



COLEGIO DE INGENIEROS DEL PERU

# ECONOMIA CIRCULAR

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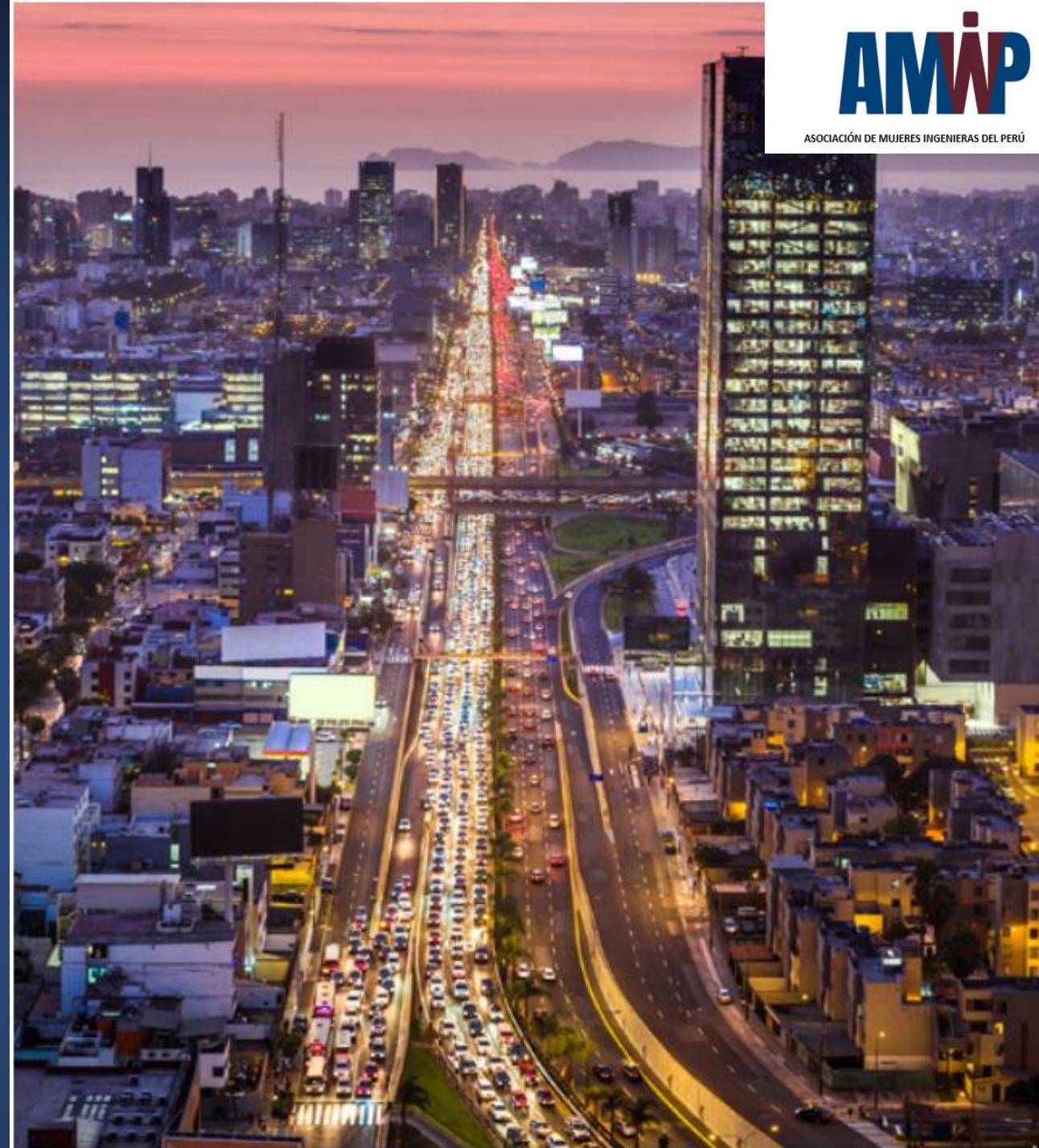
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AMIP

ASOCIACIÓN DE MUJERES INGENIERAS DEL PERÚ





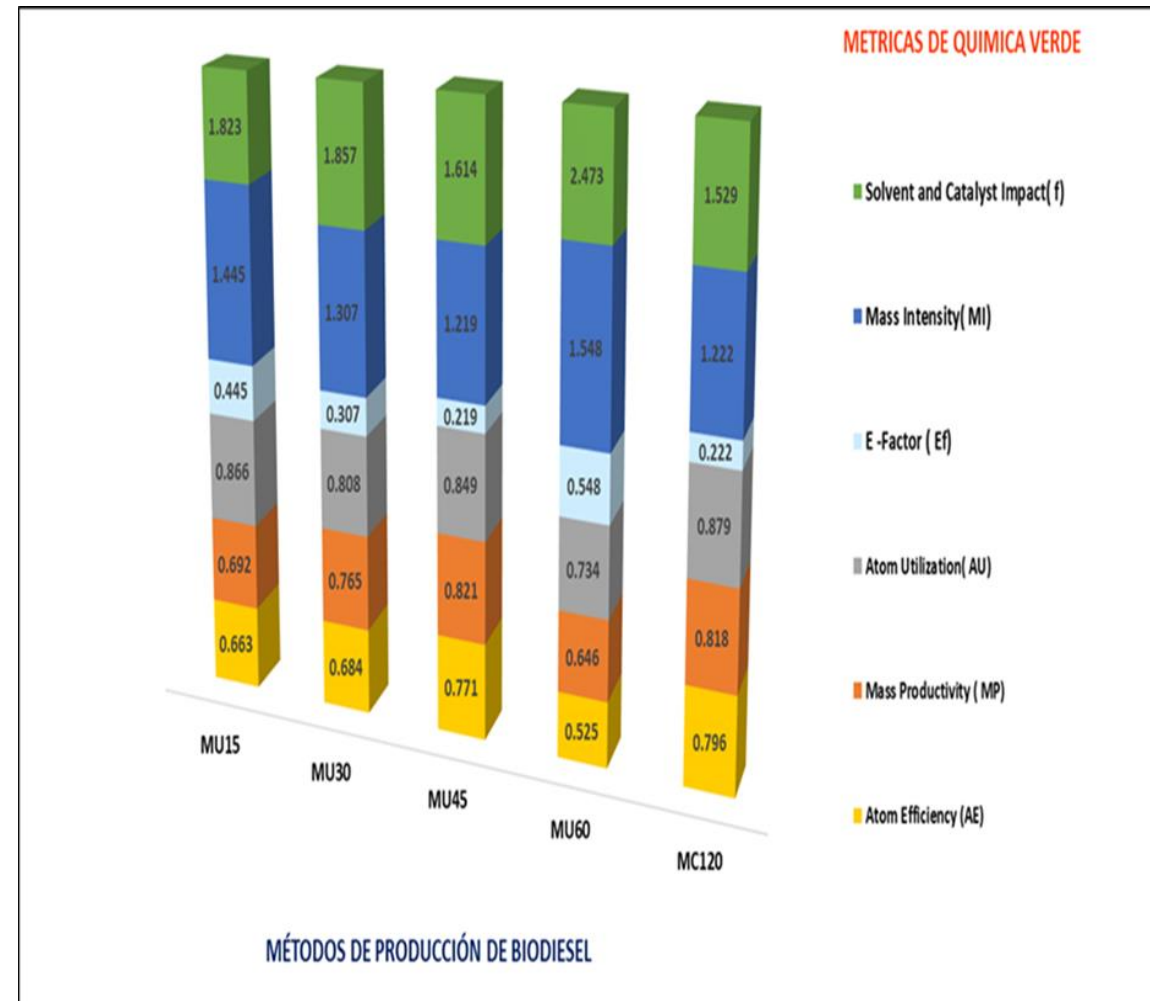
# ¿ QUE ES LA ECONOMIA CIRCULAR ?

