Now

2. EVOP

From olive-mill waste to on-site renewable heat

EVOP — Energy Valorisation of Olive Pits

A circular bioenergy pilot — CIRCULOOS Open Call 2



CIRCULOOS

Horizon Europe GA No. 101092295

Who we are

A cross-border consortium

turning an agro-industrial by-product into local, renewable energy.

VE — **Cooperativa Virgen de la Estrella**

Pilot olive mill — hosts the boiler & storage tanks

CC — **CAMACOES — Cámara Oficial de Comercio Española en Italia**

Project coordination & dissemination — Patricia Domínguez Garzón

MB — **Mercado Biomasa S.L.**

Technical coordination & biomass expertise — Rosendo García

CE — **Cooperativas Agro-alimentarias Extremadura**

Sector network & replication pathway — Emilio de Torres Díez-Madroñero

CB — **Cámara de Comercio de Badajoz**

Stakeholder engagement & territorial outreach



Pilot site
Cooperativa Virgen de la Estrella — Los Santos de Maimona (Badajoz), Spain

Partners:

This project has received funding from the European Union's "Horizon Europe" programme under grant agreement 101092295.

The challenge

Olive mills sit on a renewable fuel they don't use

— and pay for fossil fuel instead.

2,750 t

wet olive pits generated per year at the pilot mill alone

186 days

a year the oil-storage tanks need heating (>15°C threshold)

70–80%

typical thermal-cost reduction vs. heating oil (Gasóleo C)

The linear model, today:

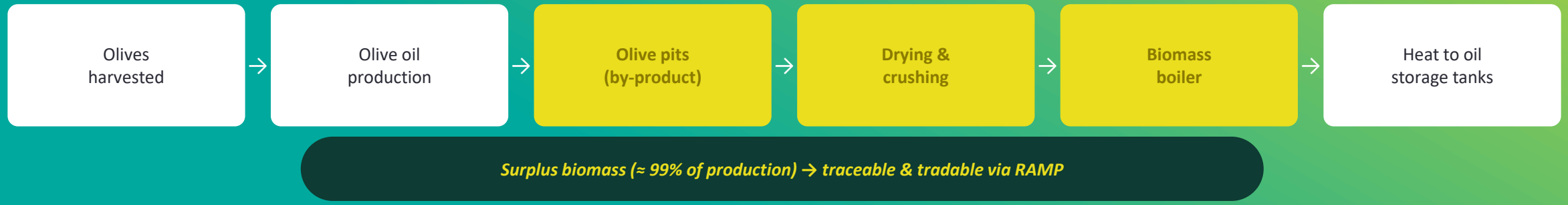
Olives harvested → Olive oil production → Olive pits generated → Stockpiled / sold cheap → **Waste & lost value**

Thermal energy at the mill still comes mainly from diesel — despite biomass sitting unused on site.

Our solution

Closing the loop

Olive pits are dried, crushed and burned on-site in a biomass boiler that heats the same oil-storage tanks — replacing diesel with the mill's own by-product.



Powered by the CIRCULOOS digital ecosystem

R — RAMP

Traceability & B2B biomass marketplace

G — GRETA

LCA & environmental KPI engine

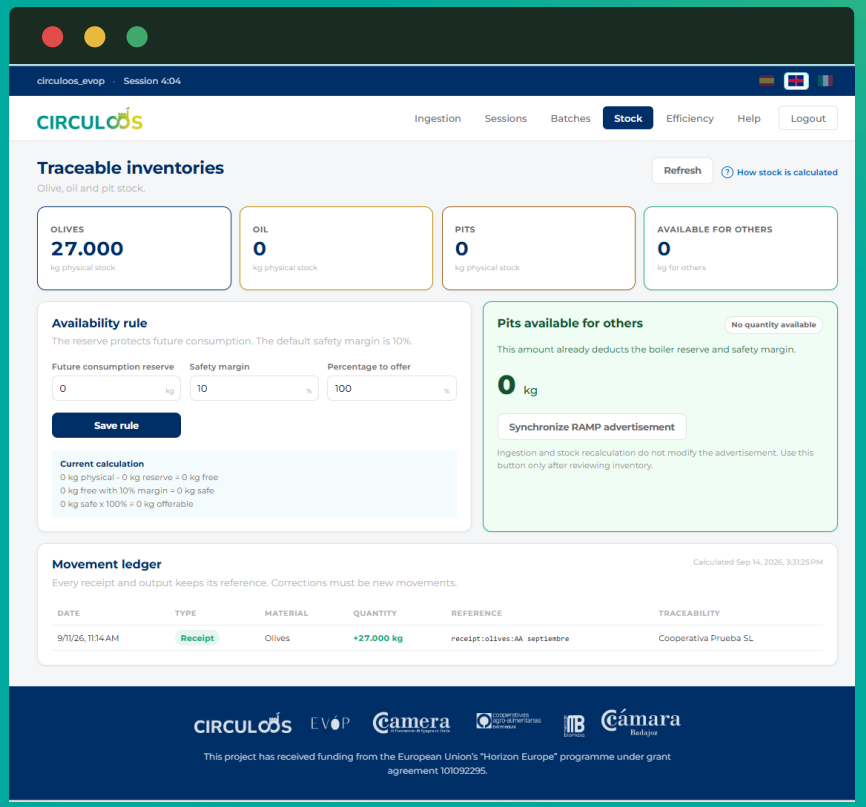
T — SCDT / SCO

Digital twin & process modelling

Built and running

Not just a concept: a live tool

A dashboard tracks olive, oil and pit stock and auto-publishes surplus to the RAMP marketplace.



circuloos_evop — live screenshot, current campaign.

