ALFA

UNLOCKING THE BIOGAS POTENTIAL OF LIVESTOCK FARMING

D2.3

ALFA support tools – Initial Version

FBCD

31 / 10 / 2023

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DISSEMINATION LEVEL

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SEN	Sensitive, limited under the conditions of the Grant Agreement	
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DOCUMENT HISTORY

VERSION	DATE	CHANGES	RESPONSIBLE PARTNER
v0.1	28/08/2023	Start	Michael Støckler, FBCD
v0.2	12/10/2023	Addition of digital presence of HUB, Biogas Cases, Biogas Forum and Knowledge Center along with additional details of Engagement Platform.	Q-PLAN (Kalaouzi A., Efraimidis G., Tsogas G.)
v0.3	26/10/2023	Internal Quality Review	SIE, CERTH
v0.4	27/10/2023	Review by the project coordinator	Q-PLAN
v1.0	31/10/2023	Final version submitted to the EC	Q-PLAN

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ABBREVIATIONS

AD	Anaerobic Digestion
CNG	Compressed Natural Gas
CHP	Combined Heat and Power (cogeneration)
DST	Decision Support Tool
GA	Grant Agreement
GHG	Greehouse Gas
GDP	Growth Domestic Product
RED II	Renewable Energy Directive
RES	Renewable Energy Source

Executive Summary

ALFA's main objective is to tap the potential of biogas production from livestock farming, enhance the wider uptake of RES and increase the share of bioenergy as a baseload energy source, while ensuring reduced emissions from untreated animals' waste and supporting the creation of new jobs and revenue for the livestock farming industry. During its three years, the project will support at least 50 livestock farmers in 6 EU countries (IT, DK, BE, SK, EL, ES) to overcome existing barriers and viably take up biogas solutions whilst providing a more informed basis for policymakers and stakeholders by unveiling biogas market dynamics. ALFA Support Tools will be created to provide actionable knowledge and science-based information to livestock farming for the potential of biogas and fruitful environment for ideas exchange, networking and collaboration. While ALFA will raise the awareness of the general public on misperceptions about biogas and bioenergy.

This document titled ***D2.3 ALFA support tools – Initial Version***, has been elaborated as a deliverable (type Other: websites, patents, filling, etc.) of the ALFA project and provides a comprehensive account of the planning, design, development, and implementation of the ALFA Engagement Platform describing the approach followed for the development of the ALFA Support Tools as part of it. The ALFA Engagement Platform serves as an online platform to provide a fruitful environment for hosting the ALFA Support Tools for smooth uptake of biogas solutions in livestock farming. This note describes the initial work that has been done in connection with making the preliminary version of the ALFA tools and what must happen in the coming period in order ALFA tools to be kept updated.

The operation and management of ALFA Tools in cooperation with the operation of ALFA Engagement Platform process are part of Task 2.3: Design and development of the ALFA Tools, which is led by FBCD and runs up to M31 (May 2025) and Task 2.1: Development and Operation of the ALFA Engagement Platform and Hubs, which is led by Q-PLAN, which runs up to M36 (October 2025). The preliminary and simple version of the ALFA tools are available online through the ALFA Engagement Platform (www.alfaep.eu) since **August 2023 (M10**) and will be continuously improved and updated.

A main component of the ALFA tools in the project, is the online **Decision Support Tool** (DST), being created to help farmers decide whether it might be an opportunity for them to establish a biogas plant or participate in the deliveries for one. Furthermore, the ALFA Engagement Platform hosts a repository of interested **Biogas Cases (Atlas Map)**, providing in a form of an illustrated map success stories that serve as inspiration and catalysts for collaborative efforts and synergy development. Moreover, ALFA Engagement Platform hosts the **Biogas Forum**, an open environment, which serves as a nurturing ground for exchanging best practices, incubating innovative ideas, forging connections, and fuelling project activities. And finally, the **Knowledge Center** which acts as a store of valuable and interesting data and tools, aiding in the mainstreaming of biogas solutions and supporting informed decision-making.

A significant part of the upcoming effort will be to incorporate country-specific information on a number of conditions for the participating partner countries, regarding the Decision Support Tool, and must be used in conjunction with the other tools developed in the project. For the rest ALFA Support Tools should be further enriched continuously with useful materials, as the ALFA Support Tools and the ALFA Engagement Platform are part of tasks that run during the whole course of the project.

The results of the next period and an updated report will be produced by the end of the project providing an updated description of its structure, content, participants, and activities (***D2.6 ALFA Support Tools – Final Version*** due on **M31 – May 2025**).

The ALFA Support Tools and the ALFA Engagement Platform have been crafted with a specific focus on meeting the needs of livestock and agriculture farmers who are keenly interested in the potential of biogas solutions. However, their impact extends far beyond the boundaries of a single industry, playing a pivotal role in shaping the digital landscape and driving progress in areas like informed decision-making, robust community engagement, and expansive knowledge sharing.

The ALFA Engagement Platform is not limited to one sector; it is a resource addressed to a diverse audience, including livestock and agriculture farmers, biogas experts, policymakers, and civil society. Its multifaceted nature is reflected in its essential components, each tailored to cater to the unique requirements of these different stakeholders. Overall, the ALFA Support Tools are not just another online tools; they represent a kick start in the journey toward advancing the biogas industry, fostering a sense of community, and empowering all stakeholders with the knowledge and tools necessary for a sustainable future.

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1. Introduction

Production of **biogas from livestock manure** can help to **reduce** greenhouse gas (**GHG**) emissions and support a more sustainable and circular bioenergy system. However, this potential is largely untapped mainly due to lack of awareness and support measures for market uptake.

ALFA aims to **increase** the use of **biogas** from **livestock farming** as a renewable energy source and reduce GHG emissions caused by the decomposition of animal waste. The project will **support** over **50 livestock farmers in adopting biogas solutions** and **provide information and tools** to **reduce investment risk and support financial frameworks**.

Moreover, ALFA intends to **raise awareness** of biogas and bioenergy among the general public and provide science-based information to livestock farming decision-makers. The project will be carried out in six representative European (EU) countries focusing on **overcoming barriers to biogas adoption**, such as limited awareness and inadequate financial frameworks. The ultimate goal is to enhance the wider uptake of renewable energy systems and increase the share of bioenergy as a baseload energy source.

By performing the intended actions, ALFA aims to reach the following goals:

- Analyse the state of play, identify regional differences, and investigate framework conditions to identify drivers and barriers to biogas adoption in the EU livestock farming industry;
- Co-create ALFA support measures which are replicable and effective in driving biogas adoption in the livestock farming industry in accordance with the identified needs and challenges;
- Develop a suite of ALFA Tools under the ALFA Engagement Platform, which facilitates collaborations and knowledge exchange among sectorial actors and provide credible estimation of biogas potential of farms;
- Deploy ALFA's biogas uptake support measures in real-world market conditions across European countries to facilitate the integration of renewable energy into their final energy consumption mix;
- Evaluate results and use evidence to communicate project results, provide policy recommendations, and promote mutual learning, and exploitation in order to scale the livestock biogas ecosystem across Europe.

In all respects, ALFA intends to improve understanding and social acceptance of biogas production facilities through a suite of educational material based on existing research findings, as well as to support livestock farmers and stakeholders in tackling barriers to the uptake of biogas systems and technology in the livestock farming industry. Additionally, ALFA will collaborate with relevant initiatives and provide tools to aid in the replication of its own project results, ensuring their long-term viability for supporting the uptake of circular bioeconomy practices.

Deliverable D2.3 ***ALFA support tools – Initial Version*** is describing the work undertaken within task T2.3 with design and development of ALFA Support Tools, which include:

1. The **Decision Support Tool** (DST) assisting the farmers to estimate the biogas potential of their farm for energy generation along with its translation into profitability and benefits (environmental and social), tapping into existing tools.
2. The **Biogas Cases (Atlas Map)**, an interactive map dynamic map showcasing biogas facilities and highlighting exemplary instances of livestock farms using biogas.

3. The **Biogas Forum**, a fruitful environment for knowledge exchange, good practices, making connections and promoting networking.
4. The **Knowledge Center** aggregating the different types of knowledge produced by this project (i.e., WP1 Reports), webinars and training material, policy recommendations generated by the ALFA project, and other data and tools for mainstreaming biogas from other EU projects and/or other sources, compromising a rich repository.

This document encompasses the platform's key components, technical intricacies, user experience considerations, security measures, and knowledge sharing. With a clear outline of the project's journey, this deliverable aims to highlight the platform's potential to transform the biogas industry and foster a sense of community among its stakeholders.

In more details this report compromised of the following sections:

- The **introduction** establishes and communicates the main role and purpose of ALFA Support Tools within ALFA Engagement Platform and its components within the ALFA project and within the wider context of establishing networks of bioenergy communities and value chain actors. Finally, it briefly describes the various sections of the report.
- **Section 2** describes the **overview** of the ALFA Engagement Platform both as web platform and a liaison and network structure including objectives pertaining to the platform operation and management, details for the design and implementation phase, security components, as well as the landing page.
- **Section 3** presents the **ALFA Support Tools** as part of ALFA Engagement Platform. It concisely accounts for all the basic components operating within ALFA Support Tools and under the ALFA Engagement Platform that were developed when the platform appeared officially online in August 2023.
- **Section 4** highlights the **promotion strategy** and future plans.
- **Conclusions - Next steps** summarizes **future plans** with respect to the online activities of ALFA Engagement Platform in the next period of the ALFA project and beyond.

Last but not least, the Annexes of this report include the: The **ALFA Engagement Platform Cookies and Privacy Policy** (Annex I); and the **Online Registration Process** in Biogas Forum (step by step process (Annex II).

2. Overview of ALFA Support Tools as part of ALFA Engagement Platform

2.1 Objectives

The EU aims to achieve net-zero greenhouse gas emissions by 2050. The management of agricultural and livestock waste, producing biogas as a renewable fuel can improve environmental sustainability, and contributes to carbon-neutral combustion in the EU[1]. The European biogas sector's shift from an energy crop-based, subsidy-reliant model to one focused on organic waste and agricultural by-products, biomethane production, and sustainability in response to ambitious greenhouse gas reduction targets in the "Green Deal." [2]

Under this framework, the Objective 2.3 of ALFA Project sets a suite of tools and services for the uptaking of biogas solutions in livestock sector. The **ALFA Support Tools** consist of the following parts and are hosted online on **ALFA Engagement Platform**:

- Decision Support Tool
- Biogas Cases Atlas Map
- Biogas Forum
- Knowledge Center

The ALFA tools will be continuously developed, updated and enriched in the coming period and a final version of the ALFA Support Tools will be described in Deliverable D2.6.The ALFA Engagement Platform and ALFA Support Tools targets a **diverse audience**, each benefiting in distinct ways, with the ultimate goal of supporting the European Union's commitment to achieving net-zero greenhouse gas emissions by 2050. **Livestock and agriculture farmers** stand to gain through the platform's decision support tools, aiding them in implementing biogas solutions tailored to their farms. **Biogas experts** find a collaborative space within the Biogas Forum to exchange best practices and innovative ideas, contributing to the growth of the biogas sector. **Policymakers** benefit from valuable insights and data, enabling informed decisions for sustainable agriculture and greenhouse gas reduction in line with the EU's "Green Deal". **Civil society** benefits from a Knowledge Center filled with information, nurturing awareness and informed choices. The platform's aim is to **facilitate a transition** within the European **biogas sector**, shifting from energy crop reliance to organic waste and biomethane production, aligning with the EU's ambitious carbon-neutral combustion targets and advancing environmental sustainability, thereby accelerating progress towards the 2050 net-zero greenhouse gas emissions objective.

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[1] Cornelis Bumharter, David Bolonio, Isabel Amez, María Jesús García Martínez, Marcelo F. Ortega, New opportunities for the European Biogas industry: A review on current installation development, production potentials and yield improvements for manure and agricultural waste mixtures, Journal of Cleaner Production, Volume 388,2023,135867,ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2023.135867.

[2] Ulysse Brémond, Aude Bertrandias, Jean-Philippe Steyer, Nicolas Bernet, Hélène Carrere, A vision of European biogas sector development towards 2030: Trends and challenges, Journal of Cleaner Production, Volume 287, 2021, 125065, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2020.125065.

