UNLOCKING THE COMMUNITY BIOENERGY POTENTIAL

D2.3 BECoop Toolkit – First

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www.becoop-project.eu

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About

Over the last years, the EU has witnessed some remarkable steps in Renewable Energy (RE) deployment. However, at the same time, we see an increasingly uneven penetration of RE across the different energy sectors, with the heating and cooling sector lagging behind. Community bioenergy schemes can play a catalytic role in the market uptake of bioenergy heating technologies and can strongly support the increase of renewables penetration in the heating and cooling sector, contributing to the EU target for increasing renewable heat within this next decade. However, compared to other RES, bioenergy has a remarkably slower development pace in the decentralised energy production which is a model that is set to play a crucial role in the future of the energy transition in the EU.

The ambition of the EU-funded BECoop project is **to provide the necessary conditions and technical as well as business support tools for unlocking the underlying market potential of community bioenergy.** The project's goal is to make community bioenergy projects more appealing to potential interested actors and to foster new links and partnerships among the international bioenergy community.

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952930.

Project partners

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Executive Summary

Note: D2.3 is registered as a website-type deliverable. The BECoop consortium decided to also develop a respective report, as presented herein, providing guidance on the toolkit's user interface and experience. The BECoop toolkit is always accessible by visiting the BECoop project website or by directly accessing: https://becoop.fcirce.es/toolkit/

In the framework of BECoop, task 2.2 aims to create **a toolkit of already existing tools that can work complementary to the support services offered by the project**, specifically assisting towards the development and operation of community bioenergy and heating projects. In this context, the aim of this deliverable is to provide an explanation about how this toolkit has been developed, how it should be used and what kind of tools can be found in it.

The chapters of this deliverable are briefly presented below:

- In the first chapter an introduction can be found.
- Secondly, the methodology that was followed for the selection of the tools, as well as for the implementation of the toolkit is described.
- In the third chapter, a brief guideline is created so it can serve as a manual to potential users of the toolkit. Next, the toolkit is described. More specifically this section provides information regarding i) the structure of the toolkit ii) the categorization of the tools iii) and the way they are presented. This section serves as a summary that provides a clear picture of the most important information available.
- Lastly, some conclusions were drawn regarding the aim of the toolkit, its updatable character, and the active collaboration between the partners in order to populate this toolkit with the most relevant tools in the bioenergy sector.

For further information, an Annex section has been incorporated at the end of the document, including supplementary information (for instance, the complete list of tools and the in-depth study of the selected tools).

1 Introduction

The energy cooperatives model is a business model where citizens jointly own and participate in renewable energy or energy efficiency projects. They are also known as *RESCoops*. *RESCoops* bear a strong potential to lead the clean energy transition to energy democracy, while respecting 7 major principles, as outlined by the International Cooperative Alliance[1]. These principles include: voluntary and open membership; democratic member control; economic participation through direct ownership; autonomy and independence; education, training, and information; cooperation among cooperatives and concern for community. Some of the advantages of this model are the following: *RESCoop*s keep money in the local economy, foster social acceptance for renewable energy, keep the individual investment affordable, benefit the local community, take action on energy or reduce the energy poverty[2].

Energy communities, that were recently introduced in the EU legislation, constitute a main focus area for the BECoop project. Energy communities organise collective and citizen-driven energy actions that will help pave the way for a clean energy transition, while moving citizens to the fore. They contribute to increasing public acceptance of renewable energy projects and attracting private investments in the clean energy transition. At the same time, they have the potential to provide direct benefits to citizens by advancing energy efficiency and lowering their electricity and/or heating bills. Moreover, by supporting citizen participation, energy communities can help in providing flexibility to energy systems through demand-response and storage[3].

However, while energy community is about to play a huge role for the future energy transition, bioenergy has a very slow development in decentralised energy production. BECoop's ambition is to foster a broad deployment of bioenergy technologies in the heating sector across Europe by providing all the necessary conditions and support tools for unlocking the underlying market potential of community bioenergy. By using the BECoop support services and tools, energy communities and authorities will be able to mobilise citizens around existing or new community bioenergy initiatives, boost local bioenergy demand by improving its image and social acceptance, and increase feasibility of their endeavours by identifying suitable technical, business and financial solutions, as well as by pooling expertise and partnerships from the wider EU bioenergy ecosystem.

To help improve current situation in the bioenergy sector and the European community energy scheme, several tools will be developed under the BECoop project. **Specifically, the toolkit described in this document is a repository of already existing tools, which have been identified as useful for any actor present in the bioenergy value chain or in the energy community model value chain.**

68 tools have already been identified, classified, studied, and summarised under a toolkit to be offered to potential users in a simple and user-friendly manner. **The toolkit is presented in a web-based interface**, and the tools have been classified in t**hree pre-identified categories: Business model; community management; and technical.** The type of stakeholders to which these tools are addressed have also been identified.

From the 68 identified tools, 6 of them have been already studied in-depth, in order to create a user's manual. The research and identification of existing tools, however, constitutes and ongoing process. Newly identified tools, after being thoroughly investigated, will be incorporated under the BECoop online toolkit and presented in an updated version of the current deliverable.

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[1] https://www.ica.coop/en/cooperatives/cooperative-identity
[2] The RESCoop model – RESCoop.eu
[3] Energy Communities – European commission. Available at: https://ec.europa.eu/energy/topics/markets-and-consumers/energy-communities_en

2 Methodology for the development of the BECoop toolkit

This section describes the tools' selection process and the contents that were chosen to be studied. A first search for tools related to bioenergy and community models was carried out. This list was shared with all project partners, so they could access all tools collected so far, and propose additional tools.

The full list of the tools identified so far can be found in Annex I. Over a first research round, 40 tools were identified and registered. After the project partners' contribution, this number grew up to almost 70 tools.

2.1 Descriptive structure for each tool

For each tool, a set of guiding information was developed.

This information includes:

- **Name:** Name of the tool
- **Logo:** Logo related to the tool
- **Link:** Link to the page where the tool can be found
- **Classification:** Tool's classification as business, technical, community model tool or related project.
- **Sub-category:** This categorises the tool by its main function – tool, calculator, map, database, policy, supply chain, report.
- **Type:** A first categorisation focused on the characteristics of the tool (assessment report, bioenergy relevant tool, digital innovation tool, economic tool, financing tool, financing books, food info, observatory / map, policy catalogue, good practices example, project publications, report and support services, soil impact calculation, technical and business model, policy, technical calculator). *This first type-categorisation takes place to internally organise the tools, so in further steps they are easier to be classified – this part, so far, is not implemented in the web page.*
- **Summary:** A brief summary that gives the main information and evaluation of the tool.
- **Main objective:** The main outcome of the tool, the information that can be obtained thanks to its use.
- **Target user:** Classification of the pre-identified stakeholders that can benefit from the use of this tool: biomass owners, biomass management companies, equipment manufacturers, Energy Service Companies and installers, associations, cooperatives / energy communities / RESCoops, investors, research centres / universities, public institutions, end users (as consumers of bioenergy).
- **Organisation developing/maintaining the tool:** The company/companies, project or organisation that has developed or is in charge for the maintenance of the tool.

An example of the analysis done for each tool is depicted in Figure 1

Tool	Logo	Link	Type (digital social innovation tools, bioenergy relevant tools, etc.)	Technical, community model, business.	Subtype	Summary of the Tool
BERST: BioEconomy Regional Strategy Toolkit	BERST Building Regional BioEconomies	https://berst.vito.be/about_berst	Policy catalogue, good practice examples	Business	Policy	Policy database, search by countries, type of measure, feedstock, product targeted....

Main objective	End user	Organisation/project that developed /maintains the tool
This Catalogue of Instruments & Measures provides information on: 1) Instrument & Measures per country of relevance to BBE. Beside the same regulation and policy information per country it also contains information on regional case studies and good practice examples.	Public institutions (regional, national EU) Consumers of bioenergy, Investors, Research Centers	WR (coordinator), Asociación Madrid Plataforma de la Biotecnología, Fundación Parque Científico de Madrid, Region of Western Macedonia, Keski-Suomen Itto, Westland / Zuid Holland, BioCampus Straubing GmbH, Biobased Delta, Cambridge Econometrics Limited, Imperial College of Science, Technology and Medicine, Flemish Institute for Technological Research, Centre for Research and Technology Hellas, University of Ljubljana, Fachagentur Nachwachsende Rohstoffe e.V./ Agency for Renewable Resources, JAMK University of Applied Sciences

Figure 1. Example of information gathered about each studied tool

2.2 In depth analysis – 6 tools by M12

Asides from a brief description for each identified tool, 6 tools from the full list were further studied in depth. The responsible partners for this were WUELS and CIRCE. In order to decide the most interesting tools, a voting between the partners was held (5 votes per partner). The results of this voting are shown in Table 1.

Table 1. Preference results for the in-depth study of the tools

Number	Name of the tool	Why do you think this tool could be helpful	Number of votes	Organization								
1	RESCoop Handbook	It looks nice in order to have a first idea for the invetsmenet schemes	5		White Research	SEV		CERTH/ESEK	WUELS	OBS		
4	Hotmaps	Interesting in order to examine the possibilities/potential of an area.	5		White Research	SEV	Goiener		WUELS	OBS		
5	BioEnergy Association: Best practice guideline for life cycle analysis of heat plant projects	Interesting for financial risk analysis	5	CIRCE	White Research	SEV	Goiener			OBS		
10	BioRaise	Tool to organize the logistics of the supply chain of the created bioenergy projects as it shows the biomass availability of different biomass types and can calculate some basic collection costs	4	CIRCE				CERTH/ESEK	WUELS	OBS		
9	uP_Runing Observatory		3				Goiener	CERTH/ESEK	WUELS			
11	52Biom	A tool to investigate the biomass potential at different areas of interest where we would like to develop a bioenergy community project. Has more functionalities that would be interesting when creating new bioenergy community projects such as BIO2Match (atch etween biomass resources and conversion technologies), BeWhere (where new biomass conversion installations can be built), biofuel database and more, but need free registration in order to access them.	3					CERTH/ESEK	WUELS	OBS		
2	Phyllis2	Very easy to use. A lot of information that can be used	2	CIRCE	White Research							
3	Agrobiomass Observatory: Agrobioheat	Very good for searching for partners and networking	2		White Research			CERTH/ESEK				
6	BEAT2	Techno, environment assessment of different biotechnologies	1				Goiener					
7	AGRIFORVALOR	Techno economic calculations	1				Goiener					
8	BioTrade 2020+		1				Goiener					
12	BERST: BioEconomy Regional Strategy Toolkit	Contains a lot of information of policies and regulations filtered by country, type of biomass, etc. Relatively easy to use. Policy tool kit	1	CIRCE								
13	Loomio	Collaborative decision making tool	1	CIRCE								

Once the tools were selected, the next step was to decide the scope of the in-depth analysis. A tentative template was created and shared with WUELS, and after gathering their feedback, the final template to be filled in is shown in Table 2.