What it does

Real-time stock

Olives, oil and pit inventory update automatically from each receipt and movement.

Smart availability rule

Reserves internal consumption plus a safety margin before anything is offered externally.

One-click RAMP sync

Pushes the offerable surplus straight to the RAMP marketplace — no manual re-entry.

Full movement ledger

Every receipt and output keeps its reference, giving end-to-end traceability.

A quality dividend, too

The same hot water improves the quality of the product

also protects the oil sitting in the tanks — and what it's worth on the market.



The pilot's oil-storage tanks — Los Santos de Maimona, Extremadura

1

Stable temperature, better oil

The perimeter hot-water jackets keep stored oil consistently above 15°C, avoiding the cold swings that degrade extra-virgin olive oil.

2

Properties preserved

Stable storage protects acidity, aroma, clarity and fluidity — the attributes that define premium-grade oil.

3

A stronger sale price

Better-preserved, consistently graded oil supports higher prices — on top of the diesel savings.



Already on the market

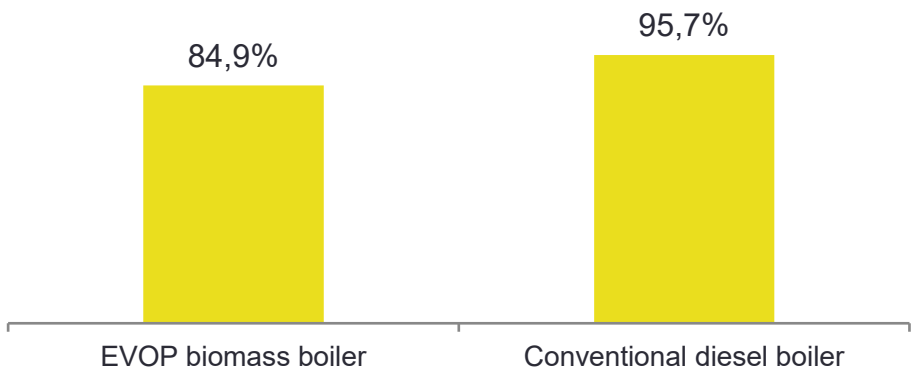
Oleo Estrella, Maimona Selección and Texturas Reserva — real, bottled brands the cooperative already sells.

Validated results

Demonstrated under real operating conditions

at Cooperativa Virgen de la Estrella.

Thermal efficiency: biomass vs. diesel



Biomass runs below diesel on raw efficiency — but still cuts CO_2 by up to 77%.



Field sampling: testing olive-pit moisture from 10% to 33.5% across the three trial campaigns.

≈ 5,155 L of diesel avoided per year (186 operating days)

≈ 99.4% of dry biomass produced remains available as surplus

≈ 76.9% GHG-emission reduction vs. diesel — independently audited (ISO 14067 & GHG Protocol)

9–11 t CO_2e avoided per year, depending on olive-pit moisture content

The full LCA analysis (25 EF indicators) confirms the olive-pit advantage: 15 of 25 indicators better, with strong reductions in climate change (-90%), fossil resources (-97%), water and acidification. Diesel remains better only on some toxicity indicators. GHG figures independently verified by 360 Soluciones Cambio Climático (ISO 14067:2018, GHG Protocol, MITECO 2025 factors).

Business potential

One boiler proves the model.

The surplus biomass is what makes it scale.

Market opportunity — Spain & Portugal

TAM **€91.5M / yr**

Total Spain + Portugal olive-pit market (381,300 t/yr @ €240/t)

SAM **€78.8M / yr**

Serviceable within 400–500 km of the pilot (328,194 t/yr)

SOM **€485K–970K / yr**

Pilot's realistic supply, first 12–24 months (≈ 2,020 t/yr surplus)

≈€280K/yr net benefit at the pilot (biomass sales + avoided diesel)

Deployment roadmap

1. **Industrial optimisation**
   Consolidate 10% moisture biomass; extend use to more internal thermal processes
2. **Multi-process integration**
   Route surplus biomass to hot water, cleaning & space heating within the mill
3. **Replication**
   Transfer the validated model to other olive mills across Extremadura & the Mediterranean
4. **Local energy communities**
   Supply heat to nearby public buildings and residences from surplus biomass