2.2 Design and Implementation phase

The ALFA Engagement Platform is **publicly available** at **www.alfaep.eu** since M10 of the project (**August 2023**) and was designed to the graphical identity of the project website and overall the project graphical identity as it was developed during the early stages of the project, in order to enhance the feeling of uniformity and seamless browsing experience among the ALFA Engagement Platform and the project website (available at https://alfa-res.eu/). It is designed and developed to be **accessible** from desktops, laptops, tablet and mobiles, and all operation systems (e.g., Android and iOS). Some sections of the platform include **multilingual capabilities** to overcome possible language barriers.

The main work for the development of the ALFA Engagement Platform with the ALFA Support Tools focused on two main axes: (i) **front-end design** and (ii) **back-end design**. The front-end and back-end development progressed in parallel, culminating in the main integration effort during the final weeks of the hard launch. The main steps followed for the front-end and back-end integration of the ALFA Support Tools into the ALFA Engagement Platform are illustrated in the following figure along with the dependencies among activities.

The **front-end design** of the toolbox focused on the development of the ALFA Engagement Platform **user interface and user experience** (UI / UX). The User Interfaces were designed starting from wireframing, moving to the pre-design and implementation / prototyping phase. The basic pages about the ALFA Engagement Platform were designed and developed including the **landing page, ALFA Support Tools pages, interactive capabilities (e.g., filtration), login / registration and contact** form among other, along with the sitemap of the ALFA Engagement Platform. This was done in parallel with the definition of the main structure of the ALFA Engagement Platform (a more detailed presentation is provided in Chapter 4). **All the ALFA partners** supported in the design and layout of the tool pages, either with **feedback** and ideas for efficient user – friendly experience or **feeding with useful material** the Biogas Library (part of the Knowledge Center) and with needed **translations**, where needed. For that reason, a template shared with ALFA HUBS, to collect information for the Hub Manager, their organisations, and countries, along with the needed translation. Finally, the **integration of translated versions** of the content of AFA Support Tools interfaces was completed. Chapter 4 of the present report is dedicated to the detailed presentation of the ALFA Support Tools front-end design. A **second round of improvement** was completed, incorporating comments and feedback of all partners. All the above drove to the hard launch of the ALFA Engagement Platform on time, in M10 (August 2023) following the ALFA Grant Agreement (GA).

The **back-end design** of the ALFA Platform and ALFA Support Tools plays a central and intricate role within this digital infrastructure. It serves as the **technical framework** that underpins the user-friendly interface, managing data, storage, retrieval, and overall platform functionality. This back-end architecture is purpose-built to handle complex decision support algorithms, intricate database management, and rigorous security protocols for user data protection. Essentially, it acts as the engine that powers the platform, efficiently processing information, managing user interactions, and facilitating the dynamic content delivery of the Knowledge Center and Biogas Library. This intricately designed back-end structure provides a robust foundation for this digital ecosystem, ensuring reliability, scalability, and a seamless user experience. Consequently, it ensures that the ALFA Platform and Support Tools operate with **maximum efficiency** and maintain consistent resource availability for ALFA Engagement Platform diverse user base.

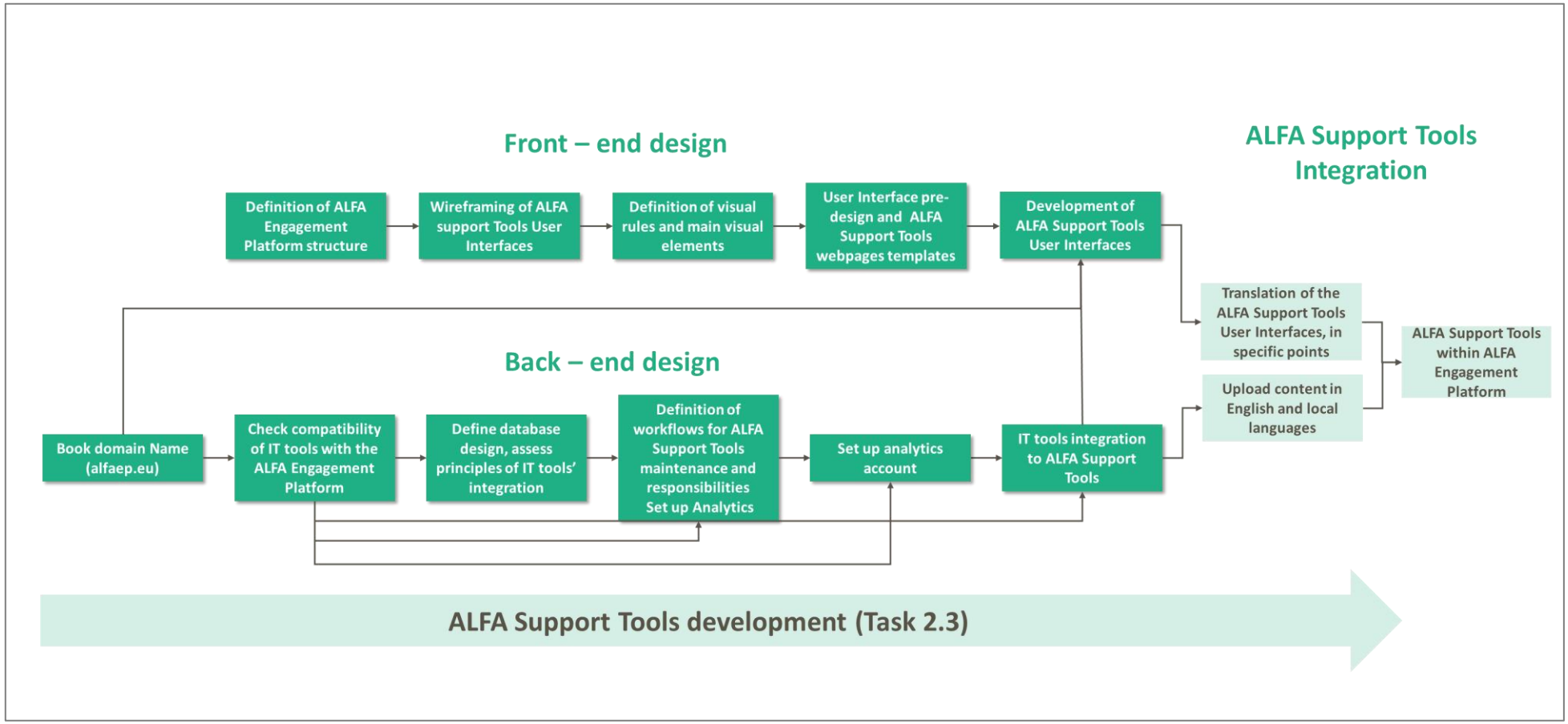

Figure 1. ALFA Engagement Platform with ALFA Support Services workflow and dependencies

2.3 Data Security and Privacy

Access to the ALFA Support Tools, integral components of the ALFA Engagement Platform, is designed to be user-friendly and **open accessible**. Most notably, these tools are available **free of charge** without requiring prior registration. However, it is important to note that while all users can **freely view** the content in the **Biogas Forum, registering is necessary** for those who wish to engage in discussions and provide comments, ensuring a secure and constructive environment for community interactions.

A **Cookies disclaimer** and **Privacy Policy** is embedded to the ALFA Engagement Platform. The latest and detailed version of the ALFA Privacy Policy can be found at the latest Data Management Plan (DMP) – by the time of reporting this (M3) they would be D6.2 ***Data Management Plan – Initial Version*** and in the project's website.

This privacy and cookies policy describes, in accordance with the EU General Data Protection Regulation 2019/679, how and when ALFA, a project funded by the EU Horizon Europe research and innovation programme under the number 101075659, collects, uses and shares ALFA Engagement Platform visitors' and users' information.

2.4 Home and Layout

The ALFA Engagement Platform has been crafted to provide a **user-friendly layout** that adapts seamlessly to **various devices**, ensuring effortless navigation throughout its **multifaceted components**. This responsive design, illustrated in the following figure, establishes a harmonious user experience.

The **header section** serves as the platform's welcoming gateway, prominently featuring the project's **logo**, which aligns with the **project's visual identity**. It is complemented by the **main navigation menu**, offering swift access to the diverse components and resources of the platform. This streamlined approach enhances user efficiency in exploring the platform's offerings.

Within the main content area, users encounter concise **descriptions** of each component (**ALFA Support Tools**), supported by intuitive elements such as buttons and icons that facilitate direct access to the corresponding ALFA Support Tools. This user-centric approach aims to simplify the journey to relevant resources and maximize engagement.

The **footer**, a comprehensive destination in itself, features an array of resources. Users have the opportunity to subscribe to the ALFA project's **newsletter**, ensuring they stay updated on the latest developments and insights. **Social media** links to the ALFA project's profiles provide avenues for deeper engagement and community involvement. Additionally, a direct link to the **Privacy Policy and cookies** section underscores the commitment to data protection and transparency. It is also important to note that the footer contains vital information regarding the **project's funding**, highlighting the support received from the European Union's Horizon Europe framework.

To further enhance user awareness and compliance with project's **privacy and cookies policies, a user-friendly pop-up window** has been incorporated. This window, displayed upon the user's first visit to the ALFA Engagement Platform, guides them through the Privacy Policy and cookies information, ensuring informed and secure browsing.

Lastly, in order to streamline the **newsletter integration**, Q-PLAN has actively sought the necessary API key from the Dissemination manager, successfully embedding it within the footer, further enhancing the user experience and their ability to stay connected with the project's updates and activities.

