

CORDIS Results Pack on Green Deal call projects

Research and innovation powering systemic
change for a resilient, sustainable
and climate-neutral Europe

A thematic collection of innovative EU-funded research results

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Editorial

Europe's path to sustainability and climate neutrality demands solutions that cut across sectors, systems and borders. This CORDIS Results Pack presents 10 EU-funded projects coordinated by the Green Deal Projects Support Office that are delivering practical tools, technologies and models to accelerate the transition to a sustainable, resilient and zero-pollution future.

Europe's environmental, economic and social systems are under unprecedented pressure. Climate change is intensifying droughts, floods and heatwaves, biodiversity loss is accelerating, and resource use continues to strain ecosystems. Meeting these challenges calls for systemic change across energy, mobility, environment, health, industrial systems and governance.

The EU Green Deal Call was created to catalyse this transition. The 10 projects featured in this Results Pack showcase concrete solutions, best practices and partnership opportunities that can be adopted, replicated and scaled.

Together, they span five core transitions identified by the Green Deal Projects Support Office: clean energy, food and health, climate and biodiversity, urban environment and mobility, and knowledge and citizens. Across these domains, the projects show how integrated approaches can unlock new pathways for sustainability in practical terms.

Climate adaptation and resilience are strengthened through tools that aid decision-making on water scarcity, flooding and heatwaves, alongside pilots that restore ecosystems, protect biodiversity and enhance carbon sequestration.

New detection, assessment and remediation technologies targeting PFAS 'forever chemicals' and other persistent pollutants, are helping to safeguard soil, water and public health and support a move towards zero pollution.

Innovations that upcycle agri food waste and multilayer plastics into new value chains help deliver circular economy ambitions, supported by territorial pilots and business models that can be replicated across Europe.

Clean and flexible energy systems are enabled by large-scale research infrastructures for hybrid storage, climate-positive hydrogen production, and better renewables integration, as well as local energy communities, resulting in improved grid stability.

Sustainable mobility and infrastructure take shape through green airport and seaport initiatives, demonstrating how transport hubs can reduce emissions, improve efficiency and integrate renewable energy.

Throughout, the projects emphasise the importance of scalability and transferability of climate transition research. Whether through digital twins for port operations, hybrid energy storage roadmaps, or circular value chain models for waste, each initiative provides tools that can be adopted by policymakers, regional authorities, SMEs and civil society networks. Many also highlight the importance of citizen engagement, recognising that to be successful, Europe's climate transition must be socially inclusive.

Collectively, the results presented illustrate how EU-funded research is accelerating the implementation of the European Green Deal. They offer actionable pathways to reduce emissions, restore ecosystems, strengthen resilience and build a fairer, more sustainable future.

How an EU-funded project is turning food and plastic waste into profitable, circular resources

Agri-food business is launching a multi-pronged attack – upcycling fruit and veg waste and applying circular methods to multilayer plastics, reducing landfills – to increase its sustainability.



Packaging and food waste are among the most pressing challenges facing the agri-food industry. Multilayer plastics are difficult to recycle, and fruit and vegetable residues often end up as animal feed or in landfills, despite being rich in useful compounds.

The EU-funded [Agro2Circular](#) project set out to change this by demonstrating a full circular model in the Region of Murcia, Spain. Through new green extraction methods, plastic upcycling technologies and a traceability system, the project turned local waste into ingredients, materials and business models ready to scale.

Pioneering 'green extraction' from fruit and vegetable waste

Agro2Circular demonstrated that often discarded agri-food waste, such as lemon peels, broccoli stalks and cauliflower leaves, can be converted into valuable natural ingredients for cosmetics, functional foods and nutraceuticals. These results were achieved by using enzymes and technologies such as ultrasound and microwaves to extract beneficial compounds while discarding harmful chemicals.

This 'green extraction' approach delivered stable, food-grade outputs with high purity, reducing health risks while aligning with regulatory standards.

As Fuensanta Monzó, Agro2Circular project coordinator, explains: "Our extracts are food-grade and non-toxic by design, which makes regulatory approval far more straightforward."

Tackling multilayer plastic with sorting, delamination and enzymes

Post-industrial multilayer plastic films are among the most difficult waste streams to recycle. Agro2Circular addressed this by combining optical sorting, physical delamination using green solvents, and enzyme-based depolymerisation. These methods helped recover materials such as aluminium, polyethylene (PE) and polyethylene terephthalate (PET) while reducing environmental impact.



Our extracts are food-grade and non-toxic by design, which makes regulatory approval far more straightforward.

Some steps required technical adaptation. For instance, PE proved resistant to enzymatic degradation until the team added an extra phase. "Since polyethylene lacks reactive functional groups, we found that oxidative pretreatment was essential for effective enzymatic degradation," says Monzó.

Further optimisation focused on solvent reuse and sorting precision. Combined with a favourable life-cycle assessment,

the approach delivered a competitive bio-based alternative to fossil-based plastics.

Data integration and traceability in circular value chains

Supporting these technologies is a digital data integration system (DIS), which tracks the journey of both food and plastic waste streams. Designed to meet emerging certification and labelling needs, it records details such as recycled content, use of renewable sources, and water and energy efficiency.

By making these parameters transparent, the tool helps actors across the chain understand their performance and adjust accordingly. As Monzó explains: "This real-time data will help farmers, packagers and recyclers make better operational and business decisions by providing insights into the environmental sustainability of their value chains."

The system's structure has already gained recognition, having been selected as a case study for the EU's upcoming Product Digital Passport framework.

From pilot scale to European roll-out

[Ten regional demonstrators](#) in the Region of Murcia, Spain, brought Agro2Circular's solutions into industrial settings. The project team also produced a '[Best Practice Book](#)' and developed proposals for rolling out the approach in [Italy's Lombardy Region](#) and in Lithuania.

Of the project's [60+ exploitable results](#), the multilayer plastic upcycling process appears closest to market, having reached technology readiness levels of 7–8. Meanwhile, public engagement helped ensure citizen support through school workshops, video games and consultations at local markets.

