teaching (WTP) / AR interface for production plant (AR interface)	WTP and AR-interface	David-Roentgen-Schule Neuwied	Germany	A process engineering model plant has been created for the school lessons of water suppliers, wastewater disposal companies and chemical technicians. This is to be used to learn about various measuring devices, pumping techniques, regulation and control systems and to analyze flow processes in pipelines.
Energy Efficiency Competition E-ES 2023	Jelgava Secondary School of Technologies	Jelgava Secondary School of Technologies	Latvia	The Eco-Efficiency Competition is an event organized by the Jelgava University of Technology to build, test and promote electric cars. The aim is to promote technical thinking in the categories of efficiency and renewable energy, to stimulate cooperation between different generations and peers, and to strengthen the creative potential of families. In about 4 months, participants build an electric car and then use it to take part in a live competition to determine the most energy-efficient prototype electric vehicle.
Energy Awareness System for Young Learners	Cape Peninsula University of Technology	Cape Peninsula University of Technology, Cape Town	South Africa	The project is aimed at (young) students and uses their inherent energy (physical activity) and competition to convey the message of energy use and generation. The project aims to raise awareness of energy in a fun way and show the benefits of saving energy or using electrical energy efficiently.

# Sector Education



Project	Team name	Education partner / Company	Country	Short summary
Phoenix Contact Tech Education Metaverse	TED-MVR	PRESENCE xR SOLUTIONS, S.L., Valdes (Asturias), Phoenix Contact Spain	Spain	The aim of the project is to develop a virtual environment, with certified products from the Phoenix Contact E-Mobility portfolio, for the assembly of a charging station. It serves as a training platform for specialists or for presenting new devices/technologies to customers.
PLCnext Virtual Training System	VR@Train	Burapha University (Muang, Yasothon )	Thailand	The team has developed a training system for students using virtual reality technology. It consists of three parts: 1) the learning part, where students receive information about PLCnext technology, 2) the training part, where students can practice their simple PLCnext programming, and 3) the testing part, where they can test their programs with simulated boilers and receive feedback in the form of points.

# Sector Environment



Project	Team name	Education partner / Company	Country	Short summary
Automated Hydroponic Cultivation Module	Holus	Universidad Tecnológica Nacional Facultad Regional San Rafael	Argentina	This project presents SEGES, a fully automated module that produces fruits and vegetables without agrochemicals and pesticides. It can control important variables that affect the growth process of plants, such as: Temperature, humidity and pH of the soil. This solution would not only help reduce energy demand and pollution in food production, but also provide families with fruits and vegetables without the use of pesticides and preservatives.
ketran agrobot v2	ketran agrobot v2	DUOC UC, Santiago de Chile	Chile	The team has developed an autonomous farming robot that can grow and maintain vegetables, flowers and fruits, with the background of significantly reducing the use of toxic agrochemicals or fertilizers and reducing the time required for human intervention.
Artificial intelligence to counteract food waste	AI2CF	Université Orléans, INSA Centre Cal de Loire, Laboratoire Prisme	France	Development of a system to reduce food waste: Based on artificial intelligence, a program is being developed that detects and sorts out black spots on potatoes. Discarded potatoes that are not suitable for sale can be used for animal feed.

# Sector Environment



Project	Team name	Education partner / Company	Country	Short summary
Smart Aquaponics Systems	Smart Aquaponics	Heriot Watt University Dubai	UAE	The project was dedicated to the development of an automated aquaponics system with a solar-powered energy supply. Aquaponics systems are a sustainable way to grow both plants and fish.
Fully Automated Agricultural System	RADiSh	Purdue University, Indiana	USA	Due to the increase in food deserts and limited resources to feed the ever-growing population, the RADiSh team from the USA designed a fully automated agricultural system. It influences and visualizes important factors such as soil pH and moisture, light and temperature to enable more efficient, as well as smart food production and increased energy efficiency in agriculture.
H2HU Aquaponics Waste Treatment 2023	H2HU Aquaponics Automation	Harrisburg University of Science and Technology Street	USA	The H2HU Aquaponics Automation team from the U.S. is working on aquaponics automation to create food production systems that are sustainable and promote resource reuse.