Table 2. Template to be completed for each chosen tool for the in-depth analysis

Name of the tool	
Logo	
Link	
Brief Description	A short and clear description on what are the benefits and why they could be beneficial for bioenergy cooperative projects
Type of tool	Digital social innovation, bioenergy relevant tool, policy, business model.
Subtype	Report, maps, tool, template, spreadsheet.
Related to	Environmental information, technical information, business model, policy information, social management, supply chain.
Most valuable information that can be obtained	
How does the tool work / manual of the tool	
Who is this tool destined to (potential users)	
How can this tool affect/benefit or help a relevant stakeholder?	
Additional information of the tool	How useful do you find it, from the end user point of view? What else can be added to make the tool more complete? Any complementary information needed?
Organisation/project that developed/manages the tool	
Responsible for the study of the tool and organisation	

Finally, the chosen tools for the in-depth analysis, along with the responsible partner are shown in Table 3.

Table 3. Tools studied in-depth by each organization

WUELS	CIRCE
BioEnergy Association: Best practice guideline for life cycle analysis of heat supply projects	***Hotmaps***
Handbook on Investment schemes for RESCoop projects	***Loomio***
-	***S2Biom***
-	***BioRaise***

These in-depth analyses are presented in Annex II. A screenshot of how these tools are displayed, under the BECoop toolkit web interface, is provided below.

For all the tools for which an in-depth analysis is performed by BECoop partners, a user manual will be available for all respective toolkit users and visitors. They will be able to access such additional information by clicking on the "*Detailed info*" button, as shown in Figure 2.

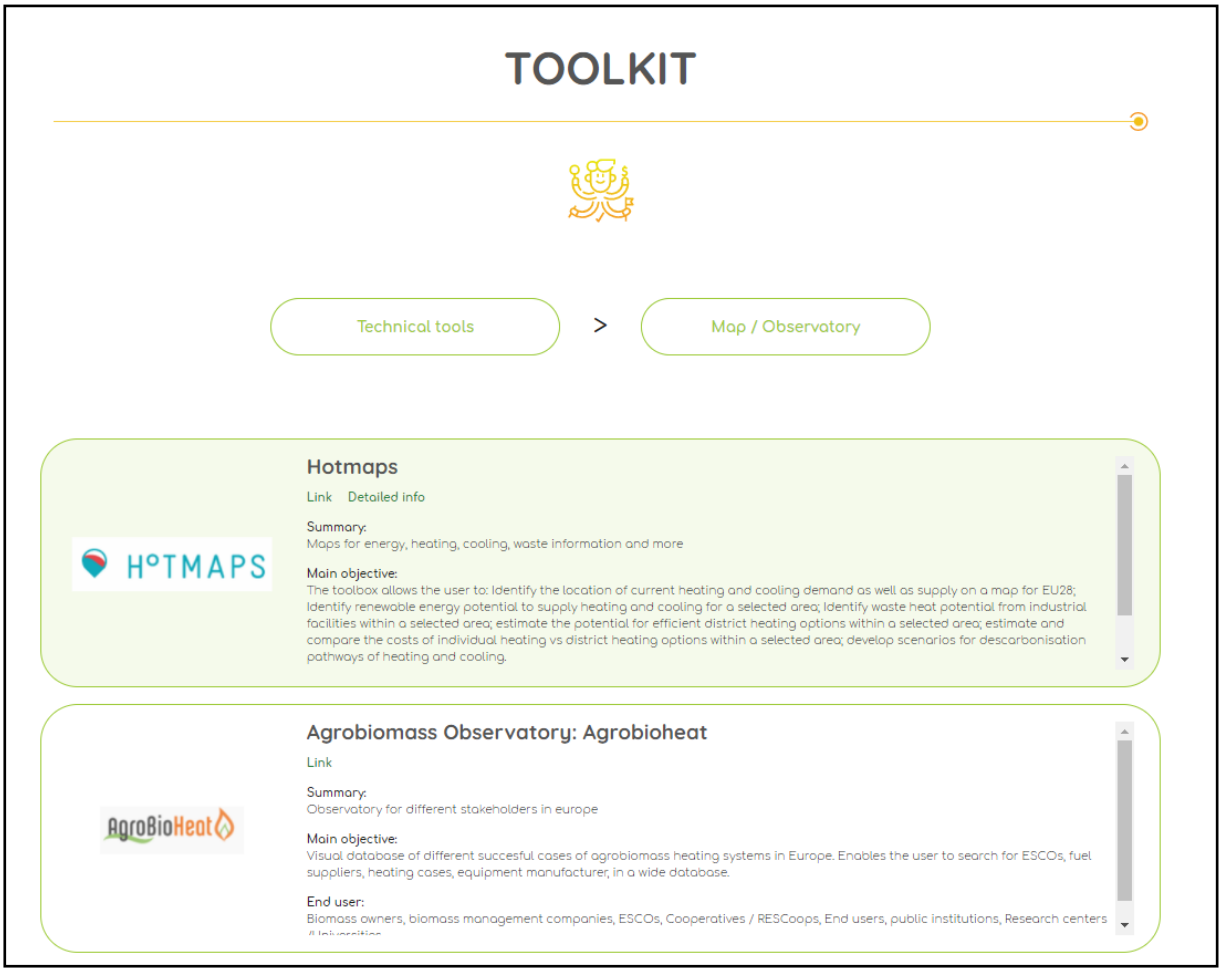


Figure 2. Example of highlighted and detailed info of one of the studied tools

3 BECoop Toolkit overview

The BECoop toolkit is a repository of already existing tools related to community and/or bioenergy projects, that will be accessible through the project's web page. The toolkit can work complementarily to the support services offered by the project, assisting the development and operation of community bioenergy and heating projects. T

As it is shown in Figure 3, on the website of BECoop project (https://www.becoop-project.eu/) there is a direct link that transfers the user to the main page of the developed toolkit.

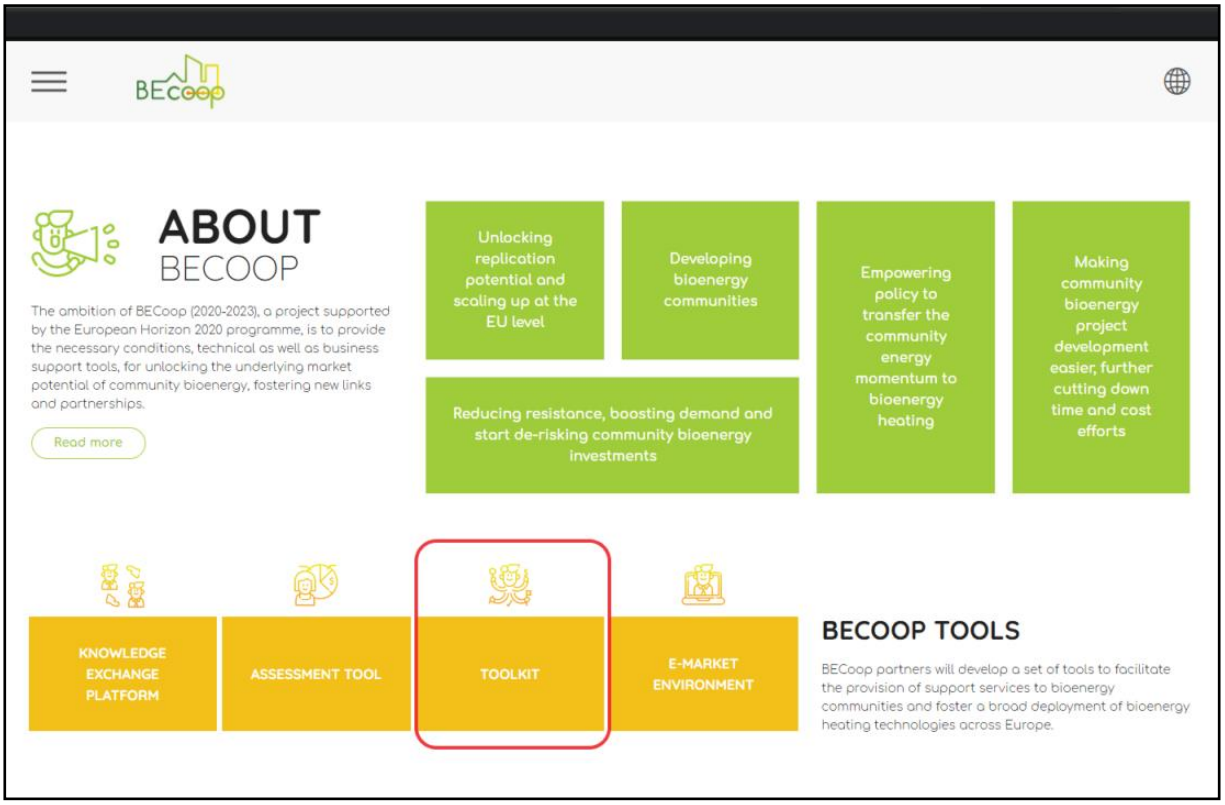


Figure 3. Access to the BECoop toolkit from the BECoop web page

3.1 Main page

Once the user clicks the "Toolkit" link, he/she is directed to the welcome page of the BECoop toolkit. In this page, two different sections may be found, as shown in Figure 4. In the right side, five buttons will appear. In the left side, a description panel about the task and general information about the project can be found.

The description panel includes the following sections:

- **Welcome to the BECoop toolkit:** Context and description of the toolkit.
- **What can you find here*:*** i) Main toolkit's categories and brief explanation ii) link to the self-assessment tool also developed by the project (in the framework of T2.1).
- **Who is this toolbox for:** What is the main target of the toolkit – main actors that can benefit from it.

- **How can I use the toolkit?** Brief explanation of the categorisation and structure of the webpage.
- **About BECoop:** Project's description destined mainly to those who access the toolkit webpage from an outside link (not the BECoop webpage).

At the same time, the links on the right side of the page correspond to the 4 pre-identified categories of the BECoop Toolkit. 1 additional box redirects visitors to BECoop self-assessment tool developed in T2.1.