Reflecting on these outreach efforts, Monzó notes that "the public is open to learning about the circular economy and recycling and eager to understand how they can contribute."

Since the project concluded in March 2025, 18 secondary raw materials produced by 10 demonstrators have been validated by several end users in 19 plastic, cosmetic, food and nutraceutical formulations, and the technology remains available to the agri-food industry for further development. Monzó and her colleagues are currently expanding the DIS to other value chains, and working on a [sustainable, biodegradable and bio-based plastic](#) known as PHBV, which is used in food packaging applications.

PROJECT

Agro2Circular – Territorial circular systemic solution for the upcycling of residues from the agri-food sector

COORDINATED BY

CETEC in Spain

FUNDED UNDER

Horizon 2020-ENVIRONMENT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101036838

PROJECT WEBSITE

agro2circular.eu

Turning climate ambition into climate action

By providing tools to connect regional climate adaptation needs with implementable solutions, the EU-funded ARSINOE project is powering a green, resilient and sustainable future.



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While regions across Europe are already experiencing heatwaves, floods, droughts and sea-level rise, climate adaptation is often tackled in a piecemeal way. "This means one sector, one technology, one pilot at a time," says [ARSINOE](#) project coordinator Chrysi Laspidou from the [University of Thessaly](#) in Greece.

"A key gap we identified was the lack of practical pathways that help regions to define their priorities across interconnected systems (water-energy-food-ecosystems, for example), identify real innovations that match those needs, and move towards financed, implementable measures. ARSINOE was designed to bridge that gap and pilot the approach of the [EU Mission on Adaptation to Climate Change](#)."

Implementing climate adaptation pathways

ARSINOE set out to create an approach that regions could use to design and implement adaptation pathways that fit their needs. For this, the project brought together a large, multidisciplinary consortium that spanned research organisations and universities, SMEs, cities/regions and public authorities, as well as European and international networks.

“We worked through nine diverse case studies (living labs), from Athens to southern Denmark,” notes Laspidou. “We brought together various stakeholders to build shared visions, identify barriers and define step-by-step pathways towards climate adaptation.”

In Athens, a key aim of city planners is to enhance green infrastructure and support urban biodiversity, in order to adapt to and build resilience to climate change challenges such as extreme heat and flash floods.

For this, an innovation marketplace and matching mechanism – the Climate Innovation Window (CIW) – was built. This mechanism allows regions to select and contract innovations for demonstration and uptake. “In short, ARSINOE didn’t treat innovation as ‘technology only’, but as a system that must include people, governance, data and finance to make solutions deployable at scale,” explains Laspidou.

From regional needs to real solutions

The CIW was a critical element in a pipeline identifying regional needs to put in place real solutions. Case studies from the nine living labs provide a detailed picture of the challenges faced and solutions identified. In Romania, pilot interventions such as evaluating biofiltration bacteria in the Danube delta and testing techniques on salt-contaminated soils were applied to restore ecosystem functions and support climate adaptation.

“We upgraded the CIW based on user feedback and practical use,” adds Laspidou. “In total, 23 innovations were contracted across the case studies through open tender rounds, helping innovators gain real-world validation and helping regions move faster from ‘interest’ to ‘implementation’.”

The project also launched a citizen science app called [MINKA](#). This was used by almost 9 000 people to collect over 370 000 biodiversity observations in urban Athens alone, providing a solid biodiversity dataset for the city to plan its future

interventions. “By pinpointing vulnerabilities, policymakers can prioritise adaptation, allocate resources effectively and design risk-mitigation strategies, while scientists can support the development of climate-resilient regions,” remarks Laspidou.

Identifying appropriate climate solutions

Moving forward, public authorities will continue to be able to use the CIW to identify appropriate climate solutions and learn from the experiences of the project’s nine case studies. Innovators and SMEs also stand to benefit through increased visibility, and a mechanism that matches their solutions with those who need them.

Replication beyond the nine living labs will also be fostered through networks such as [ENRICH GLOBAL](#). This brings together innovators, public authorities and community leaders from across Europe to shape more resilient and sustainable communities.

“ARSINOE is turning high-level [European Green Deal](#) ambitions into implementable regional pathways,” says Laspidou. “Our tools and guidelines can help regions to co-design adaptation strategies that are cross-sectoral, evidence-based and linked to financing and governance realities. This is not only about ‘what to do’, but ‘how to make it happen’.”



By pinpointing vulnerabilities, policymakers can prioritise adaptation, allocate resources effectively and design risk-mitigation strategies.

PROJECT

ARSINOE – Climate-resilient regions through systemic solutions and innovations

COORDINATED BY

University of Thessaly in Greece

FUNDED UNDER

Horizon 2020-ENVIRONMENT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101037424

PROJECT WEBSITE

arsinoe-project.eu

Putting citizens at the centre of the energy transition

By empowering citizens to track their energy consumption, make appropriate changes and work together to build energy communities, the EU-funded AURORA project is helping Europe meet its emissions targets.



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The [European Green Deal](#) targets a 55% reduction in net greenhouse gas emissions by 2030. Transforming the energy sector is essential to achieving this aim, given that the sector is responsible for [over two thirds](#) of all emissions.

For Ana Belén Cristóbal, coordinator of the [AURORA](#) project and project manager at the [Polytechnic University of Madrid](#) (UPM)

in Spain, this will not be possible without the active involvement of citizens. "Citizens are all too often seen as merely consumers and recipients of the policies and decisions taken by authorities and business," she says. "But they can contribute to emissions reductions just by changing their behaviour."

Tracking personal emissions profiles

The goal of the AURORA project was to demonstrate ways in which citizens can be empowered to reduce their energy consumption and contribute towards emissions targets.

First, several thousand citizens from across Denmark, Portugal, Slovenia, Spain and the United Kingdom worked with the project consortium to develop and trial the [AURORA Energy Tracker](#). The app allows users to track and monitor changes in energy-related behaviour over time and share their progress on social networks.

