

AGRO
FOSSIL
FREE



The 75th EAAP Annual Meeting
1-5 September 2024, Florence, Italy

The AgEnergy platform – a tool to search and assess fossil-energy-free technologies and strategies

A. Balafoutis, M. Moraitis, M. Kaminiaris, Z. Tsiropoulos, D. Manolakos



CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS

iBO
Institute for Bio-Economy
and Agri-Technology



ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
AGRICULTURAL UNIVERSITY OF ATHENS



This project has received funding from the European Union's Horizon 2020
research and innovation programme under grant agreement ID 101000496



Project General Info

- **Call:** Defossilising agriculture – solutions and pathways for fossil-energy-free farming (CSA – Coordination and Support Action)
- **Project full title:** Strategies and technologies to achieve a European Fossil-energy-free agriculture
- **Acronym:** AgroFossilFree
- **Budget:** € 1,999,937.50 by H2020
- **Duration:** October '20 – September '23
- **Partnership:** 16 partners from Greece, Denmark, Poland, Belgium, Italy, Netherlands, Ireland, German and Spain

Problem Statement



In the EU, the last 20 years innovative technologies and strategies **were applied** in most economic sectors:

1. Households
2. Industry
3. Transport

Technologies & Strategies for sustainability



Open-field crop production

- arable crops
- orchards
- vineyards

Controlled environment agricultural constructions (i.e. greenhouses and livestock buildings)



**Not applied in Agriculture
with the same intensity!**

not considered as a **main energy consumer** and **GHG producer**

High cost of such technologies for small/medium farmers due to their **low income** and **lack of sufficient incentives**

Problem Statement



Agriculture

Important gap between such developments and the actual adoption and use of the available tools and practices by farmers

GAP CLOSED BY

- **gaining knowledge** of existing and future technological advancements in energy sector
- **adequate training** within the EU

FULL ALIGNMENT WITH

- fossil energy use reduction policies
- the related legal and regulatory frameworks
- sustainable food production practices



Key-element

Fossil-Energy-Free Technologies and Strategies (FEFTS)

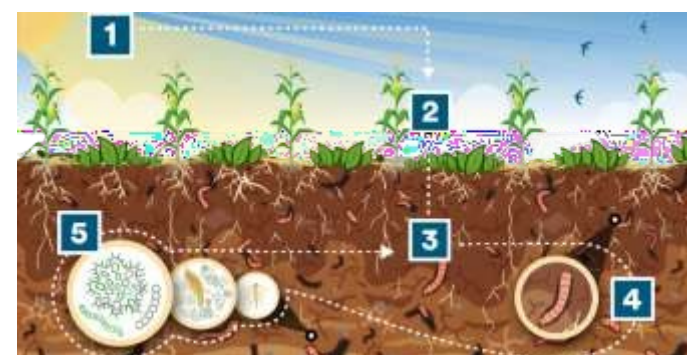
On-site renewable
energy production



Energy efficiency and
rational use of energy
in Agriculture



Soil Carbon Sequestration
Practices





AgroFossilFree Approach

POLICY (WP3 & WP5)
Policy Guidelines and dissemination

INNOVATION (WP3)
Multi-actor networking:
Innovation Workshops in 8 countries and 3 International Workshops for integrating national results in an EU context

KNOWLEDGE (WP2)
Inventory of FEFTS (Papers, Projects, Products, Training material, Financial tools)



FEFTS PLATFORM (WP4)



RESEARCH (WP1)
Assessment of EU agriculture energy status and farmers' needs

Assessment of EU agriculture energy status and farmers' needs

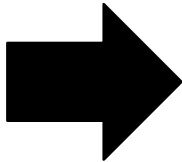


- Report on current energy use status in EU
- Farmers' survey and experts' survey

- ✓ energy use concentrations
- ✓ where future research should focus



FEFTS Adoption



Main motivation for adoption

1. ↓ Energy cost
↑ Profit (i.e. selling energy to others)
2. Reduction of environmental impact
(complementary)