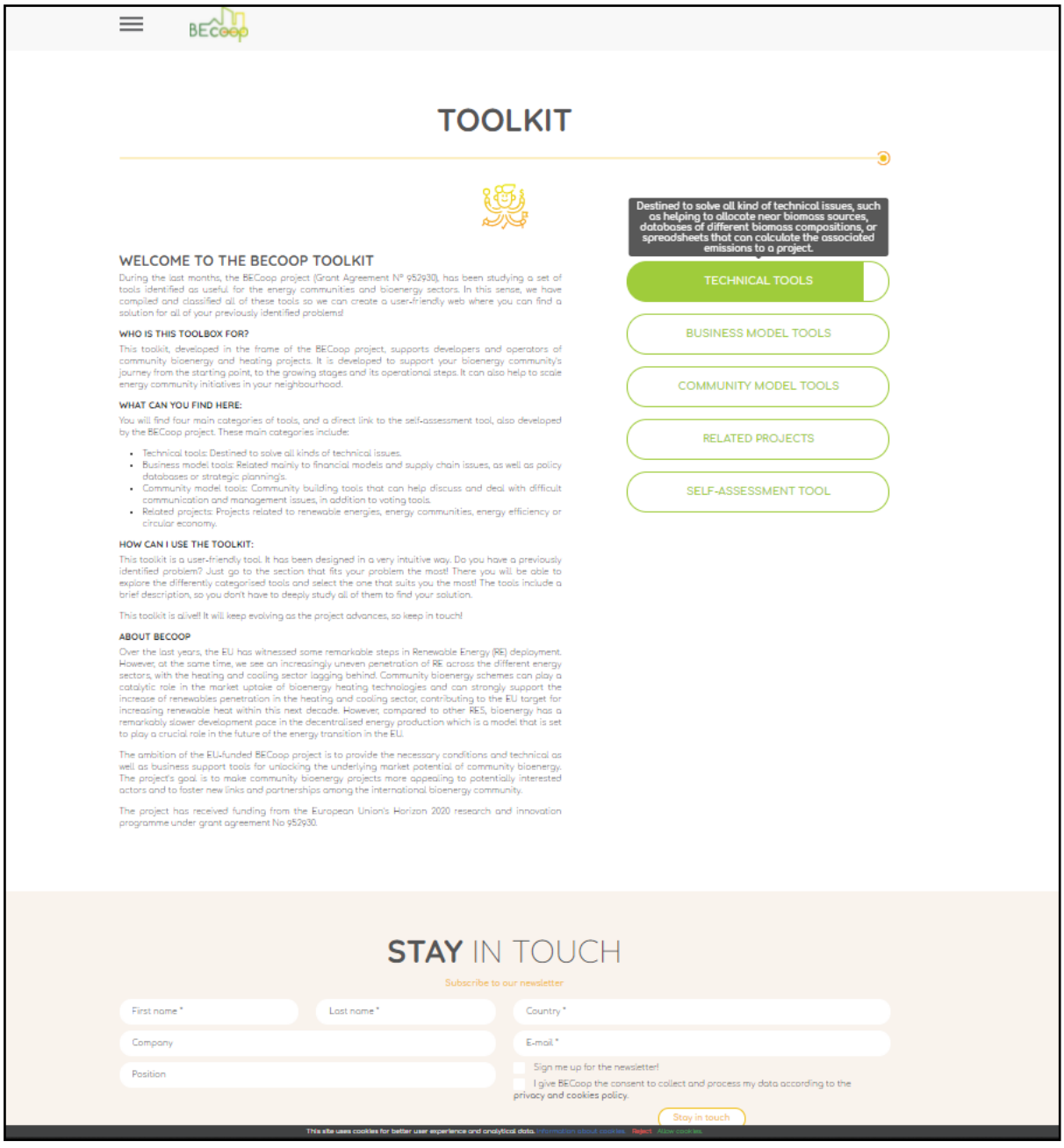


Figure 4. Main categories of the toolkit - selection page

3.2 Toolkit's navigation experience

The BECoop toolkit has been designed as a user-friendly environment where browsing is easy and genuine. It has a simple and intuitive menu, based on the 4 pre-identified categories under which the tools have been classified (technical tools; business model tools; community model tools; related projects). Once the user is aware of the kind of problem they have, it's just only a matter of time to find a tool that fits their solution.

It's important to note that the tools that are listed are not developed by the BECoop project. **This toolkit serves just as a repository of already existing tools that might be helpful for bioenergy community projects.**

As it has been mentioned in the previous section, six of the tools have a detailed analysis, provided by the project, that give a deeper insight of the utilities of the tools. Within the upcoming months, another set of tools will be studied and a similar analysis will be provided and uploaded to the toolkit webpage.

3.2.1 Tools' categorisation

When you hover the mouse over the links, a brief description of each tool category will appear (Figure 4). Indicatively, the main categories, together with the short description are also provided below:

- **Technical tools:** *Destined to solve all kind of technical issues, such as helping to allocate near biomass sources, databases of different biomass compositions, or spreadsheets that can calculate the associated emissions of a bioenergy project.*
- **Business model tools:** *Related mainly to financing models and supply chain issues, as well as policy databases or strategic planning.*
- **Community model tools:** *Community management tools, such as forums or communication solutions, that can help in discussing and dealing with difficult communication and management issues, as well as in decision making in democratic organizations.*
- **Related projects:** *Projects related to renewable energies, energy communities, energy efficiency or circular economy.*
- **Self-Assessment tool:** *The self-assessment tool is a tool developed in BECoop project for non-specialised users that want to start an initiative of a new community bioenergy project and assess the current situation of their project. The results of the tool provide a clear picture of the situation of the project, stating highlighting the strengths and weaknesses, and proposing a series of recommendations for further developing the bioenergy initiative.*

3.2.2 Tools' subcategories

The next step is the subcategory selection. This is a second layer of tools' classification in order to better differentiate them and help users find what best fits their needs. Here, tools are grouped based on their functionality. Tool's subcategories classification is presented in detail in Table 4. This structure is also depicted in Figure 5. In the case that the user selects the "self-assessment tool", he/she will be directed to the respective webpage. More information on the self-assessment tool can be found in Deliverable 2.1: "Self-assessment tool for evaluating current regional status and future potential".

Table 4. Categories and subcategories of the tools

Categories	Subcategories
Technical tools	**Calculator:** Tool that allows to carry out a calculation related to technical aspects of bioenergy (for example: wet - dry basis converter, CO2 emission calculator, calorific value calculator...). **Database:** Structured sets of data regarding biomass compositions, or supply volume **Map/Observatory:** Geographic information systems, that allocate facilities or products in a web-based map. **Report:** Documents whose purpose are to communicate a set of information collected and previously analysed according to certain criteria. These reports, therefore, contain information regarding technical info obtained by previous projects and facts verified and analysed by them. **Supply chain:** Tools that support the delivery of biomass focusing on different solutions. **Other related tools:** Different types of software that offer a variety of solutions: technology exploring, mass and energy balances, spreadsheets, nutrient recuperation for soils…
Business model tools	**Database:** Structured sets of data regarding business and finance, policy planning, etc. **Policy:** Catalogues of the different policy strategies presented in a web-based platform. **Report:** Documents whose purpose are to communicate a set of information collected and previously analysed according to business models. **Other related tools:** Different types of software that offer a variety of solutions: Modelling to plan, develop and expand local area heating and cooling systems, development of private investment systems or guidelines for life cycle analysis of heat plant projects, among others. **Self-assessment:** Self-assessment tool for evaluating current regional status and future potential
Community model tools	**Communication software:** Such as forums or open participation, decision making software.
Related projects	**Other projects:** Projects that share specific topics in common: community building, heating projects… and can be valuable for the toolkit users

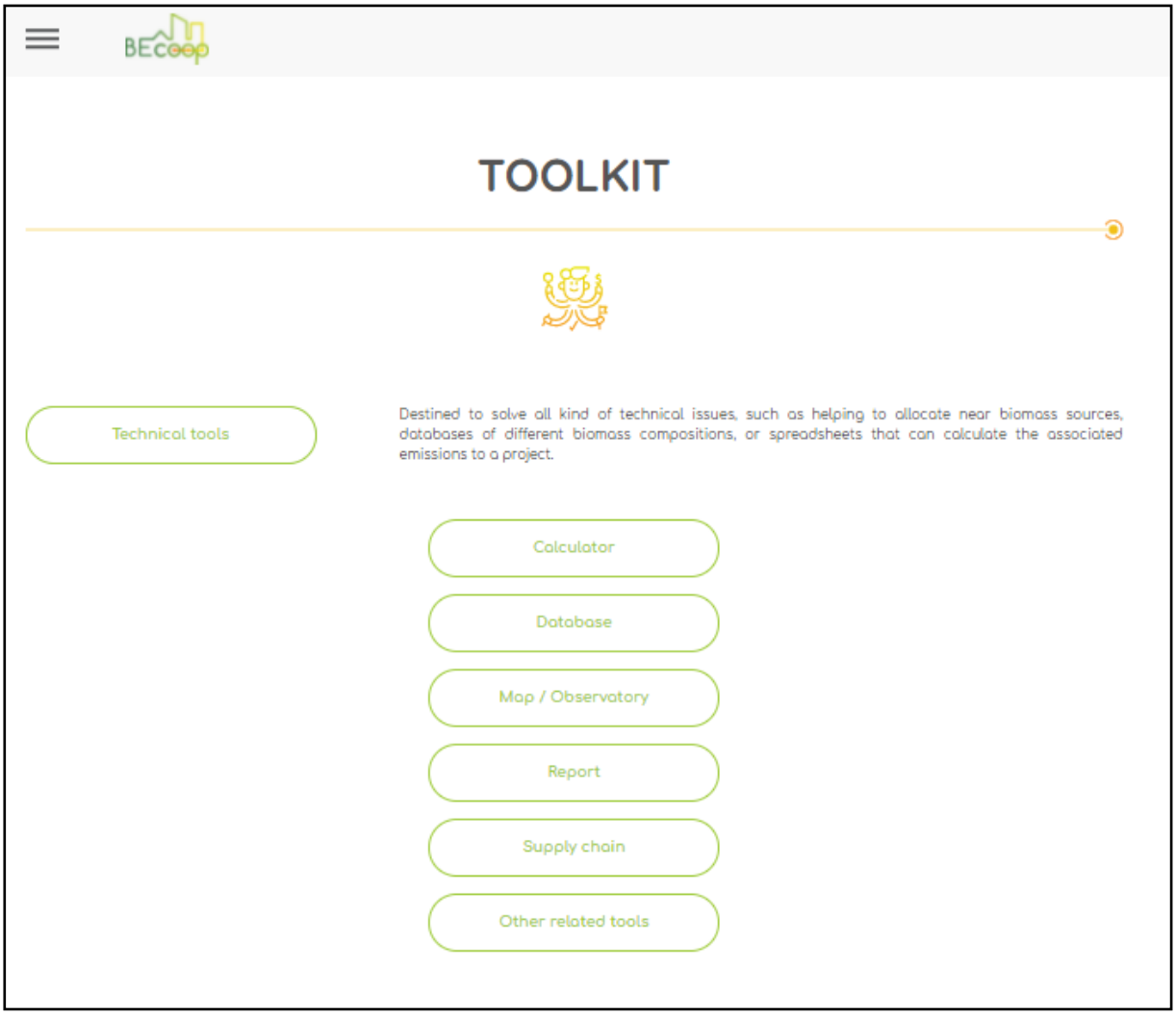


Figure 5. Subcategories of the studied tools

3.2.3 Online presentation of the tools

Once the user selects a tool category/subcategory that best fits his/her needs, then a detailed list appears next with the specific tools that lie under the chosen options path, as shown in Figure 6.

The toolkit itself does not provide or generate any results. Instead, it provides this set of tools that can be separately used for the development or market uptake of bioenergy community projects.

