



**WASTE AS A FEEDSTOCK
FOR THE CIRCULAR ECONOMY –
CHALLENGES AND OPPORTUNITIES
FOR THE CHEMICAL INDUSTRY**

20 April 2022 | 10:00 - 12:00, online

April 2022.

Chemistry, enabling driver of the green transformation

Catalonia success stories

Strategies, policies and action plans



Green transformation

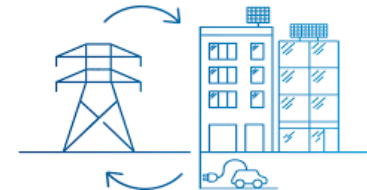


The Generalitat de Catalunya has developed a series of strategies and initiatives to make Catalonia an innovative, green and climate-responsible economy.



**Estratègia catalana
d'ecodisseny**
per a una economia circular i
ecoinnovadora

Pacte nacional per a la
transició energètica
de Catalunya



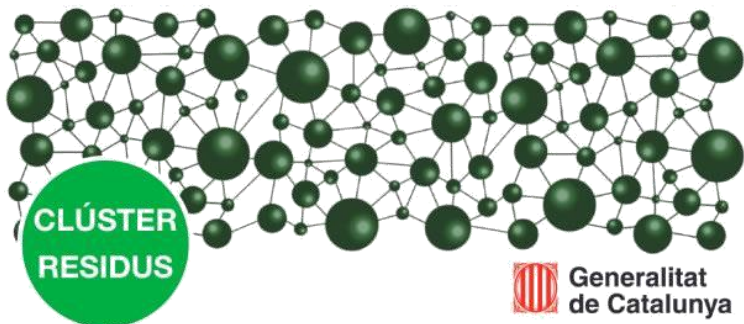
Generalitat de Catalunya

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Climàtic

2030
#Catalunya2030



Instruments



The **Waste Cluster** is a joint initiative of the Catalan Waste Agency and ACCIÓ to bring together companies and environmental agents from the entire value chain of the sector. This involves going from the source of the waste, through its management (collection, classification, treatment, and recovery) and reaching the end of its life cycle or the end customer of the secondary raw material.

Collaborative R&D projects. Non-refundable grants with maximum intensities that vary between 25% and 75% of eligible costs.

TRL 3 – 7

- The generation of the minimum possible waste.
- Achieve maximum efficiency in the use of resources, reducing the consumption of raw materials and the generation of waste throughout the life cycle of products.
- The improvement of waste treatment processes.



Instruments



The **ProACCIÓ Green** program includes ACCIÓ's services, assessment, grants and activities to position sustainability as one of the company's strategic axes through responsible innovation and using technology as a lever for green transformation.

