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HANDBOOK ABOUT CIRCULAR ECONOMY GOOD PRACTICES IN SCIENCE AND TECHNOLOGY PARKS

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I- Introduction

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An eco-industrial park is an area where businesses work together to optimize the use of resources. In this sense, Waste from one company provides the raw material or energy for another. This synergy between industries fosters economic benefits while contributing to sustainable development.

The main purpose of the European project Recycling Business Models (RBM) is to investigate and analyze the possibility to transform traditional science and technology parks into more sustainable areas, in order to establish the basis of models of Eco science and technology parks, including the creation of circular maps of the companies within the Technopolis.

The aim of the project is to create a methodology and a specific strategy to impulse the creation of new business opportunities for SMEs and the creation of new companies, based on the revalorization of the wastes, equipment and its reincorporation in the life cycle of the companies located in science and technology parks.

The present handbook about Circular Economy Good Practices in Science and Technology Parks is the results of a detailed state of the art of current parks which has been realized during the first action of the project in terms of sustainability and circular economy, as well as the challenges faced implementing a green and circular economy model.





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II- 7R's Concept

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Circular Economy aims to keep products, components, and materials at their highest utility and value, at all times. The way to do this is to focus on the principals of the model, commonly known as the “7 R’s” of circular economy:

Rethink: Re-thinking business models and solutions at every level to be mindful of resource use and waste production. The sharing economy is proof that ownership of material is dropping, making for fewer materials used. Businesses like IKEA are already looking into renting business models.

Reduce: Reduce consumption of energy and materials by applying **lean design principles** and producing products that are made to last.

Re-use: Reuse products by transferring them to another user. The **marketplaces** like eBay have already taken hold on consumers’ markets and it’s starting to be used in industries as well.

Repair: Repair components and parts so that products can be used longer by the user. With the slow-down of throw-away consumption, consumers will be thinking about purchasing products that last and the “repair” business will get a boost.

Refurbish: To achieve circular economy, businesses can look into recovering and refurbishing old products to be sold again or transformed in new products.

Recover: Recover embedded energy from non-recyclable waste material where feasible. Non-recyclable waste may at least be converted into energy through waste-to-energy processes such as combustion and gasification.

Recycle: Recycle materials or resources by disassembling components and separating parts.



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III- Analysis of the State-of-Art Survey

Managers from Science and Technology Parks, and people with great knowledge about their Technopolis and their approach toward the concept of Circular Economy, essentially from Portugal, Spain and Sweden, and throughout Europe (Bulgaria, England, French Republic - Reunion Island, Greece, Italy, Slovenia and Turkey) participated in the Recycling Business Models survey.

According to the interviewees, the three options that best define the Circular Economy concept are the following:

- Adapting business models to keep products in economic use and reducing waste
- Minimizing extraction of natural resources and
- Reducing waste production

When deciding to move towards transforming a traditional Technopolis into a “green” park, most parks stated that several steps are important to follow to make the best decision. Firstly, an analysis of the possibilities of material, energy and water flows is needed. They also consider the importance to realize awareness campaigns in industrial symbiosis, as well as to study the initial conditions and antecedents and finally, to explore and reach symbiotic connections.

The participants in the survey consider that the biggest challenge the parks are facing is the awareness of companies about the possible benefits of the circular economy. Waste treatment management and reduced water consumption, as well as the lack of infrastructures for transformation are also pointed out as challenges. Almost half of the interviewed parks are actually in a process of learning more about the concept of circular economy and its requirements before deciding whether to implement the concept meanwhile another important part of the interviewed parks are already moving toward it as part of their business strategy. Only a very few percent of the interviewed parks have already adopted a Circular Economy Framework such as the Science and Technology Park from Extremadura, in Spain.

The Technopolis considering implementing actions within the scope of the Circular Economy aim specially to promote eco-innovation and increase the economic performance of companies located in the parks, as well as to promote environmental entrepreneurship. For them, the biggest opportunities of the Circular Economy lie on the reduction of negative impact on the environment, the enhancement of business competitiveness and the creation of new jobs. In terms of barriers in the implementation, the parks consider as main the financial barrier the





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challenge of measuring the financial benefits of Circular Economy and its profitability, follow by operational barriers (difficulty of dealing and staying in control of processes within the value chain), and structural (missing exchange of information, Unclear responsibility distribution).

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The most important motivation for the Parks to undertake initiatives within the Circular Economy concept is to enhance their green/sustainability credentials, to respond to concerns about scarcity of natural resources and as well to offer new commercial opportunities.

With this transformation, these parks aim mainly to increase the economic performance of companies located in the park. They also want to promote eco-innovation, to get to know the real resources, transactions and exchange (materials, energy and water) in the Technopolis as well as to improve the ecological footprint of industrial processes.

Most of the parks surveyed and with knowledge in Circular Economy, claim that environmental concerns and sustainability play an important role in the park's growth strategy.

Lastly, only few parks are aware of examples of models and measures of circular economy applied in others science and technology parks. This shows that, although there is a growing desire to apply these concepts, very little has been achieved. The Recycling Business Models project intends to change this scenario by analyzing the possibility to transform this traditional Science and Technology Parks in more sustainable areas, in order to establish the basis of models of Eco science and technology parks, including the creation of circular maps of the companies within science and technology parks.





