

AGRO FOSSIL FREE

Available financing tools in EU agriculture

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Author(s): **Erik Fløjgaard Kristensen, Claus Grøn Sørensen (AU), Thanos Balafoutis,**

Konstantinos Vaiopoulos, Foteini Vandorou (CERTH)

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Abstract

The AgroFossilFree project focus on Fossil-Energy-Free Technologies and Strategies (FEFTS) with reference to address clean energy production and use in agriculture. The overall project goal is to create a framework under which critical stakeholders will cooperate to evaluate and promote the currently available FEFTS in EU agriculture. This report focus on identification and registration of financing mechanisms to promote the use of existing financing tools for de-fossilising activities.

This document is a structured report in which the results of the Financing Mechanisms submitted in the survey are analysed based on the methodology described in D2.1. This report is one of the three reports that will be produced for the purposes of AgroFossilFree project regarding the analysis of Financing Mechanisms on FEFTS. Each of these reports will cover an internal milestone reached for the FEFTS submissions.

After the completion of this first phase of the survey and the initial screening process, 46 Financing Mechanisms were selected to be further analysed. The whole consortium worked together in order to find financing mechanisms covering a wide range of technologies, applications and initiatives.

Records submitted are about supporting schemes for farmers, companies, industry, producers' associations, energy generators, contractors, advisory services, policy makers and universities. From the analysis it may be concluded that a majority of the financing mechanisms offer possibilities for support to various groups of users. Most of the financing mechanisms offer possibilities for applying for multiple activities, but there are also some targeted to more specific areas (e.g. agricultural field practices). Overall, the dominate focus area of the financing mechanisms is energy efficiency improvements which count for 52.9 % of the schemes while 38.2% focus on clean energy supply and 8.8 % focus on soil carbon sequestration.

This report is organized in four chapters. The first chapter sets the base for the initial identification of FEFTS as well as the methodology used. The second chapter focuses on the conducted survey. Chapter three is the analysis of the results. The last chapter is the conclusion on the results.

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1. Initial Identification

Fossil-Energy-Free Technologies and Strategies (FEFTS) refers to the tools that are required to address clean energy production and use in agriculture including Renewable Energy Sources, Energy Efficiency Technologies, Agricultural Constructions Management Systems, Biofuel production and use, Agricultural Machinery using biofuels, electrified implements, Smart Farming Technologies, Conservation agriculture methods and Best Energy Management Practices for rational use of energy and reduced GHG emissions.

A questionnaire has been developed and serves as an operative tool for an inventory creation survey regarding FEFTS. Through this tool, users have the ability to register and classify FEFTS by filling certain information about specific fields concerning the imported FEFTS.

The first group of questions referred to general information about the identified FEFTS and the person submitting the survey: organisation, contact email, FEFTS category. The second group of questions was more specific such as FEFTS title, language, applicable countries and short description of the mechanisms. Section 3 regarded FEFTS specifications such as its purpose and application field. Section 4 consisted of specific information depending on the type of FEFTS: Clean energy production, Energy efficiency improvement or Soil carbon sequestration, followed by specific sub-categories. The last one, section 5, grouped questions referring to FEFTS assessment – environmental and socioeconomic - provided by the person submitting.

The identified FEFTS regarding financing mechanisms are categorised into 3 main groups, FEFTS on global level, FEFTS on EU level and FEFTS on national level.

In this report the FEFTS categories and subcategories on financing mechanisms are presented in figures 1-8 and a short description is provided.

1.1. Definition of Financing Mechanisms FEFTS

This report refers to Financing Mechanisms identified by Task 2.6 leaders and the project partners. In this context, a financing mechanism is defined as grant schemes or support measures that provide financial subsidy for current technologies or initiatives within the area covered by AgroFossilFree (i.e., financial assistance for FEFTS adoption in EU's agricultural sector). The support may be national funding, EU funding or private funding. The level of the subsidy can be a percentage of the cost or a fixed/maximum funding. Facilities, equipment, material and labour cost may be covered by the financing mechanisms. The FEFTS deal with schemes and subsidies with a focus on both farmers, producers associations, energy generators, contractors, advisory services, policy makers and companies and the subsidies may be offered for both software, hardware, methodologies, procedures and complete solutions.

1.2. Methodology

The reported FEFTS are a collection of information related with FEFTS on funding mechanisms. The FEFTS are identified, described and uploaded by the project participants. The search of FEFTS is done by internet search or based on internal knowledge among the project participants.

The methodology consists of three phases.

