



AICE

itc



UNIVERSITAT
JAUME I

Instituto de Tecnología Cerámica

R&D strategy lines

High risk and not necessarily
with a direct application

R&D in companies

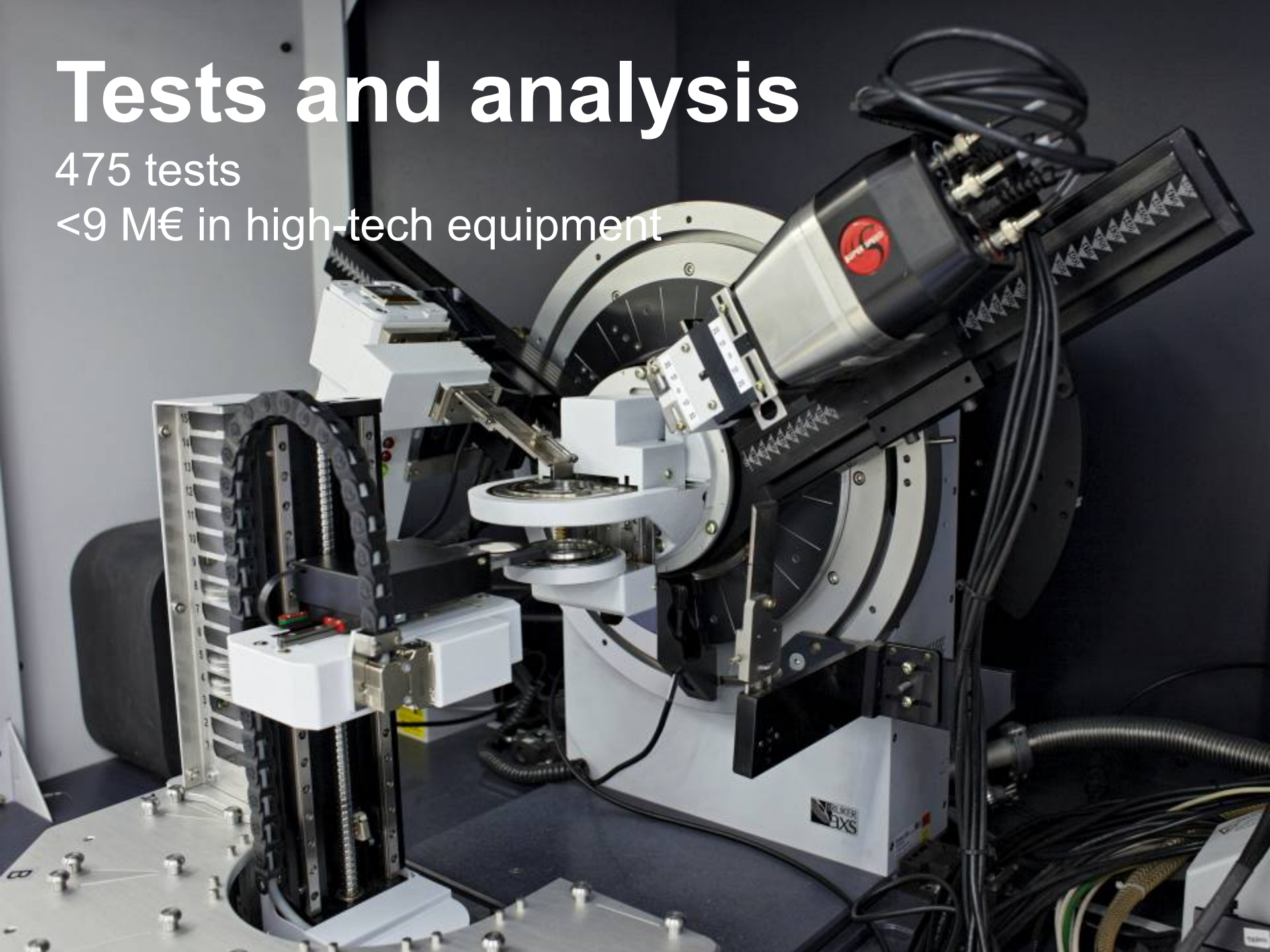
Technologic consultancy services



Tests and analysis

475 tests

<9 M€ in high-tech equipment



Competitive Intelligence ...