- EC son estrategias que ayudan a la sostenibilidad mediante la mejora de los procesos, con el eficiente uso de los recursos que permiten la reducción de las emisiones y la generación de residuos.





# ODS- IRAS Y PROCESOS VERDES

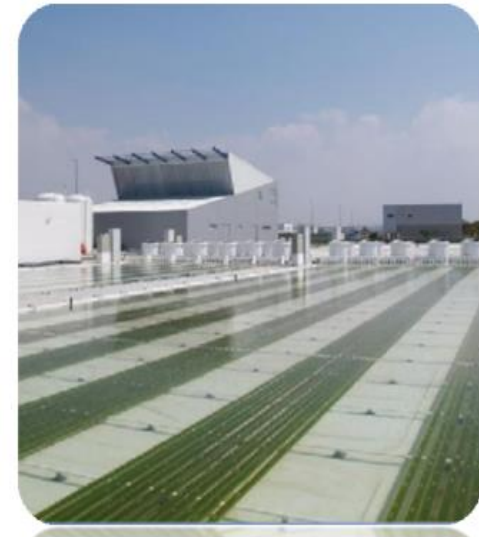
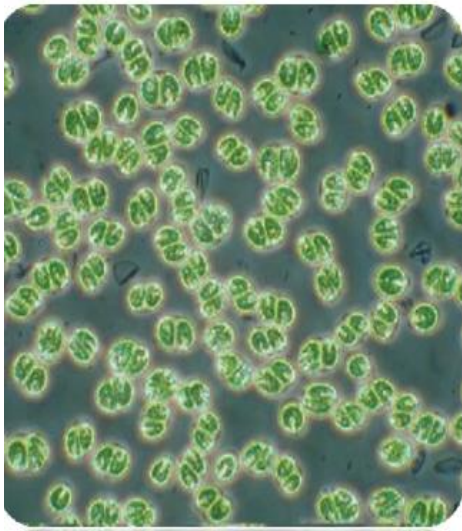
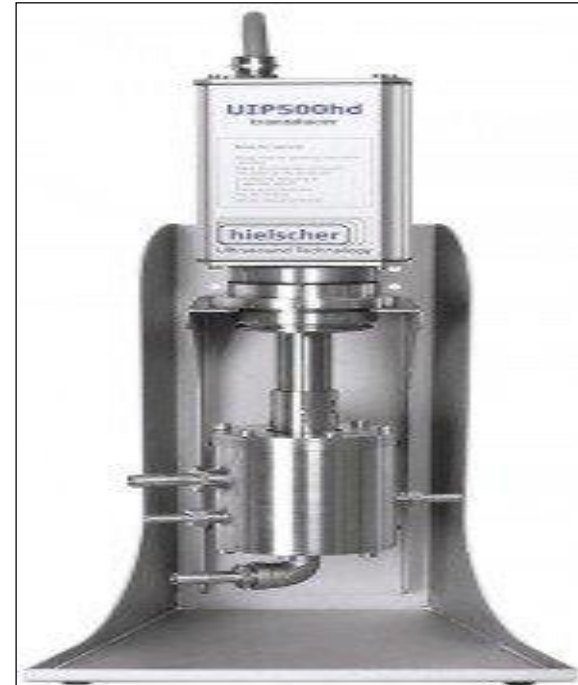