- Phase 1 – Initial identification
- Phase 2 – Survey for FEFTS inventory creation
- Phase 3 – Data Aggregation

During Phase 1 (Initial Identification), all participants conducted an initial identification of the FEFTS in order to create the AgroFossilFree database in a user-friendly way. The core strategy behind this effort was to split the search process regarding the scope and the application site of the financing mechanisms. In this context, the Task Leaders and the 3 European associations that are part of AgroFossilFree consortium focused on finding financing tools of a European scope, while the rest partners would focus on financing mechanisms existing in their countries. In this way we would construct a more complete depiction of the current status of available financing mechanisms on EU.

The aim of Phase 2 (Survey for FEFTS inventory creation) was to collect all needed data into a detailed database (Google Forms questionnaire) containing all necessary information that will be used in analysis in later steps of the project.

Finally, during Phase 3 (Data aggregation), the survey results and collected metadata from previous phases is scheduled to be cleared from malicious, duplicate and incomplete entries in order to ensure data integrity and unbiased analysis in later phase of the AgroFossilFree project.

In detail the methodology is described in the Deliverable 2.1 "*Report on methodology and standards*". Here, the overall structure as well as the specific content of the questionnaires are described.

2. Survey

The conducted survey consisted of four sets of questions described initially in Chapter 4. of Deliverable 2.1.

In the first set of questions, users state the FEFTS name, the organization and the email of the user who registers FEFTS, as preliminary identification of FEFTS. In the following question, users have to select the FEFTS category (1-scientific paper, 2-research project, 3-commercial product, 4-training material, 5-financing mechanisms). This report is on the financing mechanisms.

Information regarding the FEFTS type (clean energy production, energy efficiency, soil carbon sequestration) is given. Clean energy production selection summarises renewable energy supply and therefore leads either to energy production or energy storage systems with sub questions to further determine this FEFTS characteristics. Energy efficiency improvement leads to the selection of a specific energy type improvement. Soil carbon sequestration is an auxiliary topic of relevant FEFTS and leads to a question regarding the determination of carbon sequestration type/strategy/method respectively. All the questions of the current section are followed by specific questions, where users select the most appropriate option, aiming to a proper assessment and categorization of the FEFTS.

Finally, an assessment process of the FEFTS (general, environmental and socioeconomic) accompanies the specification and categorization of FEFTS, aiming to evaluate the FEFTS and its impact of the above-mentioned topics, as well as its applicability and efficiency. Users are able either to select from a multiple selection list of possible options, or to score several arguments/concepts based on their perception regarding the FEFTS, using a Likert scale (1-totally disagree, 2-disagree, 3-neutral, 4-agree, 5-totally agree). In case that a FEFTS has no impact on a specific field, the user was prompted to select the neutral option (3).

Both the structure of the survey as well as the analysis of the FEFTS that will be done in Chapter 3, are based on the structure established on Deliverable 2.1. A basic schematic of this structure is presented in Table 1. Annex 2 contains a link of the relevant FEFTS' survey.

Table 1. FEFTS categories and level 1 and level 2 subcategories

FEFTS category	Level 1 sub-category	Level 2 sub-category	
Energy User/Consumer	Agricultural technology applications	heating and cooling of buildings	
		process heat/cold	
		lighting	
		agricultural field practices	
		vehicles	
		tools	
		energy sales to external consumers	
Clean Energy Supply	Renewable Energy Sources	solar	
		wind	
		hydro	
		geothermal	
		bioenergy	
		free energy	
		Energy types	heating
			cooling
			electricity
			mechanical energy
	chemical energy		
	Energy Technologies	photovoltaics	
		solar thermal	
		wind mills	
		hydropower	
		heat pumps	
		geothermal	
		solid biomass conversion	
		biogas / biomethane production	
		liquid biofuels production	
Energy Storages		heat storage	
	electricity storage		
	cold storage		
	intermediate bioenergy carriers		
Energy Efficiency Improvement	Energy savings	efficient buildings	
		efficient vehicles	
		efficient tools	
		precision agriculture	
		precision livestock farming	
		conservation agriculture	
Carbon sequestration	Carbon sequestration	soil organic cover	
		tillage (Conservation Agriculture + CTF)	
		nutrient management	
		crop diversification	
		soil and water conservation techniques	
		fire management	
		grassland management	

2.1. Data Collection – Partners’ Role

All project participants have been responsible for the collection and reporting of financing mechanisms regarding FEFTS. As Task Leaders, AU and CERTH have been primarily responsible for gathering financing mechanisms of FEFTS that can be applied on European level. In addition, in this effort for financial mechanisms/tools available in EU, AU and CERTH had also on their side the 3 European associations that are part of AgroFossilFree consortium. The rest of the partners were assigned under their hub frame to identify financial mechanisms/tools already existing in their countries (national scope). The targets that had been set in the project’s 2nd plenary meeting (25/5/2021) and the collected Financing Mechanisms are shown in Table 2.

