

INNOVATORS BY NATURE

Be Part of the Future of Nature-Driven
Innovation

SUSTAINABLE ENERGY



3 December, 2025

Introduction

Innovators by Nature brings together landowners, policymakers, investors and environmental innovators from across Europe to explore how innovation can be effectively applied to land management.

Organised by the European Landowners' Organization (ELO) and Friends of the Countryside, the event creates a rare platform where nature-based solutions and on-the-ground land management expertise converged.

At a moment when Europe faces rising pressure on soils, water, biodiversity and rural resilience, Innovators by Nature focuses on practical, land-based solutions capable of delivering measurable environmental outcomes while supporting long-term economic viability.

Through concrete use cases, collaborative models and cross-sector dialogue, the event highlights the role of land managers as key actors in the sustainable transition and demonstrates how innovation and stewardship can work together to strengthen both ecological and economic resilience.



JURGEN TACK
ELO Secretary General,
ELO



ANNE MARCHADIER
Business Development
Director



BEATRICE CROCE
Project and Policy

Agriculture and renewable energy: intermediate crops in the EU

Abstract: Biofuels play a key role in the European Union's strategy to reduce GHG emissions and enhance energy security by providing a renewable alternative to fossil fuels in transport. To achieve this, the EU has revised the Renewable Energy Directive (RED III), which sets targets for increasing renewable energy use across sectors, including shipping and aviation.

RED III mandates an increase in biofuel blending requirements, with a strong emphasis on advanced biofuels derived from waste and non-food crops. Sustainability and GHG savings criteria are reinforced through transport-specific regulations, such as ReFuelEU Aviation and ReFuelEU Maritime, which require more Sustainable Aviation Fuels (SAF) and impose stricter carbon reduction rules on shipping fuels.

Within this framework, catch and intermediate crops offer an opportunity to integrate agricultural production with renewable energy generation. Grown between primary food harvests, these crops improve soil health while serving as feedstock for biofuels, helping expand low-carbon energy sources without competing with food supply.

As the European Commission finalizes RED III implementation guidelines, a clear and flexible definition of intermediate crops will be essential to maximizing their benefits while maintaining agricultural competitiveness. Integrating biofuels in agricultural systems can reduce global warming impacts and emissions, lower biomass costs and increase carbon sequestration. Policymakers have an opportunity to ensure a balanced approach that supports food production and renewable energy goals.

The EU's vision for renewable energy in transport targets 14% by 2030 while limiting first-generation biofuels. By prioritizing waste-based and intermediate feedstocks, RED III supports a circular economy and reduces dependence on fossil fuels. While electrification will shape road transport, biofuels will remain essential in aviation and maritime, where alternatives are limited.



Frank Röber
Europe Breeding
Alliances Lead



Diane Zune
EU Government Affairs
Manager – EU Parliament
Relations and North
Europe



André Paula Santos
Head of EU Policy –
Bioenergy, Nufarm



Leveraging European innovation to produce sustainable aviation fuel (SAF) from intermediate crop sunflower

Frank Roeber
Europe Breeding Alliances Lead



Solving Farmers' Toughest Challenges



More food produced per hectare



Resilience to pests, disease and weather



More sustainable cropping systems



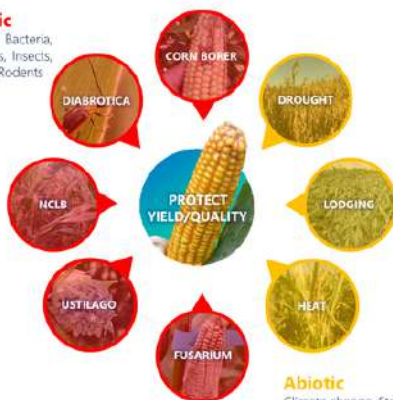
Our Company



Plant breeding research improves and secures yield and quality

Biotic

Fungi, Bacteria, Viruses, Insects, Birds, Rodents



Abiotic

Climate change, Storms, Heat-Irradiation, Drought, Nutrients

Product concepts

Use of native traits, NGT edits in the plant metabolism create new or improved product concepts



Leveraging European technology creates new value for biofuels

Unique collaboration aimed at increasing availability of plant-based oil with a lower carbon profile



Traits

- Pioneer Protector® traits for superior disease resistance
- Winter hardiness
- High oil content
- Pod shatter¹