Main barriers for non adoption

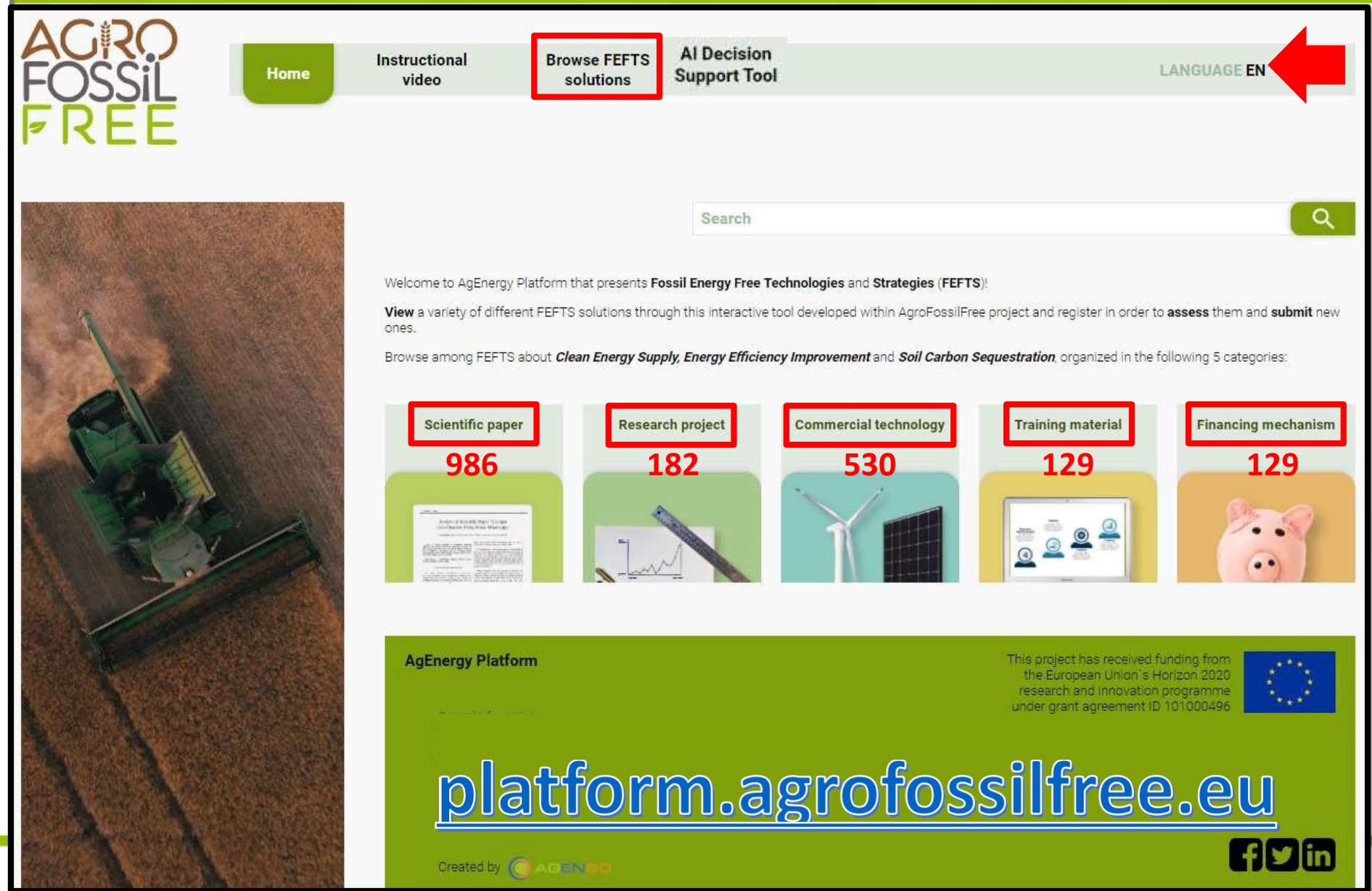
1. **Affordability - high upfront costs
(+ Long term investments)**
2. **Bureaucracy – Complicated procedures**
3. **Not best fitting/compatible
technologies for their farm**
4. **Small farm size**