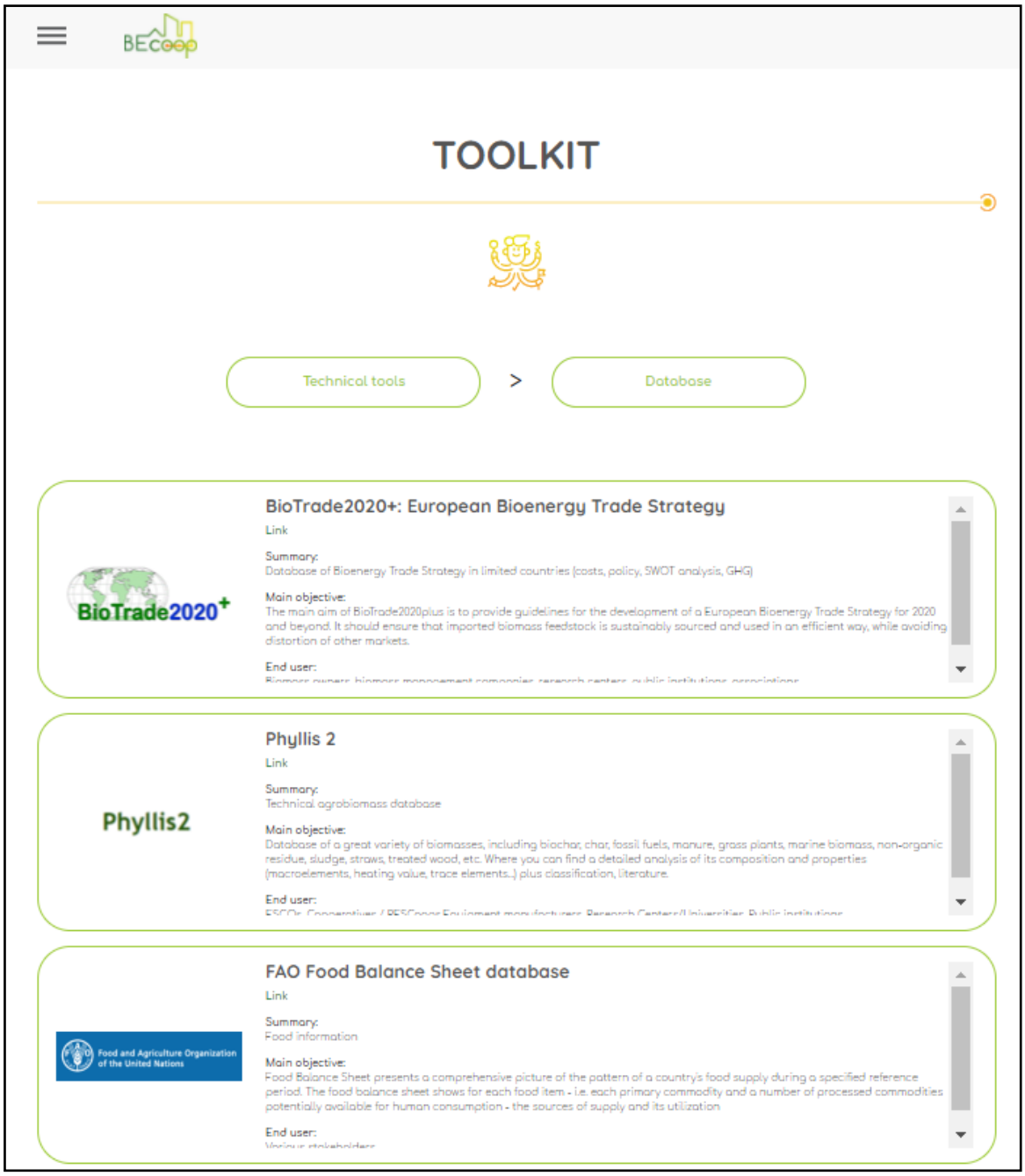


Figure 6. Presentation of the tools

Note: Tools studied in-depth and for which a manual and a user guide have been drafted can be found in Annex II of the current deliverable.

The tools' classification (technical, business model, community model or related project) and subcategory (database, calculator, atlas, etc.) will always be visible, in the upper menu navigation part of each page. Thus, inside the toolkit, it is really easy to go from one section to another. Once the mouse is hovered over the tool categories, a drop-down list will appear, allowing the user to change the section and the type of tools that are shown. This function is presented in Figure 7.

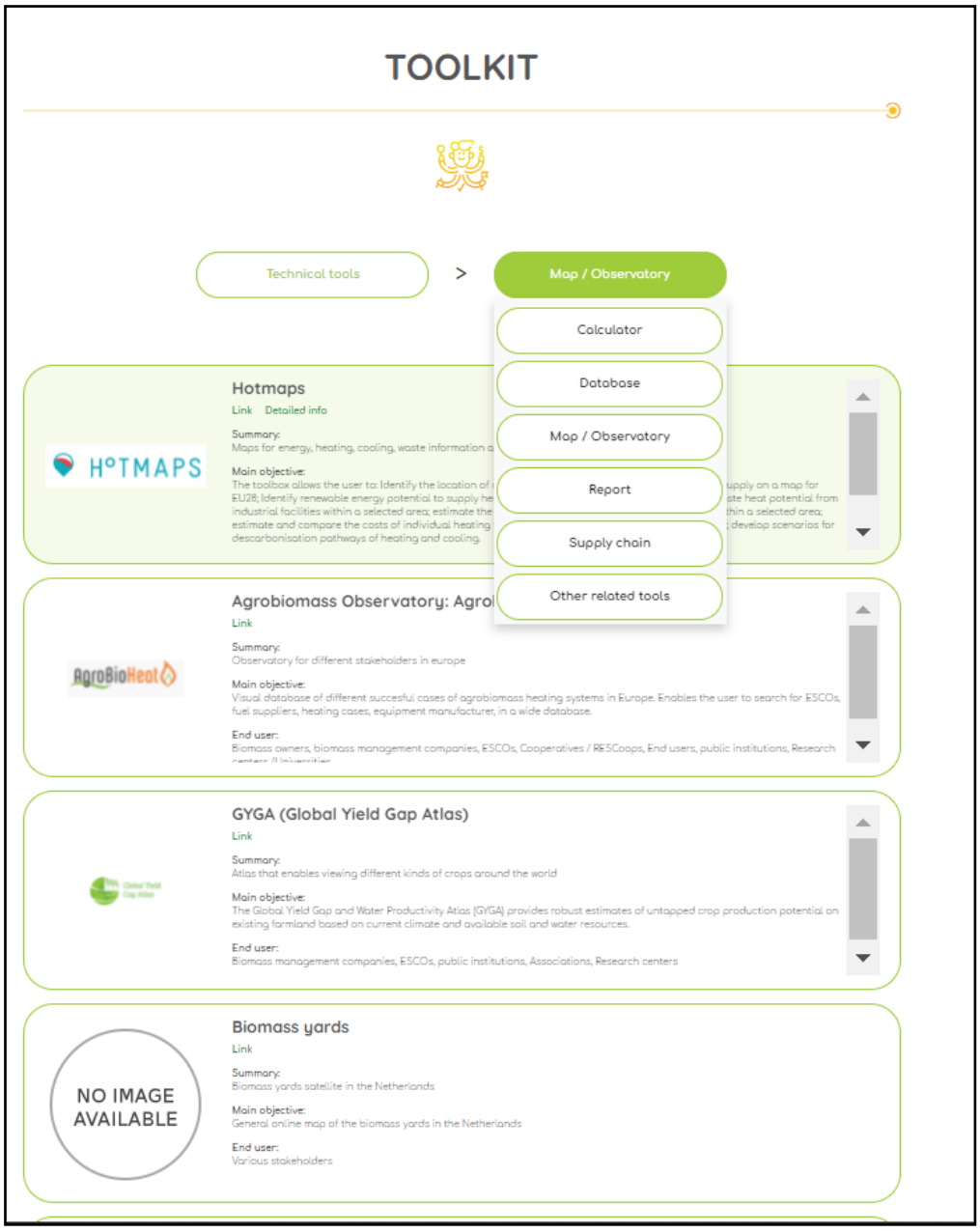


Figure 7. Drop-down menu in the tools categories

3 Conclusions

The main aim of the task is to develop the **BECoop toolkit, a repository of tools that can be relevant for bioenergy community projects, with a view to effectively deploy the concept of BECoop to its target audiences, as well as to increase the support of the project to new and existing communities**.

The toolkit can also be used by other tasks of the project and more specifically for the assistance of the identified community cases that will be supported by the pilot partners throughout the project (e.g. in WP4). The developed toolkit, along with the activities and results of the project, will support these communities during and after the end of the project, for the definitive deployment and uptake of this new form of organisations.

All partners have collaborated to maximise the impact of this toolkit, by providing more tools to enrich the environment and by deciding which tool could be more useful for the energy communities. Other relevant stakeholders that are involved in the community energy supply chain can also see themselves benefited by this toolkit.

The toolkit is a living platform and will continuously be updated in line with the project's progress. A revised version will be delivered in M24 (October2022) and will be based on the experience gathered in the first 24 months of BECoop, taking into account the opinion of relevant stakeholders and pilot partners.

The information provided about each tool will be adjusted, in order to increase and improve project's capability to help the targeted stakeholders and better convey the BECoop vision to the European community. The overall analysis will be presented in a workshop that will be recorded and uploaded to the toolkit to be used as a guideline for the selection of the most beneficial tool in each specific case.

4 Annexes

Annex I: Complete list of tools under the BECoop toolkit

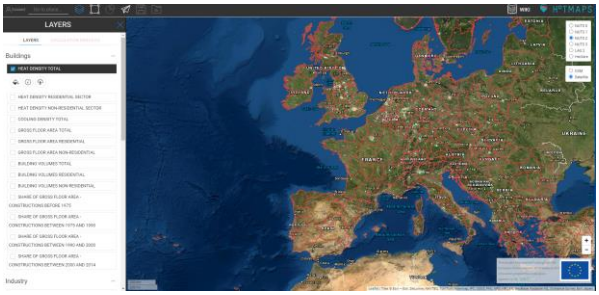
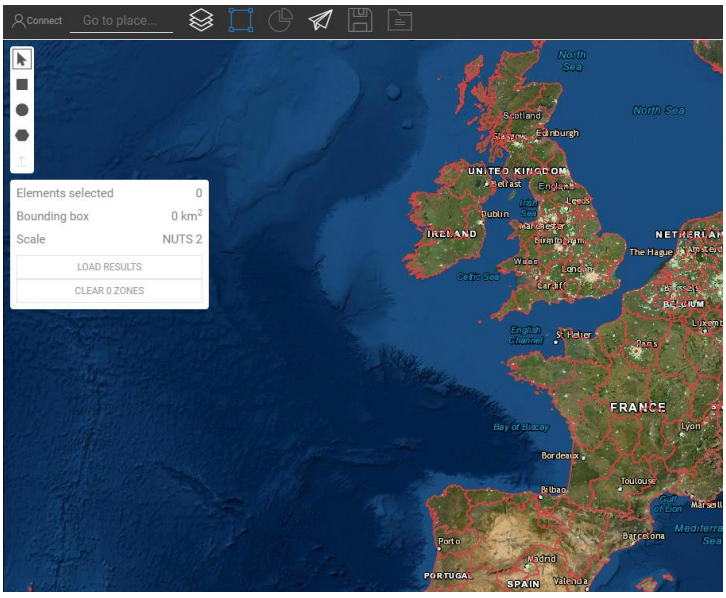
The complete list of studied tools is presented below:

Table 5. Complete list of studied tools

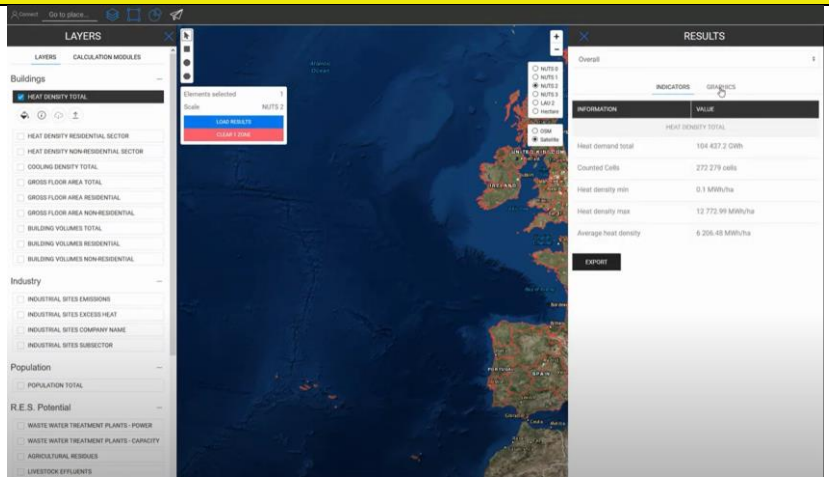
Technical tools	Business model tools	Community model tools	Related projects
• S2BIOM • BEAT2 • The Bioeconomy Tool Shed • BioESoil • BioGrace-I GHG • BioGrace-II GHG • CFPAN tool and database FeedPrint • BioTrade2020+: European Bioenergy Trade Strategy • Biomass yards • BioSAT • FAO Food Balance Sheet database • Biomass Geo-Wiki • GYGA (Global Yield Gap Atlas) • GenLess:Wood Energy Calculator: • Hotmaps • Phyllis 2 • Agrobiomass Observatory: Agrobioheat • uPRuning Observatory • Heat Roadmap Europe • BIOPLAT • REPLACE • Becool • Flemish Bioeconomy Dashboard • Systemic • SOPHENA by Carmen eV. • IDAE • Smallbiogas • ENABLING • BioBoost Geoportal	• ESCSS-SAT • BERST: BioEconomy Regional Strategy Toolkit • BIORAISE • VALERIE • DataM • TRASE: Transparent supply chains for sustainable economies • WISDOM: “Woodfuel Integrated Supply/Demand Overview Mapping” • BioEnergy Association: Best practice guideline for life cycle analysis of heat plant projects • RESCoop Handbook • Heat Roadmap Europe • THERMOS • CELSIUS TOOLBOX • SUCELLOG • SRC+ • SCORE • Biomass TradeCentre II • F-PI • Energy Management Self Assessment Tools • PublEnEF: Energy Efficiency Policy Support	• Loomio • GraphCommons • Discourse • AGORA VOTING • Your Priorities • Consul • Freecoin	• VinyesXCalor • Twecom NWE • ARBOR NWE • Graskracht • BiogasAction • BIOMASUD PLUS • EU-GUGLE • VITIBiOM • AgroFossilFree • mPOWER • LIFE+ Biodiversidad y Trasmochos

Annex II: In-depth tools' study

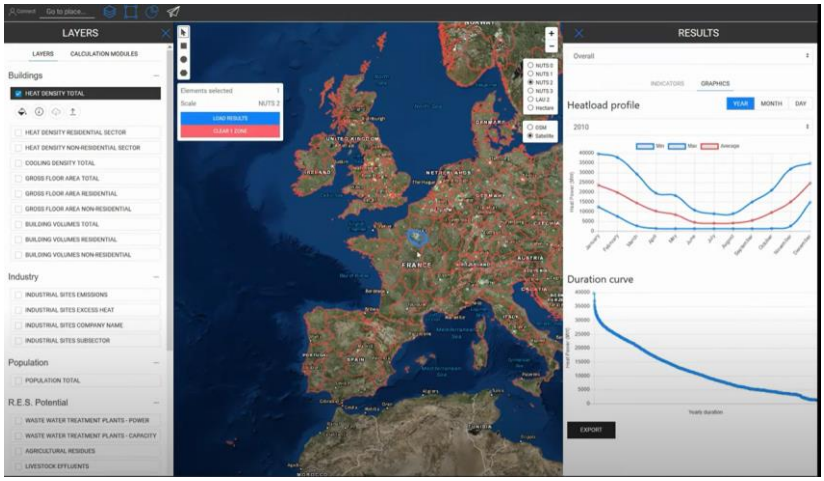
Name of the tool	HOTMAPS
Logo	
Link	https://www.hotmaps-project.eu/
Brief Description	The overarching goal of Hotmaps is the development of an open source heating / cooling mapping and planning toolbox and to provide default data for EU28 at national and local level. These data and tool allow public authorities to identify, analyse, model and map resources and solutions to supply energy needs within their territory of responsibility in a resource and cost efficient way. Those results will help authorities to develop heating and cooling strategies on local, regional and national scale which are in line with RES and CO_2-Emission targets on national and EU level.
Type of tool	Bioenergy relevant tool
Subtype	Tool
Related to	Technical tool
Most valuable information that can be obtained	The toolbox allows the user to: • Identify the location of current heating and cooling demand as well as supply on a map for EU28; • Identify renewable energy potential to supply heating and cooling for a selected area; • Identify waste heat potential from industrial facilities within a selected area; • Estimate the potential for efficient district heating options within a selected area; • Estimate and compare the costs of individual heating vs. district heating options within a selected area; • Develop scenarios for decarbonisation pathways of heating and cooling.
How does the tool work / manual of the tool	The Hotmaps toolbox allows you to provide within 5 minutes a first estimation of heating and cooling demand in your region and the potentials of local renewable energy to cover this demand. Subsequently, by using data that are more detailed

Name of the tool	HOTMAPS
	and applying calculation modules of the toolbox, you are able to elaborate much more comprehensive heating and cooling strategies. Quick introduction into the toolbox: As a starting point, the Hotmaps toolbox provides a wide range of relevant data for heating and cooling planning in EU-28 countries. This data can be visualized on the toolbox. Once you open the toolbox, you see the map of Europe. In order to visualize the data in the toolbox, you should open the “LAYERS” window from the Hotmaps toolbar.  The default data sets are categorized in “Building”, “Industry”, “Population”, “R.E.S. potential”, “Climate” and “Electricity”. The symbology helps you to understand the meaning of colours on the map. Also for additional information about the layer, you can use the information button. You may download the whole data set, or just select an area and download the corresponding data for your selection. The selection tool allows for administrative boundary selection and flexible selection including rectangular selection, circular selection, and free selection. If you wish to select and administrative boundary, you should first determine the zoom level on the pan provided on the top-right corner of the toolbox.  For flexible selection types, you should choose the Hectare zoom level. You can also select or deselect multiple areas in each zooming level. For example, you can select a number of areas or deselect some of them. With the Hotmaps toolbox, not only you can visualize and download data, but also you can get some indicators of your area of interest. Once you select an area, you can press on the “LOAD RESULTS” button and see the corresponding indicators and graphics in the “RESULTS” window.

Name of the tool	HOTMAPS



The values on the "RESULTS" window update as you select or deselect areas.



In addition, new indicators appear to the RESULTS window as you select more layers. The user account allows the user to upload data to a confidential, secure space on the platform, compare own data or other data sources with the existing Hotmaps data sets or just visualize them, perform calculations, safe working sessions and much more. Click on the "connect" button on the Hotmaps toolbar.

If you already have the username and password, you can directly log into your account. Otherwise, you must register first. Registration is easy. You just need to write your name and email address. Then, a confirmation email is sent to your email address. You just need to follow the instructions in the confirmation email to register your account – really easy and usual method.

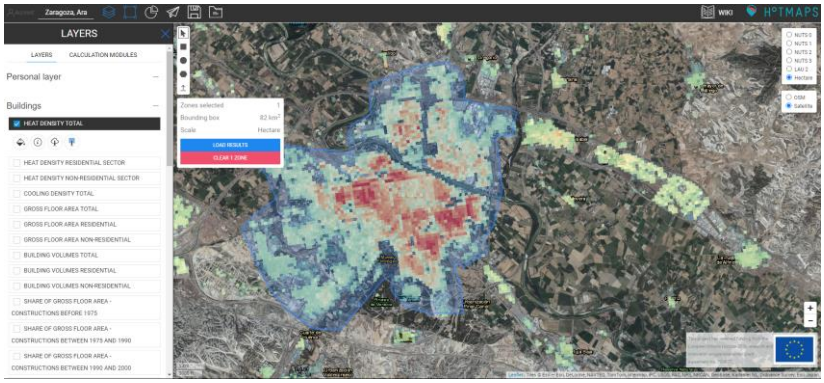
Once you are logged in, the "personal layer" category is added to the layers. Here, you see the list of your uploaded layers. To upload a layer, click on the connect button. Here, select the type of layer you want to upload and then, press the upload button. You can delete the uploaded layer any time you want by pressing on the delete button.

Now we are going to show an example of a practical calculation with the toolbox, after we have a first impression of it.

For example, as a heating and cooling planner, let's assume I am interested on knowing the district heating potential in the municipality of Zaragoza, in Spain. We

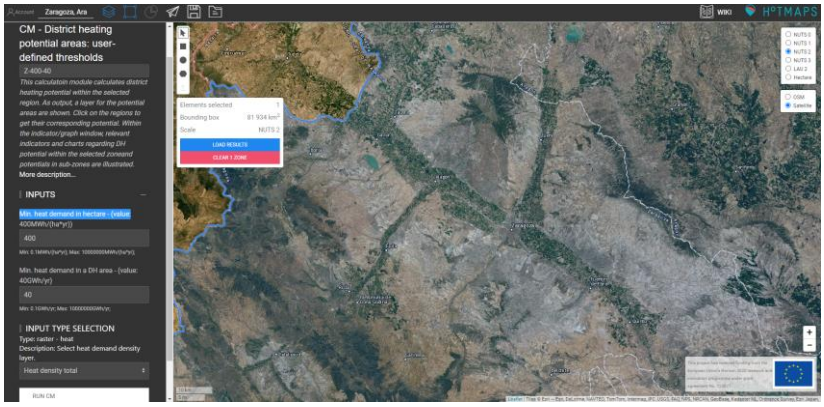
Name of the tool	HOTMAPS

can use the “Go to place” bar to find Zaragoza and zoom to it. Then, we select the part of the city that we are interested in.