"The app helps citizens to monitor their individual energy consumption," notes Cristóbal. "For example, how much electricity their household uses. They then receive automated recommendations for reducing their energy consumption in return."

For this, central hubs were established for each country. This was important, as citizens living in Denmark or Spain have different climate and energy needs. Solutions could range from better insulation to something as simple as draft excluders.

"This approach fits solutions to a person's habits and lifestyle," explains Cristóbal. "If you are reliant on using a car and for work and maybe cannot afford to switch to an electric vehicle, then there are other ways you can cut your energy consumption."

Power to the people

Another key citizen-focused action was to encourage energy communities. By pooling resources, communities can invest in shared photovoltaic power resources, saving money and energy.

Over four months, 163 people raised EUR 140 000 to build an energy community at UPM. This resulted in photovoltaic installations on the campus, contributing to the [energy transition](#) in a local way. Energy communities were also established at the University of Aarhus in Denmark, and within a rural community in the south of England.

"This gives an idea of the willingness to take collective action," adds Cristóbal. "We also identified challenges to overcome such as various legal obstacles to creating energy communities and institutional reluctance to invest."

Citizen empowerment and the energy transition

The project created a network of national [Ambassadors](#) – citizens committed to promoting energy-related climate change measures. These ambassadors will continue to help spread AURORA's message of citizen empowerment.

"One of our ambassadors works at the UN's Environment Programme and opened up a UN forum to us," remarks Cristóbal. "We were able to share our approach with delegations from almost every country in the world. This is how our message is being spread."

The major success of the project has been to put citizens at the centre of the energy transition, in positions where real change on the ground can be made. "An important lesson we learned was about being flexible," says Cristóbal. "People have families, work and responsibilities. We need to find spaces where we can engage with people."



We were able to share our approach with delegations from almost every country in the world.

PROJECT

AURORA – Achieving a new European Energy Awareness

COORDINATED BY

Polytechnic University of Madrid (UPM) in Spain

FUNDED UNDER

Horizon 2020-ENVIRONMENT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101036418

PROJECT WEBSITE

aurora-h2020.eu



Combining biomass and hydrogen for reliable green energy

By integrating biomass-based heat, electricity and hydrogen production into one scalable system, the EU-funded Bio-FlexGen project offers a novel combined heat and power plant with hourly, daily and seasonal flexibility.



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Despite offering cleaner energy, renewable energy sources such as wind and solar are intermittent in nature, and can't yet offer a complete alternative to fossil fuels. Balancing the supply of electricity with demand requires energy storage and generators that can quickly come online – with generators run on natural gas typically filling this role.

“Gas turbines play an important role in providing reliable electricity and heat, but as Europe moves towards cleaner energy sources, these turbines must adapt to new fuels such

as renewable gases and hydrogen,” says Susanne Paulrud, coordinator of the [Bio-FlexGen](#) project.

To meet this need, Bio-FlexGen focused on advances to renewable [combined heat and power](#) (CHP) plants, which burn solid biomass to produce heat and electricity. The project developed core components for [Biomass Top Cycle](#) (BTC) technology, a more advanced and efficient system where biomass is first heated under pressure to produce syngas – a mixture of hydrogen, carbon monoxide and other gases. This is burned to drive a gas

turbine (the 'top cycle'), and the hot exhaust is then used to drive a steam turbine (the bottom cycle). Operators can adjust the plant settings to maximise heat, electricity or hydrogen production, depending on their need.

"Our solution balances both short- and long-term energy supply, responding to daily or seasonal changes in demand," adds Paulrud, a senior researcher at the [RISE Research Institutes of Sweden](#).

Novel approaches to green energy

Key to success of the project was Bio-FlexGen's flexible gasifier design, complemented by a multi-fuel turbine combustor. A [hybrid fluidised bed](#) (HFB) helped break down biomass particles and increase chemical reaction efficiency, reducing by-products such as tar. A specially designed gas turbine combustor safely and efficiently switches between burning syngas and hydrogen.

Pilot-scale testing confirmed the HFB's stable and reliable operation. "With conventional steam-cycle biomass CHPs focused mostly on heat generation, electricity output typically accounts

for only 25-30% of the power output per unit of biomass. Our design not only increases this to over 50%, which lowers costs and emissions, but the plant can also flexibly respond to changing energy demands," explains Paulrud.

In winter, with heating demand high and wind/solar energy less available, the BTC plant can provide reliable power and heat from biomass. During off-peak summer periods, it turns surplus energy into

hydrogen. Integrated gas turbines can also ramp up power quickly, offering a cleaner alternative to traditional fossil fuel backups.



*In Spain,
we improved
profitability and
reduced carbon
dioxide emissions
in every scenario.*

Fit for real energy systems

Energy system modelling was conducted to ascertain the solution's economic viability, with the BTC concept applied to two use cases: a Swedish district heating system and two Spanish industrial sites (chemical and cement).

"In Sweden, while our technology would increase renewable electricity production and make the energy system more flexible, investment costs are a barrier under current market conditions. Whereas in Spain, the BTC improved profitability and reduced carbon dioxide emissions in every scenario. Industrial users with steady heat demand appear especially well suited to the technology," notes Paulrud.

Decarbonisation and bioeconomy growth

Replacing fossil fuels with renewable biomass and hydrogen will help Europe meet its climate goals. "The technical benefits translate into cleaner air for citizens, and more stable, and potentially more affordable, heat and electricity, while also creating new green jobs, particularly in rural and industrial regions," says Paulrud. The team is currently focused on moving the concepts closer to large-scale applications within the EU's growing bioenergy market.

PROJECT

Bio-FlexGen – Highly-efficient and flexible integration of biomass and renewable hydrogen for low-cost combined heat and power generation to the energy system

COORDINATED BY

RISE Research Institutes of Sweden in Sweden

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/101037085

PROJECT WEBSITE

bioflexgen.eu



Chemical upcycling closes the loop on rigid foam waste

Hundreds of kilograms of polyurethane insulation was recycled into virgin feedstock by the EU-funded CIRCULAR FOAM project, representing a milestone for the circular economy.