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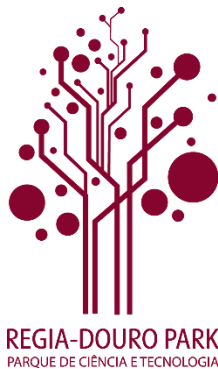


IV- Science and Technology Parks involved in Circular Economy

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PORTUGAL

Regia Douro Park - Associação para o Desenvolvimento do Regia Douro Park



[Regia Douro Park](#) is a science and technology park situated in Portugal. Main focus of their work is on agri-food, agri-industrial, enology, winemaking, green economy, environmental valorization and agri-environmental technologies. The Park represents a pillar of integrated economic development. It has multiple capacities to support entrepreneurs and companies, business projects, national and international investors, promotion of research, as well as development and transfer of technology and knowledge.

Sustainability and the circular economy have some influence on the park's future management and strategy (Régia Douro). Some measures have already been implemented under this concept: Waste Management and renewable energy consumption.

PCT Brigantia Ecopark



The [Brigantia-EcoPark Science and Technology Park](#) is a science and technology space to support entrepreneurship, consolidated companies and incubated companies (startups), based on technology. It also has laboratory spaces to support research, development, and innovation. The strategy in which Brigantia Ecopark is inserted is aligned with the latest national and international policies and directives related to economic, social and environmental sustainability.

Unlike many Science and Technology Parks, Brigantia was thought from its genesis as an ecological space - from the most sustainable facilities and equipment, and through its area of operation. The Park was created with 3 main thematic areas: Energy, Environment and Eco construction, and the laboratories are specially equipped for these areas. However, even





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though the initial idea was to specialize the park and its companies in these areas, due to the low critical mass characteristic of the interior of the country, nowadays the Park houses companies in several areas: Software, Computing and Electronics, ICT (Information and Communication Technology) , Marketing and Design, Renewable energies, R&D (Research and Development) and Architecture, Engineering and Construction.

LISPOLIS - Polo Tecnológico de Lisboa



[LISPOLIS](#) is a non-profitable private organization founded in 1991. Its main goal is to manage Polo Tecnológico de Lisbon (Lisbon’s Technological Park) where all the conditions are created in order to guarantee the success of all the companies installed.

The Polo Tecnológico de Lisbon provide a favorable habitat to welcome growing companies, especially those focused on technology and innovation. Several support services are on disposal at our Park: logistic space for companies to settle, coworking spaces, virtual incubation services (for those who wish only to have a mailbox service) and brand registration services. All these services are complemented by spaces for meetings and auditoriums up to 500 people.

SPAIN

Science and Technology Park from Extremadura



The Foundation [FUNDECYT Scientific and Technological Park of Extremadura](#) is a nonprofit organization based in Extremadura (Spain) which aims to contribute to the social and economic exploitation of science and technology in the region, supporting and promoting scientific and





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technological development and a better use of
research and innovation outcomes.

Science and Technology Park of Cartuja (PCT Cartuja)



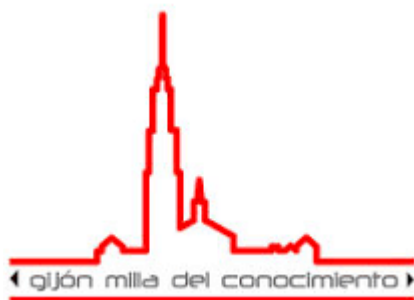
The [Science and Technology Park of Cartuja](#) is the main innovation space in Seville, in which 503 companies and startups, training and research centers and with an extensive cultural and leisure offer come together.

Science and Technology Park of Almería, PITA



[PITA](#) is set up as a great center of business cooperation and innovation in the province of Almeria. Its main tasks include maintaining operational relationships with universities and research centres, encouraging the growth of knowledge-based companies (usually residents of the Park itself) and fostering innovation.

Gijón Knowledge Mile Margarita Salas



The [Gijón Knowledge Mile](#) is a geographical area within the Eastern district of Gijón that welcomes knowledge-based public companies and institutions, in order to harness the potential of the environment and where technology and science coexist with art and culture. Its objective is to promote the exchange of this knowledge, supporting cooperation and the interrelationship between the key factors that make up this Innovation ecosystem, making this area an engine of economic growth for the city of Gijón, investing, planning and





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exploiting the synergies that arise between these factors.

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Technology Park of Andalusia



The [Technology Park of Andalusia](#), attached to the Andalusian public sector, is specially designed to house all types of entities dealing with innovation. Within more than twenty-five years, the park has become a point of international reference in terms of science and technology parks where the Information Technologies and Energy sectors dominate, both in Research and Development, and

the manufacture of equipment and services, with an innovative and environmentally friendly approach. With over 630 businesses, and a number of key agents in the Andalusian Knowledge System, such as the University and its research groups, over 18,000 employees, an area of 186 hectares with an expansion project in progress, the PTA can be considered one of the main focuses for innovation and economic development in Andalusia.

