



## ANNEX A – TECHNOLOGICAL PROPOSALS PoC ENEA 2023

- [Cultural and museum heritage, conservation, monitoring, valorization](#)
- [Smart cities/energy, energy communities, smart cities, smart mobility](#)
- [Automation, production processes, lean/smart manufacturing, smart factory, industrial robotics](#)
- [Aeronautics and aerospace, space economy](#)
- [Advanced farming, innovative agricultural production, farm of the future, automation and drones for agriculture](#)
- [Advanced infrastructure construction technologies, anti-seismics, energy efficiency in heating & cooling, lighting engineering, infrastructure efficiency, sustainable and circular decommissioning techniques](#)
- [Food & Beverage processing industry, storage techniques, food and raw material tracking, innovative production processes](#)
- [Chemistry and pharmaceutical, life sciences](#)
- [Technologies for high energy intensity industries \(steel, ceramic, glass production\) and energy recovery/heat waste](#)
- [Production and management of energy from primary sources, transport/energy carriers](#)
- [Reuse of material resources, circular economy, production and use of secondary raw materials](#)
- [Monitoring/management/reclamation of highly anthropic/industrialized environments and territories](#)
- [Technologies for ports and freight villages, water monitoring and coastal reclamation](#)



Cultural and museum heritage, conservation, monitoring, valorization		
<a href="#">SSPT202301</a>	<b>ISLAND-Tee</b> - Inexpensive Smart Labels Applied to Next generation Digital Temperature electronic indicators	Addressed to the smart packaging sector, the aim of the project is embedding a critical temperature indicator in a radio-frequency electronic label and acquiring signals in a nearby system.
<a href="#">SSPT202302</a>	<b>INNOVA</b> - INNovative Opto-VALve	The aim of the project is the development of a new type of micro-valves, based on the use of low-cost photo-mobile polymers (PMP), light-driven; by adjusting the incident light parameters, PMP can be displaced, allowing fluids to move, with no need of electronic controls.
<a href="#">SSPT202303</a>	<b>Bio-Pro-Lab</b> - Programmable and Biodegradable/Recyclable Chipless Labels	The aim of the project is the development of chip-less, programmable labels, on biodegradable or recyclable supports, like paper or bioplastics; labels could be used to identify and track goods; they are not available on the market yet. The chip-less labels are easier to discard, can be thrown away as a biodegradable waste and are cheaper compared to available ones.
<a href="#">SSPT202304</a>	<b>ISMuSe</b> - IoT Smart Multi Sensors Device	The aim of the project is the development of advanced materials, specifically designed to make up sensors with high sensitivity, reliability and stability, able to detect and analyze chemical substances in air.
<a href="#">TERIN202304</a>	<b>IOMS-CLASS</b> - Classifier of Electronic noses for odor analysis	In Italy, the UNI-11761 standard of 2023 has proposed a classification for IOMS electronic noses, while in Europe and in standard institution such as IEEE, rules are being developed. The innovation proposed, concerns the development of a prototype of "IOMS Classifier" in accordance with the regulations, to satisfy the growing demand of the companies interested in producing IOMS.
<a href="#">TERIN202305</a>	<b>QCM4PM</b> - Atmospheric particulate sensor based on microbalance	Low-cost sensors are essentially based on optical detection techniques. The proposed technology is based on gravimetric detection with vibrant membranes, also appropriately functionalized to modulate its sensitivity.
<a href="#">FSN202303</a>	<b>RECOVERING</b> - Remote detECTION through adVancEd cRime lIght imagiNG	The CLI system enables image-based monitoring of an area of interest illuminated by high-power LEDs, mainly exploiting three conditions: the target absorbs/scatters the incident light or emits fluorescence. The tool provides high resolution images related to the identified traces, referenced in the scenario that you intend to explore by using a stereo camera