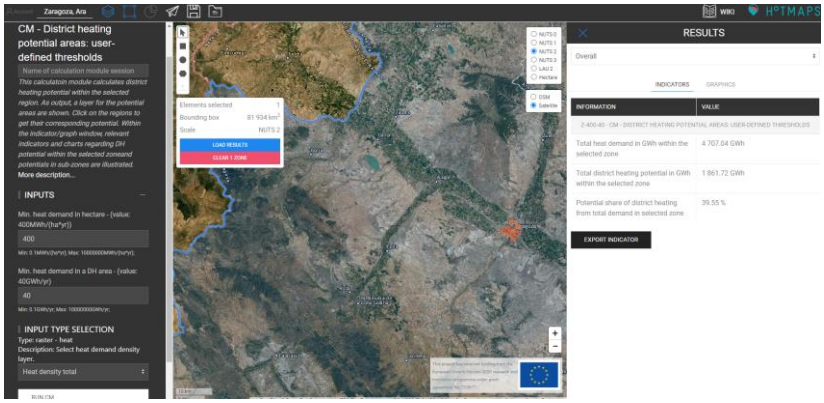


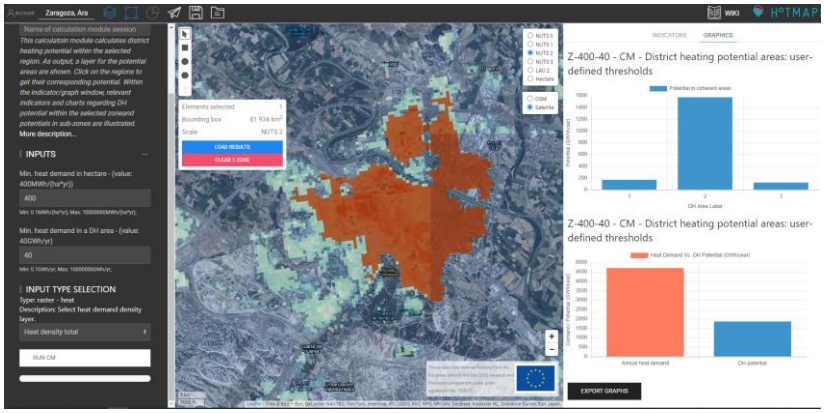
Now, let’s go to the “CALCULATION MODULE” tab and select the “district heating potential areas: user-defined thresholds” calculation module. The short explanation of the calculation module should help us understand the idea behind this calculation module. If you need further explanation about the methodology, concept, and running of the module, use the Hotmaps Wiki page.

For our case study, we want to see the district heating areas with minimum heating demand of 400 MWh/ha and minimum annual demand of 40 GWh in the area. Recommendation: Give a meaningful name to your running session – this name will appear for all output layers, therefore, you can be sure that you will not mix up different runs. Here, I write “Z-400-40”.



Now press the “Run CM” button and wait until the calculation is done. New graphics and indicators will appear to the results window. The name of the running session is shown also above them. In the indicator section, we can see the total heat demand and district heating potential in the selected area.



Name of the tool	HOTMAPS
	These two are also illustrated in graphics and you can see the potential in each district heating area with the labels given to them.  Additionally, the district heating area map is added to the maps and to the Layer window. If you click on the district heating area on the map, you see the label assigned to the district heating area potential. In the layer window, this layer appears under “calculation mode” category. The Hotmaps toolbox is still under development and many more features will be added to it. Meanwhile, you just can report your feedback by clicking in the Feedback button on the Hotmaps toolbar.  You just need to write your name and affiliation, set the feedback type, the title of your message and insert your feedback in the description field. You can also attach some screenshots to share it with the developers.
Who is this tool destined to (potential users)	Local authorities, Local economic players, RESCoops, Energy Communities, Research Centers, Investors.
How can this tool affect/benefit or help a relevant stakeholder?	Hotmaps is a **GIS-based online software** that supports authorities and energy planners to set up a **strategic heating and cooling plan** for their region. Hotmaps offers an open-source online software that supports the planning processes of the energy sector at local and national levels in a transparent manner. It is a website provides within 5 minutes a first estimation of the heating and cooling demand in any European region as well as the local renewable energy potential to meet this demand. Subsequently, by using more detailed data and applying Hotmaps calculation modules, much more comprehensive heating and cooling strategies can be elaborated. Thanks to this software, you will be able to make practical decisions in your area of interest (village, town, city, region, etc.). The applicability of Hotmaps has been proven and demonstrated in seven pilot areas. The same projects also includes the creation of two handbooks (Definition & experiences of strategic heat planning; Guidance for comprehensive assessment of efficient heating and cooling) which can be really useful for those who want to establish a new successful district heating case and do not have the required experience. It also includes a case description of strategic heat planning.

Name of the tool	HOTMAPS
Additional information of the tool	For additional supports on heating and cooling planning, please refer to the Hotmaps handbooks and to the Training Material page: • Summary of the Hotmaps Handbooks for strategic heat planning • Handbook 1 – Definition & experiences of strategic heat planning • Handbook 2 – Guidance for comprehensive assessment of efficient heating and cooling • Appendix report to the Handbook for strategic heat planning: Case descriptions • Training Material You can also find a Hotmaps Wiki, where the documentation, guidance and manual of the Hotmaps toolbox is hosted. It consists of the following main parts: • Data sets, • General toolbox functionalities, • Calculation modules, • How to apply the Hotmaps toolbox? • Developers. The **Data sets** section provides information about Hotmaps data set repositories as well as methodologies for gathering these data sets. The **General tool functionalities and structure** section guides the user through the interface of the toolbox. The section covers all general aspects of the toolbox, which are related to the user experience, e.g. navigating through different parts of the toolbox, layer selection, retrieving indicators, data upload and export functionalities etc. The **Calculation Modules** section provides an in-depth explanation of concepts and methodologies behind the calculation modules. Besides the explanation of the methodology, the provided examples and test runs for each calculation module help the user to obtain an understanding of input parameters and output results. Some calculation modules are integrated into the toolbox, while others are stand-alone. The section "**How to apply the Hotmaps toolbox?**" is one of the most important sections of the wiki. It helps Hotmaps users to perform heating and cooling planning with the Hotmaps toolbox and includes guidelines on using Hotmaps at the local and national levels, as well as training materials. This section illustrates how different calculation modules can be used to analyse different aspects of the heating and cooling system and different research questions. Furthermore, it shows, how the calculation modules can also be used as a chain of tools to derive scenarios for heating and cooling of certain areas. The **Developers** section contains all information required for developers to contribute to the Hotmaps toolbox or to understand how it works. It explains the IT infrastructure of the Hotmaps toolbox, data set integration, contribution in calculation module development, etc.

Name of the tool	HOTMAPS
Organisation/ project that developed/ manages the tool	The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723677EEG - TU Wien: Lukas Kranzl, Mostafa Fallahnejad, Jeton Hasani • CREM: Thierry Bernhard, Lesly Houndole, Albain Dufils • e-think: Marcus Hummel, Andreas Müller, Giulia Conforto, David Schmidinger • EURAC: Pietro Zambelli, Giulia Garegnani, Simon Pezzutto • Fraunhofer ISI: Ali Aydemir, David Schilling, Lisa Neusel, Tobias Fleiter • HES-SO: Daniel Hunacek, Lucien Zuber, Matthieu Dayer • Planenergi: Anders M. Odgaard
Responsible for the study of the tool and organisation	Fundación CIRCE

Name of the tool	LOOMIO
Logo	
Link	https://www.loomio.com/
Brief Description	Any organization or group looking to reduce email overwhelm, bring people together to make a decision, agree on an outcome, and keep a record of decision making can use this tool. Typical Loomio users include: • Boards • Professional service organizations • Membership organizations • Community groups Loomio supports community and volunteer organizations around the world by offering a low one-time payment for community groups to engage with as many people as they need, and for as long as they need. A free community lifetime subscription is included with annual Pro plan subscriptions so a business can sponsor a community organization of their choice. Important: It's not a free tool – There exists a free trial and special prices for non-profit organizations, but there is not a free version.

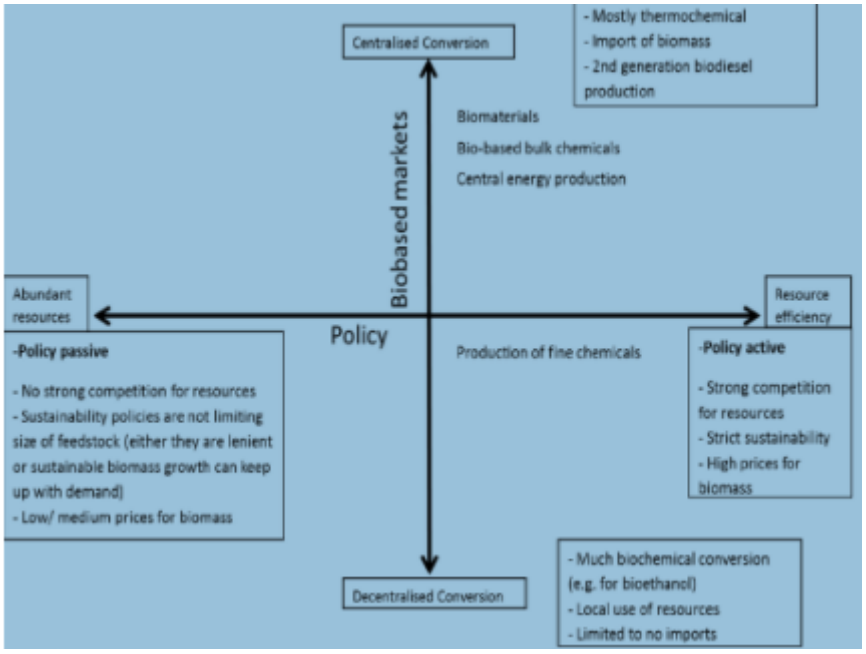
Name of the tool	LOOMIO
Type of tool	Digital innovation tool
Subtype	Tool
Related to	Community model
Most valuable information that can be obtained	You can create threads to discuss important organizational issues, bring new ideas or argue about identified problems, surveys to gauge widespread opinion or facilitate the decision making of the organization/community, and manage all the members accounts of your community. You can also create groups to differentiate participants from organization of the community or involve the adequate people in the adequate arguments.
How does the tool work / manual of the tool	User-friendly tool. • Starting threads: You can start a thread by clicking *New Thread* from a group page. When you start the thread, it will be visible to all of the group's members. Give your thread a title, try to keep it short and to the point. You can always update the title of the thread later. Use the thread context to introduce the topic. Give background information or links that people will need to participate and explain what kind of participation you're looking for. The context will always stay at the top of the thread, above the thread's comments, proposals and polls. It is also possible to create subgroups, as a way to send notifications to a specific set of people within the group settled for the thread. • Thread privacy: If your group privacy is *closed* or *secret*, then your threads will be private. Private means only members of the group are able to view the threads started in this group (except when you invite such people as an expert or any guest not currently part of your group). If your groups are *open* then all your threads will be public, meaning that anyone with the URL can view the thread. • Thread context: The *thread context* has special status within a thread. It's always at the top, and it's always visible on the page. Like a comment, you can format your text and attach files and images. Unlike a comment, anyone in the group can update the context (and the title of the thread) by default. This means you can enable anyone to pitch in and help keep things easy to understand and easy to find. The context is like the whiteboard in your meeting room, where you can write the agenda, the hopeful outcomes and how you aim to get there and take group notes. It is also possible to attach files from local drives to the thread, and to remove attachments by editing options. • Comments and replies: The most common activity in a thread is commenting. Comments are shared with everyone in the thread - usually this is just the members of your group.