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Rigid polyurethane (PU) foam is indispensable to modern industries. Lightweight and durable with low thermal conductivity, it is ideal for applications such as [insulation in refrigerators and homes](#).

However, when PU foam reaches end of life, there are no viable recycling options available, so much goes to landfill or incineration.

"Annually, 1 million tons of unrecycled PU waste in Europe results in both significant CO₂ emissions and lost economic opportunities. The solution is innovative circular value chain management," says Dorota Pawlucka, coordinator of the [CIRCULAR FOAM](#) project.

Working with 26 partners from nine countries, CIRCULAR FOAM combined innovations in collection, sorting and recycling,

complemented by optimised materials design, to develop a holistic PU recycling system targeted at refrigerators and construction insulation.

Transforming waste into raw materials

PU is a polymer formed through the chemical reaction of two main chemical components, isocyanates and polyols. "The unique properties of polyurethane rely on its complex composition and



Our results show that up to 80% lower CO₂ emissions can be achieved compared to fossil-based aniline production.

cross-linked structure. Consequently, it is not meltable, which almost entirely precludes conventional mechanical recycling," explains Stefanie Eiden, the project technical lead at German polymer manufacturer [Covestro](#), the project host.

CIRCULAR FOAM developed and demonstrated two complementary chemical upcycling technologies to convert refrigerator rigid PU foam waste into high-quality recycled feedstock.

Polymers were broken down chemically to recover the polyol and isocyanate components, demonstrated at lab scale at the [RWTH Aachen University Catalytic Center](#), and at Covestro.

At project partner [Fraunhofer UMSICHT](#)'s plant, smart pyrolysis was adapted for rigid foam processing to recover isocyanate components.

At the end of the project, over 400 kg of end-of-life PU foam was converted, mainly into 300 litres of pyrolysis oil containing aniline, the precursor for isocyanate. At [Sulzer ChemTech](#) in Switzerland, this recycled product was turned into new PU foams.

"Our results show that up to 80% lower CO₂ emissions can be achieved compared to fossil-based aniline production; that's a game changer for rigid foam that is more sustainable," notes Eiden.

Innovation across the life cycle

CIRCULAR FOAM also assessed the value chain of rigid PU foam products to identify potential targets for circular economy interventions.

"Thanks to regulations, refrigerator collection is already well established, albeit with poor quality end-of-life foam. Meanwhile, the construction and demolition industry don't have an equivalent collection system," says Elisangela Gomes Almeida, project manager at waste management company [Interzero](#).

To address this, the project developed a recycling model for sandwich panels (PU foam bonded to metal sheet) and insulation boards. A fine-sorting scheme was demonstrated that identifies foams of different composition and recovers contaminants such as flame retardants.

A sandwich panel prototype was tested with construction industry stakeholders across five European countries, with the design incorporating key innovations, such as flattened profiles for easier transportation.

When stakeholders also expressed interest in [Digital Product Passports](#) for better life-cycle management, Netherlands start-up [Circularise](#) incorporated QR codes for traceability and certification into the panels.

Benefiting citizens, the environment and the economy

By helping to decouple economic growth and innovation from resource extraction, CIRCULAR FOAM's achievements could help the EU become the world's first climate-neutral continent by 2050.

"Alongside more sustainable appliances and energy-efficient buildings, our work ultimately contributes to a cleaner and healthier environment, while providing opportunities for new businesses," adds Pawlucka.

The team is now extending its chemical recycling technologies and sorting capabilities to other PU-based waste stream compositions, for example through follow-up project [United Circles](#).

PROJECT

CIRCULAR FOAM – Systemic expansion of territorial CIRCULAR Ecosystems for end-of-life FOAM

COORDINATED BY

Covestro in Germany

FUNDED UNDER

Horizon 2020-ENVIRONMENT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101036854

PROJECT WEBSITE

circular-foam.eu

Decarbonising Europe's airports from the ground up

The EU-funded OLGA project aims to reduce the aviation sector's environmental impact in an innovative and sustainable way. It brings together airports, industry partners, researchers and public authorities to test and scale green technologies.



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Air transport is a major enabler of economic growth and societal connectivity. Yet against the backdrop of the [European Green Deal](#), aviation must move towards sustainability and [reduce greenhouse gas emissions](#). The entire aviation sector, from airlines to ground handlers and support services, faces the challenge of environmental transition.

Through the EUR 34 million [OLGA](#) project, a consortium of European airports is developing and trialling a series of innovations to reduce the sector's environmental impact.

These include initiatives both within and outside the terminal, aimed at reducing CO₂ emissions, preserving biodiversity,

improving air quality and waste management, and boosting energy efficiency. The project is coordinated by Aéroports de Paris (ADP), with Paris-Charles de Gaulle airport as the core innovation hub, alongside partner activities taking place at Milan-Malpensa in Italy, Zagreb in Croatia and Cluj in Romania. In total, OLGA involves 43 partners, across four airports, and has produced over [40 sustainable and innovative solutions](#).

Commitments to improve environmental impacts

The project is committed to delivering environmental efficiency actions in [three key areas](#): flight operations, passenger and cargo transport, and community and territories.

For flight operations, this includes the reduction in aviation's CO₂ emissions through the complete and traceable availability of sustainable aviation fuel for airlines, and demonstrating the potential of airports to be 'hydrogen hubs', through hydrogen fuel infrastructure for ground vehicles and aircraft.

To reduce the direct environmental footprint of the airport itself, OLGA supports developments for passengers, staff and freight. This includes promoting recycling in and outside the terminal, increasing renewable energy use in terminals and creating more biodiversity-friendly taxiways. The project also aims to improve air quality at airports through real-time monitoring.

Sustainable action in and outside of the terminal

Greener lighting installed at the train station at Paris-Charles de Gaulle airport aims to improve energy efficiency, and increase the use of bioplastics and recycled materials, while improving the passenger experience through architectural aesthetics and simplifying maintenance.