Training



The logo is a circular emblem with a stylized globe at its center. The globe is composed of concentric circles and is surrounded by various icons representing different aspects of technology and the environment. These icons include a wind turbine, a solar panel, a factory, a car, a house, a tree, a flower, and a gear. The globe is set against a background of blue and green wavy lines. The text "ITC" is prominently displayed in the center of the globe, with "INSTITUTO DE TECNOLOGÍA CERÁMICA" written below it. The logo is framed by a thick black border.

CURRENT STRATEGIC LINES IN CIRCULAR ECONOMY IN ITC

Industrial Symbiosis

Training in CE

Resource Efficiency



INDUSTRIAL SYMBIOSIS



[NOTICIAS](#) [CASOS DE ÉXITO](#) [CALENDARIO](#) [DOCUMENTOS](#) [CONTACTO](#)



CASOS DE ÉXITO

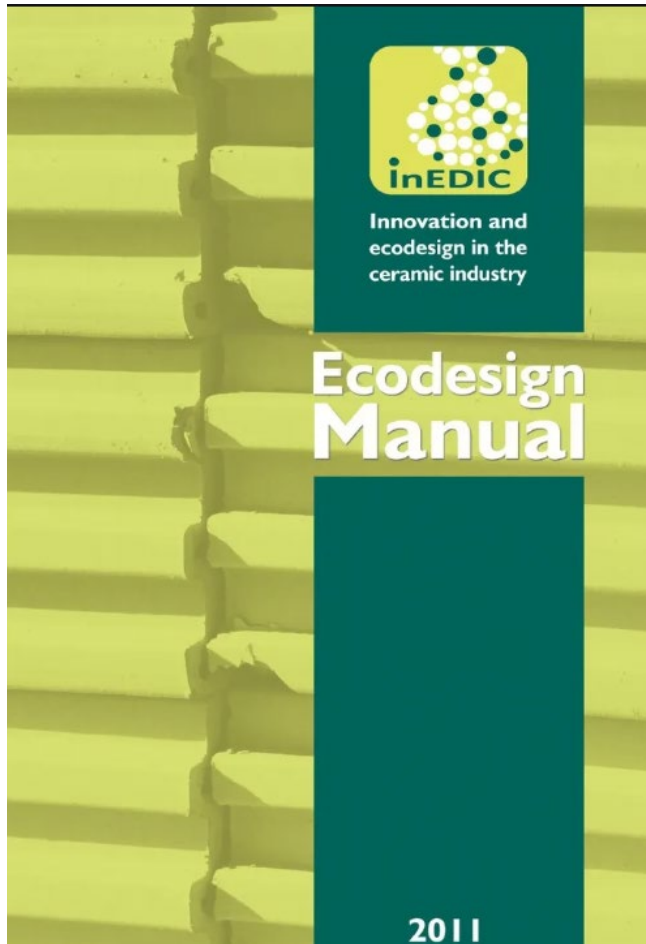
EL PUERTO DE VALENCIA

INDUSTRIAL SYMBIOSIS



Horizon 2020

TRAINING – ERASMUS+



SInnDesign
Sustainable Innovation through Design



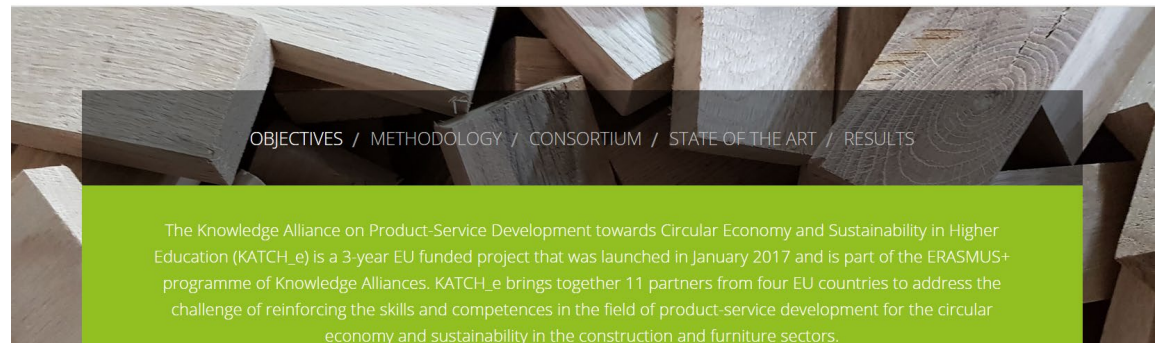
Training for Circular Economy in the Construction and
Furniture Sectors