Exclusively available through Pioneer® seed brand with top elite genetics with high-yield potential²

Protection with Lumiderm® insecticide treatment

KEY BENEFITS

- The demand for renewable biofuels is increasing
- Corteva, Bunge and Chevron are collaborating to unlock value for growers
- Sustainable crop rotation benefits entire cropping system
- Reduction in carbon intensity score of oil produced from our winter canola/soybean double cropping system compared to electricity from the grid
- Increased price premium over oil produced from single soybean cropping system



Regions
NA



Launched
XXX

European WOSR hybrids adapted to the United States



WINTER OILSEED



FOLLOWED BY SOYBEAN CROP

LOCATION: TENNESSEE

OCT
DEC
FEB
APR
JUN
AUG
OCT
M



¹ Pod shatter expected availability in winter canola hybrids beginning in 2025
² 54 bu/acre total farm-weighted average yield 2024 harvest, 46-55 bu/acre is a common target based off of university trial results, with potential to be higher based on individual operations

Leveraging European technology creates new value for biofuels

Introducing short season sunflowers as a feedstock for sustainable aviation fuel (SAF)



Traits

- Early maturity to fit into short summer growing season
- High oil output per hectare
- Downy mildew resistant



Significant yield potential without disrupting primary winter crops productivity

Trusted genetics enabling grower adoption.

KEY BENEFITS

- Intermediate sunflower acts as a catch crop between primary season winter crops - producing 3 crops in 2 years
- Improves soil fertility for the following crops by reducing soil compaction, contributing soil organic matter, and retaining nutrients.
- Resource for pollinators promoting insect biodiversity
- Improves income per unit area compared to winter cereal or other crops followed by fallow - supporting rural communities
- No competition with other feed or food crops

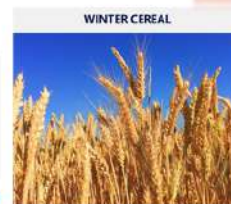


Regions
Europe



Development
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ADAPTABILITY AREA



WINTER CEREAL



SECOND SHORT SEASON SUNFLOWER

FOLLOWED BY WINTER CEREAL

DEC
FEB
APR
JUN
AUG
OCT
DEC



Policies can enable farmer access to innovation to fulfill demand



Government policies that support farmer adoption of new practices benefit both their bottom line and society at large



Science-based, consistent regulatory frameworks allow innovation to get into the hands of all farmers



Open access to global agricultural markets enable access to production of healthy, nutritious food and biofuel feedstocks



Farmers and innovators need a predictable, supportive policy environment to help grow more food, fuel and continue to invest in game-changing innovations.



7

Thank You



Carinata as an intermediate crop

Agenda

1. Nufarm
2. Carinata
3. EU Policy impacting Carinata
4. The Carina Project
5. Main takeaways

Innovators by
Nature event

3 December 2025

ELO European Landowners'
Organization

André Paula Santos
Head of EU Policy – Bioenergy, Nufarm

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1. Nufarm: agricultural innovation

Nufarm global footprint:

- Headquartered in Melbourne (NUF:ASX), with extensive Australian and global crop protection manufacture & distribution
- Manufacturing facilities in 14 countries with 100% owned subsidiaries in 25 countries
- ~\$3 billion sales in over 100 countries; 2,500 employees globally

Nufarm Seed & Bioenergy platform (previously under the brand Nuseed)

- Global R&D Innovation Centers (Horsham Vic, West Sacramento USA, Venado Tuerto ARG)
- Working on Omega-3 canola, carinata, sorghum, and energy cane to empower growers and end-use customers to scale today to meet current and emerging demand

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1. Nufarm: bioenergy platform



Carinata

- Proprietary global position
- Non-food intermediate crop producing novel industry oil
- Replaces unique downstream applications with proprietary processing
- High protein, non-GMO meal co-product
- South American expansion
- EU & AUS development underway



Sorghum

- Top 3 position globally
- Strength in food, feed and fuel
- Recently introduced early sorghum category
- Human and animal nutrition traits
- Leading efforts to link agronomic performance, new cropping patterns and high yield potential
- Brazil, USA, Argentina are key target geographies



Energy Cane

- Proprietary global position
- Novel biomass feedstock for ethanol, electricity & biogas
- Verified greenhouse gas reduction & sustainability
- Highest agricultural efficiency of biomass production
- Brazil and other tropical countries