# Sector Smart Energy



Project	Team name	Education partner / Company	Country	Short summary
Smart Energy Storage	86	VFacultad de Ingeniería - Universidad de Buenos Aires	Argentina	The Smart Energy Storage project represents an innovative approach to the storage and management of electrical energy. The project is based on the use of gravity by moving bricks up and down. During hours of low energy demand, the blocks can be raised and dropped only when more energy is needed. A generator feeds the energy thus generated back into the grid.
Next Energy Management System	GESIC Next	Universidad Tecnológica Nacional FRSN, Santa Fe	Argentina	The "Next Energy Management System" is a project dedicated to optimizing energy consumption in households and buildings. Real-time data collection and a user-friendly web interface provide users with insights into energy consumption and generation. In particular, the project introduces efficient charging management for electric vehicles based on the availability of electricity, which increases overall energy efficiency.
Intelligent Air Handling Unit Based on Digital Twins	Intelligent Air Handling Unit Based on Digital Twins	Tongji University	China	In the project, an intelligent control system for a ventilation unit was developed. With the help of a digital twin, energy saving effects are evaluated and the optimal control strategy of the ventilation unit is determined. The aim is to minimize the energy consumption of the system.

# Sector Smart Energy



Project	Team name	Education partner / Company	Country	Short summary
AI-Nergy	BBS II Wolfsburg	BBS 2 Wolfsburg	Germany	The AI-Energy project initially developed and built a small heating model, an energy consumption monitoring system, and an indoor climate monitoring system. These three sub-projects are now combined into a single system. Using the heating model, data is sent to ChatGPT. ChatGPT then calculates the difference in CO2 consumption compared to the previous heating behavior. The energy monitoring system detects irregular and above-average energy consumption and sends a notification to the user so that they can check the appliances or equipment that are causing the high consumption. This procedure saves time and effort, simplifies the process of identifying potential and enables faster energy-saving measures.
Energy Measurement, Analysis and Management	Energy Measurement, Analysis and Management	School of Technology and Management (ESTG) - Polytechnic of Leiria, Campus 2	Portugal	The motivation behind the EMAM (Energy Measurement, Analysis and Management) project is to raise people's awareness of sustainability and energy efficiency. Electricity, water and gas consumption of buildings are measured and then consumption forecasts are created and visualized for the user.
UAV BASED PV SYSTEM INSPECTION	Karya	Mugla Sitki Kocman University	Türkiye	The project deals with the detection of power losses in photovoltaic modules. A quadrotor was built (small drone) that is able to send and analyze real-time images of the PV modules to identify damage to modules.



# Sector Social & Health



Project	Team name	Education partner / Company	Country	Short summary
Non-Contact Gesture Recognition Household Control System	Hogwarts in reality	Tongji University	China	In this project, the team is dedicated to gesture control technology to simplify actions in the home. It facilitates the switching off of unused devices, saves energy and contributes to sustainable development.
fiREx	fiREx	Berufsbildende Schule 1 Mainz	Germany	fiREX is a smart fire protection concept that can be used in logistics in the area of high-bay warehouses. It comprises a large number of sensors and actuators and is designed to detect and contain incipient fires in particularly sensitive areas, such as the storage of battery cells. An intelligent and automated high-bay warehouse has been implemented. In addition, the individual rack areas are monitored by various sensors in order to detect temperature differences. This temperature difference triggers an automatic sequence: The transport platform picks up an extinguishing chamber and moves it to the corresponding shelf compartment. There, a second check of the temperature is carried out for the purpose of the infrared sensor. If the fire is still suspected, the pallet concerned is isolated from the rest of the warehouse by the extinguishing chamber and moved together with it to a specified location to initiate extinguishing of the pallet.



# Sector Social & Health



Project	Team name	Education partner / Company	Country	Short summary
Advanced Metering Infrastructure for Customers Identification	AMI-CI	Universidad de Concepcion (Chile), Univerisdad de Oviedo (Spain), PxC Chile, PxC Spain.	Spain	This project is about the topic of online characterization of customers' daily (electrical) load profiles. The team has developed a data decision structure necessary to obtain the electrical data to identify the possible behavior of customers. In the test installation, the data can be accessed by customers using different communication protocols, also combining mobility and sustainability solutions to achieve an all-electric society. The idea of the project is to implement a flexible management to analyze the different types of customer behavior.
NurseBot	Robotium	Heriot Watt University Dubai	UAE	This project addresses the shortage of healthcare providers on their continent. To address the rapidly growing shortage of skilled workers, Team Robotium is introducing the Nursebot, an automated and data-driven robot to collect and record patient data such as vital signs and conduct patient interviews for healthcare professionals.