Figure 2. ALFA Engagement Platform Home Page I

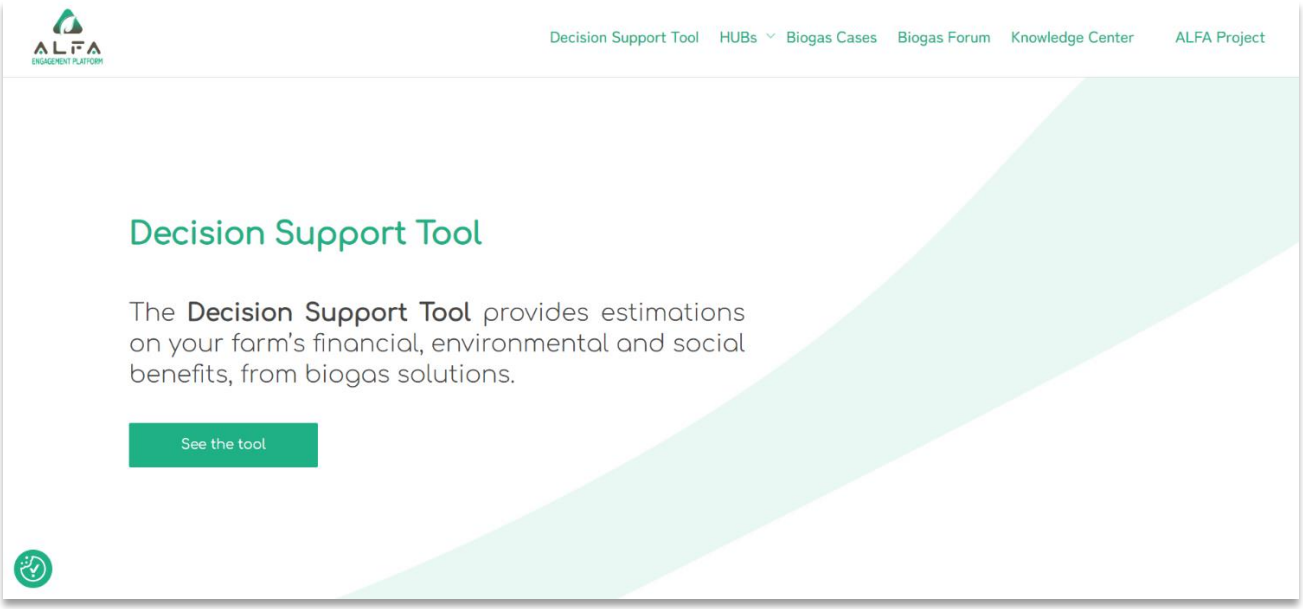

Figure 3. ALFA Engagement Platform Home Page II

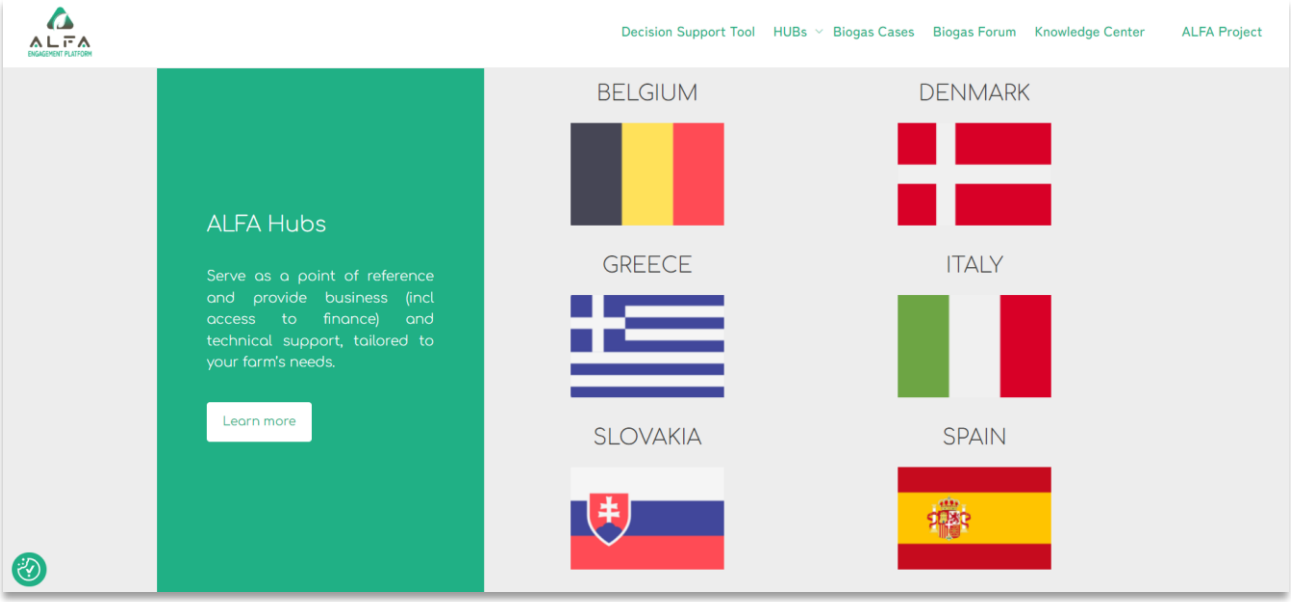

Figure 4. ALFA Engagement Platform Home Page III

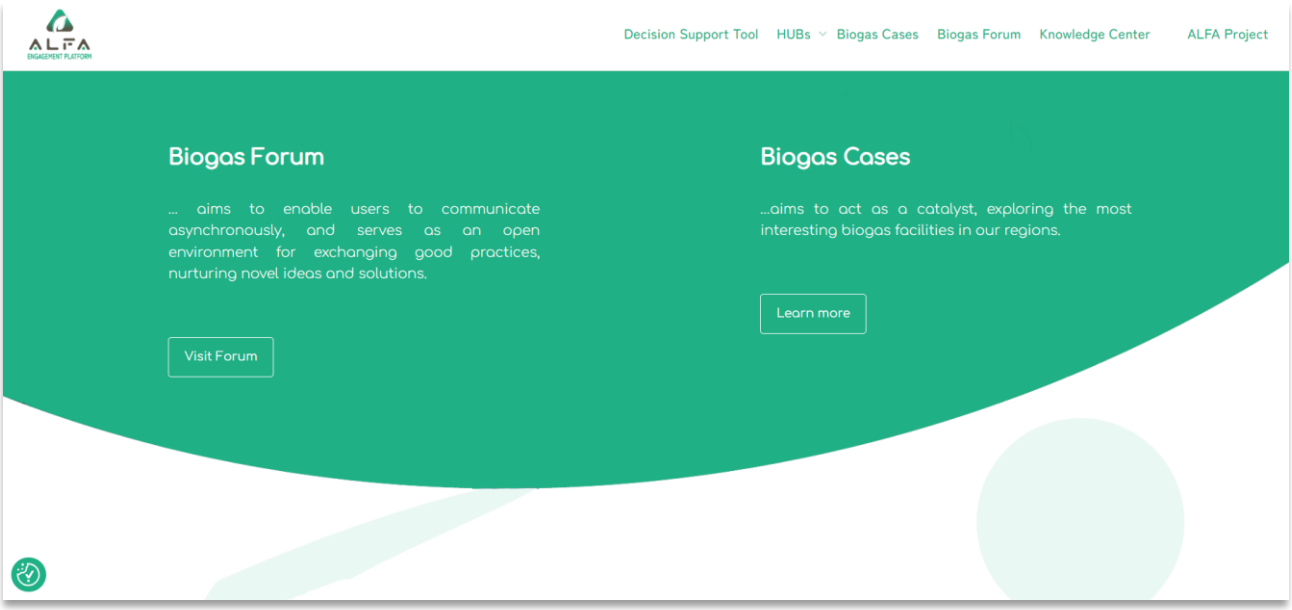

Figure 5. ALFA Engagement Platform Home Page IV

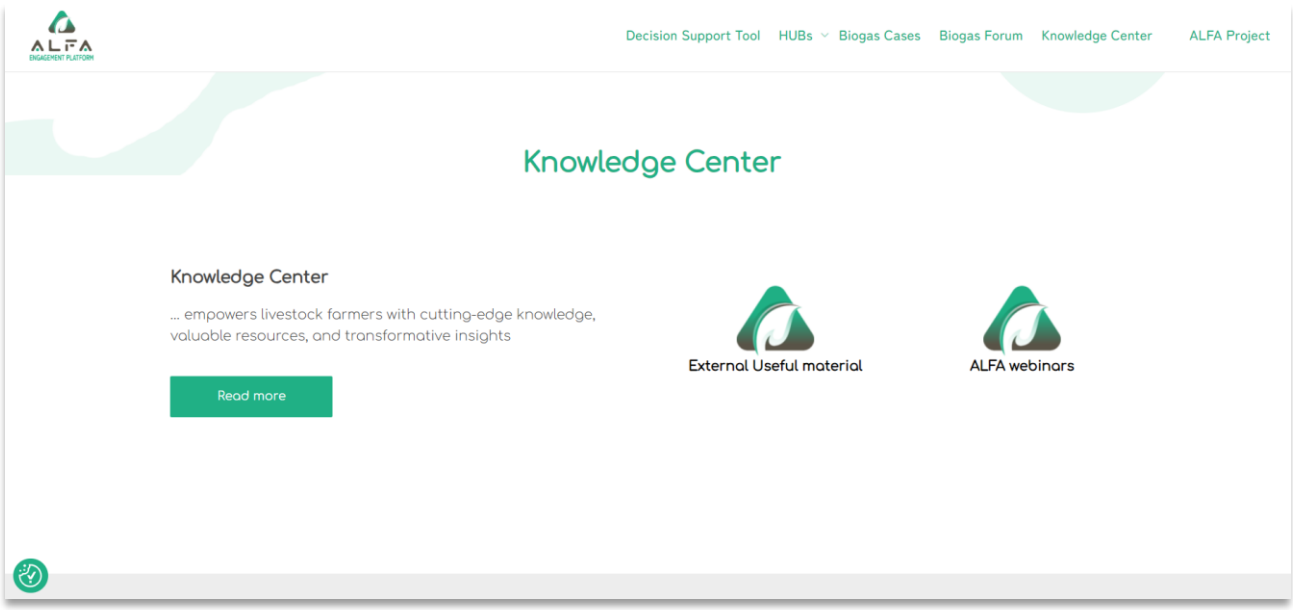

Figure 6. ALFA Engagement Platform Home Page V

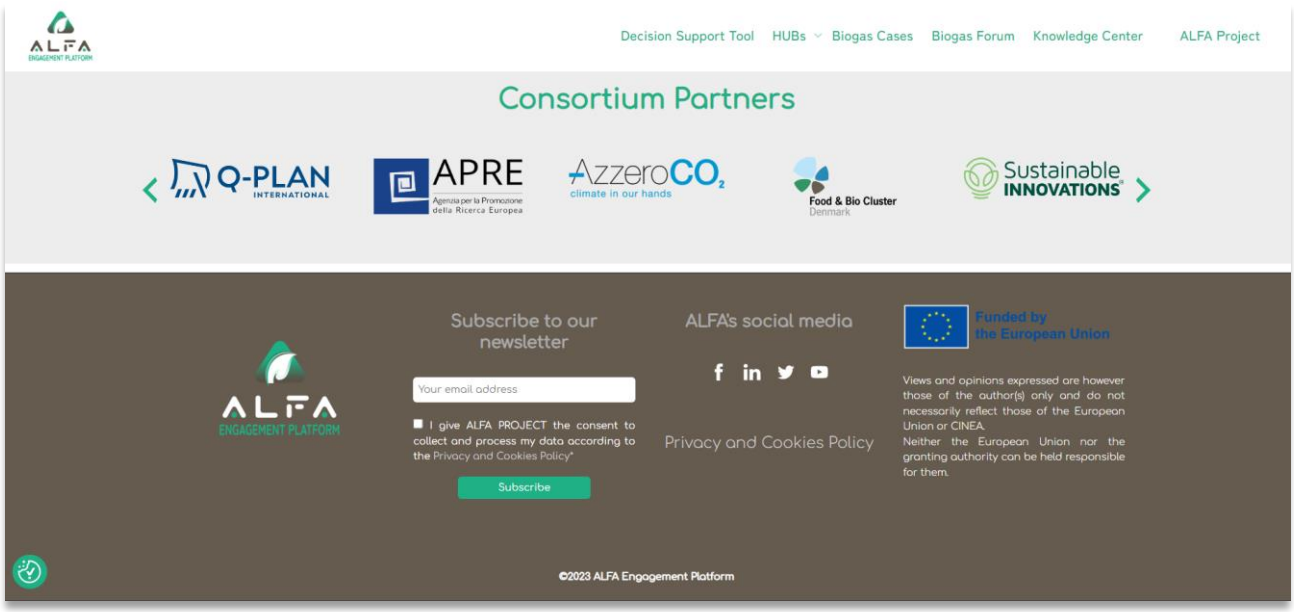

Figure 7. ALFA Engagement Platform Home Page VI

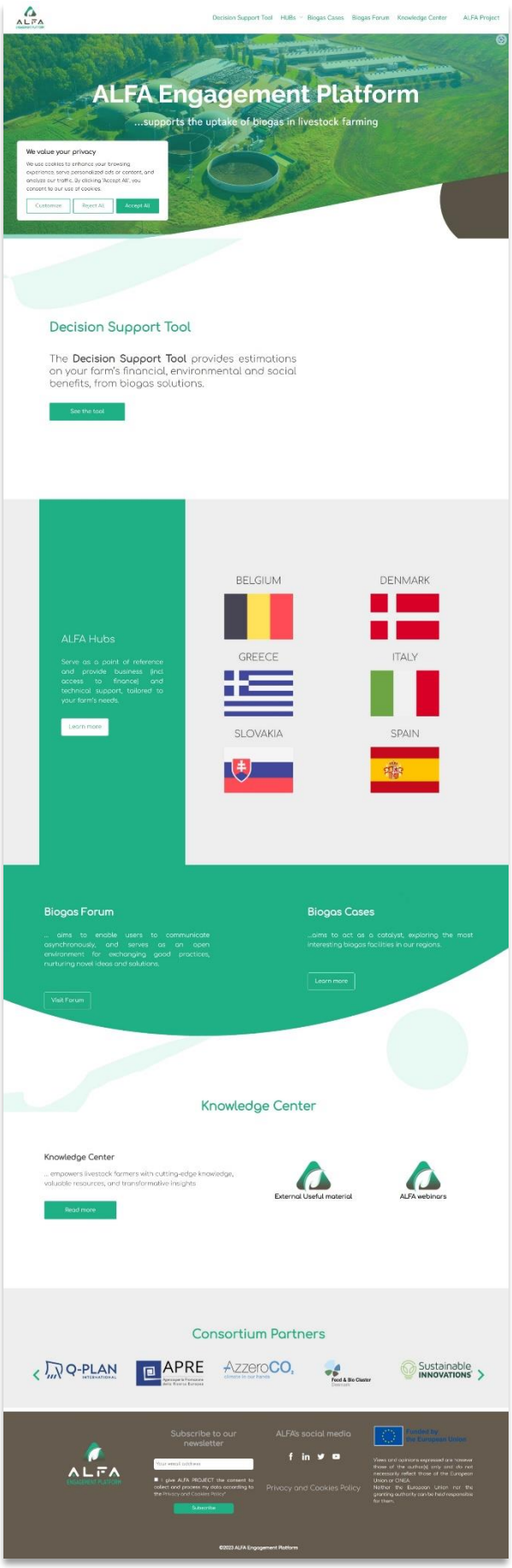

Figure 8. ALFA Engagement Platform - Home page Overall

3. ALFA Support Tools

3.1 Decision Support Tool (DST)

3.1.1 *Preliminary Version*

The preliminary version of the Decision Support Tool can be found directly at this link or accessed from the ALFA platform. This is a preliminary version of the calculation program for biogas production. The program is under development and will be continuously updated, and some of the scheduled updates are described in subsequent sections.