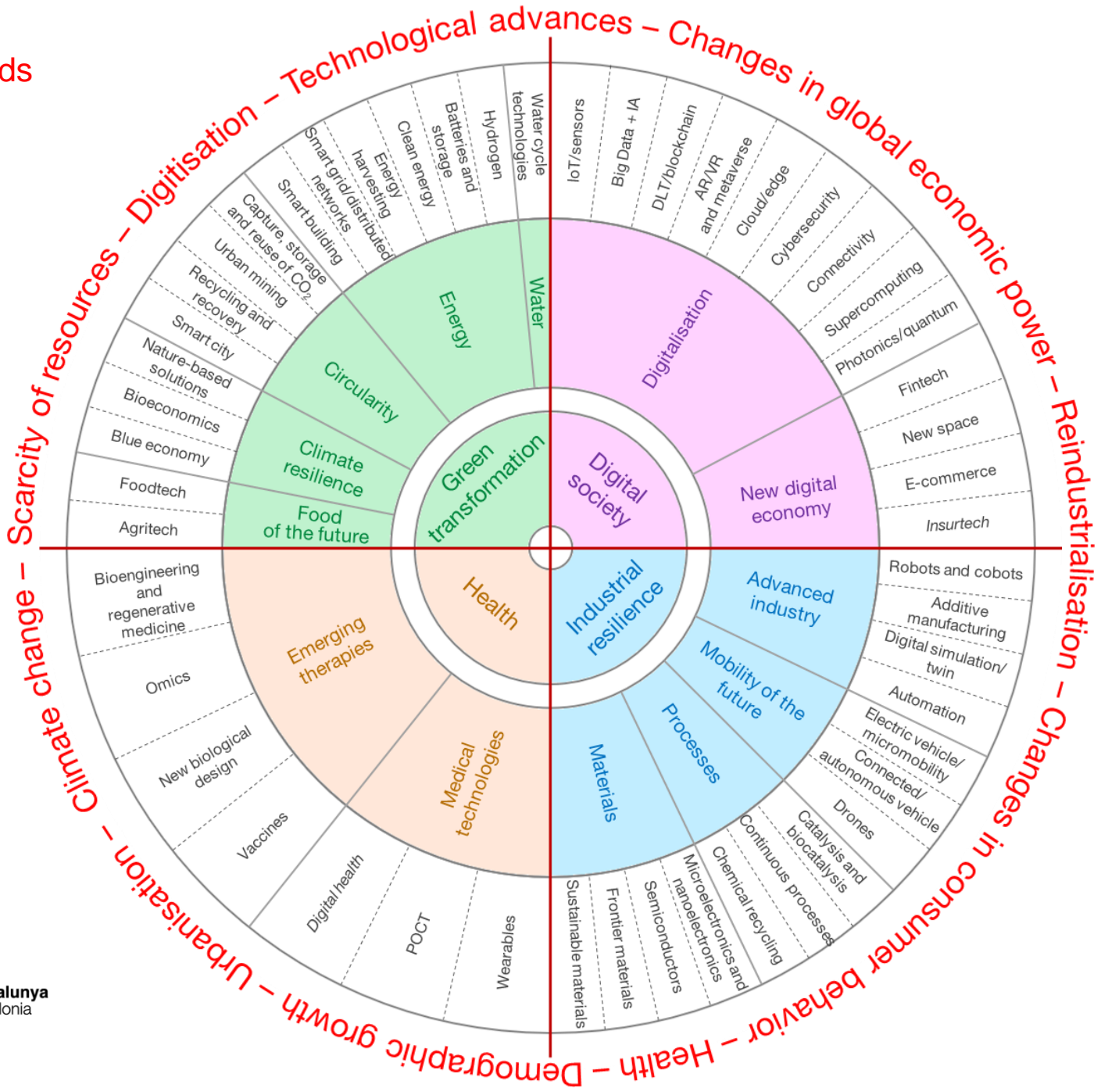
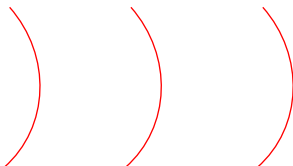
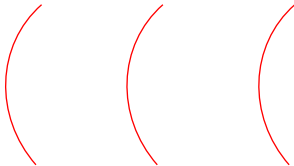
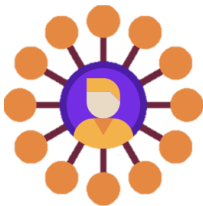
Catalog of solutions in the circular economy in Catalonia

Interactive catalog with the 100 most innovative practices in Catalonia in circular economy.



<https://www.accio.gencat.cat/ca/serveis/banc-coneixement/cercador/BancConeixement/cataleg-solucions-economia-circular-catalunya>

ACCIÓ technology trends



Catalonia success stories



Contact:

Director:

Dr. Ana Inés Fernández ana_inesfernandez@ub.edu

Researcher responsible of Circular Economy:

Dr. Josep Ma. Chimenos chimenos@ub.edu

Project Manager:

Esther Galindo esther.galindo@ub.edu

www.ub.edu/diopma



DIOPMA

Dept. of Materials Science and Physical Chemistry
FACULTY OF CHEMISTRY
Martí i Franquès, 1, 7th floor
UNIVERSITAT DE BARCELONA
Phones: 93 402 13 16/ 93 402 12 98