Name of the tool	LOOMIO
	First look for *comment* and your user photo (or initials) – *Make sure that comment is highlighted, not proposal or poll.* Write your comment and press post to have your say. Replies are like comments except in that the author of the original comment will be notified of your reply. Click reply on the comment you would like to associate your comment with, as it will be nested underneath theirs – by default – in the thread in which you replied. You can reply to your own comment in order to nest your reply underneath the comment. Click the three horizontal dots to find reply in this case. You can also *react* to any comment or thread's context which means to quickly respond with an emoji. Notification will be sent within Loomio but not by email. They enable to acknowledge something someone has said without interrupting the conversation. Formatting comments: Use the formatting tools underneath the space in which you write (any form). Hover the mouse/cursor over each item to know what it is. Options are similar to regular text editors offering to stylize formats, add attachments or links. Moreover, it is possible to embed video links from hosting websites (YouTube, Vimeo…), create checklists that allow to cross out to-dos from the edit form of any context or thread. Comment revision history: If you have new information or are coming back after and extended period of time, just make a new comment, then people who have already read your comment will see that there is new information. Automatic Translation: useful for international communities or groups, Loomio can automatically translate content from one language into another just checking *Translate comment* option in the drop-down of the comment in question, from the three horizontal dots. • Category tags: Category tags (or just tags) let you group any number of threads by categories that you define. You can use them to make it easy to find threads of a certain type or topic. You can apply tags upon starting your thread. • Facilitation and decision tools: There are a selection of facilitation tools and decision tools available to you from within the thread. Proposals enable groups to respond and provide feedback on a specific topic in order to arrive to an outcome. Often, you can use proposals to bring the discussion to conclusion. They are there to help you see if there is agreement about a statement or course of action and surface the disagreement if that's what needs to happen. As in threads, it is possible to attach any supporting documents and set a duration for responses. Polls are useful to understand preferences of the group. All polls allow you to invite people, set a deadline with a reminder, and include options for anonymous voting. Several modes of poll are possible as time polls (find the best time for a meeting), ranked poll (vote for a preferred order of a series of options), Standard (similar to a multiple/single option survey).

Name of the tool	LOOMIO
	• Ask a question: Most productive conversations start with questions. Start a new thread for each new inquiry; an inquiry can include several related questions. Use open questions to explore and get more engagement. Engage people directly by @mentioning them and asking them specifically. If you can, name any clear, shared outcome or understanding that results. As with any thread, a clear, simple title will help people find answers to engage now and reflect on down the road. • Prepare for an event: Start one thread per event, edit the thread context to let people know what kind of participation is being asked, set some polls to arrange time meetings, pick a date, collaborate on agenda-setting and record actions. Embed videos, attached audios or links are interesting for whom missed the meeting. • Take a document to completion: Start one discussion thread and link or attach the key artifact in the context. Use proposal and outcomes so that everyone is clear on what's next.
Who is this tool destined to (potential users)	Non-hierarchical groups or organizations that aim to give all members voice in the process, non-traditional top-down decision-making communities, or consensus committees requiring every member point as: professional service firms, commercial boards, non-profits and government agencies
How can this tool affect/benefit or help a relevant stakeholder?	Loomio represents a simple, effective tool that helps groups to move aligned with their objectives, solving slow and inefficient group decision making. It offers a low one-time payment source tool for community groups to engage virtually with as many people as they need, and as long as they need. Loomio's business model is operated sustainably by a small team, which offers customized guidance and support. Depending on subscription plan, Loomio will allow stakeholders to start making collaborative decisions with unlimited members, discussions, threads and subgroups integrating Slack and Microsoft Teams Software, to achieve faster positive outcomes with dedicated Loomio's expert training and implementation support. The enterprise plans include a tailored community design, which may perfectly suit contracting institution with personal Feature interface text configuration, private databases server residencies of choice, potential integration with other servers, analytics reports of tool's traffic and maintenance & technical support.
Additional information of the tool	For additional supports on Loomio online tool system, please refer to Loomio User Manual and Training Material page: • Loomio Blog | Loomio Blog • Overview | Loomio Help • User Manual | Loomio Help • Guides & Inspiration | Loomio Help • Subscriptions | Loomio Help • FAQs - Loomio

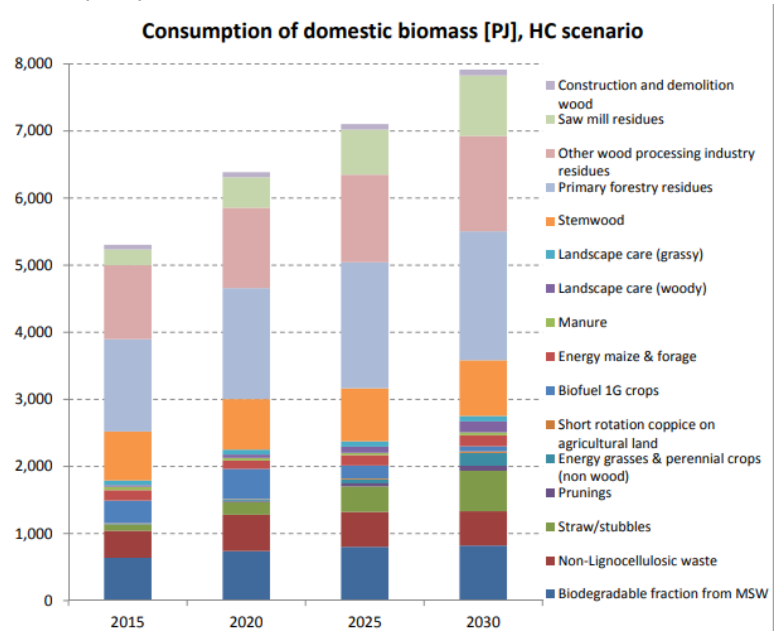
Name of the tool	LOOMIO
	• Contact - Loomio
Organisation/project that developed/manages the tool	"Loomio" is a registered trademark of Loomio Cooperative Limited. Loomio is not created by or affiliated with Slack Technologies Inc. or Microsoft Corporation. © 2021 Loomio Limited is a for-profit social enterprise owned by worker-owned Loomio Cooperative.
Responsible for the study of the tool and organisation	Fundación CIRCE

Name of the tool	S2Biom
Logo	
Link	https://s2biom.wenr.wur.nl/home
Brief Description	The S2Biom project - Delivery of sustainable supply of non-food biomass to support a "Resource-efficient" Bioeconomy in Europe - supports the sustainable delivery of nonfood biomass feedstock at local, regional and pan European level through developing strategies, and roadmaps that will be informed by a "computerized and easy to use" toolset (and respective databases) with updated harmonized datasets at local, regional, national and pan European level for EU28, Western Balkans, Moldova, Turkey and Ukraine. It meant a collaboration of 31 Partners from 16 countries. Its objectives: -Analysis of the biomass potential and respective conversion pathways. -Analysis of political and policy framework conditions and application of sustainability criteria in EU28 and neighboring countries. -Development of transnational Strategies, Roadmaps and Toolbox for a resource-efficient bioeconomy in Europe. -Development of a web-based interactive tool and material for the support of the economy, research and policy for local, regional and national stakeholders.
Type of tool	Technical and business model, policy
Subtype	Supply chain
Related to	Technical
Most valuable information that can be obtained	The S2BIOM toolset contains all data, tools, documents and reports generated in the S2BIOM project. Under the different tabs in the main menu the user can click to get access to these different tools, data, documents and reports. The tools enable the user to interact with the results by making sub-selections for

Name of the tool	S2Biom
	data of interest; or to design own biomass delivery chains and evaluate the performance; or to obtain to-the-point information on specific issues of relevance for developing biomass delivery chains. These can be key characteristics on logistical components, biomass conversion technologies, matching of biomass types with technologies, biomass potentials, cost and characteristics, biomass markets, sustainability issues, policies and regulations, and national biomass strategies.
How does the tool work / manual of the tool	User-friendly tool. **General data**: In S2BIOM **4 scenarios** were elaborated which serve as the basis for the assessment of future biomass demand and consumption patterns for energy and biobased products and cover EU28, western Balkans (WB), Moldova (MD), Ukraine (UKR) and Turkey (TR). **The 4 scenarios are:** 1) Centralised Europe scenario: Large biorefineries within Europe 2) Decentralised local scenario: Local/ regional decentralized units 3) Policy active scenario 4) Policy passive scenario  The scenarios were used as a basis to assess with the ReSolve model, which were specified in a continuum of 2 key uncertainties: a) availability level of sustainable biomass, influenced by the strictness of sustainability criteria, policies or competition for resources b) extension of biomass production either large-scale centralize systems or small-scale decentralized units. Result: assess to future biomass demand and consumption patterns **Biomass demand**: information in form of text and links to documents from directory analysing current and future biomass from energy and biomaterial

Name of the tool	S2Biom

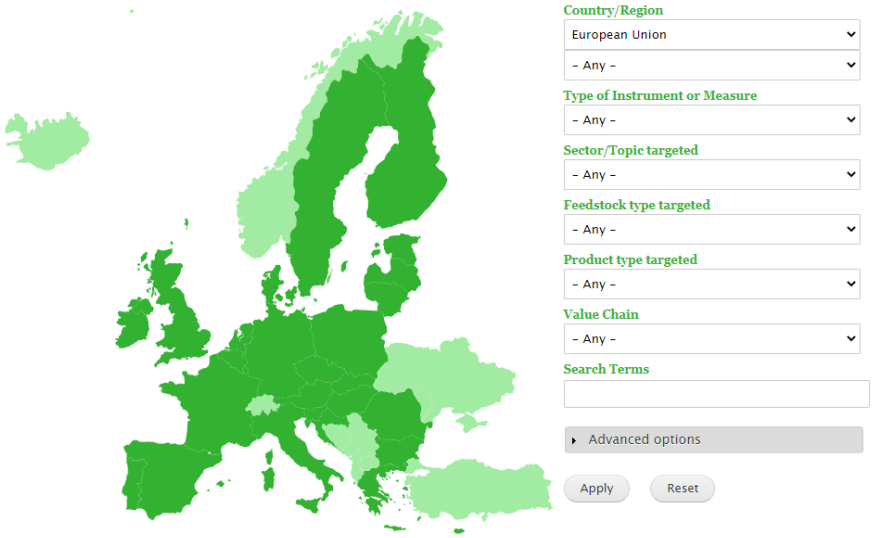
sector perspectives, assessed with ReSolve model for 4 scenarios.



Regulatory and Financial frameworks: links to open documents from directory to a catalogue of policy instruments (agriculture, forestry, biofuels, emissions…) and measures, information on regulatory and financial frameworks impacting bioeconomy.

Regulatory Viewing Tool:

Collects all data on regulations through interacting displayed Biomass Policy Tool map, were it is possible to search in a targeted way for Instruments & Measures that foster the development of regional bioeconomies.



You can filter the catalogue to only list the results relevant to your needs.

Example 1: Suppose you are interested in Economic or Financial instruments as a 'Type of Instrument or Measure', that are applicable to the Energy sector. Just select the corresponding "Type of Instrument or Measure" and "Sector/Topic targeted".