Fuente : M-E. Fuentes 2018

# METODO DE PRODUCCION DE BIODIESEL

## **Agitación con ultrasonido:**

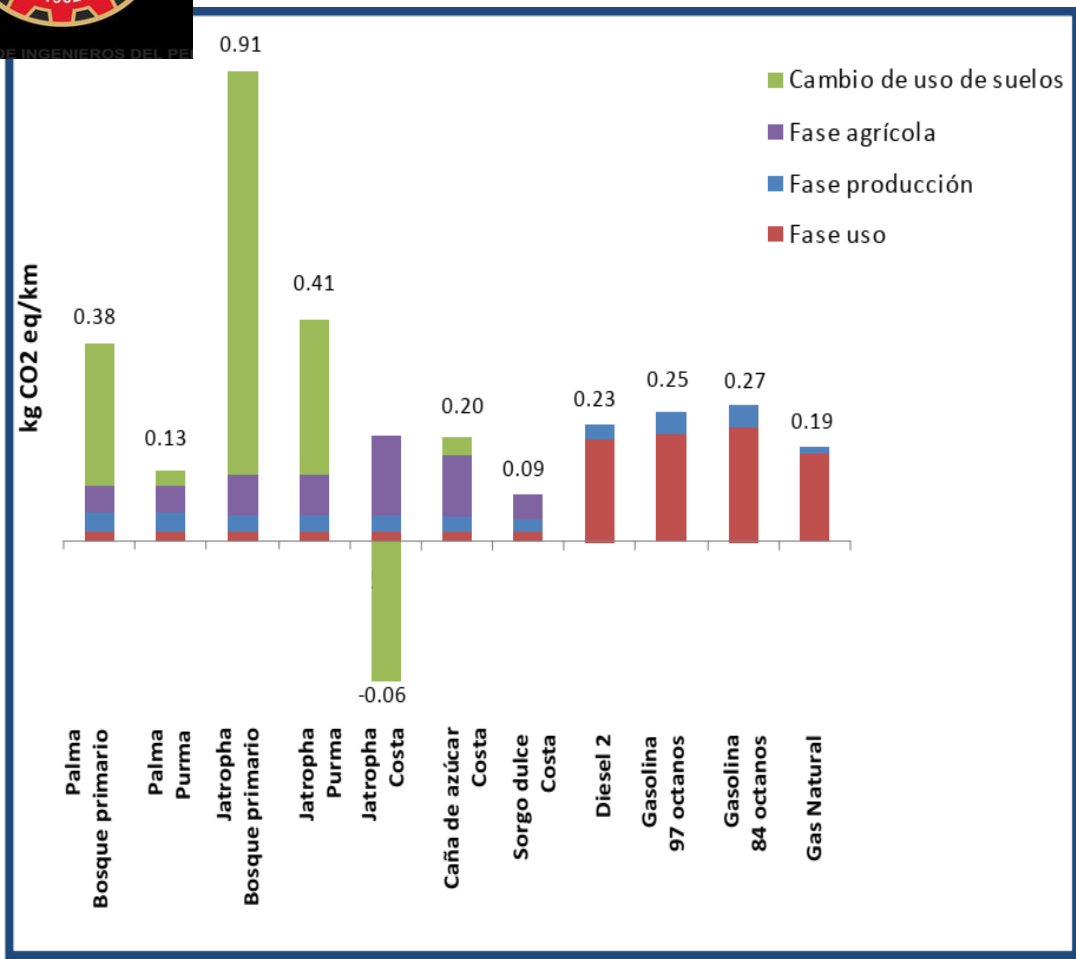
Método no convencional como uso de ultrasonido para obtener rendimiento aceptable.  
Velocidad de reacción alta .  
Subproducto de mejor calidad.  
Se cumplen con las métricas de la química verde.







# CICLO DE VIDA



**Objetivo:** Conocer los impactos ambientales del ciclo de vida (EICV) de los biocombustibles y su viabilidad como estrategia para mitigar el impacto de la emisión de gases de efecto invernadero (GEI).



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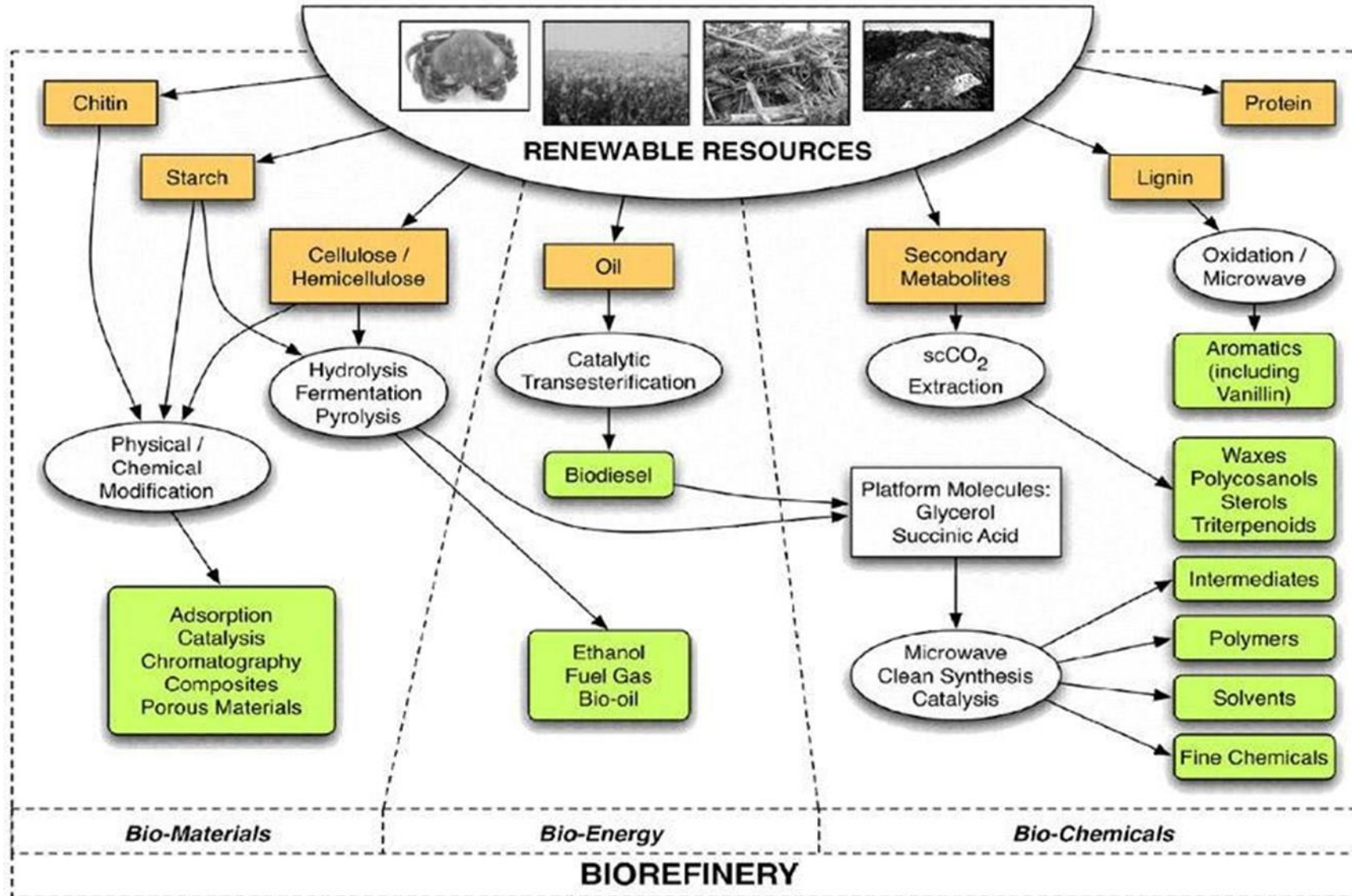


PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ



RED PERUANA CICLO DE VIDA

# BIOREFINERIAS:







# BIOREFINERIAS: REVALORIZACION DE RESIDUOS ALIMENTARIOS



258

*Recibido el 20-03-19*  
*Aprobado el 03-06-19*

## **EXTRACCIÓN ASISTIDA POR ULTRASONIDO DE COMPUESTOS FENÓLICOS DE LA CÁSCARA DE SANKY** *(Corryocactus brevistylus)*

Tatiana Rojas<sup>a</sup>, María E. Fuentes Campos<sup>b\*</sup>, Eliana Contreras-López<sup>c</sup>,  
Susana Gómez<sup>a</sup>, Ana María Muñoz-Jáuregui<sup>d</sup>



# FORMULACIONES PROTEICAS DE RESIDUOS DE QUINUA



## Análisis bromatológico del jipi de la quinua

Composición	Unidad	Jipi de Quinua
Materia seca	%	90,93
Fibra cruda	%	23,9
E.M.	Kcal/Kg	3810
Proteína cruda	%	19,2
Calcio	%	0,75
Fosforo	%	0,45

Fuente: Seladis 2012





# NANOTECNOLOGIA



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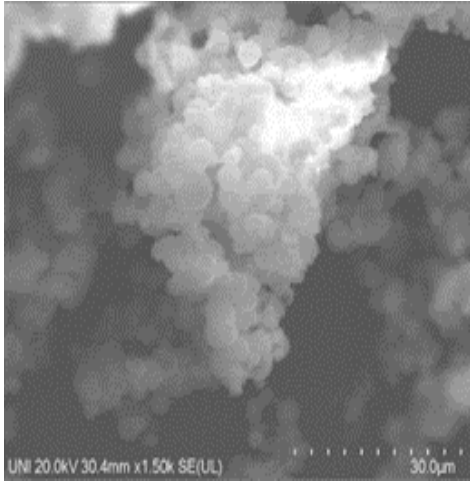


**APLICACIÓN DE  
FERTILIZANTES  
NANOENCAPSULADOS  
EN MATRICES  
POLIMERICAS**





## APLICACIÓN DE BIOINSECTIDAS CON NANOCARGADORES POLIMERICOS



Estructura de los nanocargadores de bioinsectida



Cultivo de algodón atacada por gusanos

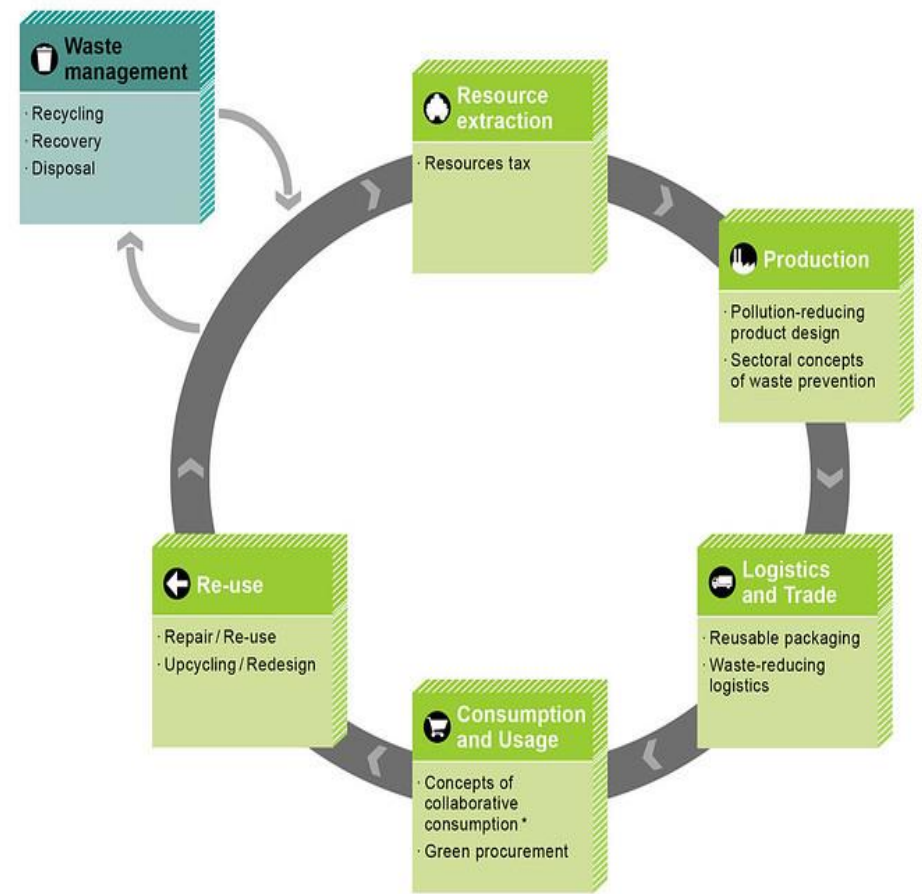


# CIRCULAR ECONOMY ACT-kRWg ( Alemania)

Öko-Institut e.V.

## Steps of Waste Prevention

Creation of value and usage within the product-lifecycle



■ Step within lifecycle   
 ▨ Measures of waste prevention   
 ■ Waste management  
 \* i.e. Professional equipment rental

SOURCE: OEKO-INSTITUTE, 2013

**Act**  
**Reorganising the Law on Closed Cycle Management and Waste**  
**(Gesetz zur Neuordnung des Kreislaufwirtschafts- und Abfallrechts) \***  
 of 24 February 2012

The *Bundestag* has adopted the following Act with the consent of the *Bundesrat*:

**Article 1**  
**Act**  
**to Promote**  
**Circular Economy and**  
**Safeguard the Environmentally-Compatible**  
**Management of Waste**  
**(Gesetz zur Förderung der Kreislaufwirtschaft und Sicherung der umweltverträglichen Bewirtschaftung von Abfällen)**

Circular Economy Act – (Kreislaufwirtschaftsgesetz – KrWG) \*

El propósito del Acta es promover la economía circular para conservar los recursos naturales y asegurar la protección del medio ambiente y la salud humana cuando se genera y se manejan los residuos.



ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Journal of Cleaner Production

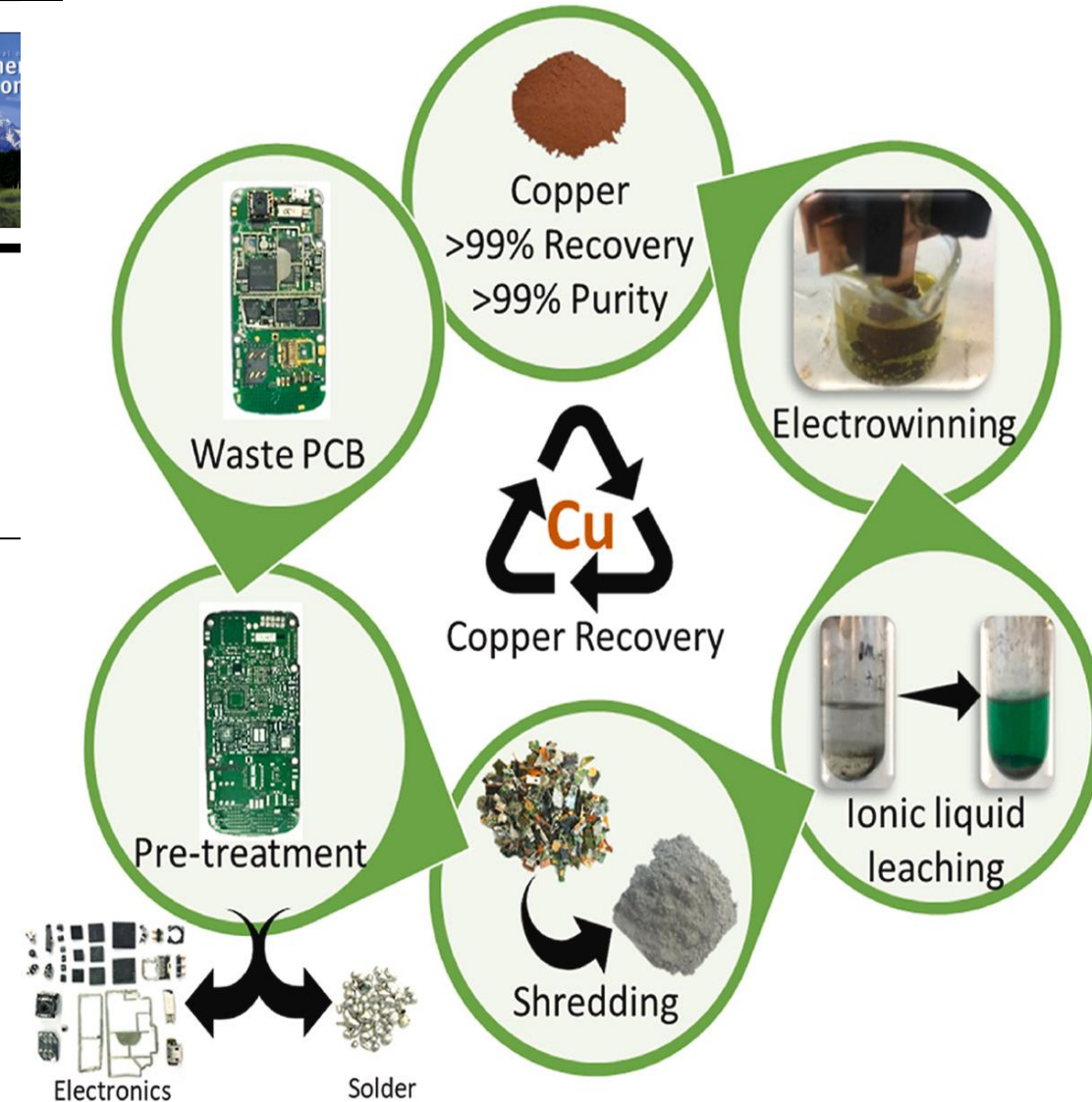
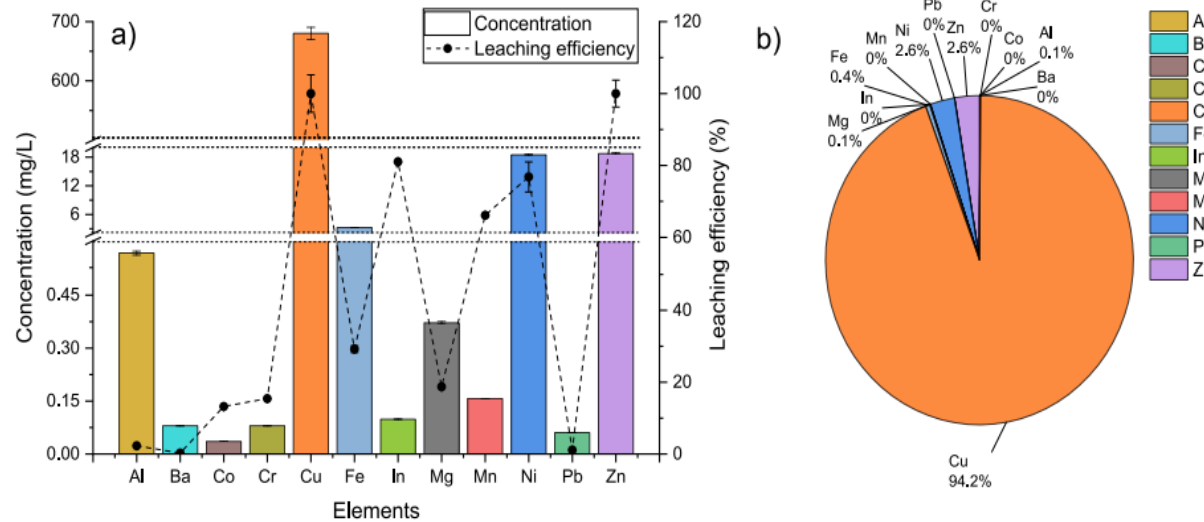
journal homepage: [www.elsevier.com/locate/jclepro](http://www.elsevier.com/locate/jclepro)



## Novel hydrometallurgical process for the recovery of copper from end-of-life mobile phone printed circuit boards using ionic liquids

