PRESS RELEASE

Decentralised recycling has arrived: EU-funded RECLAIM project deploys the world's first AI-powered portable waste recovery plant, bringing on-site waste sorting to European islands and remote tourist destinations. This robotic facility is small enough to fit in a shipping container and is now helping communities to recover valuable materials locally for recycling.

Rotterdam, 27 August 2025:

Plastics recycling for remote areas and tourist Island destinations just got smarter and AI-powered. The European Union-funded RECLAIM project has successfully deployed the world's first portable, AI-driven robotic Material Recovery Facility (prMRF) in the popular Mediterranean summer destination of Kefalonia, largest of Greece's Ionian Islands.

This innovative solution enables **on-site sorting of recyclables** from municipal solid waste, **increasing material recovery efficiency** and reducing the need for **costly waste transport** to mainland facilities, thereby **cutting carbon emissions**.

The prMRF sets a new global standard in decentralised material recovery as the world's first low-cost, autonomous and portable robotic system for remote regions.

Until now, portable material recovery facilities have lacked the integration of smart, high-tech solutions that could enhance their productivity. As a result, waste sorting in these niche sectors have largely relied on manual sorting. RECLAIM project's prMRF addresses this gap.

The most remarkable feature of this robotic waste sorting system is its portable and compact design, housing state-of-the-art technologies inside a standard shipping container.

This unique feature enables rapid deployment in remote areas or alongside existing recycling plants in tourist-heavy island destinations, bringing close-to-source material recovery of recyclables.

This flexibility has the potential to unlock **new opportunities for recovering materials** for recycling, thereby promoting a **local circular economy for plastics.**

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Tackling the seasonal tourism-driven waste challenge

Every summer, popular tourist island destinations like Kefalonia in Greece see waste volumes increase by more than 60 per cent. Despite this, the fluctuating waste volumes do not justify investments in standard Material Recovery Facilities (MRFs).

As a result, collected recyclables are transported to distant mainland facilities for processing. This involves higher waste compression to decrease pickup frequency but hinders the effective recovery of recyclable materials. Moreover, the residual waste must be either landfilled or incinerated with significant environmental costs.

The prMRF addresses this challenge by reclaiming recyclable materials that are less likely to be recovered by centralised MRFs. In doing so, the prMRF can reduce greenhouse gas emissions (GHGs) as recycling of sorted waste can avoid emissions associated with use of virgin materials.

This is why the RECLAIM prMRF is designed specifically for remote and underserved areas where installing a traditional waste treatment facility is simply not feasible.

Versatile applications beyond island destinations

While the prMRF is designed for remote islands and underserved areas, the equipment can also be deployed in locations where significant waste generation demands quick treatment, such as:

- Large-scale events like festivals and sporting competitions
- Transport hubs like airports and shipping ports
- Mountain regions

State-of-the-art waste categorisation technology

Inside this standard shipping container an AI-powered material recovery facility is neatly embedded supported by the state-of-the-art waste categorisation technology. Before the sorting begins, an AI-driven computer vision module identifies and categorises waste entering the conveyor belt using RGB images. This is complemented by the material identification capabilities of hyperspectral imaging (HSI), enabling highly accurate waste classification.

Low-cost, high output robotic sorting system

Subsequently, five Robotic Recycling Workers (RoReWos) pick and sort waste items. These are low-cost, custom-built robots especially designed for sorting tasks that don’t require delicate handling of objects. They are equipped with pneumatic actuators for fast waste picking. Their simple design and application-specific built allow the robots to significantly improve the cost-efficiency ratio measured as the number of sorted items per Euro invested.

Currently, the robotic system can achieve an average of 120 picks per minute but can easily be upgraded with additional robotic sorters to reach even higher productivity. This improves the overall material recovery efficiency and sorting performance of the entire prMRF unit. The waste sorting robots can also be mounted with interchangeable grippers with higher gripping efficiency depending on the material type.

Flexible operations: Remotely monitored via web app

Another standout feature of the prMRF is its operational flexibility, i.e., the equipment can be remotely monitored via a web-based interface. This web interface gives the production

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manager access to real-time performance insights of the sorting technologies. With the interface, managers can continuously monitor the activity of the robotic systems, track the success rates of their actions, and quickly detect any irregularities caused by unexpected events. In that sense, the web interface is a feather in RECLAIM's cap, as it will help to improve the overall productivity of the prMRF and ensure high levels of material recovery.

Recovery 6,500+ items per hour, saves 1.6 tonnes CO2 emissions

Collectively, the robotic sorting technologies will recover around 6,500 plus items per hour of plastic packaging, metal packaging, and drinking carton (PMD) packages and save an estimated 1.6 tonnes of carbon emissions daily. The decentralised material recovery approach consumes 36% less fuel by reducing roundtrip transfer of residual waste to centralised MRFs, and 12% faster waste processing, thanks to onsite sorting. RECLAIM's decentralised solution will improve local circular economy practices, benefiting the Ionian islands and the European Union. Currently, the prMRF is operating in Kefalonia where it is being evaluated using real municipal waste generated by local residents and island visitors.

Michalis Maniadakis, RECLAIM Project Coordinator, FORTH-ICS, said, *"Having successfully validated prMRF in real-world, continuous waste treatment, we are now expanding our focus to new frontiers—such as transportation hubs, mountain regions, and suburban areas—where local-scale waste management with the support of prMRF can outperform current practices. We are seeking visionary partners and investors to leverage the expertise we have gained with prMRF technology, scale up installations, and drive together a future of smarter, more sustainable resource recovery.*"

Next steps and Commercialisation

Moving forward, the RECLAIM prMRF will continue to be tested on real PMD waste to identify specific areas for improvement in the system's next version.

Speaking on this topic, Manolis Grafakos, Secretary General for Waste Management Coordination of the Ministry of Environment and Energy of the Greek government, said, "*The Greek state is keenly anticipating the results of prMRF's deployment in Kefalonia, aiming to leverage its success in shaping effective policies for managing municipal recyclable waste in island regions."*

The evaluation results will offer practical insights into the development of an upgraded version of the prMRF for alternative locations. For example, the RECLAIM consortium has already initiated discussions with mountain municipalities in Italy and with stakeholders at the new Heraklion airport in Crete. Crucially, the prMRF commercialisation efforts will adopt a hybrid approach to include not only the integrated prMRF system itself but also individual innovations, such as the bi-modal (RGB + HSI) waste classification technology and the low-cost robotic waste sorters (RoReWos). With the prMRF, material recovery activities in Europe's remote regions will become smarter, more efficient and more accessible.

For more information, visit RECLAIM website: **www.reclaim-box.eu**

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