EN / PT / ES / DE / DA

THE
PROJECT

TRAINING
MATERIALS

KNOWLEDGE
PLATFORM



RESOURCE EFFICIENCY



VALORIZATION OF IRON FOUNDRY SANDS
AND DUST IN CERAMIC TILE
PRODUCTION PROCESS
(LIFE14 ENV/ES/000252)

Coordinador del proyecto



SOCIOS



RESOURCE EFFICIENCY



ZERO WASTE IN CERAMIC TILE MANUFACTURING

Programa: LIFE +

Convocatoria: 2012

Web: <http://www.lifeceram.eu>

ASCER
Asociación Española
de Fabricantes de Azulejos
y Pavimentos Cerámicos




keros



Instituto de Tecnología Cerámica



LIFE CERSUDS

Ceramic Sustainable Urban Drainage System

Instituto de Tecnología Cerámica
Irina Celades López



This project is financed by the LIFE Programme 2014-2020 of the European Union for the Environment and Climate Action under the project number LIFE15 CCA/ES/000091 /Este proyecto está financiado por el Programa LIFE 2014-2020 de Medio Ambiente y Acción por el Clima de la Unión Europea con referencia LIFE15 CCA/ES/000091

Program:

LIFE 2015 /Climate Change Adaptation

Project title:

Ceramic Sustainable Urban Drainage System

Project period:

October 2016 ⇒ September 2019

Website:

www.lifecersuds.eu

Budget:

Total amount	59,98% financing CE
1.817.972€	986.947€



Coordinator:

- Ceramic Technology Institute (ITC-AICE)

Partners:

- Institute for Water Engineering and Environmental Research (IIAMA)
- Council of Benicàssim
- CHM Infrastructures
- Trencadís de Sempre
- Bologna Ceramic Centre (CCB)
- Coimbra Technological Centre for Ceramic and Glass (CTCV)



- **To promote sustainable urban drainage systems (SUDS)**
- **To Improve the capacity of Climate Adaptation of cities.**
- **To Design and develop a Sustainable Urban Drainage System demonstrator (3000 m²), based on a ceramic system with low value tiles.**
 - 90% reduction of the runoff production
 - 300 tons of ceramic with low commercial value used in the demonstrator
 - Storage capacity of rainwater for reuse as irrigation
 - 70% hydrocarbon, over 50% of phosphorus, more than 65% in nitrogen and above 60% in heavy metals reduced
 - A reduction of CO₂ eq emission in comparison with traditional permeable materials
- **To guarantee replication through training of professionals and raising awareness of the cities.**