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<a href="#">SSPT202309</a>	<b>BIOPONIC</b> - Formulation of a bioprotectant containing molecules from plant waste for vegetables hydroponic cultivation	In hydroponics crops, usual nutrients are made from syntetized molecules; the aim of this project is the replacement of artificial nutrients with probiotic microorganisms (like bacteria from ENEA repository and fungi) and wastes from processing.
<a href="#">TERIN202301</a>	<b>DD4BioPower</b> - Development of an innovative downdraft reactor for the production of biofuel from vegetable waste	The proposal concerns the application of innovative solutions to improve the efficiency and optimize the technology of a new reactor for the gasification of biomass, residues and waste, already designed and patented.
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<a href="#">TERIN202309</a>	<b>UrbanPhotoTwin</b> – Digital twin urban photovoltaics for the energy transition	Digital tool based on GIS, GeoAI, remote sensing and photovoltaic modelling technologies for the identification of optimal areas for the installation of small and medium-sized PV systems in areas with architectural, socio-economic, environmental and functional constraints.
<a href="#">FSN202302</a>	<b>TubOne</b> - Urban transportation of goods and objects for a new ecology	The TubOne is a widespread urban network, which reaches every building, adding to the existing ones: electricity, water, gas, telephone/data. A tube that winds like a treadmill under urban settlements, connecting homes, offices, companies and shops.

Automation, production processes, lean/smart manufacturing, smart factory, industrial robotics		
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<a href="#">FSN202301</a>	<b>RIMAX</b> Smart robot for X-mapping in fusion facilities decommissioning	The sustainability of future fusion power plants is mainly based on the simplifications concerning the cycle of radioactive materials produced. We propose to combine existing technologies (i.e., a robotic arm, a miniaturized X/gamma detector, potentially supported by a camera and a 3D Lidar or photogrammetry apparatus) into an intelligent characterization system.
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<a href="#">FSN202305</a>	<b>SmartGBox</b> - Smart Glove Box for real-time measuring of gamma radiation	The glove box used in inspections will be equipped by a series of portable gamma ray counters (detectors), called SciFi. The novelty of this solution consists in monitoring the presence of gamma radiation in the sample to be analyzed in real time and providing an indication of the position of a possible radioactive source.

Aeronautics and aerospace, space economy		
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<a href="#"><u>SSPT202312</u></a>	<b>PRO-MICRO-FER</b> - Alternative PROteins from MICROorganisms by the FERmentation of agri-food waste	The aim of the project is the optimization of the process, and the characterization, of a proteic biomass, that can be obtained from fermentation of specific vegetable waste (es. waste of prickly pear, rich in sugar) with specific yeasts; such biomass is rich in proteins and can be obtained in short time and high mass; as a final result, flour and snacks can be produced.
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<a href="#">SSPT202305</a>	<b>SIProVAC</b> - Integrated Systems for Plant Production in Closed Environments	In the soilless cultivation, Lamps (currently available in the market) provide sharp lighting, not venting. In this project, based on ENEA know how, the Venting Lamp combines together sharp lighting (in terms of light frequency and intensity) and forced aeration, specifically designed for vegetable needs.
<a href="#">SSPT202307</a>	<b>VALMEGREA</b> - Exploiment of the Annurca Apple of Phlegraean origin	The aim of this project is obtaining high value active molecules (antioxidants, etc) as powder/extract/oil, from Annurca apples, via new operating conditions during extractions, e.g., Temperature <40 °C and high Pressure (>80°C) to preserve characteristics.
<a href="#">SSPT202310</a>	<b>RecuPro</b> - Recovery and concentration of whey proteins from dairy supply chain waste	In the milk processing, the membrane technologies can be used to divide serum proteins from exhausted serum like "scotta" (the serum concentrated by heating). The "scotta" is the new raw material, recovered from waste.
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<a href="#">TERIN202308</a>	<b>MOST</b> - Agricolture monitoring with optical fiber sensors	FBG optical fiber sensor will be employed innovatively in the agricultural sector as a growth sensor, after customized realization, by incorporating in siliconic matrices developed to easily adapt to the morphology of the plant.