2/3 of RES adopters said that a **SPECIFIC SUBSIDY** → opportunity to invest

AgEnergy platform



Almost 2000
FEFTS available
in our inventory
by the end of
the project



The screenshot shows the AgEnergy platform website. The header features the 'AGRO FOSSIL FREE' logo on the left and navigation links: 'Home', 'Instructional video', 'Browse FEFTS solutions' (highlighted with a red box), and 'AI Decision Support Tool'. A 'LANGUAGE EN' link is on the right, with a red arrow pointing to it. Below the header is a search bar. The main content area welcomes users to the platform, which presents 'Fossil Energy Free Technologies and Strategies (FEFTS)'. It encourages users to view a variety of FEFTS solutions, register to assess them, and submit new ones. It also lists categories for browsing: 'Clean Energy Supply', 'Energy Efficiency Improvement', and 'Soil Carbon Sequestration'. Below this, five categories are displayed with their respective counts: 'Scientific paper' (986), 'Research project' (182), 'Commercial technology' (530), 'Training material' (129), and 'Financing mechanism' (129). Each category has a representative image. The footer includes the 'AgEnergy Platform' logo, a statement about funding from the European Union's Horizon 2020 research and innovation programme (grant agreement ID 101000496), the European Union flag, the URL 'platform.agrofossilfree.eu', and social media icons for Facebook, Twitter, and LinkedIn.

AGRO
FOSSIL
FREE

Home Instructional video **Browse FEFTS solutions** AI Decision Support Tool LANGUAGE EN

Search

Welcome to AgEnergy Platform that presents **Fossil Energy Free Technologies and Strategies (FEFTS)**!

View a variety of different FEFTS solutions through this interactive tool developed within AgroFossilFree project and register in order to **assess** them and **submit** new ones.

Browse among FEFTS about **Clean Energy Supply**, **Energy Efficiency Improvement** and **Soil Carbon Sequestration**, organized in the following 5 categories:

Scientific paper	Research project	Commercial technology	Training material	Financing mechanism
986	182	530	129	129

AgEnergy Platform

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ID 101000496

platform.agrofossilfree.eu

Created by AGENSO

f t in

▼ FEFTS information type

- ☐ Scientific paper
- ☐ Research project
- ☒ Commercial technology
- ☐ Training material
- ☐ Financing mechanism

► Solution type

► Use of FEFTS

► Agricultural application

▼ FEFTS type

- ☒ Clean energy supply
- ☐ Energy efficiency improvement
- ☐ Soil carbon sequestration

▼ Clean energy supply

- ☒ Energy production system
- ☐ Energy storage system

▼ Energy production system

- ☐ Renewable energy source
- ☐ Energy produced
- ☒ Technology used

▼ Technology used

- ☐ Photovoltaics
- ☒ Solar thermal
- ☐ Wind turbines
- ☐ Hydropower
- ☒ Heat pumps
- ☒ Geothermal
- ☐ Solid biomass conversion
- ☐ Biogas/biomethane production
- ☐ Liquid biofuels production

► Solar thermal

► Heat pumps

Sort By:

Newest

Search



Showing 1 to 10 of 16 FEFTS
(filtered 16 from 1520 total FEFTS)

EscoPod - Heat pump



An ultra-efficient, high temperature (up to 100°C), multi-function heat pump...

HPM kit



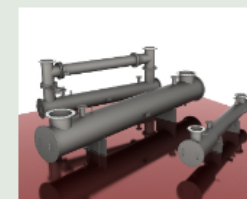
HPM kit consisting of a heat pump as well as an SWPC heat exchanger and an SVK b...

STEAM TO ENERGY (S2E) Transformer



Micro Steam Turbine & Generator Module; PLUG and PRODUCE System. Highl...

Exhaust gas heat exchanger



CHP is the exhaust gas heat exchanger. The exhaust gas heat exchanger extra...

SUNpulse Stirling engine



With the Sunpulse +, Sun Orbit has created a heat engine that opens up complet...

HEAT RECOVERY SYSTEMS - WERO-Rotary Hea...



Wessel heat recovery systems are also available with self-cleaning systems. This...

Ceres Ecoloop



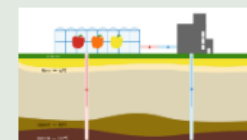
The Ceres Ecoloop™ is a ground coupled heat pump system that heats, cools...

Geothermal heat pumps - ELFOEnergy Groun...



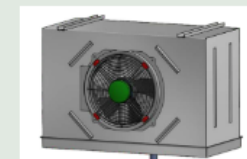
ELFOEnergy Ground Medium² liquid chillers and heat pumps are water-cooled u...