**Ceramic with
low commercial
value**



Permeable
ceramic
pavement



Climate change:
Periods of droughts
Increase of floods
+
Sealed ground



**Sustainable Urban
drainage system**

- ⊖ Floods
- ⊖ CO₂
- ⊖ Energy
- ⊕ H₂O

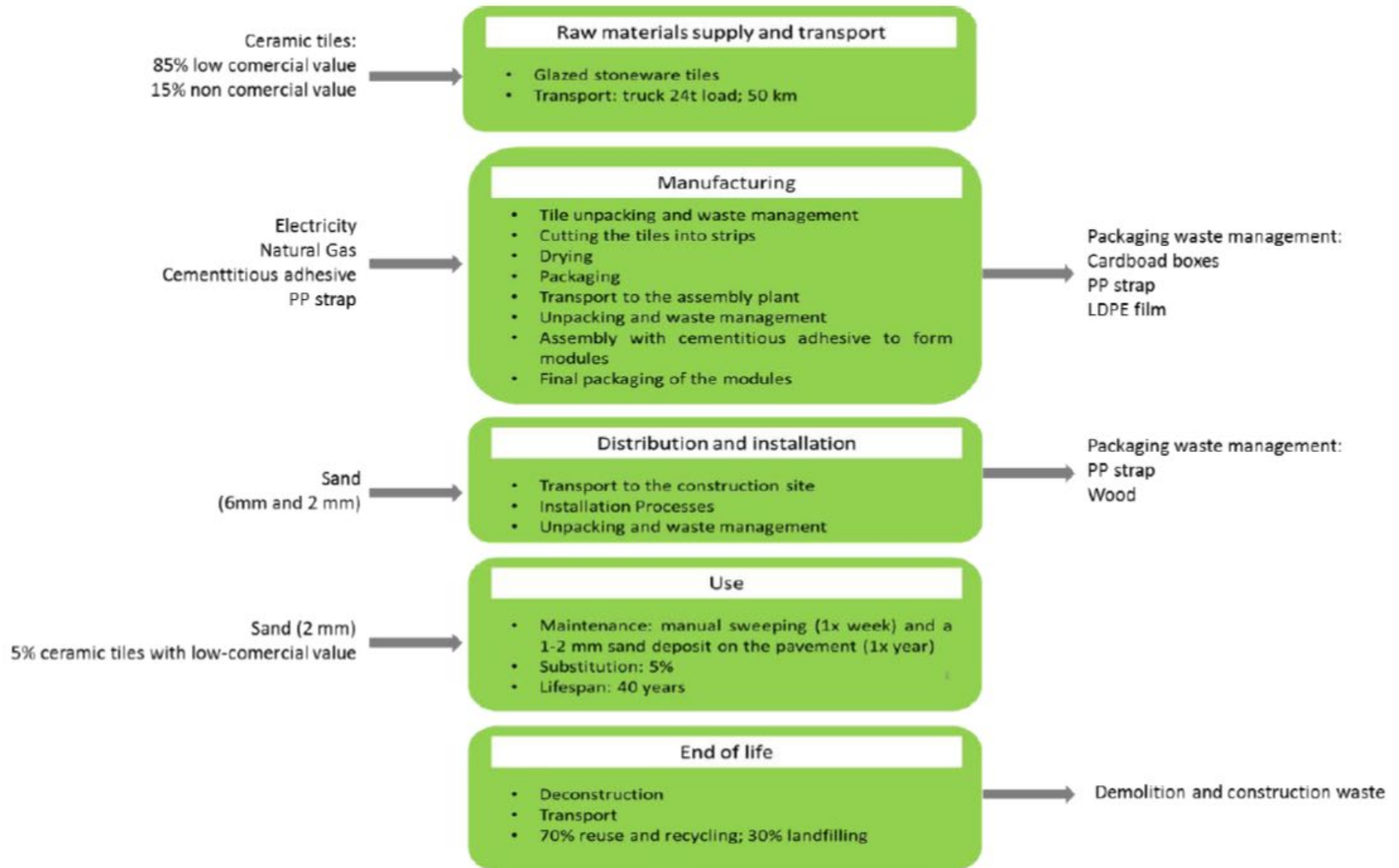


1 MANUFACTURING PROCESS

2 ENVIRONMENTAL BENEFITS

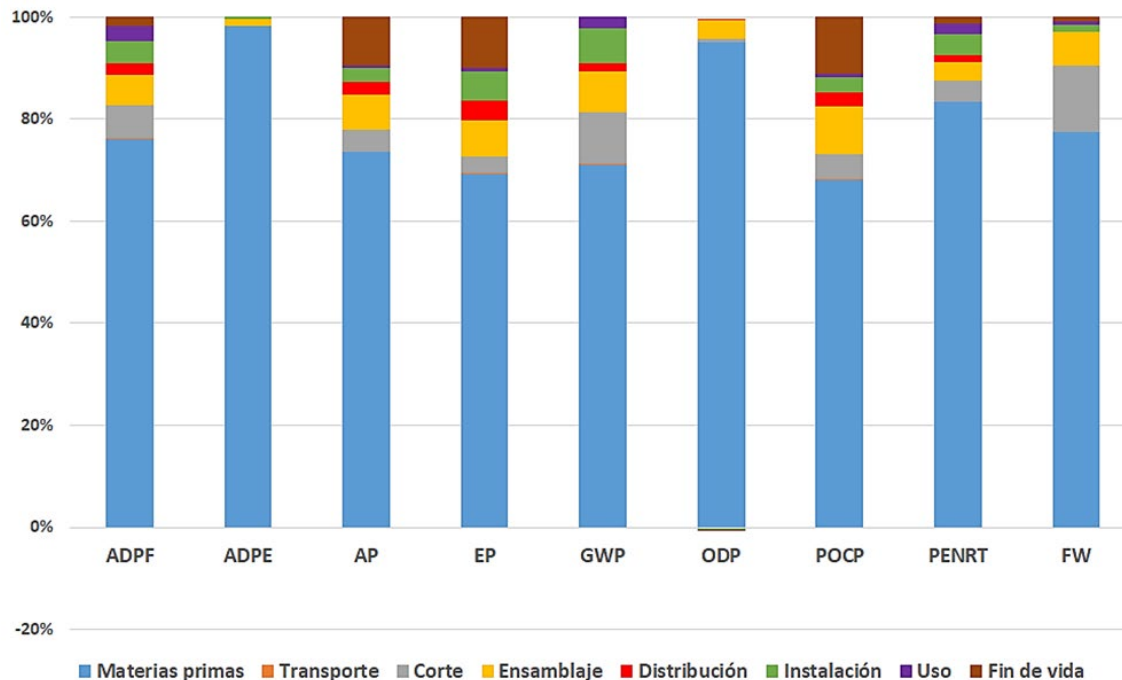
CO2 REDUCTION EMISSIONS VERSUS OTHERS

MATERIALS: LCA approach



ENVIRONMENTAL IMPACT CONTRIBUTION ANALYSIS

Functional Unit: amount of water drained (in l/minute) per m²



✓ **Allocation** of environmental burdens on the basis of **economic criteria** has been applied.

✓ The higher environmental impact is the **raw material** in all the categories.

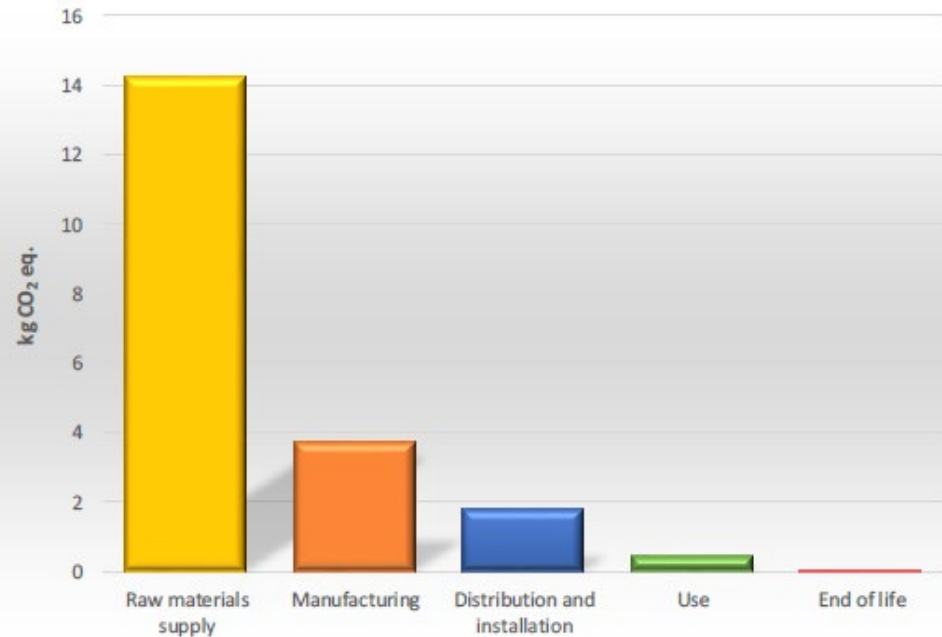
✓ The environmental **impact** may **vary according to the allocation rule applied (economic basis)**.

KATCHING CARBON TOOL

RESULTS

