Supporting PV usage and production to reduce fossil fuel use in European agriculture – the AgroFossilFree project

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SUMMARY OF THE ABSTRACT

Global agricultural emissions are a significant driver of climate change when compared to emissions from other industries. Except for land use, land use change, and net forestry removals, the agricultural sector was responsible for about 10% of the EU's overall GHG emissions in 2015. These emissions are primarily linked to the management of manure and enteric fermentation in livestock production, as well as the application of fertilizers to agricultural soils. With the exception of horticultural crop types, the emissions associated with the production of energy in agriculture are insignificant in comparison to other emission sources. Even so, producing fertilizer and pesticides as well as using fossil fuels for heating, cooling, transportation, and electricity requires a significant amount of fossil fuels.

The AgroFossilFree project promotes the use of fossil-energy-free technologies and strategies (FEFTS) in the agricultural industry by combining multiple stakeholder initiatives and disseminating information about FEFTS in agriculture. Applications that promote the integration of RES in significant agricultural sectors, particularly solar technology, are given a lot of attention. The main objective of the project is to develop a platform where farmers, advisors, academics, business partners, and other interested parties can find relevant data about FEFTS in agriculture. To support the EU Green Deal and Farm to Fork strategies, the AgroFossilFree initiative works to reduce the use of fossil fuels in all facets of agriculture. It helps to close the gap between the available FEFTS and typical EU agricultural practices, making European agriculture more environmentally, socioeconomically, and energetically sustainable by facilitating the efficient flow of innovative information and ideas among stakeholders. With the aid of the knowledge that is gathered, categorized, and presented to actors in the agricultural field, the European agricultural sector can support and abide by policies to reduce the use of fossil fuels, the pertinent legal and regulatory frameworks, and sustainable food production practices. The final results of the three-year project AgroFossilFree will be presented.

APPLICABLE TOPIC AND SUB-TOPIC NUMBER

The subtopic chosen for the submission of your abstract is: "5.1 Energy System Integration; Resilience and Security of Supply; Solar Fuels, Storage" as the contribution highlights agricultural energy system integration on fossil fuel use reduction. It especially focuses on the role of PV in agriculture sector coupling and suggests measures on the policy level.

EXPLANATORY PAGES

AIM AND APPROACH

AgroFossilFree is a H2020 research project that aims to provide a framework in which crucial stakeholders will work together to assess and promote the fossil-energy-free

technologies and strategies (FEFTS) that are now available in EU agriculture. The AgroFossilFree project will support the High-Level EU Strategies (such as the EU Green Deal and Farm to Fork strategy) since it intends to reduce the use of fossil fuels across the whole farming process, from seed to fork, while preserving yield and product quality. By encouraging efficient communication of innovative ideas and information across research, business, extension, and agriculture, it will also help close the gap between the available FEFTS and common EU agricultural practices. If this gap is closed, European agriculture may become more environmentally, socioeconomically, and energetically sustainable. All the professionals participating in the process need to be properly trained to incorporate all the available tools and methods that have been produced via prior research and industry initiatives. Therefore, agriculture won't be able to completely align with the policies for reducing the use of fossil fuels, the related legal and regulatory frameworks, and sustainable food production practices until agricultural stakeholders gain knowledge of current and future technological advancements in the energy sector and adequate training is achieved within the EU.

SCIENTIFIC INNOVATION AND RELEVANCE

To reduce greenhouse gas emissions, de-fossilization practices are investigated by AgroFossilFree. These practices are closely related to PV strategies and policies that promote a bioeconomy. To enable the development of interactive innovation processes in the national and regional agricultural value chains, AgroFossilFree will convene farmers, advisors, researchers, industrial partners, and other participants in interactive innovation workshops (physical and virtual). A conceptual framework will be established to adjust the FEFTS inventoried to the regional contexts for an effective and targeted distribution. The same methodology will be used to collect and direct grassroots ideas, resulting in future innovation-based projects that are created in response to the actual needs of end users and are implemented more quickly as a result of the actors' empowerment and the co-ownership established during the collaborations. This strategy will be elevated to the EU level in an effort to promote international collaboration in the field of FEFTS. This is, as far as the authors are aware, the first attempt at creating a novel FEFTS inventory.

RESULTS (OR PRELIMINARY RESULTS) AND CONCLUSIONS

- AgroFossilFree assessed and analyzed the current state of energy consumption in EU agriculture in field agriculture, greenhouse facilities and livestock units through full-scale desk research. In total, 4 scientific publications were produced.
- 470 end-users' needs and interests were assessed, 41 factors that influence farmers' generation ship, adoption and diffusion of FEFTS were identified;
- AgroFossilFree identified 8 successful innovation processes, 3 energy needs assessment in open field crops and 2 energy needs assessment of agricultural constructions;
- AgroFossilFree established the AgEnergy platform, where we identified and registered currently accessible and immediately applicable fossil-energy-free techniques and technology, including 733 applied research findings, 393 commercial solutions, 155 EU/national project results, 95 training materials and 98 financing tools for fossilizing activities;
- Creation of community-based concepts for the integration of fossil-energy-free methods and technology in agricultural systems on a regional and EU level in conjunction with all pertinent stakeholders in thematic groups utilizing interactive physical and online approaches. In total we involved 998 stakeholders, 53 FEFTS with major use potential in workshops, 97 needs and enablers for FEFTS adoption, and 74 grassroots-level ideas;

Improved awareness and promotion of the suggested methodology and technology in practical agricultural activity in the near future, development and dissemination of policy guidelines on an EU, regional, and national level. AgroFossilFree established 13 connections with EIP-Agri Operational Groups and national FEFTS clusters, 4 connections with EIP-Agri Thematic Networks, 21 practice abstracts and 7 collaborations with EU related projects.

The project is still ongoing and closing to the end, it will deliver crucial policy recommendations to be put into effect soon as well as a defined research plan for FEFTS. The detailed outcomes of the AgroFossilFree project will be outlined in a presentation at the EUPVSEC, with a focus on the prospects for PV production and usage to reduce fossil fuel use in the agriculture industry.