Table 2. Registry of financing mechanisms about FEFTS

FEFTS TYPE	Partner	Target set	Collected
Scientific Papers	CERTH	493 (approx. 500)	489
	All other partners		
Research Projects	IUNG-PIB	100	107
	All other partners		
Commercial Technologies	WIP	200	178
	All other partners		
Training Material	WIP	36 (approx. 40)	37
	All other partners		
Financing Mechanisms	AU	48 (approx. 50)	46
	CERTH		
	All other partners		
Total		877 (approx. 900)	857

The whole identification and registration process was supported by an online thread for Task2.6, which was created in Microsoft Teams platform to host Q&As about financing tools, between the Task Leader and partners.

2.2. Screening of Financing Mechanisms/tools about FEFTS

As it is commonly stated to the rest reports of WP2 (D2.2, D2.5, D2.8, D2.11), after the beginning of FEFTS registration process and the successful achievement of our first internal milestone of submitted financing mechanisms about FEFTS in the inventory (until the end of September 2021), the screening process is scheduled to begin before the launch of the platform. In this way, the AgEnergy platform will be filled with high quality and relevant innovative financing tools. However, a first step has already been done, as all records were screened in order to delete duplicate, malicious and incomplete entries. “Incomplete entries” were considered those lacking an exhaustive description and information, thus making their evaluation impossible. For these records, partners were asked to insert additional information. If not available, those entries were completely deleted from the inventory. This

initial screening round was carried out for each FEFTS category by the corresponding Task Leader. In the case of financial mechanisms, AU and CERTH were responsible for the procedure.

In order for all the Task Leaders to complete the screening process, acceptance and exclusion criteria had to be set. To do so, frequent meetings between the Task Leaders were arranged (through Microsoft Teams platform), in order to discuss this matter and agree on the screening procedure. During these meetings, it was decided that a FEFTS Quality Committee consisting of the Task Leaders of WP2 would be set for the aforementioned purpose. The main role of this Committee is the screening of all the FEFTS submitted on the platform.

It should be mentioned though, that the FEFTS submitted from each Task Leader (and by all financing mechanisms) were already checked for their appropriateness, to be uploaded in the inventory, based on the methodology followed by each Task. However, our database will be open for public entry so that interested stakeholders will also be able to input additional data. Their entries will be unpublished until they are validated by the FEFTS Quality Committee. By doing so, the accuracy and reliability of the platform's information regarding its relevance with the objectives of the AgroFossilFree project is guaranteed.

2.2.1. Acceptance Criteria

Financing mechanisms with a clear agricultural application potential supporting research and development projects, innovative energy saving or RES technologies, relevant to the current EU state that can (or could) be used by a farmer, producers associations, energy generators, contractors, advisory services, policy makers, companies and universities are accepted. No financing tool is going to be registered unless it supports/promotes adoption of technologies or strategies that could eliminate (or even diminish) the use of energy produced by fossil fuels in EU agriculture (directly or indirectly). Any financing mechanisms which do not follow the aforementioned criteria and do not clearly provide an alternative solution on the fossil fuel use in agriculture, are excluded from the inventory.

3. Analysis of financing mechanisms about FEFTS

A total of 46 FEFTS on Financing Mechanisms was identified at the end of the first screening process. This number consists of 10 on European level and 35 applicable on country level and 1 "other" (a program centred on Greece but initiatives from the Balkans are also eligible).

The language of the FEFTS on European level are all English and for one of the mechanisms both English, German and French. For the FEFTS on national level the language are the native language for the actual country. Thus the language of the FEFTS is ten in Greek, eight in Polish, five in German, four in Dutch, four in Danish and four in Spanish.

The identified financing mechanisms comprise a wide range of FEFTS in terms of different types of renewable energy sources, applications, energy reduction possibilities, applicants etc.

An explanatory description of all the registered FEFTS including graphs with the most important information which can be derived from the results (type of FEFTS (clean energy supply or energy efficiency improvement or soil carbon sequestration), type of technology, type of energy, application field)) can be found below.

3.1. Financing mechanisms general analysis

When it comes to FEFTS' users to whom specific financing mechanisms are dedicated, the largest group constitute farmers (84.4%). A majority of the financing mechanisms offer possibilities for support to various groups of users, therefore, a multiple choice was possible in the case of this question. Specific numbers are shown in Figure 1.