Name of the company	LIFE-CERSUDS
Name of the product or service	CERSUDS
Declared/Functional Unit	paving 1 m2 of urban land with CerSUDS
Lifespan of the product (years)	40 years

LIFE CYCLE STAGES	kg CO ₂ eq.
Raw materials supply	14.23
Manufacturing	3.7
Distribution and installation	1.77
Use	0.44
End of life	8.70E-03

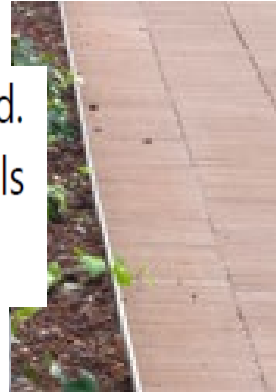


CO2 REDUCTION EMISSIONS VERSUS OTHERS MATERIALS



COMPARISON WITH OTHER DRAINAGE PAVEMENTS. SCOPE: CRADLE TO GATE; SOURCE: EPD

CE STRATEGIES TO REDUCE IMPACT: CE ANALYST AND CE DESIGNER



In order to identify the most appropriate design strategy, the CE Design tool has been executed. To quantify the potential improvement associated, the CE Analyst and KATCHing Carbon tools have been applied.

The results show that there is significant potential in the related strategies **Design for Material Sustainability** and **Design for Energy Sustainability**.