Advanced infrastructure construction technologies, anti-seismics, energy efficiency in heating & cooling, lighting engineering, infrastructure efficiency, sustainable and circular decommissioning techniques		
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<a href="#">TERIN202306</a>	<b>CEMO</b> – Km0 Cement	CEMO creates an innovative Km0 cement mortar, with the aim of replacing up to 100% of the concrete normally used, obtaining a mix design of a mortar with better mechanical and functional performance.
<a href="#">TERIN202307</a>	<b>GECO</b> - Green Ecolight Cement mOrtar	The project develops a lightweight cement mortar to high performance to create an energy efficient product from an environmental and easy to apply, in accordance with the European directives regarding waste management and sustainable use of resources.
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Food & Beverage processing industry, storage techniques, food and raw material tracking, innovative production processes		
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<a href="#">SSPT202306</a>	<b>REBIOCYN</b> - Recovery and concentration using mild-technologies of bioactive molecules from artichoke waste ( <i>Cynara cardunculus</i> ) for the production of food supplements.	This project is related to the recovery of polyphenols and inuline, from waste, during artichokes processing, coupling a new membrane process for the selective fractionation, with spray-dryer techniques.
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<a href="#">SSPT202308</a>	<b>PROMIES</b> - Production of sustainable proteins by means of innovative methods integrated with entomo-conversion of agro-industrial waste	The aim of this project is the definition of the whole process to obtain protein flours, combining the use of larvae or insects, and the valorization of agroindustrial wastes (e.g. from beer or legumes processing). The final target is providing proteins in an alternative, more sustainable way.
<a href="#">SSPT202310</a>	<b>RecuPro</b> - Recovery and concentration of whey proteins from dairy supply chain waste	In the milk processing, the membrane technologies can be used to divide serum proteins from exhausted serum like "scotta" (the serum concentrated by heating). The "scotta" is the new raw material, recovered from waste.
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<a href="#">TERIN202310</a>	<b>AMICS</b> - Innovative Apparatus and Method for Processing Liquid Reagents with Solid Catalysts to	Continuous-flow Stirred-Tank Reactor (CSTR) with improved performance in biodiesel synthesis compared to conventional batch systems.



	Optimise Biodiesel Production from Waste Oil	
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Chemistry and pharmaceutical, life sciences		
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<a href="#">SSPT202305</a>	<b>SIProVAC</b> - Integrated Systems for Plant Production in Closed Environments	In the soilless cultivation, Lamps (currently available in the market) provide sharp lighting, not venting. In this project, based on ENEA know how, the Venting Lamp combines together sharp lighting (in terms of light frequency and intensity) and forced aeration, specifically designed for vegetable needs.
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<a href="#">SSPT202311</a>	<b>PlantAb</b> - Peroxidase labeled antibodies and biomolecules	Development of innovative reagents and diagnostic tests based on recombinant biomolecules produced biotechnologically in plants. The patented technology allows to obtain complete antibodies (IgG), or other biomolecules, fused directly to the peroxidase enzyme (HRP) to replace the current chemical conjugation, for diagnostic applications such as: ELISA, Biosensors, Lateral Flow.
<a href="#">SSPT202314</a> <a href="#">L'origine riferimento non è stata trovata.</a>	<b>SPOILER</b> - Identification of steatohepatitis fecal biomarkers for the development of diagnostic and prognostic kits	At the moment, there are no easy and low-cost diagnostic kits available, to identify hepatic steatosis, that is an increasing disease in many countries. The aim of the project is the identification of biomarkers of hepatic steatosis in fecal samples, in order to develop an easy-to-use and low-cost kit, for diagnostic and prognostic use.

<a href="#">SSPT202315</a>	<b>D-STIMAT</b> - Digital twin for Transcranial Magnetic Stimulation	The aim of the project is a progress in an already-developed and -tested numerical model applied to electromagnetic applied dose to Alzheimer patients. Starting from magnetic resonance images, the model allows to customize electromagnetic dose treatment.
<a href="#">SSPT202316</a>	<b>DANTE</b> - Digital nANoTwin delivEry	The aim of the project is the development of a Digital Nanotwin for the simulation of two natural processes: the autoassembly of a natural molecule, as a potential carrier for therapeutic molecules, and its interactions with a specific biological target, to optimize the effectiveness of delivery.
<a href="#">FSN202304</a>	<b>IGNIS</b> - Neutron Irradiation of Biological Substrates	In intraoperative radiotherapy, for the irradiation of tumor beds, immediately after the removal of the tumor mass, to minimize the spread of metastases, the energy and flow of the neutron field generated by the D-D nuclear fusion reaction can be effective. These can be obtained by means of a deuterium ion accelerator, prototyped at the ENEA research center in Brasimone.
<a href="#">FSN202305</a>	<b>SmartGBox</b> - Smart Glove Box for real-time measuring of gamma radiation	The glove box used in inspections will be equipped by a series of portable gamma ray counters (detectors), called SciFi. The novelty of this solution consists in monitoring the presence of gamma radiation in the sample to be analyzed in real time and providing an indication of the position of a possible radioactive source.
<a href="#">FSN202306</a>	<b>HGB</b> - Preparation of electroconductive hydrogels for biomedical applications	Hydrogels are ideal for applications such as controlled drug delivery, tissue engineering and flexible electronics for biomedical devices, due to their high hydration, tunable physical properties and structure. The synthesis enables to obtain multifunctional materials that can be engineered.