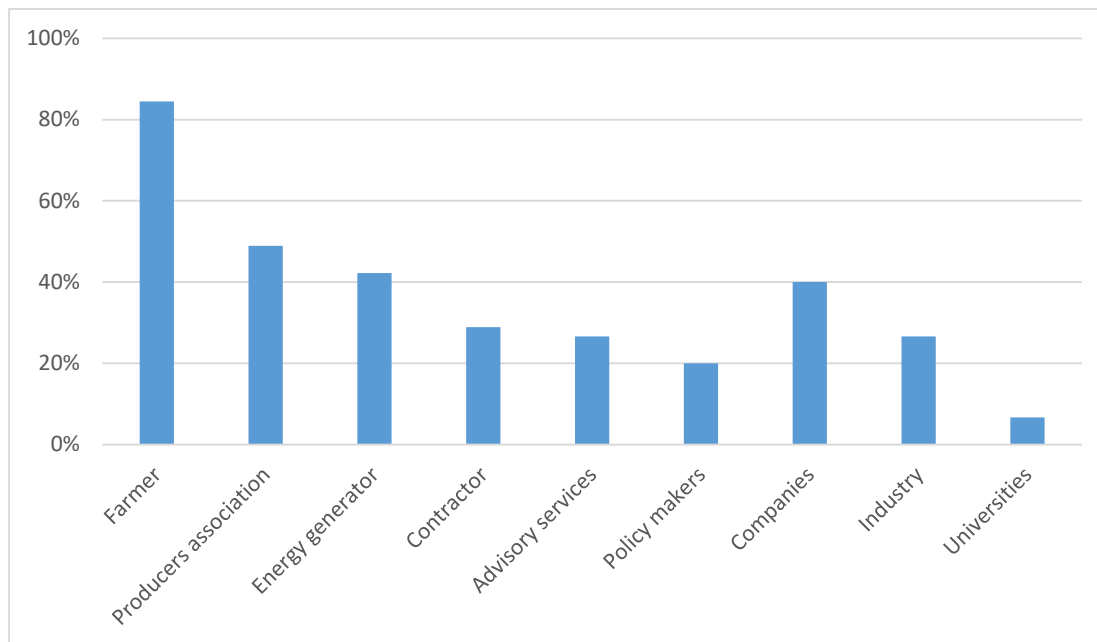


Figure 1. Classification of identified financing mechanisms according to users addressed

The financing mechanisms applicable on European level are for the most EU based. Among the national financing mechanisms the most of the identified schemes were applicable to Greece and Poland, see Figure 2.

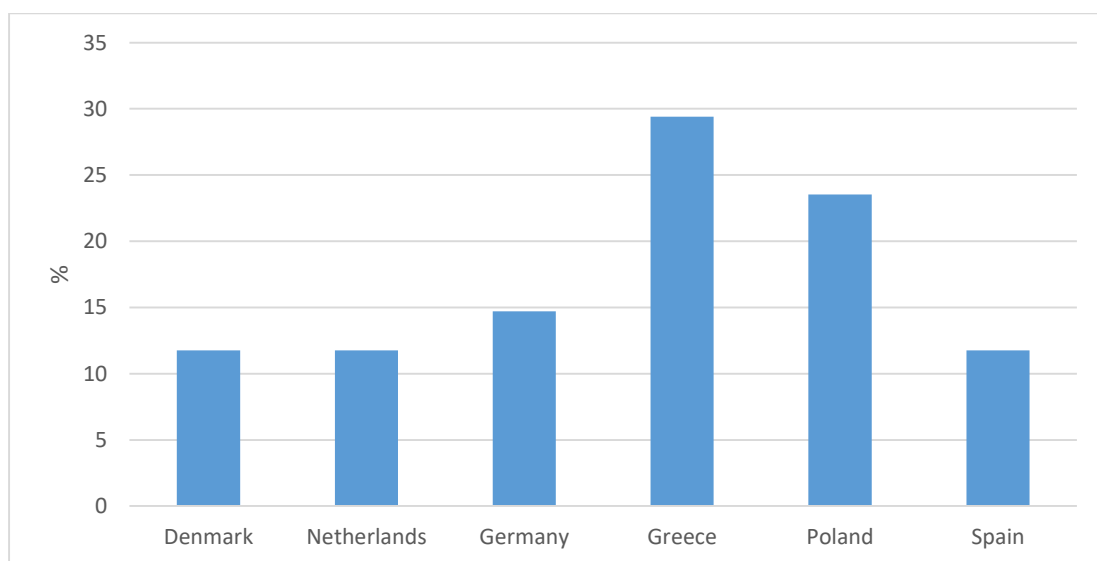


Figure 2. Classification of the national financing mechanisms based on the country of the FEFTS

The financing may be based on either a maximum funding or a percentage of the funding rate. Among the identified FEFTS 68.6 % of the subsidy mechanisms was on a percentage of the expenses with the remaining 31.4% receiving maximum funding.