Moisés Gómez, Sue Grimes\*, Geoff Fowler

Department of Civil and Environmental Engineering, Imperial College London, South Kensington Campus, London, SW7 2AZ, United Kingdom







# INVESTIGACIONES E INICIATIVAS EN ECONOMIA CIRCULAR



### Recuperación de metales preciosos

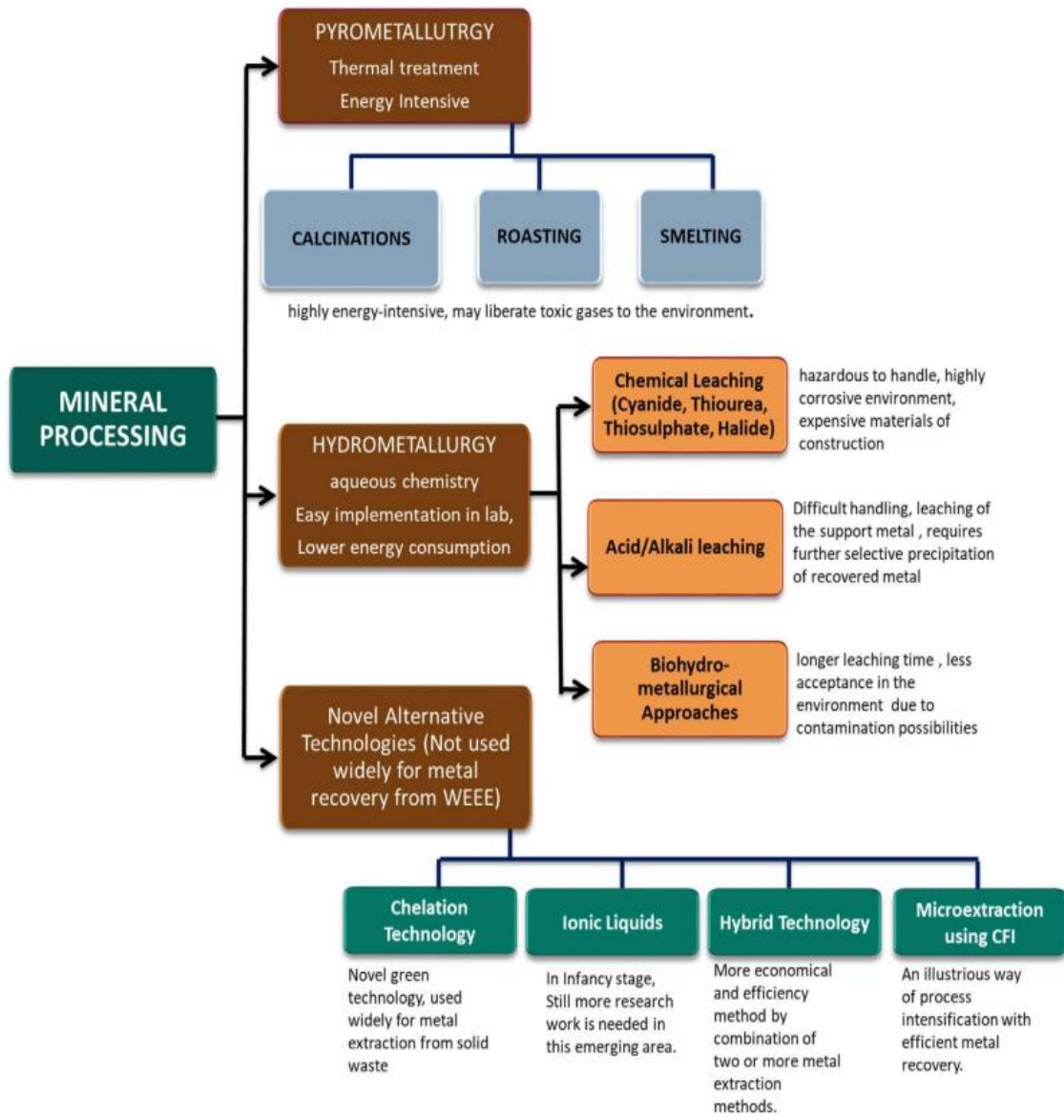
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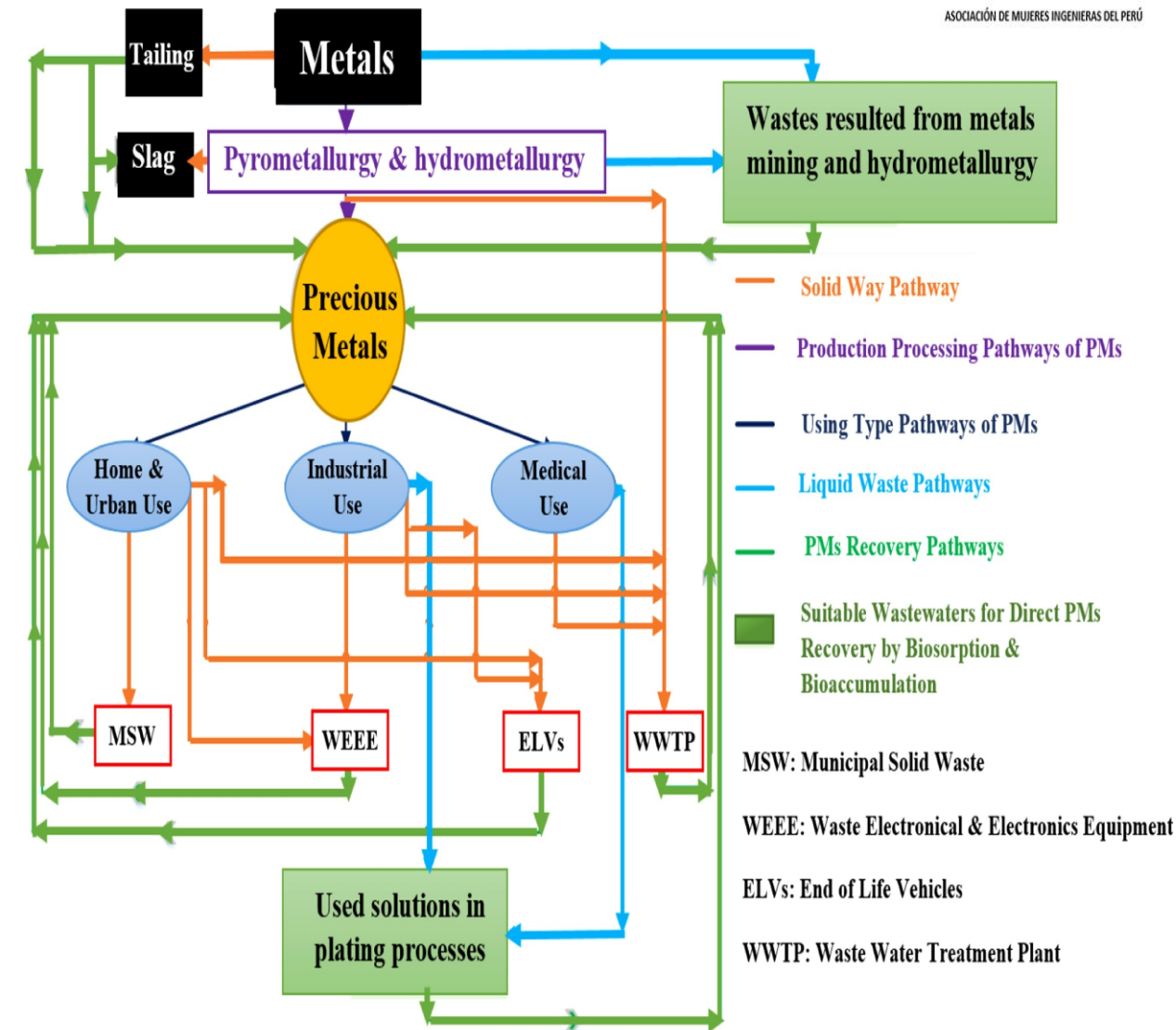
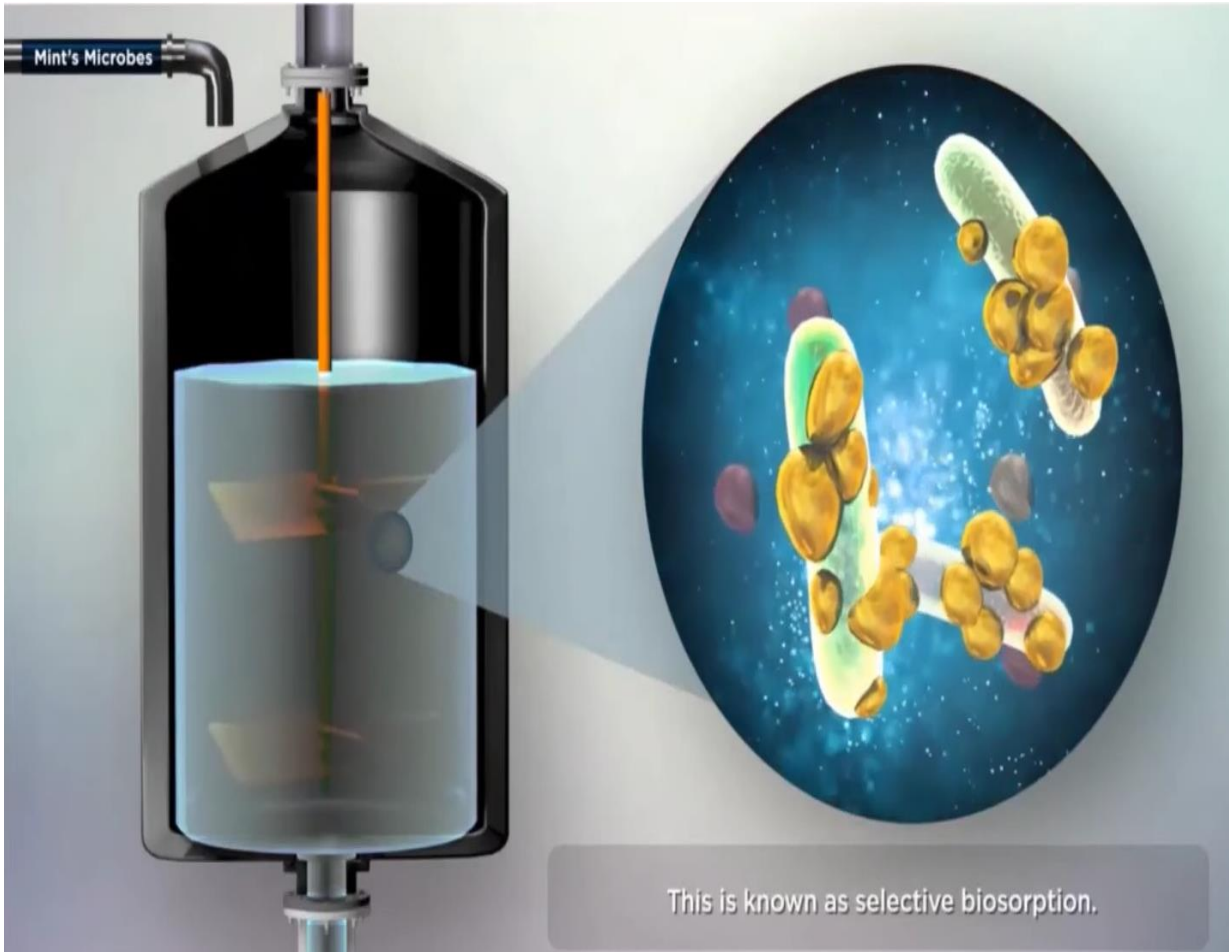
## German consortium launches project Battery Pass to support EU circular battery data