Solar panels were also installed in unused spaces, including the roofing of passenger boarding bridges. This solution generates clean electricity to supply aircraft and reduce dependence on fossil fuels.

A semi-robotic towing vehicle known as TaxiBot has also been trialled, moving aircraft from the boarding gate to the designated runway area, reducing the use of aircraft engine power. This engine-off taxiing of aircraft aims to revolutionise ground

operations and could bring both environmental and economic benefits by reducing aircraft engine operating time and fuel use.

OLGA has also developed BiodiversIT, a state-of-the-art system which adopts AI algorithms, advanced field sensors and data analytics to monitor biodiversity at airports. This enables not only monitoring of desirable, high-stakes species, but also keeping track of invasive species to ensure balanced biodiversity. An added experiment focuses on plant species that attract certain birds that can maintain aeronautical safety around airports.

"These innovations target mobility, operations, energy, air quality and ecosystems, showing that airports can be active players of environmental transition across multiple domains," says Yannaël Billard, sustainable development director at Groupe ADP.

Spreading the word about green initiatives

OLGA has produced a range of publications, some of which have been presented at conferences, and all of which are [available online](#). Achievements have also been publicised at prestigious events such as the Paris Air Show and the Passenger Terminal Expo.

OLGA has also hosted several in-house events to strengthen cooperation in green initiatives across the European aviation community and develop successful proofs-of-concept.

OLGA was also selected for the [Science4EU](#) campaign, showcasing impactful EU research and innovation.

Overall, the many concepts trialled in the project will aim to reduce Europe's carbon footprint and deliver greener airports for the future.

PROJECT

OLGA – Holistic & Green Airports

COORDINATED BY

Aéroports de Paris in France

FUNDED UNDER

Horizon 2020-TRANSPORT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101036871

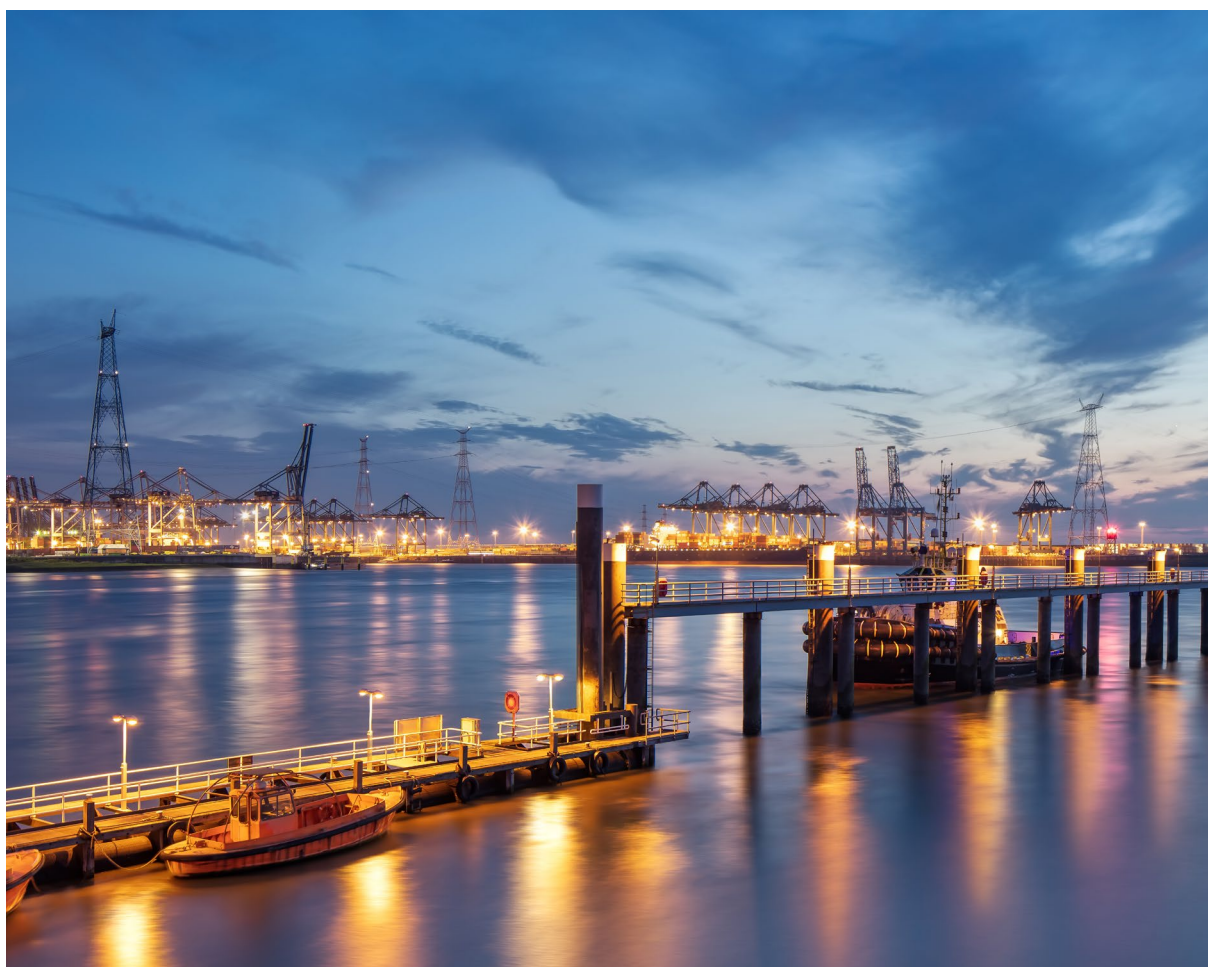
PROJECT WEBSITE

olga-project.eu



A greener, more sustainable future for Europe's ports

Innovations and solutions to transform Europe's ports into green infrastructure and boost resilience against climate and criminal threats have been trialled by a broad European network organised under the EU-funded PIONEERS project.