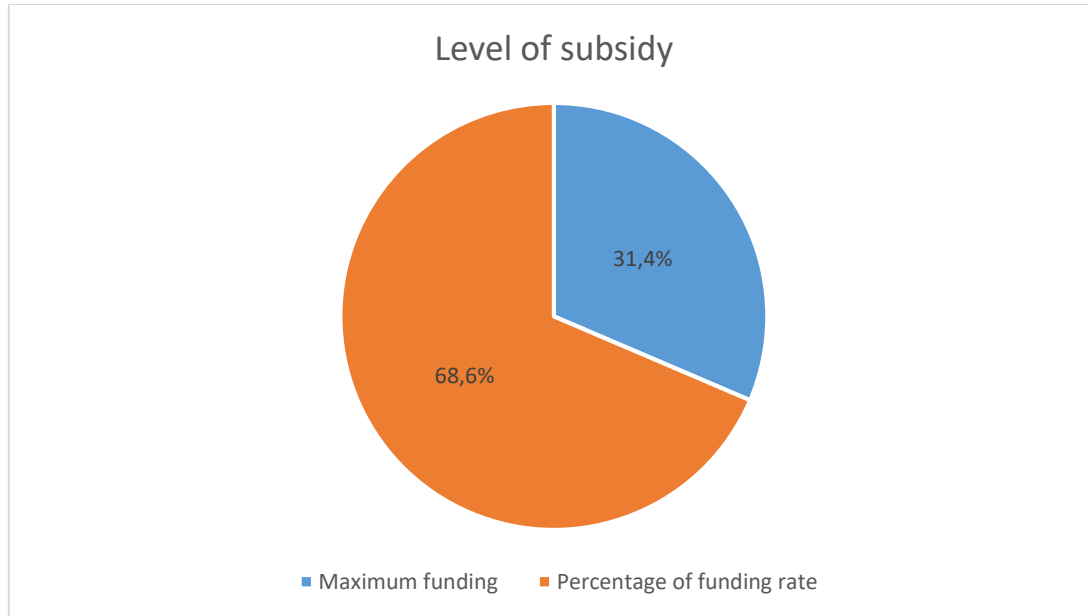


Figure 3. Type of subsidy, maximum of percentage of funding rate

3.2. Financing mechanisms application field

Most of the financing mechanisms (76.1%) offer possibilities for applying to multiple activities, but there are also some which are targeted to more specific areas i.e. agricultural field practices (8.7%) and heating and cooling (4.3%). An overview is given in figure 4.

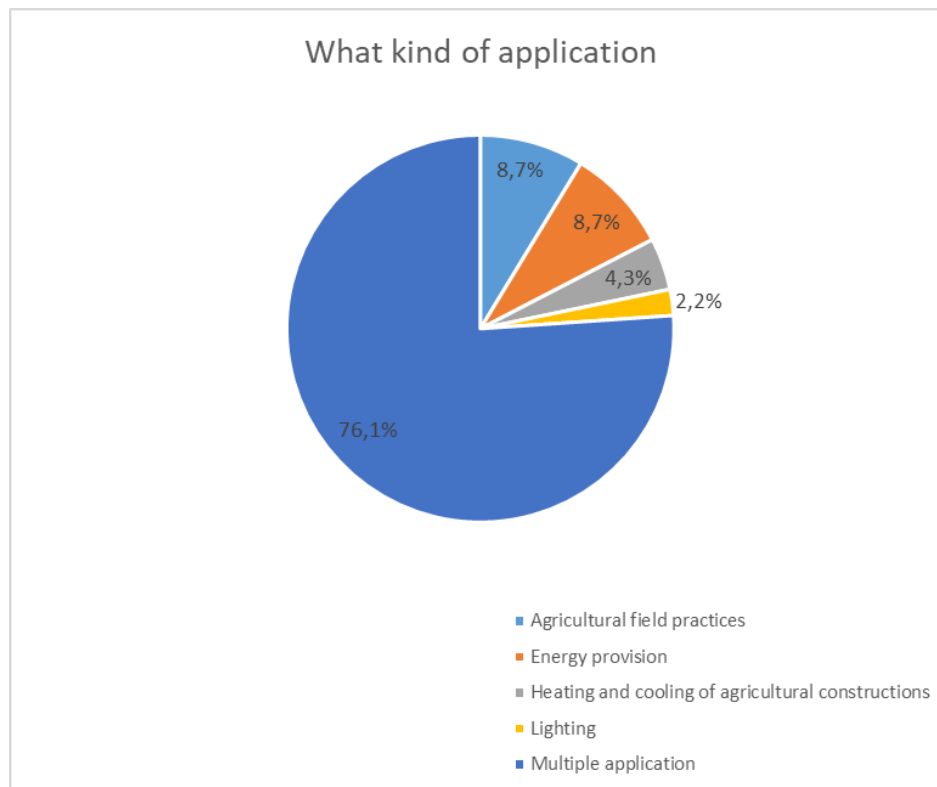


Figure 4. Classification of the identified financing mechanisms on agricultural application