26 April 2022 12:00 Battery Recycling Solutions





# INVESTIGACIONES E INICIATIVAS EN ECONOMIA CIRCULAR



Golnaraghi et al., 2020. Biosorption for sustainable recovery of precious metals from wastewater.

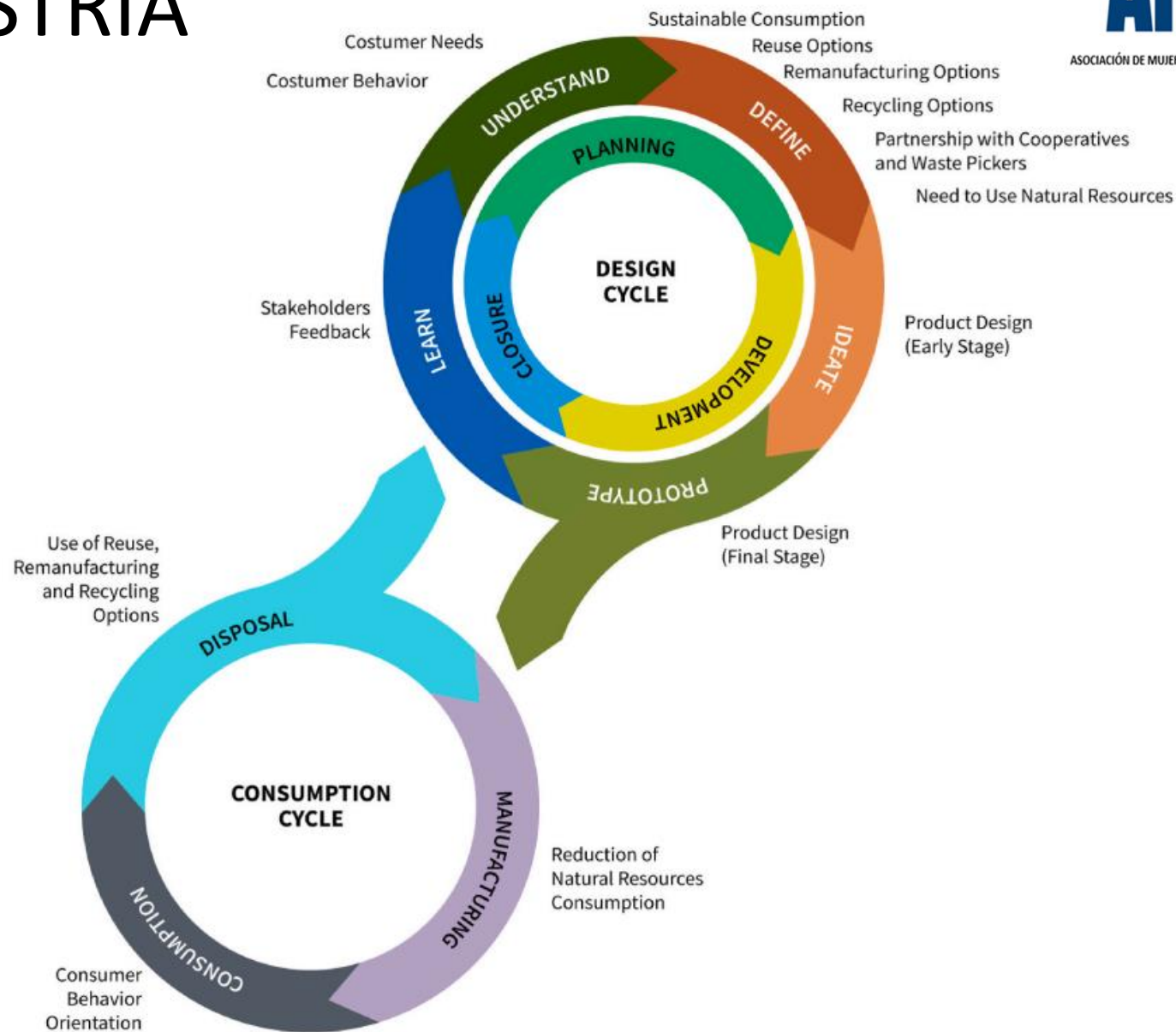




# EC EN LA INDUSTRIA TEXTIL



ASOCIACIÓN DE MUJERES INGENIERAS DEL PERÚ





# A package to facilitate CE implementation



**ISO WD 59 004** – Circular Economy – Terminology, principles and framework for implementation  
Gives a common understanding of Circular Economy



**ISO WD 59 010** – Circular Economy – Guidance on business models and value networks  
Provides a guideline to transform business models from linear to circular



**ISO WD 59 020** – Circular Economy – Measuring circularity  
Provides a framework to measure and assess circularity performance



**ISO WD 59 040** – Circular Economy – Products circularity datasheet  
Provide further framework and toolbox for reporting circularity performance at product level



**Supporting documents:** Provides experience feedback to make circular economy tangible and concrete

**ISO TR 59 031** – Circular Economy – Performance based approaches



**ISO TR 59 032** – Circular Economy – Review of business model implementation



**Another project: Joint WG ISO TC207 SC5 & ISO TC323 JWG14 - ISO WD 59 014** - Secondary materials – Principles, sustainability and traceability requirements







# ISO 59004 Circular economy - Terminology, principles and framework for implementation

**Circular Economy**  
Economic system that uses a systemic approach to maintain a circular flow of resources by regenerating, retaining or adding to their value, while contributing to sustainable development.

**Terminology, terms related to**

- Circular Economy
- Solutions
- Resources
- Business model, design & development
- Measurement & assessment
- Organization & other interested parties

**Circular Economy principles**

- Systems thinking
- Value creation
- Value sharing
- Resource availability focus
- Resource traceability
- Ecosystem resilience

**Framework for implementation of circular economy**

- Embedding circular economy principles in the implementation
- Level of implementation
- Structure of the framework for implementation
- Reference assessment and context evaluation
- Vision & goals definition
- Strategy development
- Implementation
- Monitoring & reporting

**Areas of action**

- Circular design
- Resource management
- Procurement
- Industrial and territorial symbiosis
- Solution provision
- Reverse logistic
- Waste management during the transition to circular economy
- Education
- Investments
- Policies & Regulation



# ISO EN ECONOMIA CIRCULAR



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STANDARDS	PUBLICATION
ISO WD 59 004 – Circular Economy – Terminology, principles and framework for implementation	2023
ISO WD 59 010 – Circular Economy – Guidance on business models and value networks	2023
ISO WD 59 020 – Circular Economy – Measuring circularity	2023
ISO WD 59 040 – Circular Economy – Products circularity datasheet	2023
ISO TR 59 031 – Circular Economy – Performance based approaches	2022
ISO TR 59 032 – Circular Economy – Review of business model implementation	2022
ISO WD 59 014 – Secondary materials – Principles, sustainability and traceability requirements	2023

Fuente: Online Workshop/Webinar on Role of Standards & Policy in Resource Efficiency and Circular Economy Transition in India and the EU (Presented by Catherine Chevauché)



Support your local  
Circular Economy

# Go circular

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ambiente

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