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Ports have evolved alongside Europe's economy for centuries. To meet the continent's climate ambitions, these freight and passenger hubs must now find a way to [reduce their environmental impact](#) while staying globally competitive. This is not all bad news for operators: ports hold the potential to become sources of renewable energy, further reducing environmental harm and contributing to the green economy. This transformation will not be simple, however.

"Transitioning ports to green infrastructure is not simply a matter of adopting new technology – it is a systemic challenge," explains [Inge De Wolf](#), [PIONEERS](#) project coordinator at the Port of Antwerp-Bruges. "Decarbonisation must be pursued alongside resilience, operational efficiency, safety and long-term competitiveness," she adds.

In the PIONEERS project, a consortium of 46 partners demonstrated a range of innovative solutions designed to

transform ports into green infrastructures while addressing other vulnerabilities, including climate impacts and cyberattacks. A [showcase of the various demonstrators](#) is available online.

"PIONEERS demonstrated several ways in which ports can reduce their carbon footprint," says De Wolf. "These are not isolated actions, but part of a broader transition strategy that balances environmental goals with operational and commercial realities."

Demonstrations of green innovation

PIONEERS was designed not to invent solutions from scratch, but to test, validate and scale promising innovations in real port-operating conditions, many for the first time at a large scale.

The project tested 19 solutions through live trials in different port environments, primarily at the Port of Antwerp-Bruges, but

also at Barcelona in Spain, and Venlo in the Netherlands. They were developed under a framework that allows transfer and scale between ports beyond the pilots. Further projects are under way.

Innovations were organised around four pillars: clean energy, sustainable port design, modal shift and flow optimisation, and digital transformation. Examples include a hydro turbine system to capture residual water and generate

clean electricity, autonomous vessel technology for inland waterway transport, and the world's first [dual-fuel straddle carrier](#), which used hydrogen to cut its diesel consumption by 35%.

"The goal was not only to showcase what works, but also to understand why certain solutions succeed and others do not," explains De Wolf. Other innovations included a digital twin of port operations and a maritime 5G network with AI-powered vessel tracking.

Scalable, transferable green solutions

The most important result was not any single innovation, but the transition framework itself, remarks De Wolf. A Handbook of Best Practices, a flagship deliverable, is in production. This brings together tools, guidance and system mapping – all grounded in lessons learned from real port environments.

"Crucially, the handbook is designed to be adaptable: it does not prescribe a single solution, but equips ports to navigate their own transition based on their specific context, size and ecosystem," notes De Wolf.

Inspiring Europe's ports to go green

The legacy of PIONEERS goes beyond the individual solutions, especially as ports all vary significantly in size, needs and challenges. PIONEERS therefore offers a menu of potential innovations to be adopted. "The message is simple and clear: you do not have to start from scratch," says De Wolf. "The methodology and the evidence are there, and you can tailor it to your port ecosystem."

PROJECT

PIONEERS – PORTable Innovation Open Network for Efficiency and Emissions Reduction Solutions

COORDINATED BY

Port Authority of the Port of Antwerp-Bruges in Belgium

FUNDED UNDER

Horizon 2020-TRANSPORT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101037564

PROJECT WEBSITE

pioneers-ports.eu



Transitioning ports to green infrastructure is not simply a matter of adopting new technology – it is a systemic challenge.



Science takes on persistent and mobile organic pollutants, appropriately named ‘forever chemicals’

Europe’s circular economy is under threat, but PROMISCES found new ways to better detect, assess, remove and regulate ‘forever chemicals’ and industrial pollutants.



© Brian Jackson/stockadobe.com

Europe’s circular economy action plan is one of the bases of the [European Green Deal](#), but persistent, mobile and potentially toxic substances, PM(T)s, – particularly per- and polyfluoroalkyl substances (PFASs) – are challenging obstacles to achieving this goal.

PFASs, known as ‘forever chemicals’, are found in industrial and consumer products such as paints, food packaging, firefighting foams and non-stick pans. These substances resist degradation and spread easily in soil, water and sediment systems.

The EU-funded [PROMISCES](#) project focused on identifying how these pollutants prevent circular economy deployment, and on developing strategies to address these issues. An accessible overview of the project’s findings is available in the [Layman’s Report](#).

“Once PFASs enter the environment, they can remain for decades or even centuries, accumulating over time,” explains Julie Lions, a hydrogeologist at [BRGM](#) and PROMISCES project coordinator. “Some of them are highly mobile in water systems, which means they can disperse far from their source, contaminating large water basins.”

Advancing PFAS detection

PROMISCES developed analytical capabilities to improve the measurements of these pollutants in various types of environmental samples. The researchers implemented 14 quantitative detection methods including 62 PFASs and 84 other industrial PM(T)s.

Advancements included new methods to measure total organic fluorine in soil and sludge, helping estimate PFAS contamination. The team utilised cutting-edge technologies to identify unknown pollutants, as well as devices (passive samplers) that collect pollutants from water over time.

Results show that detection of sensitivity varies depending on sample type. Although a test called 'TOP assay' helped characterise hidden PFASs and their precursors, there is no single reliable method able to measure all PFASs.

"PFAS analysis faces major challenges. PROMISCES has therefore contributed to the need to develop ever more effective methods to meet the growing demands of environmental monitoring," says Lions.

The project contributed to setting European standards on PFASs, developing [recommendations for implementing EU directives](#) and working with expert groups linked to the [Drinking Water Directive](#).

Understanding health risks

Beyond traditional chemical analysis, the project used non-animal tests to evaluate 15 health effects of PFASs and industrial PM(T)s.

"The most prominent impacts observed were receptor-binding effects on the thyroid hormone system," Lions notes. "This was somewhat unexpected, as existing PFAS research has mainly focused on liver toxicity, reproductive issues or immunotoxicity."

PROMISCES developed computational models to predict the toxicity and environmental behaviour of 71 PFASs. These tools are available and can be accessed by the broader research community through a web application.