Heating greenhouses with geothermal ener...



More and more greenhouse growers are using geothermal energy to heat their green...

ARKTOS unit cooler



ARKTOS unit coolers are suitable for commercial, marine and industrial applicati...



General Description

Solar air collectors significantly reduces the running costs for heating and dehumidification of larger buildings. The solar air collector will be heated by the solar radiation. The energy given by the solar radiation will be transferred into the building as fresh, preheated air. The air enters the collector through a patented double-perforated rear wall. The air passes through the absorber, made of a black technical material, which is resistant to high temperatures. The material is also an effective air filter. Unique to this collector is the conversion of solar energy to warm, fresh air. The air goes between the rear wall and the absorber.

SolarVenti - Solar air collectors

da

Information

Provider/source

Material

Assessment

FEFTS Specifications

COMMERCIAL TECHNOLOGY
for Clean energy supply (Energy production system)

RENEWABLE ENERGY SOURCE
Solar

TECHNOLOGY USED
Solar thermal

SPECIAL TYPE
Flat plate collectors

ENERGY PRODUCED
Heat

SUITABLE/IDEAL FOR
Heat for buildings

AGRICULTURAL DOMAIN
Livestock, Greenhouses

SUITABLE FOR
Farmer, Companies, Industry

APPLICATIONS
Heating and cooling of agricultural constructions

ESPECIALLY
Stables, Greenhouses, Farmer's buildings

TYPE OF SOLUTION
Hardware

AgEnergy Platform

[General Information](#)
[Terms of services and policy](#)
[Cookies](#)
[Official project website](#)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ID 101000496



This AgEnergy platform has been developed only by using published material from different open access sources. The main objective of the AgEnergy platform is to facilitate the dissemination of useful information for a better application of fossil-energy-free strategies and technologies (FEFTS), and has no any commercial or comparative purposes. If you do not agree with the dissemination of the information, please contact us at info@agrofossilfree.eu



General Description

Solar air collectors significantly reduce the running costs for heating and dehumidification of larger buildings. The solar air collector will be heated by the solar radiation. The energy given by the solar radiation will be transferred into the building as fresh, preheated air. The air enters the collector through a patented double-perforated rear wall. The air passes through the absorber, made of a black technical material, which is resistant to high temperatures. The material is also an effective air filter. Unique to this collector is the conversion of solar energy to warm, fresh air. The air goes between the rear wall and the absorber.

SolarVenti - Solar air collectors

da

Information

Provider/source

Material

Assessment

Details

Company name: **SolarVenti**

Official company name: **SolarVenti Ltd. International**

Address: **Fabriksvej 8, 8881 Thorsoe, Denmark**

Company size: **11 to 50 employees**

[Visit the Website](#)[Official website link](#)

AgEnergy Platform

[General information](#)[Terms of services and policy](#)[Cookies](#)[Official project website](#)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ID 101000496



This AgEnergy platform has been developed only by using published material from different open access sources. The main objective of the AgEnergy platform is to facilitate the dissemination of useful information for a better application of fossil-energy-free strategies and technologies (FEFTS), and has no any commercial or comparative purposes. If you do not agree with the dissemination of the information, please contact us at info@agrofossilfree.eu



General Description

Solar air collectors significantly reduces the running costs for heating and dehumidification of larger buildings.

The solar air collector will be heated by the solar radiation.

The energy given by the solar radiation will be transferred into the building as fresh, preheated air.

The air enters the collector through a patented double-perforated rear wall. The air passes through the absorber, made of a black technical material, which is resistant to high temperatures. The material is also an effective air filter.

Unique to this collector is the conversion of solar energy to warm, fresh air. The air goes between the rear wall and the absorber.