SWEDEN

Innovatum Science Park

INNOVATUM

[Innovatum](#) is a Science Park where they work to broaden and strengthen the business sector in Western Sweden and arouse young people's curiosity for technology and creative industry. There is a place for people with smart ideas, where innovation and sustainable solutions are always the focus.

Sotenäs Symbioscentrum





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Symbiosentrum

In the municipality of Sotenäs, on the West coast of Sweden, [Sotenäs Symbiosentrum](#) (“Symbiotic Centre”) is established since 10 years. The Symbiotic Centre is geared towards fishery and related industries and hosts large and small companies working in the fields of fish processing, algae cultivation, land-based fish breeding, horticulture, waste processing and more. In addition to Industrial Symbiosis, the Centre also focuses on Social Symbiosis, including upper secondary school programs as well as courses and programs for adult learners.

Science Park Borås



Science Park Borås enables innovations in the Borås region. With resources from research and prototype development, they create opportunities for commercialization of products and services. The Technopolis creates social benefits and results together with the academia, institutes, businesses, public actors and the civil society. Science Park Borås is an environment that consists of close collaboration with the University of Borås, RISE Research Institutes of Sweden, Smart Textiles, Marketplace Borås and Borås Incubator.

Main financiers are Vinnova, Västra Götaland region and EU. Science Park Borås is also funded by other research financiers.

[Re:Textile](#) is a circular project within Science Park Borås that aims to develop new design principles, business models and production systems that enable circular flows in the textile industry. By creating new garments developed to last a long time by being able to be repaired, reworked or otherwise updated, opportunities open for completely new business areas in repair,





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redesign and other types of services that extend the life of the garment and create economic growth.

Within Re:textile the aim is to make fashion synonymous with something meaningful, instead of a symbol of overproduction, mass consumption and a lifestyle beyond the planet's boundaries.

In the future, a resource-efficient textile industry is needed, with a focus on providing style, expression, function, and value to the customer, rather than a focus on selling new items as soon as possible.

Wargön Innovation



Wargön Innovation AB is an innovation environment for companies, with goals to enable the production of sustainable materials of the future. The organization collaborates with business, academia, public parties, and civil society and has a very broad network of contacts. Several projects are run, several of which are based on circular models, including the Wargo Tex Development project, which in 2019 was nominated for the sustainability award "Encouragement for Action" in the fashion tech category.

The project aims to create a national textile center for textile recycling in Sweden. 25 actors work together to find new perspectives and solutions for the entire textile flow. It is about improving the efficiency of sorting for reuse and redesign, the production of new hy textile masa or the development of technology for automatic sorting. The participating parties come from Ideal second hand, clothing chains, industry, academia and institutes. The Wargo Tex Development project runs between June 2018 - December 2020 and is funded by the strategic innovation program RE:source.

(Swedish only) <https://wargoninnovation.se/2020/06/wargon-innovation-nominerad-till-prestigeftyllt-hallbarhetspris/>





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V- Good practices detected in science and technology parks

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An eco-industrial park is an area where businesses work together to optimize the use of resources. In this sense, Waste from one company provides the raw material or energy for another. This synergy between industries fosters economic benefits while contributing to sustainable development.

The government of China has been a pioneer to establish a strategy in eco-industrial parks since 2001, facilitating the development of eco-industrial park, aiming to output more with less environmental burden. The Chinese Ministry of Environmental Protection decided to jointly carry out the promotion and implementation of national eco-industrial parks, together with the Ministry of Commerce and the Ministry of Science and Technology. In this sense, China has implemented eco-industrial park (EIP) initiatives as a mainstream strategy of circular economy since the turn of the new century.

In Europe, in terms of circular economy and Science and Technology Parks, the pioneers are Danes, which have a circular economy ecopark called the Kalundborg Symbiosis. This initiative is a leading industrial symbiosis with a circular approach to production. Finland, Holland and Belgium are as well very active in this field and they will be contacted in the framework of the project for peer to peer activities. With the realization of the Recycling Business Models survey in several European countries, we have perceived that most of the science parks are still in an early phase regarding the adoption of circular economy strategy within the schemes.

The parks conscious of the importance of this new approach are focusing actually on **awareness campaigns** toward their public objectives, and the design and implementation of **national and international projects** as pilot initiatives to test circular economy applications that can be implemented in their Technopolis. More advanced parks in the field of industrial symbiosis have designed **strategic plans** and are starting to implement and run initiatives related to **waste management** and **infrastructures**. It is worth mentioning that several companies located in science and technology parks are running independently circular economy initiatives.

Next you will find the different initiatives from the science parks who participated in the survey.





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IV.1 Infrastructures

Next you will find a compilation of infrastructures' initiatives in the field of circular economy which have been detected in the Science and technology Park who participated in the RBM survey.

PORTUGAL

- **Brigantia Ecopark model:** The whole park is modern, everything is based on sensors, the blinds are electric, the spaces are thermally insulated, it has photovoltaic panels and solar collectors for generating electricity and using solar thermal energy, LED lights, waste water recovery system (for irrigation, use in sanitary plumbing and firefighting), electric car chargers in the car park..