In this preliminary version, it is necessary that you know about the biomasses that are available for biogas production so that an expected biogas production can be calculated.

Additional facilities will be added to the program subsequently. In the model that is being developed, it will be possible to choose whether you want to enter information about the biomass that is available or whether you want to enter some information about the number of different animals that are on the farm and what is available from production in general.

Information about the company and the farmer is not necessary for the actual calculation in this preliminary version, but these are used in the event that ALFA partners want to contact that person for possible support.

All the received data are secured and in compliance with the projects' data security policy.

Farm description.

In this section, we would like to have basic information about the farm so that we can form an impression of it.

A holding can consist of several farms. If the holding consists of more than one farm, we would like to know how big these are and how far apart they are. This may have implications for later calculations of costs for transport and logistics.

Under "Type and number of animals", several different ones can be selected. These will be used in a later version to estimate the quantities of livestock manure that these give rise to, depending on which country you are in.

Information about the area, water consumption, electricity and heat consumption will in later version be used to assess whether it is appropriate to establish biogas production for the farm.

If there are existing biogas plants nearby or the possibility of connecting to another outlet for the biogas, this is important to know.

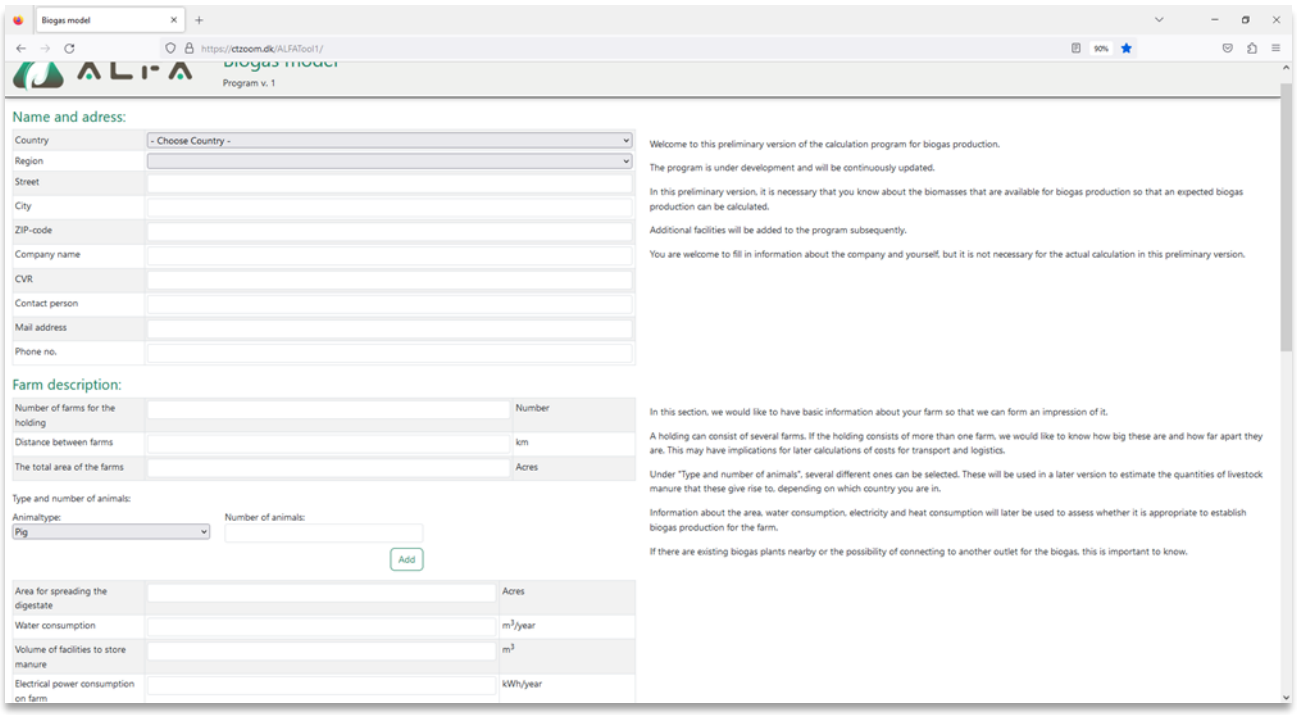

Figure 9 Overview of information about the specific farm

Biomass

In this section, it is specified which biomasses are available for biogas production.

It is important to choose these biomasses, as it is these choices which (in the first version of the program) are the calculation basis for the biogas production. The option to instead enter information about the farm's livestock and other production will be developed in future versions.

It is possible to choose between four different categories of biomass. When you have chosen the category, options appear in the box with biomass types.

When you have chosen a biomass type, some default values for the dry matter content and for the organic part of the dry matter appear in the boxes below. If you have more precise information for the biomass in question, you can enter these instead of the default values.

You have to select all the biomasses that are available and add them one at a time.

The program adds all the biomasses together and calculates the expected gas production based on these.

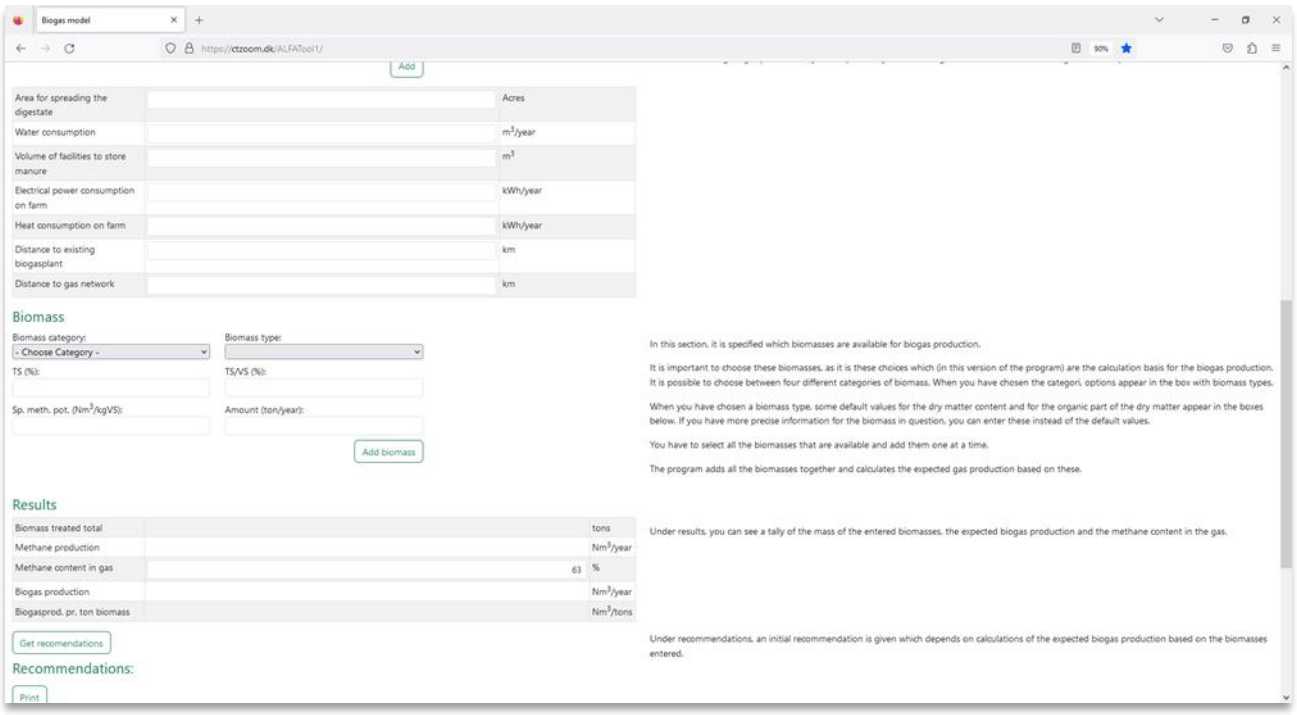

Figure 10 Section for entering information about the available biomasses

Results.

Under results, you can see a summation of the mass of the entered biomasses, the expected biogas production and the methane content in the gas. The expected biogas production at a given location is calculated based on the information provided regarding the available biomasses.

Based on the estimated biogas production, it is calculated how large a production of electricity and heat can be expected under the given conditions. The result of the calculations is displayed online, and it is also possible to print out a note about the preliminary results directly from the online tool.

Recommendations

Under recommendations, an initial recommendation is given which depends on calculations of the expected biogas production based on the biomasses entered. As a standard part, it is recommended that, after the calculation, the user of the tool contacts one of the national hubs in ALFA for expert help.

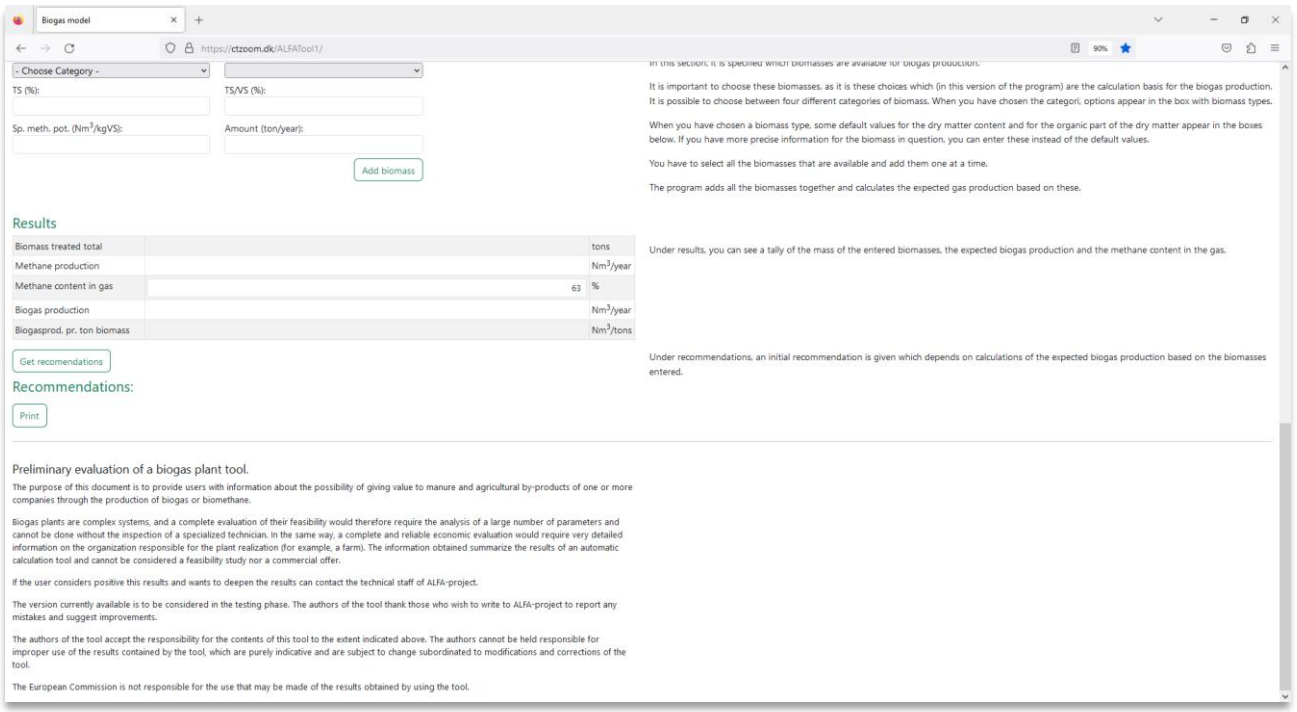

Figure 11 Finally, the recommendations can be viewed and printed as a file.