Canola

- #1 canola seed position in Australia
- Top 4 position globally
- Range of novel oil positions
- Currently executing growth strategy into high value Canada, Europe and Latin America markets
- Best in class canola traits capability, with leading market share within Australia

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2. Carinata

Oilseed intermediate crop

Maximum GHG reduction

Positive impact to land utilization

Sustainable agriculture practices

Regenerative agriculture

Additional grower revenue

Moisture and nutrient management

Biodiversity in crop systems

Improves disease and pest control

Certified production system

Deep rooted biomass

Efficient nutrient uptake

Avoids erosion

Soil carbon sequestration



Opportunity

Over 170M hectares* of existing cropland could benefit from cover cropping in Europe and the Americas alone

Climate change mitigation potential

Planting just 1.5 % of this land with Nufarm Carinata could, potentially:

- Produce annually around 3M tones of Sustainable Aviation Fuel (SAF)**
- Annually remove 8M tons of CO2
- Improve rural economies and agriculture sustainability



Independently certified and globally recognized as a low carbon renewable fuel feedstock

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2. Carinata genetics

- Mustard family (Brassicaceae)
Brassica carinata
Also called Ethiopian mustard
- Closely related to rapeseed
- Non-GMO
- Cold, heat, and drought tolerance
- Low rates of seed shattering
- Aggressive crop and will outcompete many winter weeds



2. Carinata: what it delivers



High quality oil



High protein non-GMO meal



- Non-food oil, grown between main crop rotations



- Independently certified and traceable from the field to oil



- Drop-in high-quality, lean oil product



- Feedstock for SAF/Biojet, HVO, FAME, co-processing, chemicals

- Qualified in large biofuel markets



- High protein/low fiber offers several feeding options



- Up to 45% protein content



- Additional protein source to meet growing market demand

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2. Carinata: life cycle value chain



By 2028, we will offer customer choice across bioenergy feedstocks along various dimensions:

**Certification schemes | Data reporting needs |
Calculation methodologies | Sustainability attributes**

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2. Carinata: Nufarm trials in Spain

Locations and Average Yield (kg/ha at 10% of Moisture)

Spain

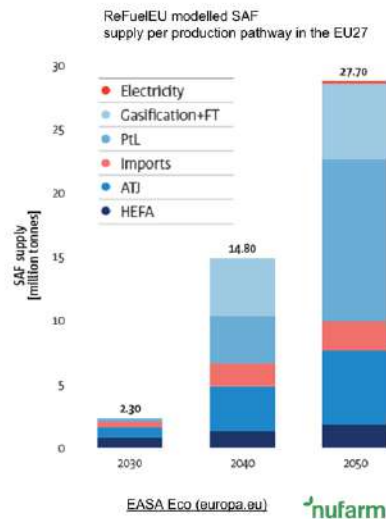


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3. EU policy impacting carinata

European biofuels market is enabled by public policy, and carinata is well-placed to deliver much needed new feedstocks

- EU has **ambitious GHG emissions reduction targets** (aim at carbon neutrality in 2050), including a strong push to add more renewables in transport.
- **Multiple EU incentives for biofuels:**
 - Renewable Energy Directive (RED);
 - ReFuelEU Aviation Regulation
 - FuelEU Maritime Regulation;
 - Emissions Trading System (ETS)
 - and many others.
- **EU sustainability criteria is key**
→ **Opportunity for carinata**



4. The Carina Project

EU stakeholders working together on intermediate crops

A cross-national 4-year long Innovation Action (01/11/2022- 31/10/2026), supported by the EU within the framework of Horizon Europe.

- **Nufarm is involved as a technology partner.**

Project is focused on new sustainable and diversified farming systems with 2 new oilseed crops, **carinata** and **camelina**, able to provide low iLUC feedstocks for the bio-based economy:

14 Countries involved



CARinata and Camelina to boost the sustainable diversification in EU farming systems

<https://www.carina-project.eu/>

Funded by the European Union

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4. The Carina Project



Carina take home messages so far

- Intermediate cropping with carinata and camelina is feasible in Europe
- The choice of the preceding/succeeding crops is extremely important for the success of the system
- Carinata and camelina as intermediates during winter appear the strategy allowing the highest seed yield (> 2 t/ha)
- Within the analysed crop rotations, combining carinata and camelina (as intermediate crops) with sunflower and soybean (as main crops) appears the best option so far
- Carinata and camelina as intermediates during summer are also feasible but the achievable seed yield will be about 0.5-1 t/ha
- Pea and barley as cash crops before carinata and camelina appeared the best options so far