Technologies for a cleaner future

The project developed multiple technologies to remove PFASs and industrial PM(T)s, tested under real-life conditions across seven European [case studies](#). The innovations address contamination in diverse environments, from drinking water in Germany to contaminated sediments in Italy.

One promising advancement is ultrasonic cavitation technology, which uses high-frequency sound waves to generate microscopic bubbles that collapse and break carbon-fluorine bonds in PFAS molecules. "We demonstrated efficiency up to 95 % for PFAS destruction in contaminated waters. This technology has the advantage of not requiring chemical additives," Lions remarks.

High-temperature heating (pyrolysis) at 600°C effectively removed PFASs from soils and sediments. Other promising methods include in situ soil flushing using non-Newtonian fluids, which can wash PFASs out of soil with up to 80 % efficiency, and plasma treatment, which achieved 40 % to over 90 % removal of long-chain PFASs. For short-chain PFASs, stable removal from organic-rich groundwater was achieved using a combined approach of activated carbon filtration and ion exchange.

Additionally, PROMISCES delivered critical policy recommendations, emphasising the need for harmonised regulations, improved monitoring and science-based risk assessment. Another output is the [decision support framework](#), which helps stakeholders manage PM(T)s in circular economy contexts through enhanced substance data availability and interoperability.

Work has continued since the PROMISCES project concluded in April 2025, with three project partners (COLAS, BRGM and IPGP) applying for a patent for PFAS remediation. "This process can be used to decontaminate soil, groundwater and industrial facilities, and has already been deployed on several fire safety system clean-up sites," says Lions.

PROJECT

PROMISCES – Preventing Recalcitrant Organic Mobile Industrial chemicalS for Circular Economy in the Soil-sediment-water system

COORDINATED BY

BRGM in France

FUNDED UNDER

Horizon 2020-ENVIRONMENT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101036449

PROJECT WEBSITE

promisces.eu



Once PFASs enter the environment, they can remain for decades or even centuries, accumulating over time.

Advancing hybrid storage for Europe's clean energy transition

Europe is rapidly expanding its renewable energy capacity and requires more effective ways to store this power. The EU-funded StoRIES project gave researchers access to world-class research facilities to design and test new energy storage systems.



Originating from [Joint Programme Energy Storage](#) within the European Energy Research Alliance, [StoRIES](#) brought together 17 partners to increase access to 64 research infrastructures across Europe, ranging from laboratories to digital modelling

platforms. Thanks to its [Transnational Access programme](#), scientists and engineers working on hybrid energy storage systems used specialised facilities that would otherwise have been unavailable in their own institutions.

"We put together the different communities, and tried to look for hybrid storage solutions to solve application problems, not just to focus on individual technologies," explains project coordinator Stefano Passerini, from the [Karlsruhe Institute of Technology](#) (KIT) in Germany.

Researchers received more than 350 weeks of access to these facilities, and used the time to test materials, build and trial combined storage systems, and evaluate performance in real-world conditions. The project also brought scientists, system engineers and modellers together to work more closely than would usually be possible.

Bringing storage technologies together

Rather than focusing on storage technologies in isolation, StoRIES investigated how different systems could work together for different energy uses, including grid stabilisation, off-grid systems, renewable energy communities, heavy-duty transport and industrial decarbonisation.

Storage technologies can vary dramatically in terms of power density, energy capacity, lifetime and cost. Batteries can respond quickly to fluctuations in supply and demand, thermal storage supports industrial heat applications, while hydrogen and other chemical carriers can provide longer-duration storage.

Combining these and other technologies within a single system allows storage to respond quickly to changes in supply while also supporting longer-duration energy needs.

The project produced the first [European Technology Roadmap](#) and [Strategic Research and Innovation Agenda](#) (SRIA) dedicated to hybrid energy storage. These documents identify priority research areas and innovation gaps across electrochemical, chemical, thermal, electrical and mechanical storage systems, and will inform future research and infrastructure investment.

Building skills and shared research

StoRIES also worked to develop the next generation of energy storage researchers. A network involving 46 early-stage researchers

designed hybrid storage solutions for real-world case studies, and more than 100 students took part in [three summer schools](#) held in Nicosia, Rome and Trondheim. Mentoring programmes and online seminars supported interdisciplinary learning throughout the project.

"Hybrid energy storage requires expertise from different fields, so it was crucial to bring researchers together across disciplines," says KIT's Myriam E. Gil Bardají, deputy project coordinator.

The project also published in two open access books presenting case studies and analyses of storage technologies: '[Emerging Battery Technologies to Boost the Clean Energy Transition](#)', which has recorded more than 197 000 downloads, and '[Hybrid Energy Storage: Case Studies for the Energy Transition](#)', published early 2026.

StoRIES connected more than 250 research and industry stakeholders working on hybrid energy storage, and helped build a community of practice focused on combining storage technologies. It also produced two white papers on open data and sustainability in hybrid storage systems.

The project leaves behind its technology roadmap and insight into how different storage technologies can work together in practice. It also created a community that continues to inform energy storage research and development across Europe.

Last but not least, the [RISEnergy](#) project (also coordinated by KIT) has picked up where StoRIES left off, providing coordinated access to research infrastructures across a wider range of renewable energy technologies.

PROJECT

StoRIES – Storage Research Infrastructure Eco-System

COORDINATED BY

Karlsruhe Institute of Technology in Germany

FUNDED UNDER

Horizon 2020-INFRA

CORDIS FACTSHEET

cordis.europa.eu/project/id/101036910

PROJECT WEBSITE

storiesproject.eu

Putting forest restoration into practice across the EU

Forests are vital to Europe's environmental policy and rural livelihoods, yet face increasing climate change, degradation and land-use pressures. The EU-funded SUPERB project examined pathways to coordinated, large-scale restoration.



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The [SUPERB](#) project aimed to restore thousands of hectares of forest landscape across Europe by providing decision makers with practical, multidisciplinary knowledge to support informed choices on biodiversity, ecosystem services and carbon sequestration.