3.1.2 *Development of DST*

In order to achieve more precise estimates and better calculations, it is necessary that the tool be made specific for each of the participating countries. There are very large differences in the conditions in the participating countries both with regard to the structural conditions, available types of biomass, framework conditions, economic conditions and more.

In the first version, no financial calculations have been made as these require a range of information on national conditions. All this information must be inserted in subsequent versions.

In order to adapt the tool to the individual countries, it is necessary for the partners from the participating countries to fill in information specific to their country. It is necessary to include information on construction and operating costs that are expected for the individual countries.

In the initial version there is a draft of how information on establishment costs from the individual countries can be collected. Correspondingly, a country-specific estimate must be made of operating costs and income when establishing the various sizes of facilities. A draft for this has been made and is under development.

3.1.3 *Biomass and biogas calculations*

In the preliminary version it is possible to choose between

- Livestock
- Crops
- Residual products
- Industrial products

And for each of the categories to choose between several types of biomass. After selecting all the biomasses that are available in the case at hand, the expected biogas yield is calculated based on the standard figures for the biomasses in question.

In the future expansion of the tool, it is necessary to add a number of biomass products that may be relevant for the participating countries specifically.

In addition, work is being done to ensure that in future versions an option is given to choose another option to indicate the amount of biomass that is available. This is done by making it possible to enter how many animals you have of different kinds, and then use standard values for how much manure they produce etc.

In the calculation of the biogas production, it is possible to update the standard values used if the user has concrete and more accurate information about the available biomasses and their biogas potential. The standard values are taken from various national articles and models and may vary from country to country.

3.1.4 *Estimation of construction costs*

In order to provide advice on the possible establishment or participation in biogas production, it is necessary to provide financial estimates of what it will cost to establish facilities of the relevant size for the user in question.

There is a very large difference in the establishment prices between the participating countries, which is why it is necessary to introduce country-specific information for all the participating parties.

A common template for entering this information is created and transferred to the online version after completion.

3.1.5 *Estimation of operating costs*

In order to give advice on the profitability of establishing a biogas production or participating in a biogas production, it is necessary to provide estimates of what it will cost to operate facilities and what income can be expected for the user in question.

There is a very large difference between the operating costs and the possible income between the participating countries, which is why it is necessary to introduce country-specific information for all the participating parties.

A large number of these costs and income are highly variable, which is why it will be necessary to make some assumptions about e.g., average values. In Denmark, the price for buying and selling electricity fluctuates, for example, every hour and it is not possible to use anything other than average values in this context.

Furthermore, there may be differences in what support there may be for biogas production in the individual countries, including whether it is given for establishment or operation or both.

A common template for entering this information is created and transferred to the online version after completion.

Based on the estimates of the establishment costs, operating costs and possible income, an initial assessment is given of whether it is favourable to begin biogas production.

3.1.6 *Environmental consequences*

A significant part of the environmental consequences of the establishment of biogas production comes from the impact on the CO_2 accounts.

In order to be able to say something about the environmental consequences, it is necessary that a section is added which can help in making a CO_2 account for the proposed facilities. A note on how a Danish company has handled this is made but a simple version that all can use has to be developed.

A general description of the conditions for biogas production in Denmark and a note on calculations of CO_2 reduction in small CHP-based biogas plants has been made.

In addition to the impact on the CO_2 accounts, biogas production gives rise to consideration of other environmental effects, including emissions of nitrogen, leaching of nutrients and others. These conditions are described in general terms for the individual cases.

In the context of the ALFA services provided, the selected cases will be able to have an overview of their environmental impact through a Life Cycle Analysis (provided by CERTH).

3.1.7 *Social aspects*

It is a fact that the production and exploitation of biogas stimulates the local labour market, since it is produced decentrally and mainly outside of urban centres.

Although underrepresented, women play a pivotal role in the agricultural and livestock farming, accounting for 39.7% of the agricultural workforce in Greece in 2013. Notably, the young people in farming take up only 10.2% for men and 4.5% for women.

Regarding the social acceptance of biomass powerplants in Greece, the main bottleneck in such projects was the NIMBY (not in my backyard) phenomenon and the lack of knowledge, however 33% of people accepted the potential of a biomass power plant in their region. The feasibility of a biomass plant projected is influenced by knowledge and/or lack of knowledge. It is important to provide information to the neighbours of the plant to help demystify bad opinions that biogas is harmful to the environment.

The implementation of biogas plants represents a great advantage where biogas it is not only a new source of renewable energy, but it should also be seen as a crucial element of the farm: it allows to diversify revenues, to produce energy, to manage the flows of sewage and agricultural residues and to have soil improvers / fertilisers.

These conditions will be described in general terms for the individual cases.

3.2 Biogas Cases Atlas Map

The Biogas Cases component stands as an intricate and comprehensive in form of a **map repository (Atlas Map)**, encompassing a diverse array of active biogas facilities that span farms and utilize livestock residues as a primary feedstock, among other configurations. However, its significance extends beyond existing installations; it also opens its doors to potential biogas solutions, forming a rich repository that caters to registered cases spanning the entirety of Europe. This multifaceted resource has a dual function: it acts as an easily navigable directory for residents seeking information about biogas facilities in their proximity, while simultaneously serving as an inclusive directory where livestock farmers and biogas managers can come together to share insights and resources.

For each registered case, an **informative pinpoint** was developed, providing valuable insights into the unique attributes of each facility. **Key details**, such as geographic location, feedstock utilization, operational technology, rated power output, case type, installation year, and web links (when available), are thoughtfully presented, offering a holistic view of each case. Moreover, this information is complemented by visual documentation in the form of photos, providing a deeper understanding of each facility's setup and operation.

Within the Biogas Cases, users have at their disposal an array of **filters**, empowering them to pinpoint cases that align precisely with their requirements and interests. Furthermore, users are encouraged to contribute to the repository by **registering new cases**, thereby enriching the directory

with fresh insights and expanding its utility as a valuable resource. It is essential to acknowledge that newly registered cases undergo a meticulous validation process overseen by the ALFA Engagement Platform, a measure implemented to ensure the precision and credibility of the information presented.

A noteworthy aspect of this repository is its commitment to inclusivity. As of, for each case pined on the map, information is thoughtfully presented in both **English and local languages** for all 19 (up to the time of this report), an initiative that caters to a diverse and multilingual audience throughout Europe, ensuring accessibility and relevance for all.

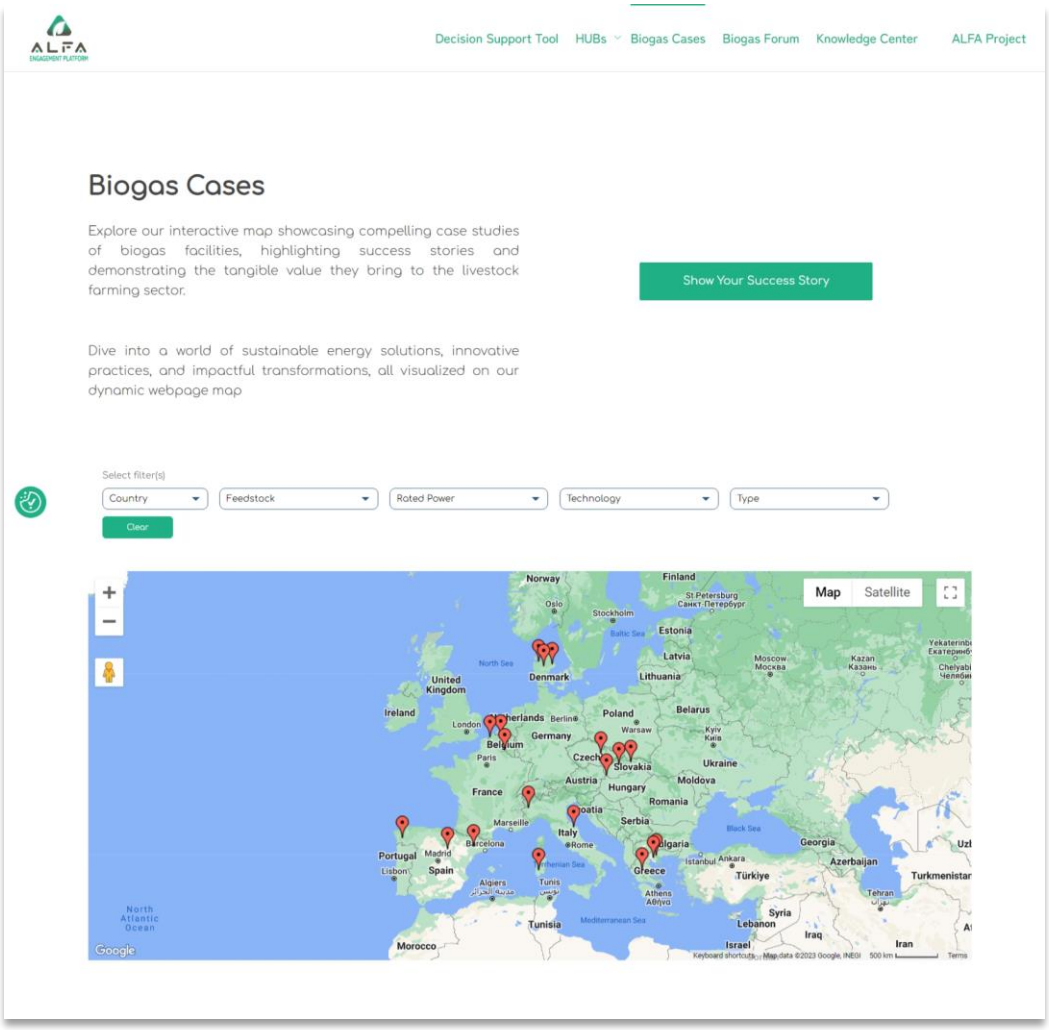

Figure 12. Biogas cases page

3.3 Biogas Forum

At the heart of suite of ALFA Support Tools lies the Biogas Forum, an organized and structured component designed to **foster rich discussions and knowledge sharing**. Operating within a hierarchical framework, the Biogas Forum is intuitively organized into **thematic groups**. This thoughtful organization either ensures that **discussions remain focused**, allowing forum members to engage in conversations that matter most to them, or allows knowledge exchange in **different languages**, tailored to the needs of stakeholders. Forum members are encouraged to participate actively in these discussions by **subscribing to the thematic groups** that align with their interests and expertise. This streamlined approach enhances user engagement and ensures that members

can connect with like-minded peers and experts in their fields of interest. The figure below presents and overview of the Biogas Forum.