3.3. Financing mechanisms type

The identified FEFTS target energy efficiency improvements, clean energy supply, and soil carbon sequestration. The dominant area is energy efficiency improvement which counts for 18 out of 46 of the collected schemes, 13 out of 46 of the financing mechanisms focusing on clean energy supply and 3 out of 46, focusing on soil carbon sequestration. The distribution is shown in Figure 4

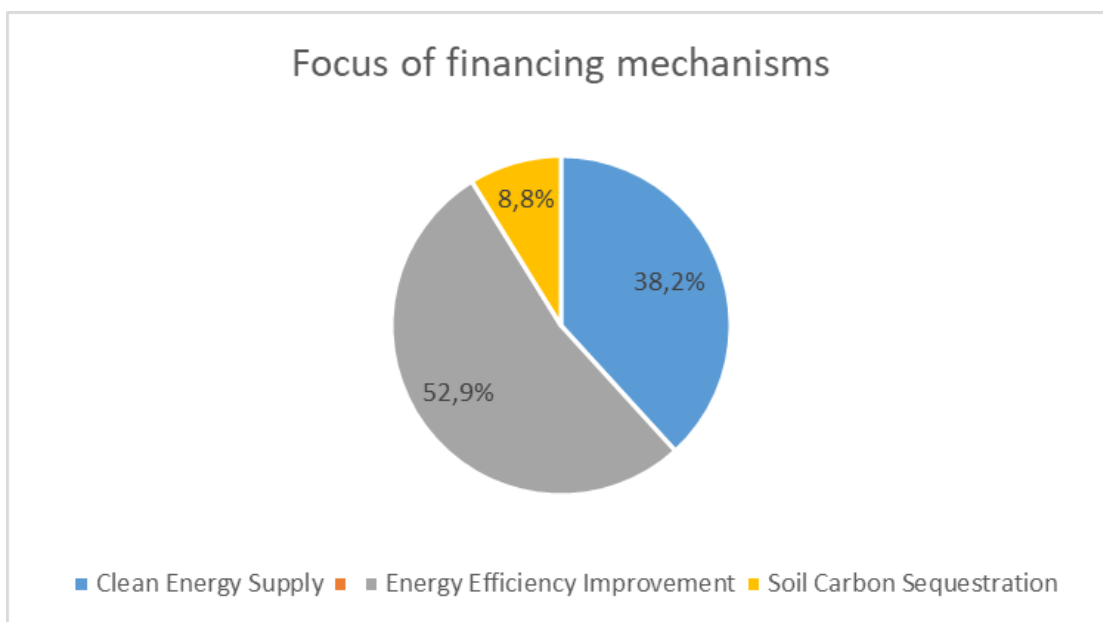


Figure 5. Classification of identified financing mechanisms according the target effort area

Regarding the financing mechanisms on energy efficiency improvement by analysing the results it can be seen that 7 financing mechanisms are dedicated to efficient buildings (such as efficient lighting, building wall insulations, roof and cellar insulations and windows). There are 6 financing mechanisms on efficient tools such as irrigation (pumps, drip systems), conveyors, milking machines, refrigerators, feeding and other mechanisms. Lastly, this category also include 3 precision farming financing tools (precision agriculture and livestock farming).

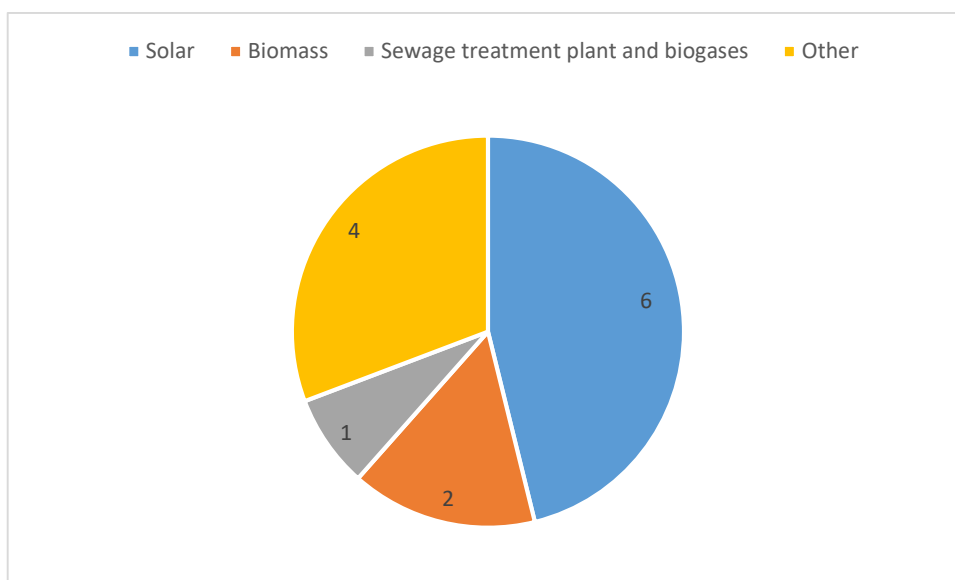


Figure 6. Classification of the identified financing mechanisms according to the Clean Energy Supply Sector breakdown

Regarding the clean energy supply sector between the 13 tools provided are presented in the above Figure. Following, 2 of them are about biomass as energy source, 1 about biogas and 4 under the label "Other" provide funding for all kinds of RES.