### Technologies for high energy intensity industries (steel, ceramic, glass production) and energy recovery/heat waste

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<a href="#">TERIN202302</a>	<b>INSPROBIG</b> - Innovative technology mediated by INsect for valorization of organic waste into PRotein and Oil for Blfuels, biorefinery and Green chemistry	By -products of the baking confectionery industry are transformed into high added value molecules to be used in biorefineries and cosmetic industry. The technology is developed starting from ENEA patent.
<a href="#">TERIN202302</a>	<b>SYNAPSY</b> - SYNgAs uPgrading SYstem	The project aims to develop a purification system integrated with a biomass/waste gasifier which, starting from low-cost natural minerals (e.g., Dolomite), at the temperature of the gasifier (650-850 °C), allows the TAR and NH3 and H2S and HCL capture.
<a href="#">TERIN202309</a>	<b>UrbanPhotoTwin</b> – Digital twin urban photovoltaics for the energy transition	Digital tool based on GIS, GeoAI, remote sensing and photovoltaic modelling technologies for the identification of optimal areas for the installation of small and medium-sized PV systems in areas with architectural, socio-economic, environmental and functional constraints. →
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<a href="#">FSN202308</a>	<b>IET</b> - Thermal energy storing by means of composite materials	By exploiting a renewable energy source, such as solar energy, a material can be brought into a high-energy state. Returning to a low-energy state involves releasing excess energy into the environment in the form of heat. The proposal is to disperse nano/micro particles in a gel with low water content, store them, even for long periods, and use them when needed.

Reuse of material resources, circular economy, production and use of secondary raw materials		
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<a href="#">TERIN202303</a>	<b>SYNAPSY</b> - SYNgas uPgrading SYstem	SYNAPSY vuole realizzare un sistema di purificazione integrato con un gassificatore di biomasse/rifiuti che, partendo da minerali naturali di basso costo (es. dolomite), alla temperatura del gassificatore (650-850 °C) consente la decomposizione di TAR e NH <sub>3</sub> e la cattura di H <sub>2</sub> S e HCl. →
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<a href="#">TERIN202307</a>	<b>GECO</b> - Green Ecolight Cement mOrtar	The project develops a lightweight cement mortar to high performance to create an energy efficient product from an environmental and easy to apply, in accordance with the European directives regarding waste management and sustainable use of resources.
<a href="#">FSN202301</a>	<b>RIMAX</b> Smart robot for X-mapping in fusion facilities decommissioning	The sustainability of future fusion power plants is mainly based on the simplifications concerning the cycle of radioactive materials produced. We propose to combine existing technologies (i.e. a robotic arm, a miniaturized X/gamma detector, potentially supported by a camera and a 3D Lidar or photogrammetry apparatus) into an intelligent characterization system.
<a href="#">FSN202302</a>	<b>TubOne</b> - Urban transportation of goods and objects for a new ecology	The TubOne is a widespread urban network, which reaches every building, adding to the existing ones: electricity, water, gas, telephone/data. A tube that winds like a treadmill under urban settlements, connecting homes, offices, companies and shops.
<a href="#">FSN202307</a>	<b>ACQ-EL</b> - Abatement of pollutants in waters from industrial or anthropic origin by means of electronic irradiation	An energy electron beam causes the appearance of highly reactive radical chemical species, capable of degrading the substances present in solution in a volume of water. The method is very effective and capable of obtaining excellent results in a short time, irradiating a continuous flow of water.