SolarVenti - Solar air collectors

da

Information

Provider/source

Material

Assessment

Relevant Files and Videos

Files:

- https://platform.agrofossilfree.eu/storage/fefts/files/additional_files/ab80a1426cc8611d82307f22d8c5f378.pdf

Audio Visual Material: –

AgEnergy Platform

[General Information](#)

[Terms of services and policy](#)

[Cookies](#)

[Official project website](#)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ID 101000496



This AgEnergy platform has been developed only by using published material from different open access sources. The main objective of the AgEnergy platform is to facilitate the dissemination of useful information for a better application of fossil-energy-free strategies and technologies (FEFTS), and has no any commercial or comparative purposes. If you do not agree with the dissemination of the information, please contact us at info@agrofossilfree.eu

Created by 





General Description

Solar air collectors significantly reduces the running costs for heating and dehumidification of larger buildings.
 The solar air collector will be heated by the solar radiation.
 The energy given by the solar radiation will be transferred into the building as fresh, preheated air.
 The air enters the collector through a patented double-perforated rear wall. The air passes through the absorber, made of a black technical material, which is resistant to high temperatures. The material is also an effective air filter.
 Unique to this collector is the conversion of solar energy to warm, fresh air. The air goes between the rear wall and the absorber.

SolarVenti - Solar air collectors

da

Information

Provider/source

Material

Assessment

Assessment

This section contains a brief assessment of the FEFTS described.

There are 3 basic categories: General, Environmental and Socioeconomic assessment.

The purpose of this assessment is to give a quick overview to the potential FEFTS user of its application benefits.

For each question, the Likert scale is used with the following possible answers:

Strongly disagree, Disagree, Neither agree nor disagree (Neutral)/non applicable, Agree, Strongly agree

General

This FEFTS contributes to improve the energy profiles of farming systems:

Strongly disagree Disagree Neutral/non applicable Agree Strongly agree

This FEFTS is (technically) mature and can be (commercially) applied in farming systems:

Strongly disagree Disagree Neutral/non applicable Agree Strongly agree

This FEFTS helps to increase the production efficiency of farming systems:

Strongly disagree Disagree Neutral/non applicable Agree Strongly agree

The description of this FEFTS was very helpful:

Strongly disagree Disagree Neutral/non applicable Agree Strongly agree

Environmental

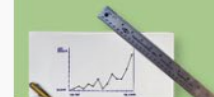
Decision Support Tool

[Home](#)[Use Cases'
Videos](#)[Browse FEFTS
solutions](#)[AI Decision
Support Tool](#)[LANGUAGE EN](#)[Log in](#)

Welcome to AgEnergy Platform that presents **Fossil Energy Free Technologies and Strategies (FEFTS)**!

View a variety of different FEFTS solutions through this interactive tool developed within AgroFossilFree project and register in order to **assess** them and **submit** new ones.

Browse among FEFTS about **Clean Energy Supply**, **Energy Efficiency Improvement** and **Soil Carbon Sequestration**, organized in the following 5 categories:

[Scientific paper](#)[Research project](#)[Commercial technology](#)[Training material](#)[Financing mechanism](#)

AgEnergy Platform

[General Information](#)
[Terms of services and policy](#)
[Cookies](#)
[Official project website](#)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ID 101000496



This AgEnergy platform has been developed only by using published material from different open access sources. The main objective of the AgEnergy platform is to facilitate the dissemination of useful information for a better application of fossil-energy-free strategies and technologies (FEFTS), and has no any commercial or comparative purposes. If you do not agree with the dissemination of the information, please contact us at info@agrofossilfree.eu

Created by AGENERO





Decision Support Tool

What is the main farmed animal?

Please choose the main farmed animal.

What is the size of your farm?

Please choose "Small" for farms size below 10 he, "Medium" for farm size between 10 he and 100 he and "Large" for farm size beyond 100 he.

How big is the distance to the closest paved road?

Please choose "Small" for distances below 1 km, "Medium" for distances between 1 km and 5 km and "High" for distances above 5 km.

How big is the distance to the electricity distribution grid?

Please choose "Small" for distances below 100 m, "Medium" for distances between 100 m and 1 km and "High" for distances above 1 km.

How big is the distance from protected areas like Natura?

Please choose "Small" for distances below 1 km, "Medium" for distances between 1 km and 5 km and "High" for distances above 5 km.

How big is the distance from archaeological or cultural heritage sites?

Please choose "Small" for distances below 1 km, "Medium" for distances between 1 km and 5 km and "High" for distances above 5 km.