The last major which is Soil Carbon Sequestration consists of 3 financing mechanisms, with 2 being about tillage methodologies (Conservation agriculture and Control Traffic Farming tools) and the remaining 1 solution is about soil organic matter.

Currently there are 12 uncategorized FEFTS, but they will be screened by the Quality Committee and categorized appropriately, and they will be included in the analysis of the updated version of this deliverable (D2.15). As it is already stated the abovementioned analysis does not include those 12 uncategorized entries. There is a need to point out that it was expected to collect many uncategorized financing tools about FEFTS, as it is usual for such kind of mechanisms to cover a wide variety of agricultural domains (open field, livestock, and greenhouse) and different applications. In the same context, it is quite often to come across financing mechanisms related to multiple RES types and technologies.

The identified FEFTS were classified into three categories depending on their application field within the supported activities. A multiple choice of categories was possible in this case.

The majority of the financing mechanisms covered all application fields (79.5%), but in some cases they were only targeting 1 or 2 of the applications fields. A percentage of 11.4% of the financing mechanisms were only targeting the category open field agriculture, and overall the largest group were dedicated to open field agricultural activities (95.5%), while the number of FEFTS devoted to livestock farm or greenhouses was slightly lower (88.6 and 81.8 % respectively). Results are shown in figure 6.

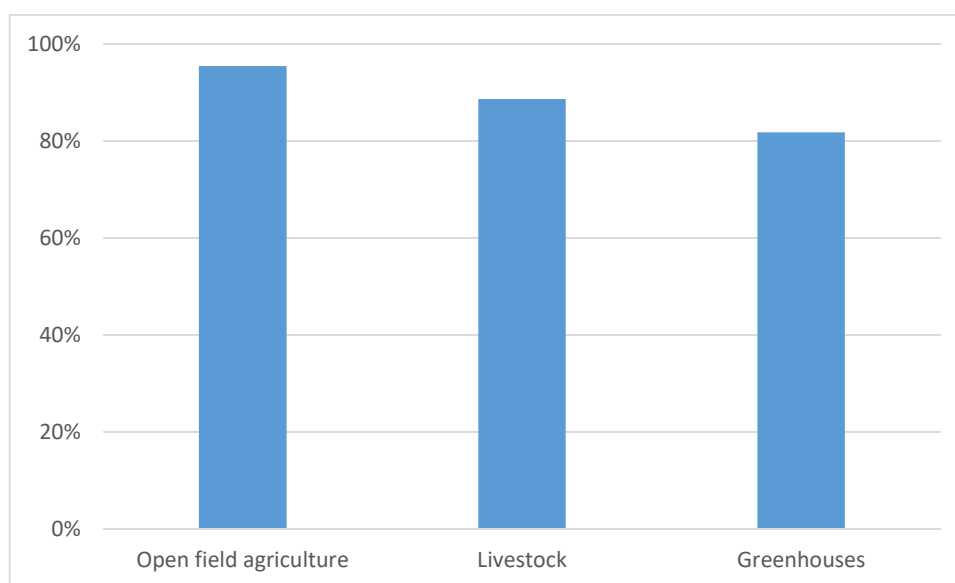


Figure 7. Classification of identified FEFTS according to application field

There are differences in the structure of the individual support schemes. In some cases, support is provided for both equipment, materials, facilities, employees, consulting etc. while others are more specific (e.g. only provides equipment support). An overview of what the identified FEFTS are offering is shown in Figure 7. The column marked "Other" comprises a total of 8 FEFTS and the kind of the given support is for example, tax reduction, price reduction, guaranteed minimum price etc. The aforementioned examples are mainly referring to photovoltaic installations and especially net-metering. Moreover, in 4 of the financing schemes the support is given in terms of economic incentives for the produced energy (such

as guaranteed price, tax reduction, price surcharge etc). In 3 schemes, support is given to establishment and operation costs (financing, low-interest loans, or leasing) and at least there is 1 financing mechanism for consulting services.