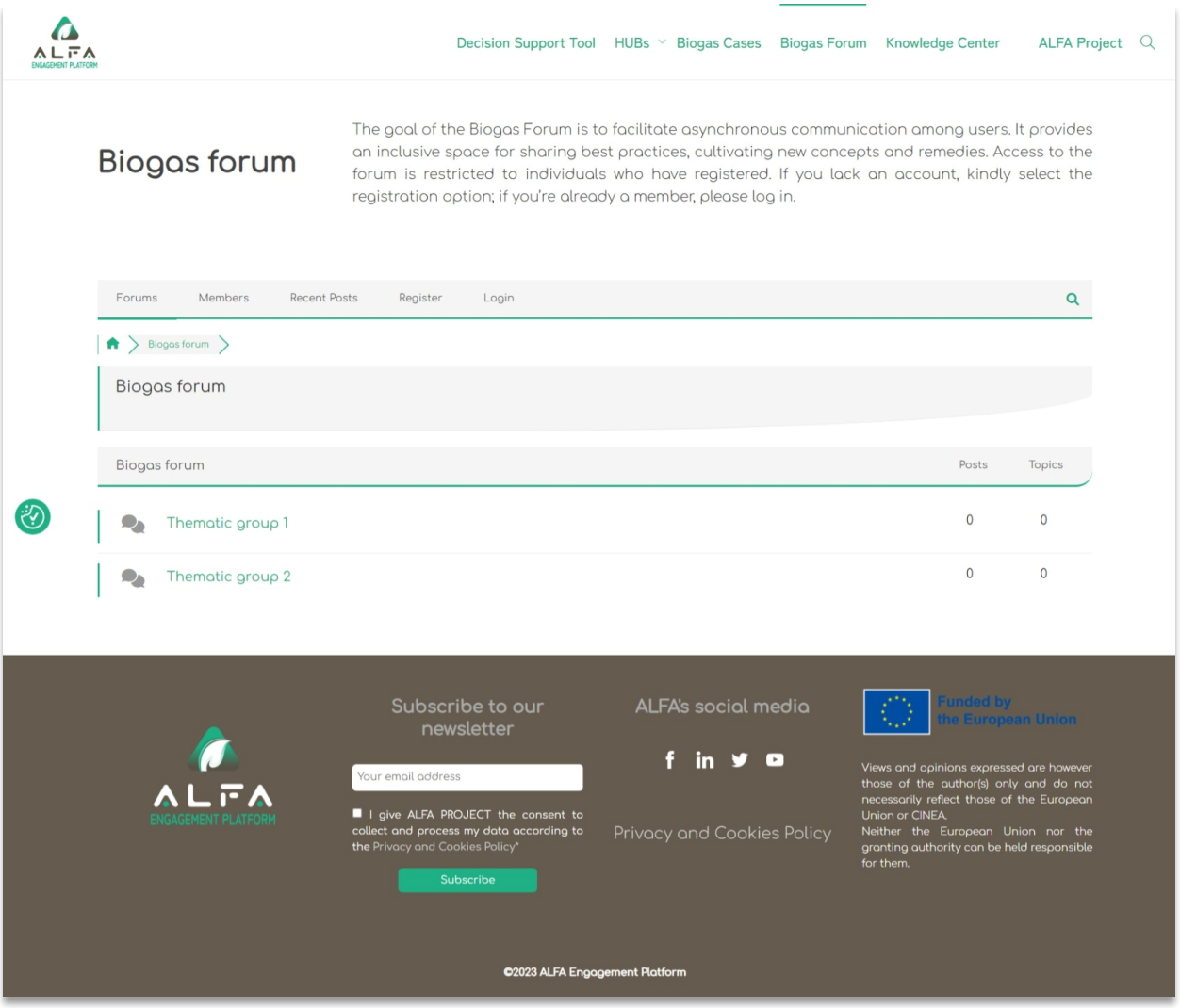

Figure 13. Biogas Forum page

Only **registered members** are granted the privilege to **create and reply to** these invaluable conversations, fostering an environment that prioritizes meaningful and informed exchanges. Nevertheless, it is **open to view without registration** to all users. For those who are interested in joining these enriching conversations but are unsure about the registration process, detailed information is thoughtfully provided in Annex II.

3.4 Knowledge Center

The Knowledge Center serves as a **dynamic, open-access repository**, enriching the ALFA support measures by providing an extensive reservoir of existing articles, materials, and tools that synergize with the drive toward the adoption of biogas solutions in the livestock sector. This robust repository is divided into two distinct sections, each contributing significantly to project's mission, as presented in the figure on the next page.

The first section, **ALFA Webinars**, is an integral facet of **ALFA's activities**, offering a wealth of valuable insights and expertise. Here, participants can access an array of webinars aimed at enhancing their understanding of biogas solutions and their implementation in the livestock sector. These sessions are designed to empower stakeholders with the knowledge and skills required for effective decision-making. Additionally, it is noteworthy that a series of complementary webinars will be meticulously crafted and subsequently made available throughout the project's duration.

The second section, known as the **Biogas Library**, is an expansive, open-source extensive store of resources catering to the broader community of the biogas and livestock sectors in the realm of renewable energy. Within this repository, user finds an extensive array of materials spanning articles, comprehensive case studies, documents, multimedia content including videos, and a rich assortment of tools, all thoughtfully curated to provide invaluable insights and guidance. These resources are thoughtfully presented in multiple languages to accommodate a diverse audience.

To facilitate seamless navigation within the Biogas Library, a comprehensive **set of filters** is implemented, ensuring that users can easily access the precise materials they seek. It is essential to note that this repository is continually enriched, consistently introducing new and relevant content with the generous support of ALFA partners.

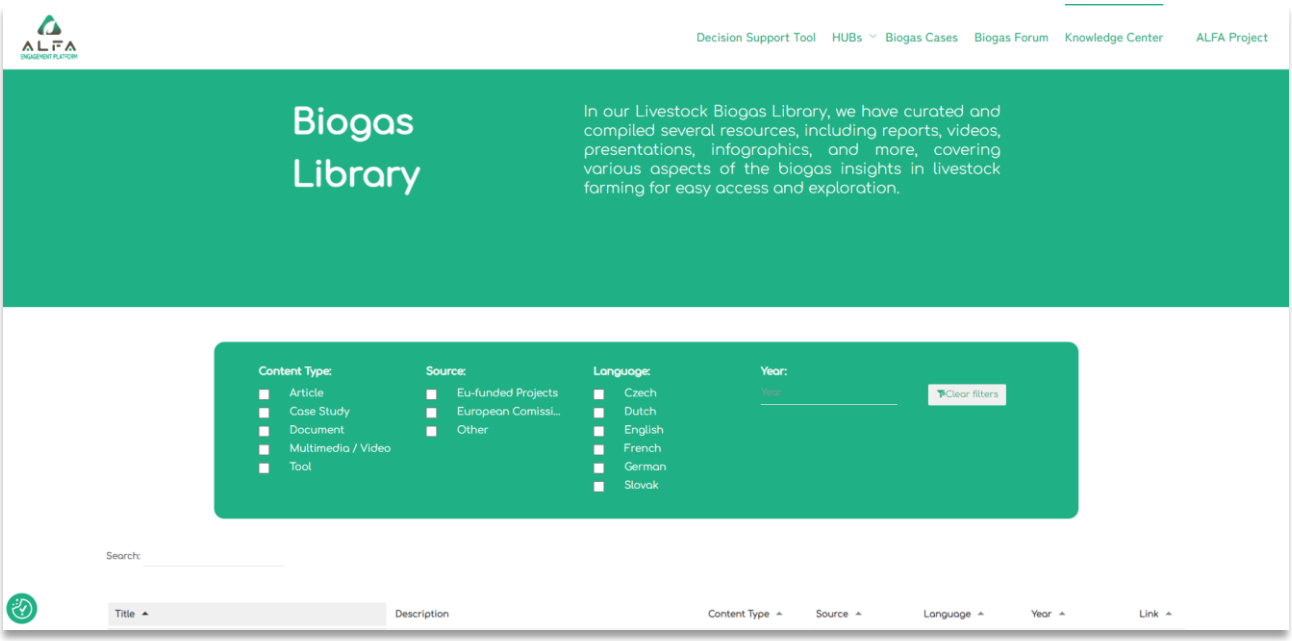

Figure 14. Knowledge Center Filters

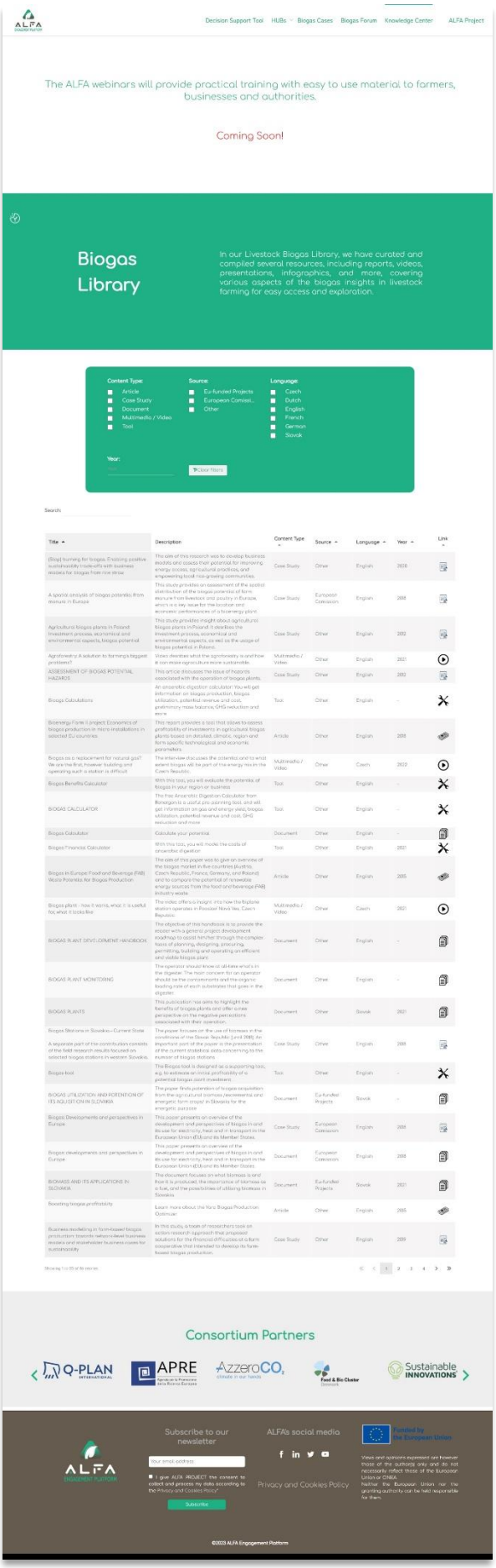

Figure 15. Knowledge Center

3.5 Promotion Strategy

The promotion strategy of ALFA Engagement Platform and ALFA Support Tools reflects a holistic approach, incorporating both traditional and contemporary methods to ensure **widespread visibility** and **user engagement**. In the upcoming period, a comprehensive series of promotional activities will be diligently implemented, harnessing the power of various channels and strategies, including:

- Press Releases: Leveraging the reach of local, national, and European Mass Media by disseminating press releases. These serve as a fundamental means to share the platform's objectives, success stories, and updates with a broader audience.
- Partner Collaboration: Collaboration with ALFA partners and the ALFA project's digital channels, including the website, newsletters, and social media accounts (Facebook, Twitter, LinkedIn), will ensure a continuous and far-reaching presence.
- Awareness Campaigns: The ALFA Support Tools will be thoughtfully integrated into the project's larger awareness campaigns, effectively aligning the tools with the project's overarching goals.
- Biogas Forum Integration: The Biogas Forum, a dynamic space for discussions and knowledge exchange, will play a pivotal role in engaging potential supported cases and validating support measures, further enhancing the collaborative spirit of the platform.
- Support Measures for Cases: The ALFA Support Tools and resources will be actively provided to supported cases, allowing them to harness the benefits of the platform's comprehensive offerings.

Throughout these promotional activities, ALFA Engagement Platform manager (Q-PLAN) will work closely with the ALFA Dissemination Manager (WR) to ensure seamless coordination, avoid duplication of efforts, and maximize the overall effectiveness of project outreach endeavours. Moreover, recognising the importance of breaking language barriers and, where feasible, the activities will be translated into national languages, to enhance accessibility and expand the platform's reach across diverse communities. This holistic approach ensures that our promotion strategy is versatile, inclusive, and tailored to connect with audiences at local, national, and European levels.

3.6 Sustainability Plan

By the end of the project the ALFA Engagement Platform is set to evolve into an extensive trove of diverse material, crafted and collected over the course of the project. This digital platform is destined to transform into a pivotal community across Europe. It will serve as a comprehensive resource, a platform where knowledge, insights, and best practices are congregated, nurturing innovation and facilitating informed decision-making within the biogas sector.

The initial exploitation plan, detailed in the D5.2 document titled ***Exploitation and Sustainability Plan - First Version***, sets the foundation for leveraging the platform's potential beyond the project's conclusion. As the project nears its end, a more comprehensive and refined plan is expected to emerge. This plan will serve as a roadmap for maximizing the utility and sustainability of the ALFA Engagement Platform and ALFA Support Tools, ensuring enriching the biogas community long after the project's official conclusion. The platform is poised to not only stand as a testament to the project's achievements but also as an enduring resource that catalyses the growth and collaboration within the biogas sector across Europe.

4. Conclusions and Next steps

The present report has outlined the development of the **ALFA Engagement Platform** and **ALFA Support Tools** as part of it, their structure, and components as well as the methodology for the formation and operation.