Twitter: @DIOPMA_UB



Environment

- Recycling
- Valorization
- Inertization
- Circular Economy
- LCA

Metallurgy

- Metals Purification
- Metallic coating
- New alloys



Mining

- Leaching
- Granulometric analysis
- Reactivity

Industrial Processes

- Pilot plants
- Process optimization

Energy

- Fuel cells
- Superconductors
- Thermal energy storage



3D-Printing/Additive Manufacturing

- Formulation of ceramic, metallic and polymeric inks
- Technology: DLP, Robocasting
- Multimaterial printing

Construction

- Fire-resistant aggregates
- Solid urban wastes as construction aggregates
- Polymer fireproofing
- Thermal and acoustic insulation

Projects

- ∴ Sustainable development of alkali activated cements from municipal waste incineration bottom ash to be used as a tiles and urban furniture
- ∴ Strategies to reduce plastic pollution in mountain ecosystems. EFA340/19
- ∴ Use of magnesium by-products for the recovery of phosphorus in Wastewater treatment plants using struvite precipitation RTC2019-007257-5
- ∴ Characterization of raw materials, refractory products and LG MgO for revaluation of industrial processes
- ∴ Shrinkage compensating additives for high-performance concrete from non-recyclable waste
- ∴ Soil stabilization with LGMgO
- ∴ Recycling steel making solid wastes for added value Energy Efficiency building products, ECO/13/630286
- ∴ Methodology for analysis of thermal energy storage technologies towards a circular economy, RTI2018-093849-B-C32

Bioelectrochemical assisted anaerobic digestion (AD-BES)



- Design, construction and operation of **BES-assisted anaerobic digester** for improved **biogas generation** from WWTP sludges
- **From laboratory to pilot scale**, with special attention to electrode materials and inoculation protocols standarization
- **Technology validation** in a real WWTP (200L, TRL6)
- Project duration: 2014-2018

Main findings:

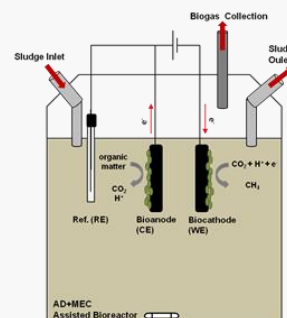
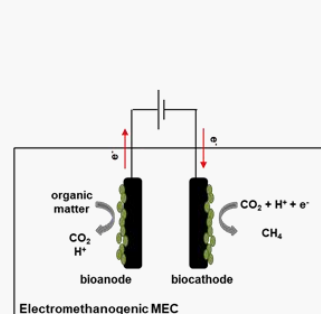
- AD-BES allowing higher organic load vs control AD: $HRT \downarrow$ CH_4 production \uparrow
- Improvement in biogas quality is confirmed: 70% CH_4 in AD-BES vs 60% in AD



Eduard Borràs PhD

eborras@leitat.org

Circular Economy Department



Theoretical basis

AD-BES reactor design

Lab-scale trials (2 L)

Pilot-scale trials (200 L)

Valorization of urban biowaste and agri-food by-products based on their bioconversion, using insects, into high added value products for the strategic sectors



Development of an innovative system for the management and recovery of urban waste and agri-food by-products, based on its bioconversion, using insects, into high value-added products for different industries such as chemical applications in textiles and fertilizers

Municipal organic fraction waste (MOFW)

Byproducts from market and grocery stores

Sewage sludge

Biomethanation digestate



Protein flour
Lipid fraction insect-based

FOOD

Insect bioactive peptides
Pharmacologically active compounds (anti-inflammatory, anticancer properties)

NUTRACEUTIC/
PHARMA

Peptides and free aminoacids (antioxidants, antimicrobial properties)
Chitosan derived compounds

VEGETAL
NUTRITION

Chitin/chitosan derived compounds

CHEMISTRY



Montse Jorba PhD

mjorba@leitat.org

Circular Economy Department

Ecoplanta



The Ecoplanta project, the only Spanish candidacy pre-selected in the European Commission Innovation Fund

ECOPLANTA
Reduction of CO₂ emissions in methanol production from municipal non-recyclable waste

Thank you

Passeig de Gràcia, 129
08008 Barcelona

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