The Brigantia Ecopark building has a Geothermal Energy Station, which gives the building greater energy efficiency. The building is equipped with three geothermal heat pumps, one just for heating sanitary waters and the others to acclimate the structure (more information is available [here](#)). The building also has a constructed wetland, which allows the reuse of water produced in the untreated water network. Constructed wetlands are biological systems designed to take advantage of specific characteristics of natural wetlands, which improve the wastewater treatment capacity. From a technical and economic point of view, they are advantageous in the treatment of residual water, since they require lower costs in terms of construction, operation, and maintenance (compared to other treatment options). All these measures allow the reduction of energy consumption, and make the building have a definition of ecological.

SPAIN

- The **Science and Technology Park from Extremadura**, in Spain, counts with several infrastructures focusing on the sustainable use of resources:
 - Grid energy through solar and geothermal panels in the park
 - Building of the head office of the Technopolis with walkable decks with an urban garden
 - Runoff (from a nearby river)
 - Installation of electric pumps





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- **PCT Cartuja SmartLab Platform:** the [Science and Technology Park of Cartuja \(PCT Cartuja\)](#) SmartLab platform is making possible the launch of innovative initiatives oriented to Smart City, generating new pilots exportable to urban centers. Public-private initiatives, such as the parking system Smart Parking - are already arising.
- **Selective Recycling Management:** the selective recycling in the [Science and Technology Park of Almería, PITA](#) is managed by the city where is located the park. The park counts with several selective trash cans located in the Technopolis for paper and cardboard, plastic, glass, electric and electronic components.
- **Building for Bioeconomy initiatives:** the PITA park hosts several business initiatives related to the bioeconomy and waste management sectors such as the company Hintes Europa who turn plastic waste into fuel. See the list of companies in the link next: <https://pitalmeria.es/ubicacion/edificio-pitagoras/>.
- **Clean Point:** The [Technology Park of Andalusia](#) has installed a Waste Concentration Point (PCR) to collect the industrial and organic waste generated by companies installed in the Technopolis and to take care of the environment. Each entity located in the park can deposit the waste, mostly electronic, generated daily, in one of the vats installed in the park. The objective is to offer to the companies a comprehensive but recoverable service of material management, to promote the recycling and maximum exploitation of wastes.



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IV.2 Waste Management

Next you will find a compilation of waste management initiatives in the field of circular economy which have been detected in the Science and technology Park who participated in the RBM survey.

PORTUGAL

➤ **Ecopoints:**



Waste paperboard, plastics and organic waste are the most prevalent in the Regia Douro Park and the Brigantia Eco-Park. Regarding the paper and cardboard waste, these parks have a recycling system through the distribution of large Ecopontos (large containers that serve to make the selective collection of garbage) in several outdoor areas of the parks, as well as recycling units within the buildings.

Small units are also distributed to each company, thus allowing the involvement of all “tenants” in the recycling of these materials (as well as glass and metal). The big outdoors Ecopontos are mainly for the industrial companies of the park. The waste produced and separated is collected by companies responsible for the treatment and recovery of urban waste from different municipalities in their region. Its mission is to explore and manage the multi-municipal sorting, collection, recovery and treatment system of urban waste, contributing to the sustainable development of the region and the country and to maximize human well-being by creating value while respecting the legal requirements established for its area of activity.

Science and Technology Parks:

[The Regia-Douro Park – Vila Real Science and Technology Park](#)

<https://www.brigantia-ecopark.pt/>

➤ **Waste of Electrical and Electronic Equipment (WEEE) management:**



Waste paperboard and electronic waste are the most prevalent in Lisbon’s Technological Park. The first ones are collected and, in order to use the electronic waste created, the Park uses the [European Recycling Platform](#) (ERP Portugal) to collect these materials.





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ERP Portugal is a legal person of private law, non-profit, licensed by the Portuguese Government, to manage integrated systems of Waste Electrical and Electronic Equipment (WEEE) and Waste Batteries and Accumulators (RPA). ERP Portugal, within the scope of its activity, provides the WEEE and RPA collection service, to facilitate the correct routing of waste generated in companies.

Science and Technology Park: [Lisbon's Technological Park](#)

➤ **Compost Point:**

Regarding the organic waste, the Regia Douro Park is in an initial phase of implementation of a compost point. The composting process allows the reduction of waste's volume through the transformation of organic waste into compost.

Science and Technology Park: [The Regia-Douro Park – Vila Real Science and Technology Park](#)

➤ **Re-food Model:**



When there are events, the Regia Douro Park hires the company [Re-food](#) to pick up the waste.

Re-food is an independent, citizen driven, 100% volunteer, eco-humanitarian community charity, working to eliminate food waste and hunger on a neighborhood basis, by delivering surplus food in perfect condition to needy families.

Science and Technology Park: [The Regia-Douro Park – Vila Real Science and Technology Park](#)

➤ **Organic Waste Management Observatory:**

the Regia Douro Park intends to create an observatory that allows quantifying the production of organic waste.