Submit

Open-field Farming

Livestock Farming

Greenhouse Farming

The tool aims to mimic the consultation process of a number of experts as if they were in the same room evaluating the input data provided by the end-user to propose the most interesting interventions for each farm

Decision Support Tool

Ranked list of Fossil Energy Free Technologies and Strategies (FEFTS) categories.	Commercial Technologies	Training Materials	Financing Mechanisms
Heating, cooling, ventilation incl. heat pumps	view solutions	view solutions	view solutions
Energy efficient lighting	view solutions	view solutions	view solutions
Intelligent Management Systems / Automation	view solutions	view solutions	view solutions
PVs	view solutions	view solutions	view solutions
Waste for energy generation systems incl. biogas applications	view solutions	view solutions	view solutions
Improved burners / boilers	view solutions	view solutions	view solutions
Geothermal energy systems	view solutions	view solutions	view solutions
Electricity Storage	view solutions	view solutions	view solutions
Wind turbines	view solutions	view solutions	view solutions

Decision Support Tool

▼ FEFTS information type

- ☐ Scientific paper
- ☐ Research project
- ☒ Commercial technology
- ☐ Training material
- ☐ Financing mechanism

► Country

► Solution type

▼ Use of FEFTS

- ☐ Open-field agriculture
- ☒ Livestock
- ☐ Greenhouses

► Agricultural application

▼ FEFTS type

- ☐ Clean energy supply
- ☒ Energy efficiency improvement
- ☐ Soil carbon sequestration

▼ Energy efficiency

- ☒ Efficient buildings
- ☐ Efficient vehicle
- ☐ Efficient tool
- ☐ Precision agriculture
- ☐ Precision livestock farming
- ☐ Conservation agriculture
- ☐ Efficient postharvest technologies

▼ Efficient buildings

- ☐ Building wall insulation
- ☐ Roof insulation
- ☐ Cellar insulation
- ☐ Windows

Sort By:

Newest

Showing 1 to 5 of 5 FEFTS
(filtered 5 from 1961 total FEFTS)

Lely Sphere



Lely Sphere is an environmental technology solution for manure management that s...

Silotronic - Silos Level Control In Real...



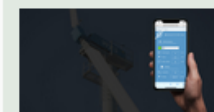
Rotecna's Silotronic is a sensor with laser technology that allows you to...

Rondeel poultry farm



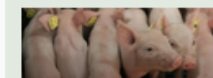
In the Rondeel, chickens are kept with great care for animal welfare and the env...

SCADA Wind Energy Monitoring Application



SCADA stands for 'Supervisory Control And Data Acquisition', a monitorin...

Complete solutions for livestock farmers



Hotraco Agri's business objective is to provide total peace of mind for live...

Decision Support Tool

Ranked list of Fossil Energy Free Technologies and Strategies (FEFTS) categories.	Commercial Technologies	Training Materials	Financing Mechanisms
Heating, cooling, ventilation incl. heat pumps	view solutions	view solutions	view solutions
Energy efficient lighting	view solutions	view solutions	view solutions
Intelligent Management Systems / Automation	view solutions	view solutions	view solutions
PVs	view solutions	view solutions	view solutions
Waste for energy generation systems incl. biogas applications	view solutions	view solutions	view solutions
Improved burners / boilers	view solutions	view solutions	view solutions
Geothermal energy systems	view solutions	view solutions	view solutions
Electricity Storage	view solutions	view solutions	view solutions
Wind turbines	view solutions	view solutions	view solutions

AGRO
FOSSiL
FREE

The 75th EAAP Annual Meeting, 1-5 September 2024, Florence, Italy

Successful case study stories videos

[Home](#)[Use Cases' Videos](#)[Browse FEFTS solutions](#)[AI Decision Support Tool](#)[LANGUAGE EN](#)[Log in](#)

Use Cases' Videos

AgroFossilFree has identified 10 fossil free **successful Use Cases** around Europe, and showcases them in YouTube Videos.

- Case study in Greece: Agrivoltaics with Brite solar, available [here](#).
- Case study in Denmark: Green Protein, an alternative soya, available [here](#).
- Case study in Germany: The New Holland T6 methane tractor, available [here](#).
- Case study in Netherlands: Sustainable storage barn 'Bewaarschuur van de toekomst', available [here](#).
- Case study in Spain: Conservation agriculture, available [here](#).
- Case study in Italy: Agrivoltaics, photovoltaics and biogas plant, available [here](#).
- Case study in Ireland: Biomass Heat Solutions Limited, available [here](#).
- Case study in Poland: GB Hybrid - strip-till and subsoiler, available [here](#).
- 2 Case studies by REScoop (in Bocholt and Bierbeek): The pathway towards a fossil-free agriculture and a citizen-led energy transition, available [here](#).