The **online presence** of ALFA Support Tools (DST, Biogas Cases Atlas Map, Biogas Forum, Knowledge Centre) was **outlined** together with **brief description** of their **layout and content**. In addition, elements of the ALFA Engagement Platform **promotion strategy** were presented, and the initial **sustainability plan** was discussed. It is worth noting that the design and development of ALFA Engagement Platform aims to ensure that the platform will **outlive the duration of the ALFA project** and become a focal point for the community of biogas in livestock farming.

The results of the next period and an updated report ***D2.6 – ALFA Support Tools – Final Version*** will be produced by M31 of the ALFA project providing an updated description of the ALFA support tools as further enhancements and additions will be developed to all components taping on the feedback of evaluation and validation activities.

The development of the ALFA Engagement Platform and the ALFA Support Tools mark a significant stride towards the **empowerment of the biogas community** within the livestock farming sector. These digital resources not only serve as a comprehensive **repository of knowledge and tools** but also offer a **collaborative space** that transcends the lifespan of the ALFA project. The value of ALFA Support Tools extends far beyond the immediate, aiming to become a central hub for the biogas community. This digital presence is poised to enable **transformative change**, facilitating informed decision-making, knowledge sharing, and a network of like-minded individuals. By fostering this community, it is not only being aligned with the **EU's sustainability goals** but also spearheading the journey towards a more environmentally conscious and sustainable future for the **livestock farming sector**. In this scheme, ALFA Support Tools represent the backbones in a shared pursuit of a greener, more sustainable tomorrow. Furthermore, the ALFA Engagement Platform **promotes the exchange of best practices and innovation** within the biogas sector, fostering growth and sustainability. Serving as a central hub for the biogas community, these tools are positioned to play a pivotal role in advancing environmental and agricultural sustainability, in line with the objectives of the European "Green Deal" and beyond.

5. Annexes

Annex I: ALFA Engagement Platform Cookies and Privacy Policy

Who we are

ALFA's main objective is to tap the potential of biogas production from livestock farming to enhance the wider uptake of RES and increase the share of bioenergy as a baseload energy source, while ensuring reduced emissions from untreated animals' waste and supporting the creation of new jobs and revenue for the livestock farming industry. During its three years, the project will support at least 50 livestock farmers in 6 EU counties (IT, DK, BE, SK, EL, ES) to overcome existing barriers and viably take up biogas solutions whilst providing a more informed basis for policymakers and stakeholders by unveiling biogas market dynamics. Tools will be created to reduce investment risk and support more robust and efficient financial frameworks to allow massive scalability of biogas. Furthermore, ALFA will provide science-based information to livestock farming decision makers for the potential of biogas and raise the awareness of the general public on misperceptions about biogas and bioenergy. The partners of ALFA consortium, listed below, process certain types of personal data for the purposes of the project. Each partner is responsible for the personal data they collect and process during their activities under the framework of the project:

Q–PLAN INTERNATIONAL ADVISORS PC, Greece (Coordinator), https://qplan–intl.gr/

AGENZIA PER LA PROMOZIONE DELLA RICERCA EUROPEA, Italy, https://apre.it/

AZZERO CO2 SRL, Italy, https://www.azzeroco2.it/en/

CENTRE FOR RESEARCH & TECHNOLOGY HELLAS, Greece, https://www.certh.gr/

FBCD AS, Denmark, http://www.foodbiocluster.dk

SUSTAINABLE INNOVATIONS EUROPE SL, Spain, https://sustainableinnovations.eu/

WHITE RESEARCH SRL, Belgium, https://white–research.eu/

PEDAL CONSULTING SRO, Slovakia, https://pedal–consulting.eu/

EUROPEAN DAIRY FARMERS E.V., Germany, https://www.dairyfarmer.net/

EUROPEAN BIOGAS ASSOCIATION AISBL, Belgium, https://www.europeanbiogas.eu/

For further information, we can be contacted at: info@alfa-res.eu

How we collect your personal data

We collect personal data both directly and indirectly:

Directly. We obtain personal data directly from individuals in a variety of ways, including but not limited to the following cases:

- an individual subscribes to our newsletter/s;
- an individual registers to attend meetings and events we host and during attendance at such events;
- we establish cooperative relationships with an individual;

- we provide professional services pursuant to our contract with the European Commission;
- an individual participates in an interview or survey organized by us.

Indirectly. We obtain personal data indirectly about individuals from a variety of sources, including:

- our research partners;
- our networks and contacts;
- public and open data sources such as public registers, news articles and internet searches;
- social and professional networking sites (e.g., LinkedIn).

What types of data we collect?

We only collect the data that are necessary for the smooth implementation of our project. These data fall into the following categories:

- **contact details** (name/ surname, e-mail address);
- **professional information** (job title, organization, field of expertise);
- **demographics** (e.g., age, gender, nationality);
- **information about what a person knows or believes**;
- **videos and photos** (from people that attend our events).

Bases of lawful processing

We process personal data on the following legal bases:

Legal obligations – for processing activities required for compliance both with applicable national and European legislation as well as with the specific legal and regulatory framework of the Horizon Europe Framework Programme for Research and Innovation of the European Union.
Consent – for processing activities such as organization of surveys and interviews, completing of questionnaires and dissemination of project's results.
Contractual obligations – for processing activities such as reporting to the European Commission and complying with project's publicity obligations.

What we do with your personal data

We process your personal data with the purpose of:

- Conducting research (e.g., interviews, surveys);
- Dissemination our project's results to different types of stakeholders;
- Sending invitations and providing access to guests attending our events and webinars;
- Administering, maintaining, and ensuring the security of our information systems, applications, and websites;
- Processing online requests or queries, including responding to communications from individuals;
- Complying with contractual, legal, and regulatory obligations.

How we secure your personal data when we process it

We continuously apply a personal data risk assessment process to identify, analyse, and evaluate the security risks that may threat your personal data. Based on the results of this risk assessment, we define and apply a set of both technical and organizational measures to mitigate the above security risks, including but not limited to:

- Data Protection Policies to guide our personnel when processing your data;
- Written contracts with organizations that process personal data on our behalf;
- Non–Disclosure Agreements with our personnel;
- Back up process, antimalware protection, access control mechanisms, etc.
- Some of our partners have appointed a Data Protection Officer.

Do we share personal data with third parties?

We may occasionally share personal data with trusted third parties to help us deliver efficient and quality services. When we do so, we ensure that recipients are contractually bound to safeguard the data we entrust to them before we share the data. We may engage with several or all the following categories of recipients:

- Parties that support us as we provide our services (e.g., cloud–based software services such as Dropbox, Microsoft SharePoint, Google);
- Our professional advisers, including lawyers, auditors, and insurers;
- Dissemination services providers (e.g., MailChimp);
- Law enforcement or other government and regulatory agencies or other third parties as required by, and in accordance with applicable law or regulation;
- The European Commission according to our relevant contractual obligations.

Do we transfer your personal data outside the European Economic Area?

We do not own file servers located outside the European Economic Area (EEA). However, some partners may use cloud and / or marketing services from reputable providers such as SharePoint, Dropbox, MailChimp, Google, etc., situated both inside and outside the EEA. We always check that such providers comply with the relevant GDPR requirements before start using their services.

Do we use cookies?

Our websites use cookies. Where cookies are used, a statement will be sent to your browser explaining the use of cookies. Cookies are small text files which are saved on your computer, mobile phone or tablet. They allow the website to remember your actions and preferences (such as login, language, font size and other display preferences) so you do not have to keep re–entering them whenever you come back to the site. You can control and/ or delete cookies as you wish. If you do this, however, you may need to manually adjust your preferences every time you visit a site. For more information on how to manage cookies, please visit: http://www.aboutcookies.org/

We use tools like Google Analytics to better understand how visitors interact with our website. This provides us with important information to enable the site to work better. The information collected is not linked to your personal data. For more information on the cookies set by Google Analytics, please visit: http://code.google.com/apis/analytics/docs/concepts/gaConceptsCookies.html

The following cookies are used by Google Analytics:

_**ga**: Used to distinguish user. Expires after 2 years;

_**gat**: Used to throttle request rate. Expires after 1 minute;

_**gid**: Used to distinguish users. Expires after 24 hours.

Your rights

You have the following rights regarding our processing of your personal data:

- **Right to withdraw consent** – You can withdraw consent that you have previously given to one or more specified purposes to process your personal data. This will not affect the lawfulness of any processing carried out before you withdraw your consent.
- **Right of access** – You can ask us to verify whether we are processing personal data about you and, if so, to have access to a copy of such data.
- **Right to rectification and erasure** – You can ask us to correct our records if you believe they contain incorrect or incomplete information about you or ask us to erase your personal data after you withdraw your consent to processing or when we no longer need it for the purpose it was originally collected.
- **Right to restriction of processing** – You can ask us to temporarily restrict our processing of your personal data if you contest the accuracy of your personal data, prefer to restrict its use rather than having us erase it, or need us to preserve it for you to establish, exercise or defend a legal claim. A temporary restriction may apply while verifying whether we have overriding legitimate grounds to process it. You can ask us to inform you before we lift that temporary processing restriction.
- **Right to data portability** – In some circumstances, where you have provided personal data to us, you can ask us to transmit that personal data (in a structured, commonly used, and machine–readable format) directly to another entity.
- **Right to object** – You can object to our use of your personal data for direct marketing purposes, including profiling or where processing has taken the form of automated decision–making. However, we may need to keep some minimal information (e.g., e–mail address) to comply with your request to cease marketing to you.
- **Right to make a complaint** to your local Data Protection Authority (DPA) (see https://ec.europa.eu/justice/article–29/structure/data–protection–authorities/index_en.htm) regarding any concerns you may have about our data handling practices.

To ask us to do anything of the above, you can contact us by email: alfa.project.eu@gmail.com We will promptly examine your request against the relevant requirements of the laws and regulations governing privacy and personal data protection and we will answer the latest within 30 days after receiving your request. We will ask from you some kind of identification (e.g., photocopy of your identity card or passport) to avoid non–authorized reveal of your personal data. If, for reasons of complexity of the request or a multitude of requests, we are unable to respond promptly, we will notify you within 30 days of any delay, which in no case may exceed two months from the expiration of the 30–day deadline.

How long do we retain personal data?

We retain personal data to provide our services, stay in contact with you and to comply with applicable laws, regulations, and contractual obligations to which we are subject. Please note that we have an obligation to retain data concerning projects funded by the Horizon Europe Framework Programme for Research and Innovation of the European Union for up to five years after the end of the project (unless further retention is requested by auditors). After the expiry of the retention period, and unless further legitimate grounds for retention arise, we will dispose of personal data in a secure manner.

Disclaimer of liability for third party websites

Although our site may contain links to third–party sites, including the sites of the consortium partners, we are not responsible for the privacy practices or content of these sites and we expressly disclaim any liability for any loss or damage that may be caused by the use of these links. We do not monitor the privacy practices or the content of these sites. If you have any questions about the privacy practices of another site, you should contact the site's responsible personnel. We suggest you read the privacy policy of each website you interact with, before allowing the collection and use of your personal data.

We may also provide social media features that allow you to share information on your social networks and interact with our project on various social media sites. The use of these social media features may result in the collection or sharing of information about you. We recommend that you check the privacy policies and regulations of the social networking sites you interact with, so that you can be sure that you understand what information may be collected, used and disclosed by these sites.

Children

We do not knowingly collect, use, or disclose information from children under the age of 16. If we learn that we have collected the personal information of a child under 16, we will take steps to delete the information as soon as possible. Please immediately contact us if you become aware that a child under 16 has provided us with personal information.

Revisions of this Privacy Policy

This Privacy Policy is valid from 30/11/2022 and replaces any other previous notifications that we had issued in the past regarding our personal data management practices. We reserve the right to revise this Policy at any time. The current version will be always uploaded to our website indicating the date of entry into force, so you know when the most recent revision took place. If there are critical changes in this policy or our personal data practices change significantly in the future, we will notify you by posting the changes on our website.