Science and Technology Park: [The Regia-Douro Park – Vila Real Science and Technology Park](#)





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IV.3 Awareness Campaigns

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PORTUGAL

➤ **Circular economy awareness action applied to waste management in businesses:**

To raise awareness among entrepreneurs and to achieve some of the Sustainable Development Goals through the correct waste management, the Regia Douro Park, in partnership with the Municipality of Vila Real, RESINORTE (entity responsible for the treatment and recovery of Municipal Solid Waste) and with the Nature and Environment Protection Service (SEPNA), the Technopolis organizes awareness-raising actions on Circular Economy applied to Waste Management in companies.

Science and Technology Park: [The Regia-Douro Park – Vila Real Science and Technology Park](#)

➤ **Awareness sessions and events on Circular Economy:**

With the goal to raise awareness for Circular Economy topic, the Brigantia Eco-Park organize and holds awareness sessions and events on the topic. Some of these events are organized in partnership with the Polytechnic Institute of Bragança, namely with the departments of Environmental Engineering and Renewable Energy Engineering. Whenever the opportunity arises, the park participates in projects involved with the theme of sustainability and circular economy; and incubate “green” Projects, such as the “Energie” Project. The Project, from IPB and incubated at Brigantia Ecopark through the Startup Voucher program (IAPMEI), aims to study new ways of using urban waste, using thermochemical processes, to obtain biofuels and electricity.

Science and Technology Park: <https://www.brigantia-ecopark.pt/>

➤ **Seminars and international conferences:**

Regia Douro Park hosts several seminars as well such as the recent event focusing on the Economic Impacts of Climate Change on the wine industry or the International Conference of the International Organisation for Biological Control (IOBC-WPRS).

Science and Technology Park: [The Regia-Douro Park – Vila Real Science and Technology Park](#)





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SPAIN

➤ Organization of talks and expert panels

The Science and Technology Park from Extremadura support innovation, entrepreneurship and cooperation for the promotion of smart, sustainable and inclusive growth of the region. In this sense, they are design and organizing several awareness activities to inform the members of the park and the local ecosystem about the benefits and added value the Circular Economy can bring.

Science and Technology Park: [Science and Technology Park from Extremadura](#)

➤ Events of presentation of public funds to improve the energy efficiency in the industry:

As set out in the United Nations Sustainable Development Goals, the Almería Scientific-Technological Park works as a priority in the society and sustainable local growth. Under this prism, the SDGs are integrated into its strategy with the focus: climate action and affordable and clean energy.

Science and Technology Park: [Science and Technology Park of Almería, PITA](#)

➤ [European Week for Waste Prevention:](#)

This initiative aims to promote the implementation of sustainable resource awareness and waste management actions through the simultaneous celebration of hundreds of collective actions. Every year, for 1 week, awareness-raising actions are promoted and implemented on sustainable resources and waste management.

Science and Technology Park: [Gijón Knowledge Mile Margarita Salas](#)

➤ [Circular weekend Gijón:](#)

Annual innovation meeting to learn how to launch ideas with circular business models, modernize companies by implementing more efficient processes in the use of resources and contact all agents of the circular economy ecosystem. In order to make the concept more practical, Circular weekend Gijón includes presentations, workshops and advice sessions to solve the challenges of this type of economic model and launch new projects.

Science and Technology Park: [Gijón Knowledge Mile Margarita Salas](#)

➤ Summer Course “Principle of Circular Economy”:





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In the framework of the seventeenth edition of the Summer Courses of the University of Malaga - UMA, the Technology Park of Andalucia collaborated with UMA in the realization of a Summer Course based on the "PRINCIPLES OF THE CIRCULAR ECONOMY" which aimed to present in a general way the new paradigm known as Circular Economy, which propose to transform the traditional acquire-use-throw model into one in which both the need for raw materials and the production of wastes are minimized.

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Science and Technology Park: [Technology Park of Andalucia](#)

➤ **Circular Economy Master:**

The Technology park of Andalucia, together with the University of Malaga is working on the Design of a Circular Economy Master, in the framework of their collaboration in the field of industrial symbiosis.

Science and Technology Park: [Technology Park of Andalucia](#)





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IV.4 National and International Projects

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PORTUGAL

- **Project “SDGs Labs- making the SDGs our business”**: SDGs Labs aims to build a culture of collaboration and knowledge exchange between different stakeholders involved in agribusiness and food production with the goal of holistic incorporation of the Sustainable Development Goals (SDGs) into modern business practices of the sector.

Science and Technology Park: [The Regia-Douro Park – Vila Real Science and Technology Park](#)

- **Project “Energie”**: project aims to study new ways of using urban waste, using thermochemical processes, to obtain biofuels and electricity. The park participates in this project together with the company responsible for the Waste Management System of the region Northeast Transmontano, and the Polytechnic Institute of the University in Braganza.

Science and Technology Park: [PCT Brigantia Ecopark](#)

- **Project “Centro Bio”**: In 2016, the project “Centro Bio” of the [Association BLC3](#) - Technology and Innovation Campus, won the RegioStars award, given by the European Commission in the category of “Sustainable Growth: Circular Economy”, after being elected among the 23 finalists from all over Europe in the contest. This project in the central region of the country represents a public-private investment of 9.2 million euros, gave impetus to the creation of 24 Research and Development subprojects, saw the creation of four spin-offs and six new companies. The RegioStars competition is launched annually with the aim of recognizing good practices in regional development and to distinguish the most innovative projects supported by European Union cohesion policy funds that have a positive impact on citizens' lives.