The improvement in design is focused on modifying slightly the current cutting technology that allows ceramic tiles of different formats and thickness to be cut into strips at the same time.

Currently, only a few types and formats of tiles are viable for this type of solution.

This modification in the machinery would not only speed up production but would also make possible to increase the number of available and suitable tiles that currently have no commercial value which, in a near future, will be landfilling.

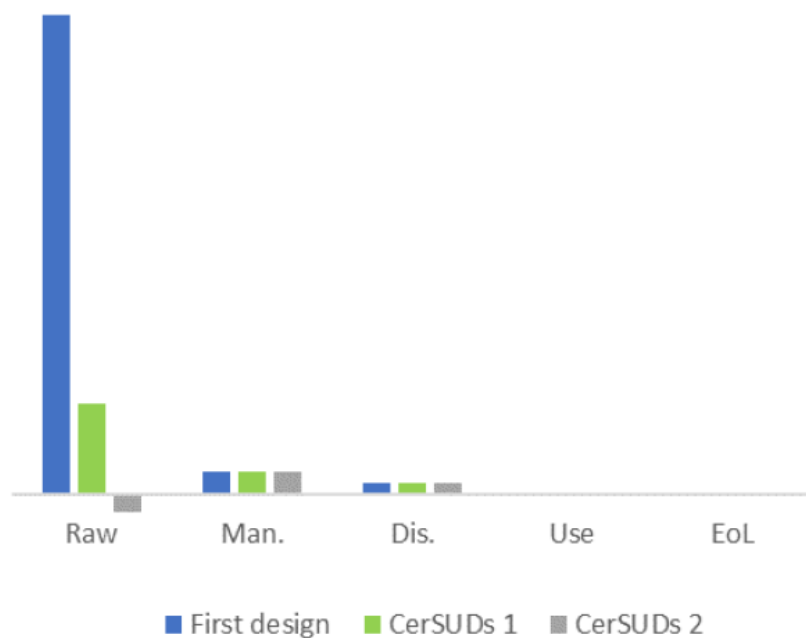
In order to determine the influence of the type of ceramic tiles used as raw material in the life cycle of the CERSUDS flooring filter system, 3 scenarios were analyzed:

- 1) First design: 100% of the tiles used have commercial value at the current date
- 2) CERSUDs 1: 85% have a commercial value that has been reduced by 77% and 15% have no commercial value (current scenario)
- 3) CERSUDs 2: 100% of the tiles used have no commercial value (ideal scenario)

KATCH-E CE ANALYST

Name of the project	First design	CERSUDs 1	CERSUDs 2
Description of the product or service	Permeable covering made of ceramic tiles <u>manufactured for this purpose</u>	Permeable covering made of ceramic tiles with <u>low commercial value</u>	Permeable covering made of ceramic tiles with <u>non-commercial value</u>
Declared/Functional Unit	1 m ² of urban flooring system		
Lifespan of the product (years)	40 years		

CE STRATEGIES TO REDUCE IMPACT: CE ANALYST AND CE DESIGNER



	<i>First design</i>	<i>CerSUDs 1</i>	<i>CerSUDs 2</i>
<i>Raw</i>	74.7	14.2	-2.8
<i>Man.</i>	3.7	3.7	3.7
<i>Dis.</i>	1.8	1.8	1.8
<i>Use</i>	0.44	0.44	0.44
<i>EoL</i>	0.0087	0.0087	0.0087

First design 80.65 kg CO₂ eq.

CERSUDs 1 20.15 kg CO₂ eq.

CERSUDs 2 3.15 kg CO₂ eq.

SUMMARY OF RESULTS. TRAINING MATERIAL



PERMEABLE CERAMIC SYSTEM AS A SUSTAINABLE URBAN DRAINAGE SOLUTION: PRINCIPLES, DESIGN AND EXECUTION

Demonstrator Project in Benicàssim
(Castelló)



Available at:
www.lifecersuds.eu

Spanish
English
Portuguese
Italian











☀️ **First prize SOM CERÁMICA 2018** to the use of Ceramic Product. Diputación de Castellón.

☀️ **Honorable mention** at Innovation space of **Tektónica 2019**, International Construction and Public Works Fair of Portugal.

☀️ **Prize** to the innovative product or material at Future Arena. **Construmat 2019**, International Construction Exhibition.

Thanks!

www.lifecersuds.eu

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LIFE
CER
SUDS