AgEnergy Platform

[General information](#)
[Terms of services and policy](#)
[Cookies](#)
[Official project website](#)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ID 101000496



This AgEnergy platform has been developed only by using published material from different open access sources. The main objective of the AgEnergy platform is to facilitate the dissemination of useful information for a better application of fossil-energy-free strategies and technologies (FEFTS), and has no any commercial or comparative purposes. If you do not agree with the dissemination of the information, please contact us at info@agrofossilfree.eu

Created by AGENERO



Successful case study stories videos

case study in GREECE



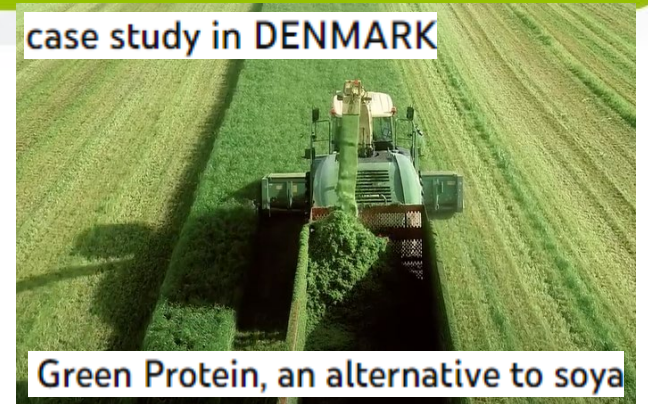
Agrivoltaics with Brite Solar

case study in NETHERLANDS



Sustainable storage barn

case study in DENMARK



Green Protein, an alternative to soya

case study in Italy



Bagnoli sustainable farm

case study in SPAIN



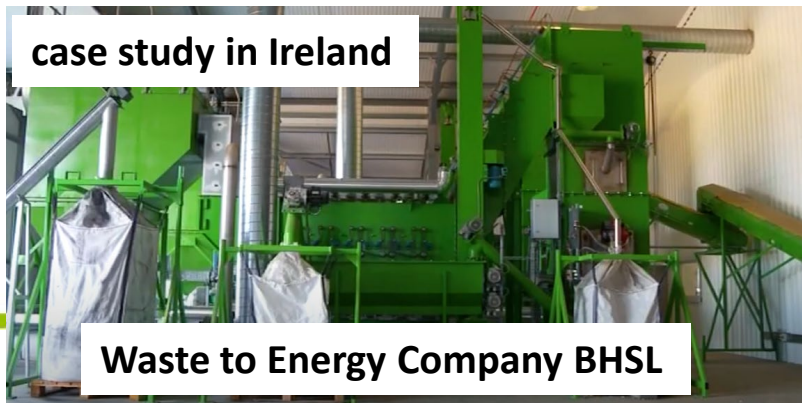
Conservation agriculture

case study in GERMANY



The New Holland T6 methane tractor

case study in Ireland



Waste to Energy Company BHSL

case study in Poland



Hybrid subsoiler and strip-till

case study in Belgium



Citizen-led energy transition



Thank you!



platform.agrofossilfree.eu

Project Coordinator: Thanos Balafoutis: a.balafoutis@certh.gr



[Agrofossilfree H2020 project](#)



[AgroFossilFree Project](#)



[AgroFossilFree_H2020](#)



[Agrofossilfree](#)



www.agrofossilfree.eu



CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS
iBO
Institute for Bio-Economy
and Agri-Technology



AARHUS
UNIVERSITY
DEPARTMENT OF ENGINEERING



ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
AGRICULTURAL UNIVERSITY OF ATHENS



Institute of Soil Science
and Plant Cultivation
State Research Institute



CEMA
European
Agricultural
Machinery



ECAAF
European Cooperation Agriculture Federation

RESCOOP.EU



Innovation Centre
for Organic Farming



Confagricoltura



AGENSO

Delphy



Eagasc
Association of Food Processing Companies



WIP
RENEWABLE
ENERGIES



TTA
Irama
TecnAmbiental



iniciativas
innovadoras