- **Project “3iBioeconomia”**: The 3iBioeconomy project was born in 2017 and aims to boost a network of skills for the transfer of knowledge and technological intensification in Bioeconomics produced by co-motors for the business sector, valuing the results of I&I with the market needs.

The central objective of the 3iBioeconomy Consortium is to boost a network of skills for the transfer of knowledge and technological intensification in Bioeconomics produced by the co-motors for the business sector, valuing the results of R&I with the market needs, promoting the transfer of technology and knowledge for the market, in its various sectors





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and with territorial coverage extended to the North, Center and Alentejo regions, as well as the positive externalities resulting from its implementation, in particular with the creation of new companies, and consequently with the generation of more jobs.

Over the past two years has given dynamism to a set of activities dedicated to the promotion of the theme of Bioeconomy with a focus on Circular Economy;

Science and Technology Park: [BLC3 – Campus de Tecnologia e Inovação](#); [Tagusvalley – Tecnopolo do Vale do Tejo](#); [CATAA – Associação Centro de Apoio Tecnológico Agroalimentar](#).

SPAIN

- The **Technological Platform of Organic Agriculture of Extremadura (PTAEEX)**, aims to group the entire value chain of organic farming in the region, in order to promote cooperation between producers, companies and other agents of the Science and Technology Regional System of Extremadura, contributing to the improvement of the sustainability, efficiency and competitiveness of the sector, through the orientation of the politics related to the organic agriculture. Fundecyt is partner of this initiative.

Science and Technology Park: [Science and Technology Park from Extremadura](#)

- **High Technology Incubator in Bioeconomy and Circular Economy:** the incubator, Incubator, specialized in Bioeconomy and Circular Economy, has been designed to promote and attract technological-based business projects aimed at obtaining new products/processes of high added value through purification techniques and biotechnological processes, based on the natural resources of the region and the by-products and waste of the agri-food industry.

Science and Technology Park: [Science and Technology Park from Extremadura](#)

- **GREENIN peer learning project:** financed by the European Union`s Horizon 2020 research and innovation programme, led by FUNDECYT-PCTEX and implemented in collaboration with European innovation support institutions in Portugal and Hungary. It aims at developing and sharing an effective mechanism for reviewing and identifying the state of the art of policies, methodologies, experiences and good practices on Green Public Procurement for Innovation (GPPI), to implement effective GPPI initiatives in European territories. More information [here](#).

Science and Technology Park: [Science and Technology Park from Extremadura](#)





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- **European SYMBI project** (Industrial Symbiosis for Regional Sustainable Growth and a Resource Efficient Circular Economy) contribute to improve the implementation of regional development policies and programmes related to the promotion and dissemination of Industrial Symbiosis and Circular Economy faced to policies alignment with the Circular Economy strategy of the European Commission.

Science and Technology Park: [Science and Technology Park from Extremadura](#)

- **DEGREN Project** (Cross-Border Center for Business Innovation in ECODESIGN at the EUROACE, DESIGN & GREEN ENGINEERING), is a project from the Operational Program EP - INTERREG VA Spain Portugal (POCTEP) 2014-2020, which aims to encourage business participation in innovation processes related to ECODESIGN. It will consist in the creation of a network of collaboration between centers with R&D&i activity and the participation of companies, to: create and promote the development of ideas, research and actions in the field of ECODESIGN, and thus responding to the needs of the most important productive economic sectors of EUROACE: agri-food, forestry or wood sector, packaging, as well as construction and construction materials.

Science and Technology Park: [Science and Technology Park from Extremadura](#)

- FUNDECYT and the Extremadura Industrial Technology Centre (CETIEX) developed an **inventory on existing renewable energy production plants** in the Alentejo-Centro-Extremadura Euroregion (EUROACE) through a European project (SIATDECO).

Science and Technology Park: [Science and Technology Park from Extremadura](#)

- **Cartuja Qanat Project:** [Cartuja Qanat](#) is a European project of innovative urban transformation through which the use of the streets as social dynamizers will be encouraged, improving it and involving in that transformation the entire ecosystem of the city (public, private agents and citizens). This project will regenerate a public space that functions as a laboratory for the experimentation of new microclimate systems by new companies.

Science and Technology Park: [Science and Technology Park of Cartuja \(PCT Cartuja\)](#)

- **European Project SPEEDIER** (H2020): SPEEDIER is a highly innovative end-to-end solution that applies an integrated approach to energy management, provides information,





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advice, capacity development, energy audits, financing, implementation of efficiency solutions energy and impact monitoring. The PCT Cartuja will host one of the 4 pilot projects planned in different European countries under the project.