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5. Main takeaways

- Developing carinata as an intermediate crops aligns with EU climate & energy policies because it is:
 - A scalable intermediate crop, with multiple climate and agriculture benefits
 - A traceable and certified renewable feedstock, able to significantly contribute to achieving the EU's climate targets
 - A potential new source of revenue for farmers
- The Carina Project and other pilot/testing activities are aiming at proving feasibility of carinata and other intermediate crops in Europe
- **EU certification rules for eligibility of intermediate crops under RED Annex IX need to deliver a practical and workable system**

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Thank you

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Agricultural-PV: Unlocking Europe's Dual Potential for Food and Energy

Abstract:

Agri-PV — the combination of agriculture and solar energy — offers a unique opportunity to preserve agricultural land while producing clean power. By integrating photovoltaic systems into productive farmland, we can enhance land efficiency, support local farmers, and strengthen regional energy security.



Lukas Hinkel
Head of ILOS Germany,
ILOS

Despite its enormous potential, Agri-PV remains largely unregulated across Europe, slowing down innovation and investment. In this talk, Lukas Hinkel discusses the opportunities and challenges of Agri-PV in Europe — from innovative applications and market developments to the evolving policy landscape. The presentation takes a forward-looking perspective on how combining energy production and agriculture can contribute to Europe's sustainability goals while preserving valuable land resources.



— Innovators by Nature

Agri-PV: Unlocking Europe's Dual Potential for Food and Energy

ILOS

www.ilos-energy.com

ILOS Projects GmbH & Co. KG

— Innovators by Nature

"The Farmer on the Frontline of Climate Change"



ILOS

ILOS

Innovators by Nature

A New Kind of Hope

But there is hope — and it doesn't come from abandoning agriculture. It comes from **rethinking how we use the land**.

Agrivoltaics (Agri-PV)

the combination of solar panels and crops

- **Stabilizes farm income**
by generating renewable energy even when crops fail.
- **Protects the soil**
from erosion and overheating, reducing moisture loss
- **Improves water efficiency**
by shading the ground and lowering evaporation
- **Enhances crop productivity**
for many varieties, especially under stress conditions
- **Reduces Carbon Footprint of farming**
- **Gives farmers control back**
turning uncertainty into resilience.

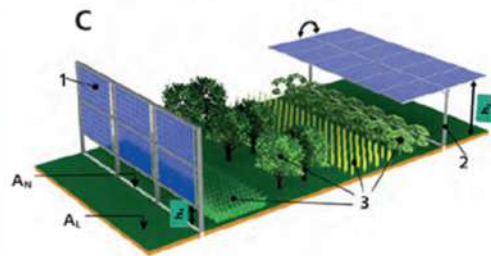


*"Agri-PV is not just about energy.
It's about keeping farmers farming — keeping our
landscapes alive and securing our food supply."*

ILOS

Innovators by Nature

Vineyard Agrivoltaics



ILOS

Innovators by Nature

Agri-PV Innovation

AI-guided farming machinery operating autonomously between solar rows

- ✓ **Autonomous field robots**
operate safely between rows (weeding and under-vine tasks) and reduce herbicide use.
- ✓ **AI + sensing**
activate irrigation only when and where needed; models predict crop yield and solar energy output.
- ✓ **Farm-friendly Agri-PV layouts**
(vertical or elevated rows) maintain full access for agricultural machinery.

Additional Agri-PV Innovations

AI-driven remote sensing, precision farming, resource optimization, predictive analytics, land & soil mapping, and early-warning risk detection...



ILOS



Innovators by Nature

Policy: What Brussels Can Unlock – Three Key EU Actions

What happened so far:

- 2022** The EU has formally recognized agrivoltaics as a strategic innovation
- 2023** JRC Report publishes key findings and needs for agri PV
- 2025** EU Farming Strategy recognizes solar in agriculture



What should be done next:

1. Define Agri-PV EU-wide
2. Lock CAP & land-status clarity
3. Priority Grid Access for Agri PV

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Summary: Agri-PV is a
bridge between food and
energy systems

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www.ilos-energy.com

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Get in Touch
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