The project embraced a broad view of restoration, from rewilding and restoring native ecosystems to more sustainable, biodiversity-friendly and climate-adaptive forest management. It also examined governance, financing models and social acceptance as factors influencing whether restoration efforts can be sustained over time.

Restoration across diverse landscapes

A consortium of 36 partners from 16 European countries set up 12 demonstration areas across Europe that spanned different biogeographical regions and socio-economic contexts. These diverse pilot sites allowed the project to test restoration in areas facing different types of degradation and forest management practices along with local stakeholder priorities.

In France, partners integrated biodiverse hedgerows into plantation forests, while in Romania, they began converting plantation forests back to native ecosystems, with a long-term ambition of establishing a national park. "From the very beginning, we saw restoration as an adaptive, forward-looking process," explains project coordinator Elisabeth Schatzdorfer, principal scientist at the [European Forest Institute](#). "It responds to rapidly changing environmental conditions and evolving societal expectations."

Along with hands-on activities in the demonstration areas, the project delved into how restoration can be financed, by looking at costs, funding gaps and the role of public money, and voluntary nature markets. Their results showed that private investment alone can't cover the costs, and that public intervention is necessary to ensure demand and provide continuity.

SUPERB also examined public perceptions of restoration. While support for forest recovery is generally high, some stakeholders raised concerns about access rights, including mushroom picking, berry harvesting and hunting. According to Schatzdorfer, these concerns and trade-offs need to be addressed transparently in line with the [EU Nature Restoration Regulation](#).

Turning research into practical guidance

To make all of its findings accessible, the project developed the multi-language [Forest Knowledge Gateway](#), a platform that now shares results and practical guidance for stakeholders. It provides tailored information for policy actors, investors, planners and implementers, as well as small-scale landowners, drawing on resources from SUPERB and other relevant projects and initiatives.

"It was intended to be permanent," says Schatzdorfer. "From the outset, we designed the Gateway as a long-term resource that would support restoration and sustainable forest management across Europe."

Other Horizon projects are already using the platform. [TRANSFORMIT](#), dedicated to integrative forest management (IFM), is expanding the Gateway's scope to include IFM-related knowledge.

Supporting restoration in policy

Aside from the Gateway itself, SUPERB produced practical outputs to support restoration efforts. A 'Lessons Learned' booklet brings together insights from all 12 demonstration areas, highlighting what worked and some of the challenges they faced. It also produced policy briefs setting out recommendations for policymakers, along with practical guidance on monitoring, restoration techniques and upscaling strategies.

SUPERB brought together practitioners, policymakers, financiers and researchers through a series of [Forest Restoration Talks](#) and stakeholder workshops from the demonstration areas to EU level, supporting exchange across sectors and regions. Additionally, the team engaged with national authorities working on National Restoration Plans at the high-level policy event 'Supporting National Restoration Plan Development' in Brussels in March 2025.

The project ended in November 2025, but its results are already being incorporated into external knowledge platforms. At the international level, the UN Food and Agriculture Organization's FERM platform is using SUPERB's Good Practices as an additional source, extending their visibility beyond the EU.



From the very beginning, we saw restoration as an adaptive, forward-looking process.

PROJECT

SUPERB – Systemic solutions for upscaling of urgent ecosystem restoration for forest related biodiversity and ecosystem services

COORDINATED BY

European Forest Institute in Finland

FUNDED UNDER

Horizon 2020-ENVIRONMENT

CORDIS FACTSHEET

cordis.europa.eu/project/id/101036849

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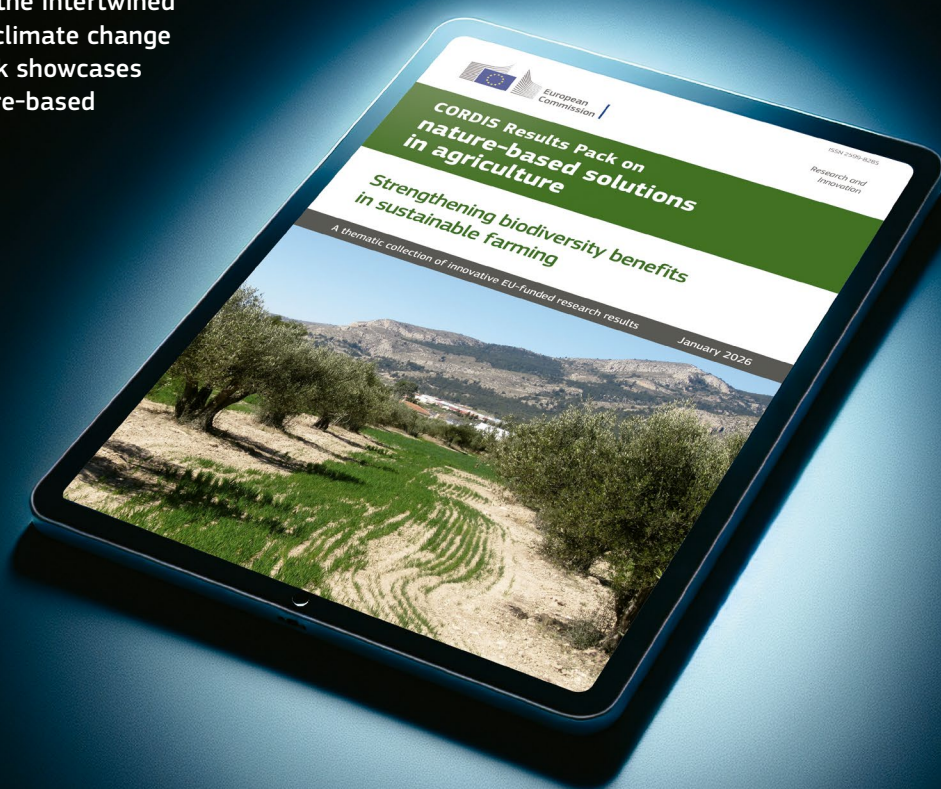
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RESULTS PACK ON NATURE-BASED SOLUTIONS IN AGRICULTURE

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