Science and Technology Park: [Science and Technology Park of Cartuja \(PCT Cartuja\)](#)

- **#eCitySevilla Project:** The project will develop a model of city in open, digital, decarbonized and sustainable ecosystem on the Island of Cartuja (where is located the Technopolis) by 2025. The agreement for the implementation of the project has been signed by PCT Cartuja, the the regional government, the city council and Endesa. The project will turn the PCT Cartuja into an international sustainability benchmark and an urban energy transition model, so that the energy and climate targets set for 2030 will be achieved in this enclave five years earlier, in 2025.

Science and Technology Park: [Science and Technology Park of Cartuja \(PCT Cartuja\)](#)

- **Gijón EcoCircular Project:** This project, promoted by several local and regional public institutions, aims to lay the foundations for knowledge of the circular economy in the municipality of Gijón and to raise awareness among companies and organizations about its importance, with the ultimate aim of contribute to the so-called "green employment".

Science and Technology Park: [Gijón Knowledge Mile Margarita Salas](#)

- **Asturias Paradise Hub 4 Circularity:** Creation of a circularity hub called Asturias Paradise Hub 4 Circularity, in collaboration with all the actors of the region, based on the reuse of industrial and urban waste as new raw materials. This hub is territorial grouping of industries, committed to the R&D environment and infrastructures for the recovery, public and private, which collectively reach demonstration levels in terms of circular resource management.

Science and Technology Park: [Gijón Knowledge Mile Margarita Salas](#)

- **ZERO-HYTECHPARK Project (Life + program):** The aim of the ZERO-HYTECHPARK was to put measures in place to achieve total sustainability in science and technology parks via optimum energy management by means of systems based on hydrogen technologies and renewable energies.

Science and Technology Park: [Technology Park of Andalucia](#)





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- **SMART MED PARKS** project (Med Program): The project SMART-MED-PARKS aimed at developing the Smart Parks concept in the Med Area. The cornerstone of this concept relied on the idea that: energy demand in Parks should be largely covered with local power plants. A high degree of energy self-sufficiency will allow Mediterranean Parks direct energy savings related to losses in distribution and transport network.

Science and Technology Park: [Technology Park of Andalucia](#)

- **Recycling Business Models** – RBM Project (H2020): European Project which aims to investigate and analyze the possibility to transform traditional science and technology parks in more sustainable areas, in order to establish the basis of models of Eco science and technology parks, including the creation of circular maps of the companies within science and technology parks.

Science and Technology Park: [Technology Park of Andalucia](#)

SWEDEN

- **Cradlenet** – Cradlenet is an NGO founded 2009 inspired by the international movement “Cradle to Cradle”, signifying a shift from a linear model (“Cradle to Grave”) to a circular model (“Cradle to Cradle”). In 2013, Cradlenet started adopting the models and ideas from the Ellen MacArthur foundation. Cradlenet has as its goal to accelerate Sweden’s transition to circular economy by creating meetings between businesses, organizations and people. Cradlenet also works with advocacy to support politicians in their work with circular economy. The network is based in Stockholm, with local chapters in northern, western and southern Sweden. Membership is open both to organizations and private individuals.

Independent Circular Economy Swedish Platform: <http://www.cradlenet.se/> (Sweden)





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IV.5 Business Initiatives in the field of Circular Economy runs from Technopolis

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PORTUGAL

- **Spawnfoam:** born in 2013, the company produces *biocomposites* ((forestry pots and containers, construction boards and ornamental vases) combining natural elements such as organic and agroforestry residues and an organic adhesive material, that can be reused for organic fertilization of soils or incorporated into new biocomposites. The company has a clear objective: to change the paradigm of production and consumption of composites and petroleum-derived materials, such as plastics, presenting a competitive alternative of organic and biodegradable origin. Today it is a recognized biotechnology company with important prizes and awards. It stands out in the market for technological innovation in the development of biomaterials that contribute decisively to increasing the planet's sustainability, efficiency in the use of resources and, consequently, to the transition to a circular economy;

Science and Technology Park: [The Regia-Douro Park – Vila Real Science and Technology Park](#)

- **Book in Loop:** Book in Loop is a spin-off from the University of Coimbra, incubated at Instituto Pedro Nunes and Startup Lisboa, which is dedicated to bringing the sharing-economy virtualities to the education market, proposing to reduce household expenditure on school textbooks by 80%.

is a Circular Economy platform that allows you to sell school books and purchase next year's books, earning money while saving the environment.

Science and Technology Park: [IPN - Instituto Pedro Nunes Incubadora](#)

- **Maria Maleta:** created in 2013, Maria maleta is a Portuguese brand of bags and accessories design, incubated at UPTEC - Science and Technology Park of the University of Porto, launched a new line dedicated to sustainability, with four totally vegan products, with biodegradable and recyclable textiles.

The brand also created the “Reuse” program, where it is possible to recycle an old “Maria” - that is, a suitcase - or even receive a voucher for returning the product for recycling.

Science and Technology Park: UPTEC - [Science and Technology Park of the University of Porto](#)





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- **WAYZ:** startup founded in 2018 and incubated at UPTEC - Science and Technology Park of the University of Porto, produces sneakers ethically, with environmentally friendly materials, a local supply and production chain.
The products are made with recycled and biodegradable materials, from high quality cowhide, bi-leather to recycled rubber.