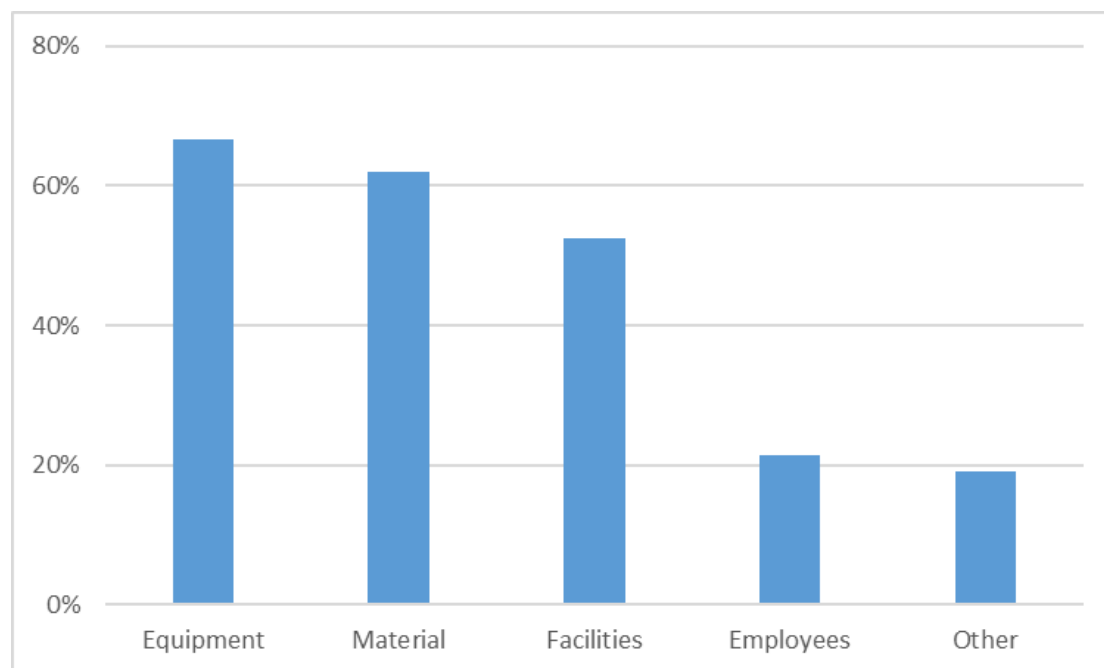


Figure 8. Classification of the financing mechanisms according to what are the offerings of the mechanism

The budget for the individual financing mechanisms is very different as they involve widely differing FEFTS ranging from smaller national support schemes to the major EU programs. The budget frame varies from 5,000 euros up to 95 billion euros and this is something quite expected. The reason for this is that some of the registered financing mechanisms refer to the amount of support that an individual stakeholder (farmer, energy producer etc.) could benefit while some others are complete funding national or EU strategies (a state derived fund targeting/promoting specific agricultural activities).

4. Conclusions

There is a wide variety of national and European funding mechanisms to promote a fossil energy free EU agriculture. So far, 10 FEFTS have been identified at European level and 36 are national schemes.

The majority of the financing mechanisms offer possibilities for support to various groups of users. Overall the largest group constitute farmers (84.4%) but there are also financing mechanisms that target producers associations, energy generators, contractors, advisory services, policy makers, companies, industry and universities.

Most of the financing mechanisms offer possibilities for applying for multiple agricultural applications, but there are also some of them that target to more specific applications like

agricultural field practices (tilling/ploughing, planting/seeding, fertilizing, pest control (crop protection), irrigation, harvesting, etc.).

Last but not least, as it is commonly stated in all WP2 Deliverables (D.2.2, D.2.5, D.2.8, D.2.11), the consortium worked as a unified partnership with all beneficiaries contributing with their maximum effort. We achieved 46 registered financing mechanisms out of 48 that was our target set on our project's 2nd plenary meeting on May 25th 2021, thanks to teamwork and the overall diverse contribution. Given the KPI of 1700 FEFTS (of any type) for our repository until the end of the project, both the initial goals that had been set and the vivid reaction of all partners, led to the collection of more than the half FEFTS in total. Also, two update reports showing the progress achieved will be created (M24 and M36).

Annex

In this section the material used for the registration is provided in order to support what has been described in the above chapters.

Annex 1: Financing mechanisms retrieved from survey

The following link is the online spreadsheet which contains all the financing mechanisms retrieved from the survey until the 24th of September.

[https://docs.google.com/spreadsheets/d/12QdJ9odzbcXzNKPxozWLo4Bz_Hln3P_cbyqyzg9TYUw/edit#gid=577148393'](https://docs.google.com/spreadsheets/d/12QdJ9odzbcXzNKPxozWLo4Bz_Hln3P_cbyqyzg9TYUw/edit#gid=577148393)

Annex 2: Financing Mechanisms Survey

The following link is the online survey that was used to submit all the categories of identified FEFTS.

<https://docs.google.com/forms/d/e/1FAIpQLSfMpFweapaUYlkquzbm6PUHEBzH0QjGetQop0jD2TJDEV1OPA/viewform>