Monitoring/management/reclamation of highly anthropic/industrialized environments and territories		
<a href="#">SSPT202304</a>	<b>ISMuSe</b> - IoT Smart Multi Sensors Device	The aim of the project is the development of advanced materials, specifically designed to make up sensors with high sensitivity, reliability and stability, able to detect and analyze chemical substances in air.
<a href="#">SSPT202305</a>	<b>SIProVAC</b> - Integrated Systems for Plant Production in Closed Environments	In the soilless cultivation, Lamps (currently available in the market) provide sharp lighting, not venting. In this project, based on ENEA know how, the Venting Lamp combines together sharp lighting (in terms of light frequency and intensity) and forced aeration, specifically designed for vegetable needs.
<a href="#">SSPT202313</a>	<b>AIRTUNE</b> - AIR pollutants and Toxicology Understanding by Nanotwin Evaluation	The aim of the project is the development of a Digital Twin, able to simulate the interaction between air pollutants and human lung cells, at molecular scale. Such simulation would allow to model the direct correlation between air pollution and bronchopulmonary diseases.
<a href="#">TERIN202304</a>	<b>IOMS-CLASS</b> - Classifier of Electronic noses for odor analysis	In Italy, the UNI-11761 standard of 2023 has proposed a classification for IOMS electronic noses, while in Europe and in standard institution such as IEEE, rules are being developed. The innovation proposed, concerns the development of a prototype of "IOMS Classifier" in accordance with the regulations, to satisfy the growing demand of the companies interested in producing IOMS.
<a href="#">TERIN202305</a>	<b>QCM4PM</b> - Atmospheric particulate sensor based on microbalance.	Low-cost sensors are essentially based on optical detection techniques. The proposed technology is based on gravimetric detection with vibrant membranes, also appropriately functionalized to modulate its sensitivity.
<a href="#">FSN202301</a>	<b>RIMAX</b> Smart robot for X-mapping in fusion facilities decommissioning	The sustainability of future fusion power plants is mainly based on the simplifications concerning the cycle of radioactive materials produced. We propose to combine existing technologies (i.e. a robotic arm, a miniaturized X/gamma detector, potentially supported by a camera and a 3D Lidar or photogrammetry apparatus) into an intelligent characterization system.
<a href="#">FSN202302</a>	<b>TubOne</b> - Urban transportation of goods and objects for a new ecology	The TubOne is a widespread urban network, which reaches every building, adding to the existing ones: electricity, water, gas, telephone/data. A tube that winds like a treadmill under urban settlements, connecting homes, offices, companies and shops.
<a href="#">FSN202305</a>	<b>SmartGBox</b> - Smart Glove Box for real-time measuring of gamma radiation	The glove box used in inspections will be equipped by a series of portable gamma ray counters (detectors), called SciFi. The novelty of this solution consists in monitoring the presence of gamma radiation in the sample to be analyzed in real time and providing an indication of the position of a possible radioactive source.

Technologies for ports and freight villages, water monitoring and coastal reclamation		
<a href="#">SSPT202301</a>	<b>ISLAND-Tee</b> - Inexpensive Smart Labels Applied to Next generation Digital Temperature electronic indicators	Addressed to the smart packaging sector, the aim of the project is embedding a critical temperature indicator in a radio-frequency electronic label, and acquiring signals in a nearby sistem.
<a href="#">TERIN202304</a>	<b>IOMS-CLASS</b> - Classifier of Electronic noses for odor analysis	In Italy, the UNI-11761 standard of 2023 has proposed a classification for IOMS electronic noses, while in Europe and in standard institution such as IEEE, rules are being developed. The innovation proposed, concerns the development of a prototype of "IOMS Classifier" in accordance with the regulations, to satisfy the growing demand of the companies interested in producing IOMS.
<a href="#">FSN202303</a>	<b>RECOVERING</b> - Remote detECTION through advanced crime light imaging	The CLI system enables image-based monitoring of an area of interest illuminated by high-power LEDs, mainly exploiting three conditions: the target absorbs/scatters the incident light or emits fluorescence. The tool provides high resolution images related to the identified traces, referenced in the scenario that you intend to explore by using a stereo camera
<a href="#">FSN202305</a>	<b>SmartGBox</b> - Smart Glove Box for real-time measuring of gamma radiation	The glove box used in inspections will be equipped by a series of portable gamma ray counters (detectors), called SciFi. The novelty of this solution consists in monitoring the presence of gamma radiation in the sample to be analyzed in real time and providing an indication of the position of a possible radioactive source.