Science and Technology Park: UPTEC - [Science and Technology Park of the University of Porto](#)

- **CoLAB B2E - The collaborative laboratory CoLAB:** headquartered at UPTEC Mar, the Laboratory aims to promote Blue Bioeconomics, contribute to new uses and valorization of marine natural living resources, as well as to stimulate the creation of qualified jobs that generate economic and social value in Portugal - in the Biotechnology and Aquaculture sectors.

The laboratory aims to promote the creation of highly qualified jobs that can actively contribute to enhance the economic and social value of bio-based products and services, new and existing, inspired by the ocean, supporting the blue growth sectors with the greatest potential: natural resources, marine biotechnology and sustainable aquaculture. It promotes knowledge-based solutions to respond positively to the present and future needs of society's stakeholders, it will be possible to shape a new blue bio-economy leveraged by 4.0 automation technologies and data exchange.

Science and Technology Park: UPTEC - [Science and Technology Park of the University of Porto](#)

- **The Smart Waste Portugal Association (ASWP):** located in the UPTEC, is a non-profit association, created in 2015, which aims to create a nationwide platform that enhances waste as a resource, operating throughout the sector's value chain, promoting research, development and innovation. enhancing and encouraging cooperation between different entities, public and private, national and international.

Science and Technology Park: UPTEC - [Science and Technology Park of the University of Porto](#)





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- **NET4CO2 Collaborative Laboratory:** located in UPTEC, is a new network of R&D skills and new technologies, designed to create new production processes that contribute significantly to a sustainable CO² economy.

NET4CO2 intends to:

- Capture and separation of CO₂ safely, efficiently and cost-effectively;
- Production of competitive alternative fuels: synthetic fuels, which provide a route for the reuse of CO₂ and CH₄; and hydrogen with zero associated CO₂ emissions.

Science and Technology Park: UPTEC - [Science and Technology Park of the University of Porto](#)

SPAIN

- **Ecosegundos:** company dedicated to promoting recycling through end-user incentives. They offer a system of achievements and rewards through an app.

Science and Technology Park: [Science and Technology Park of Almería, PITA](#)

- **Biorizon Biotech:** production of microalgae-based biofertilizers for the formulation of a wide range of solutions for agriculture. In other lines of work, they develop biostimulators based on antagonistic microorganisms and safe pesticides, without residues, for organic and sustainable agriculture.

Science and Technology Park: [Science and Technology Park of Almería, PITA](#)

- **Geothermal plant** (pilot initiative in the South of Spain from the company Cardial) which consists in exploiting a hot water reservoir to use it to heat and cool greenhouses. This type of energy that does not generate emissions, waste, or other environmental damages. More information in: <http://pitalmeria.es/en/spain-14-ha-greenhouse-to-get-geothermal-plant/>

Science and Technology Park: [Science and Technology Park of Almería, PITA](#)



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IV.6 Strategic Plans from Science and Technology Parks

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SPAIN

- The [Science and Technology Park of Cartuja \(PCT Cartuja\)](#) is working, in collaboration with companies and entities located on the Technopolis, on a Strategic Plan that defines the main lines of action and that converges on the model of Park foreseen: sustainable, innovative, generator of business and employment opportunities and at the service of citizens.
- The [Science and Technology Park of Almeria](#) focuses on the **Sustainable Development Goals** 7 (Affordable and Clean Energy) and 13 (Climate Action) participating in collaborative projects related to water resources and climate change. The park participates in several Operative Groups formed by strategic actors of the region such as HORT-OBSER-TIC, a regional bioeconomy Observatory and CALHUAMB, which's mission is to establish a protocol for the calculation of the environmental footprint by fruit and vegetable products.
- The [Gijón Knowledge Mile](#) is actually working on the Design of measures in the field of recycling and sustainability in collaboration with all the actors of the region which include the development of an **industrial and urban symbiosis program**, a **technological acceleration program**, the creation of comprehensive **recovery circuits and demonstration spaces** and different **measures to support socio-economic barriers** to move towards a legal framework, economic and social support that allows the development of business projects focused on the recovery of by-products and waste.
- The [Technology Park of Andalucia](#) is actually working on the design of an action plan within the Technopolis to manage efficiently the recycling of the main generated wastes such as paper, cardboards, glass, plastic. In addition, the PTA has been collaborating for several years with the University of Malaga in the design and implementation of several initiatives such as a working group in circular economy, an expert course from the University of Malaga in Circular Economy and a joint project with the European Space Agency focusing on research, education, outreach and spinoffs targeting circular economic systems.



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VI- Conclusion

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The actual Society is living complex times, and once again, the strategic imperative of transformation is essential, to prepare a sustained competitiveness base for the global circular economy.

Science and technology parks are perfect ecosystems to drive a true commitment with the future that is based on innovation, creativity, as central factors to increase the ability to generate sustainable solutions.

The role of the Technopolis in this commitment includes to bring together strategic actors such as governments, universities, business communities and citizens who, together, work to consolidate new perspectives. Parks want to foster a new paradigm of sustainable environments by becoming true areas of participatory modernity.