Annex II: Biogas Forum Registration

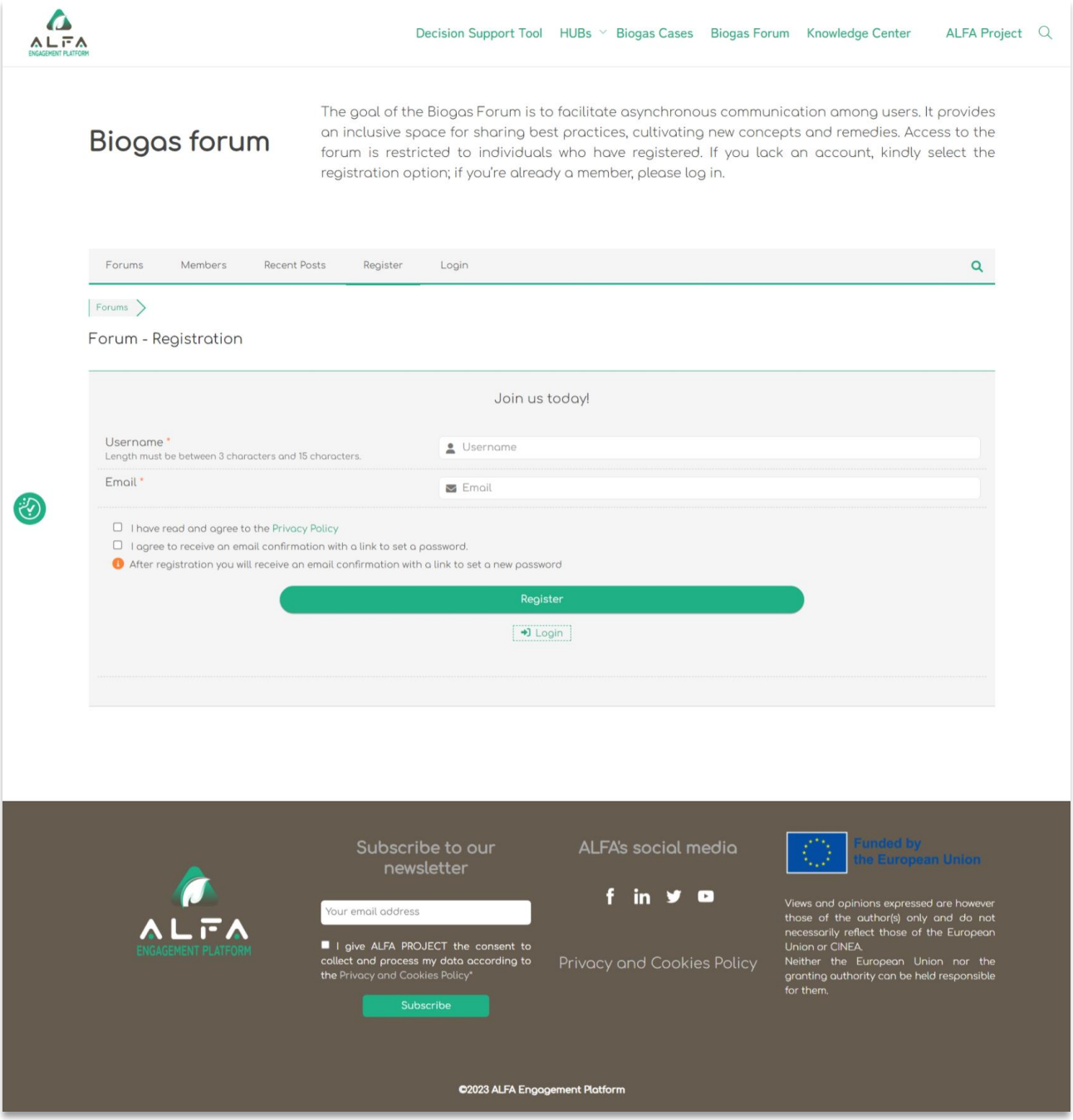

Figure 16. Biogas Forum Registration - 1st step

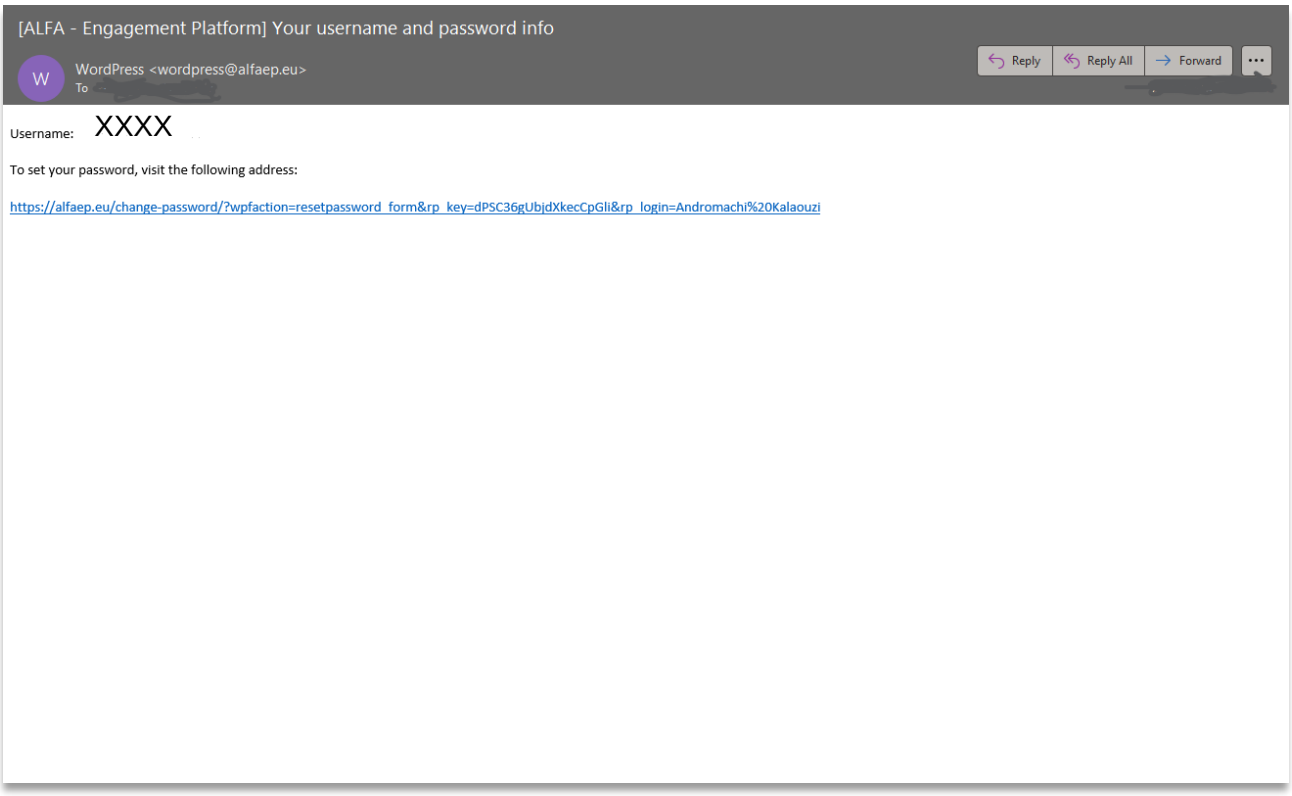

Figure 17. Biogas Forum Registration - 2nd Step

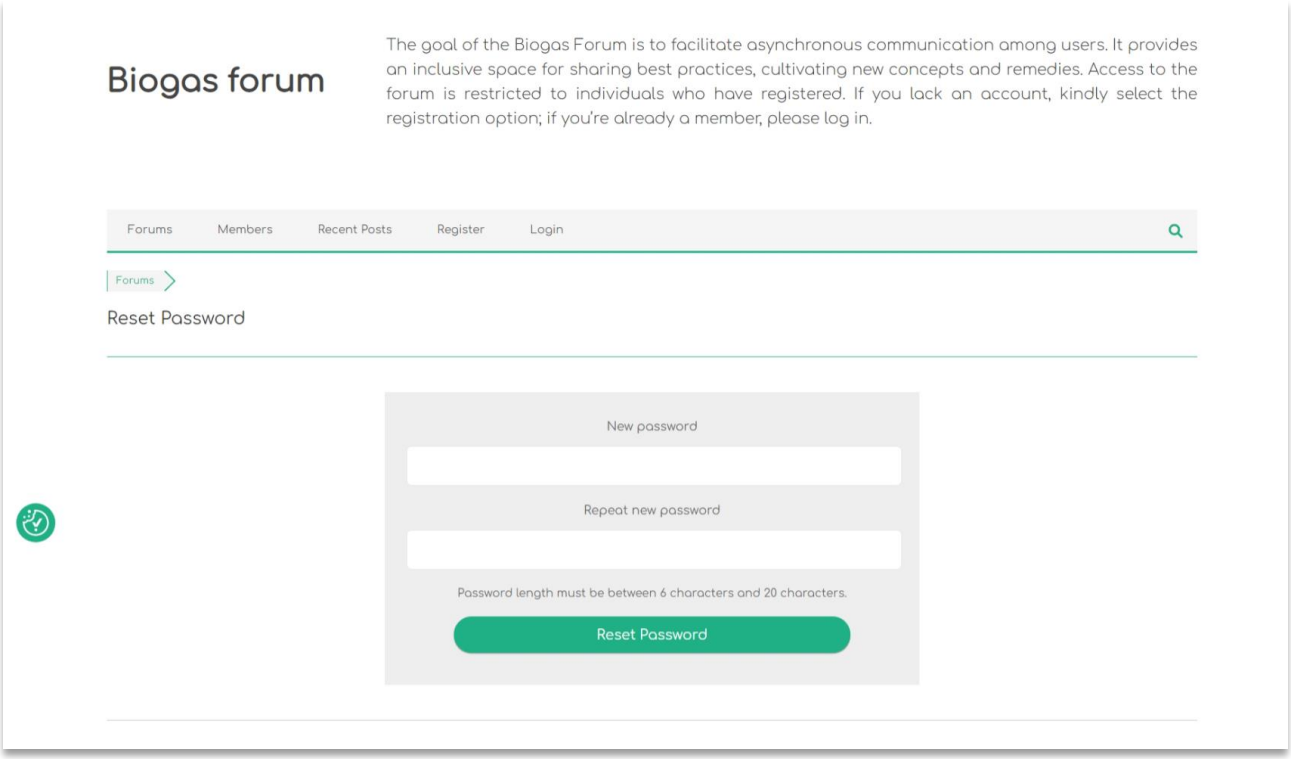

Figure 18. Biogas Forum Registration - 3rd step

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The project

ALFA has the objective to help unlock the EU's biogas production potential by fostering the adoption of technologies using manure to produce biogas, thus helping increase the adoption of renewable energy sources in the EU and helping reduce emissions from untreated animal waste. The project will identify drivers and barriers for the uptake of biogas in the EU livestock farming industry and will support farmers from 6 EU countries (Italy, Denmark, Belgium, Slovakia, Greece and Spain) through its own co-created solutions, including financial, business, and technical support services as well as capacity-building seminars. In parallel, the project will develop an Engagement Platform to host tools that facilitate collaboration and knowledge exchange among industry actors and provide credible estimations of each farm's biogas potential, prospect profits, and environmental and social impacts. Moreover, ALFA will inform all relevant stakeholders via awareness-raising campaigns and policy recommendations and will provide guidelines for replication of its results in other regions.

Coordinator: **Q-PLAN**

PARTNER		SHORT NAME
Q-PLAN INTERNATIONAL	Q-PLAN INTERNATIONAL ADVISORS PC	QPL
APRE	AGENZIA PER LA PROMOZIONE DELLA RICERCA EUROPEA	APRE
AzzeroCO2	AZZERO CO2 SRL	A0CO2
CERTH	CENTRE FOR RESEARCH & TECHNOLOGY HELLAS	CERTH
Food & Bio Cluster Denmark	FBCD AS	FBCD
Sustainable INNOVATIONS	SUSTAINABLE INNOVATIONS EUROPE SL	SIE
WHITE	WHITE RESEARCH SRL	WR
PEDAL CONSULTING	PEDAL CONSULTING SRO	PED
EUROPEAN DAIRY FARMERS	EUROPEAN DAIRY FARMERS E.V.	EDF
EBA European Biogas Association	EUROPEAN BIOGAS ASSOCIATION AISBL	EBA

CONTACT US: info@alfa-res.eu **VISIT: www.alfa-res.eu**

ALFA Project @alfa_euproject alfa-euproject @alfaprojectHE