Name of the tool	S2Biom

Clicking Apply, will give you the following result:

Short name of Instrument or Measure	ISO	Country/Region	Type of Instrument & Measure	Sector/Topic targeted
Clean Energy Services Programme		KENYA (JAMHURI YA KENYA)	Subsidies	Energy
Clean Energy Services Programme		KENYA (JAMHURI YA KENYA)	Subsidies	Energy
Clean Energy Services Programme		KENYA (JAMHURI YA KENYA)	Subsidies	Energy
Clean Energy Services Programme		KENYA (JAMHURI YA KENYA)	Subsidies	Energy
Clean Energy Services Programme		KENYA (JAMHURI YA KENYA)	Subsidies	Energy
Clean Energy Services Programme		KENYA (JAMHURI YA KENYA)	Subsidies	Energy
Clean Technology Fund		INDONESIA (REPUBLIK INDONESIA)	Investment Subsidies	Energy
Clean Technology Fund		INDONESIA (REPUBLIK INDONESIA)	Investment Subsidies	Energy
Clean Technology Fund		INDONESIA (REPUBLIK INDONESIA)	Investment Subsidies	Energy
Clean Technology Fund		INDONESIA (REPUBLIK INDONESIA)	Investment Subsidies	Energy

1 2 3 4 5 6 7 8 9 … next › last »

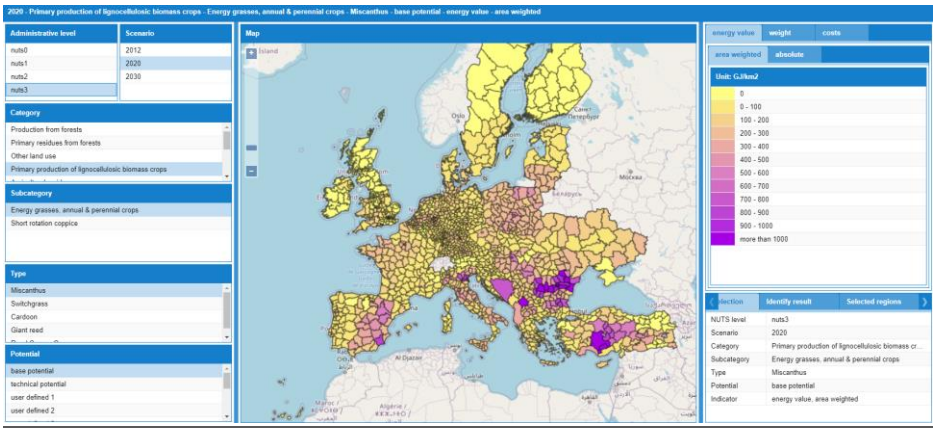
Example 2: Alternatively, if you want to see all German Instruments and Measures that are currently In Force. Choose "Germany" in the 'Country/Region' select box. Additionally open the 'Advanced options' section and choose "In force" in the Status select box.

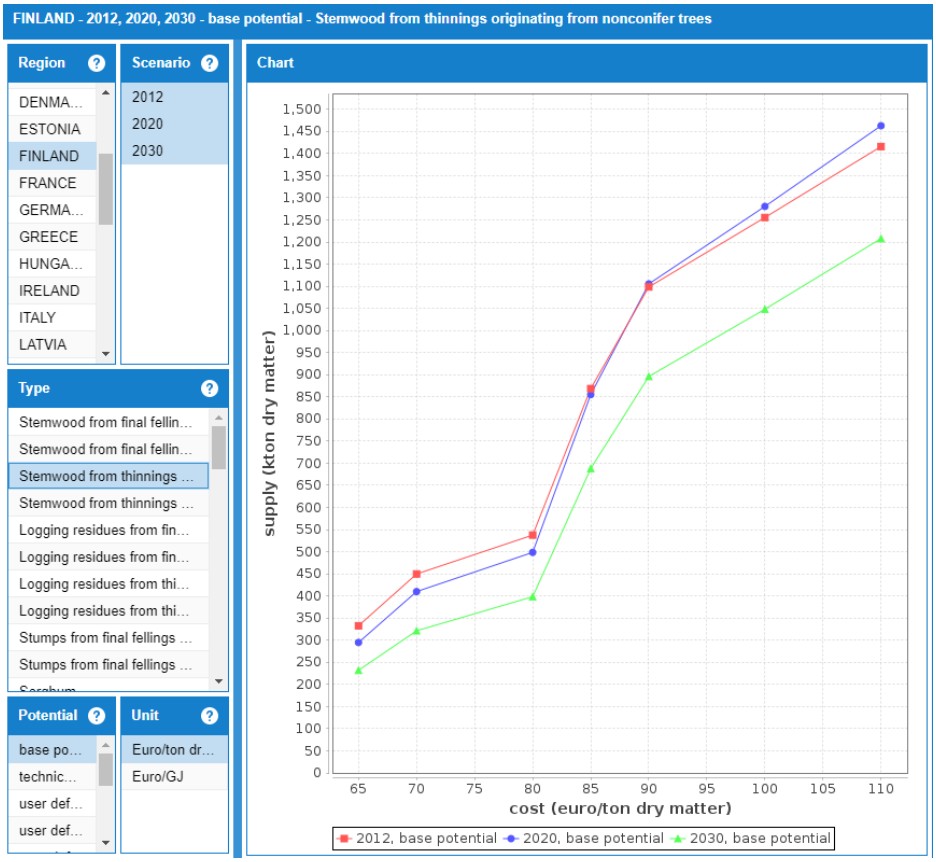
Clicking Apply, will give you the following result:

Short name of Instrument or Measure	ISO	Country/Region	Type of Instrument & Measure	Sector/Topic targeted
Bio Innovation Growth mega Cluster	BE	VLAAMS GEWEST, NORDRHEIN-WESTFALEN, NETHERLANDS (NEDERLAND)	Platform	Clustering, co-operation and networking
Cross-Border Innovation Fund (GCS)	BE	VLAAMS GEWEST, NORDRHEIN-WESTFALEN, Limburg (NL)	Economic/financial instruments	Agriculture, Biotechnology, Climate, Clustering, co-operation and networking, Communication and information, Consumer and societal affairs, Economy, Environment (soil, water, air, nature, biodiversity,...), Health & public safety, Industry, enterprise and commerce, Mobility, transport and logistics, Products
Interreg IVB	BE	BELGIUM (BELGIQUE-BELGIË), GERMANY (DEUTSCHLAND), IRELAND, LUXEMBOURG, Utrecht, ENGLAND	Economic/financial instruments	Agriculture, Industry, enterprise and commerce, Products
Biovalley	CH	SWITZERLAND (SCHWEIZ/SUISSE/SVIZZERA), EST, BADEN-WÜRTTEMBERG	Platform	Clustering, co-operation and networking, Communication and information, Education, training and human ressource development, Industry, enterprise and commerce, Research and Innovation

(Note that the result will include all Instruments and Measures that are applicable to Germany as well as to any of its regions)

Biomass chain data tool:



Name of the tool	S2Biom
	Under the item 'Biomass chain data' access is provided to all data included in the central S2BIOM database and this is accessed interactively through several viewing tools. It is possible to visualise either overall number of biomass availability. Cost-supply per kton of defined biomass. On the left side we can define which items cost and supply information we desire to collect. The information has been collected on 56 types of biomass, at various NUTS levels and for 2 to 9 types of potentials. The biomass types are divided into 9 categories with 15 subcategories. The geographical information is organised by the 2013 NUTS regions.  Database for biomass conversion technologies: An overview of available conversion technologies and their properties is stored in the conversions table and related tables. The related tables are one-to-many sub-tables for output capacity and for additional input that might be needed for the conversion process. Finally, there are domain tables to store possible values for selected attributes. The properties collected for conversion technologies belong to several categories: 1. General properties.

Name of the tool	S2Biom

View details of Dry Batch Digestion (MSW)

GENERAL PROPERTIES

Name	Dry Batch Digestion (MSW)	Level of commercial application	Commercial large scale
Main category	Anaerobic digestion	Important pilots and EU projects	Only to develop innovations
Subcategory	Plug flow digester	Expected Developments	Mainly in biogas upgarding and in efficiency improvement
Image url		Current Technology Readiness Level in 2014	Level 9, System ready for full scale deployment
Year of first implementation	1900	Expected Technology Readiness Level in 2030	Level 9, System ready for full scale deployment
Estimated number of systems in operation	100	Justify expected Level in 2030	System is commercial - Innovations implemented

Main operating principle:

Mainly used for Municipal Solid Waste (MSW). MSW or comparable substaret is digested over a 2 to 4 week period in a closed area. It is a batch process. Temperature can be between 30 and 60C.

2. Technical properties.

View details of Dry Batch Digestion (MSW)

TECHNICAL PROPERTIES

Capacity of outputs (typical values)

Power (MWe) 1					
Conversion efficiencies: net returns electricity(GJ/GJ biomass input)	typical: 0.2	min: 0.1	max: 0.4	typical in 2020:	typical in 2030:
Biogas (m3/hour) 700 LHV (GJ / m^3) 19.7					
Conversion efficiencies: net returns fuel(GJ/GJ biomass input)	typical: 0.5	min: 0.2	max: 0.90	typical in 2020:	typical in 2030:
Methane (m3/hour) 420 LHV (GJ / m^3) 32.8					
Conversion efficiencies: net returns fuel(GJ/GJ biomass input)	typical: 0.5	min: 0.2	max: 0.9	typical in 2020:	typical in 2030:

Data sources used to define conversion efficiencies in 2014:

Depends on biomass input type!

Data sources used to define conversion efficiencies in 2020:

Data sources used to define conversion efficiencies in 2030:

General data sources for technical properties:

External inputs (not generated by the biomass in the conversion process)

Power	(kW): 1000
Heat (useful, not process steam)	(kW): 1000

Indication: experience based data	Yes
Number of possible full load hours per year (hours)	5000
Number of typical full load hours per year (hours)	3500
Typical Lifetime of Equipment (years)	15

3. Biomass input specifications

View details of Dry Batch Digestion (MSW)

BIOMASS INPUT SPECIFICATIONS

Biomass input, common for the technology used:	HH MSW, Household waste; NACE MSW, Waste not from households; NACE Vegetal, Waste not from households; Grass, Abandoned grassland; Grass, Biomass (roadside Verges);
Biomass input, technically possible but not common:	Cardoon, Energy Grasses, Annual Crops, Perennial Crops; Sorghum, Energy Grasses, Annual Crops, Perennial Crops; Reed Canary Grass, Energy Grasses, Annual Crops, Perennial Crops; Maize, Straw/stubbles;

Traded form	Other (Black liquor, BMW, PO etc.)
Dimensions	Not applicable

Moisture content	(% wet basis) typical 50	max 70
Minimal bulk density	(kg/m^3, wet basis) 500	
Maximum ash content	(% dry basis) 40	
Minimal ash melting point (= initial deformation temperature)	(°C)	
Volatile matter (only for thermally trated material, torrefied or steam explosed)	(VM%)	

Maximum allowable contents

Nitrogen, N (wt%, dry)	Sulphur, S (wt%, dry)	Chlorine, Cl (wt%, dry)

Optional attributes

Net caloric value	(MJ/kg) min	max
Gross caloric value	(MJ/kg) min	max
Biogas yield	(m^3 gas/ton dry biomass) 50	% methane 50
Cellulose content	(g/kg dry matter) min 0	max 100
Hemicellulose content	(g/kg dry matter) min	max 100
Lignin content	(g/kg dry matter) min 0	max 100
Crude fibre content	(g/kg dry matter) min 0	max 100
Starch content	(g/kg dry matter) min 0	max 100
Sugar content	(g/kg dry matter) min 0	max 100
Fat content	(g/kg dry matter) min 0	max 100
Protein content	(g/kg dry matter) min 0	max 100
Acetyl group content	(g/kg dry matter) min 0	max 100

4. Financial and economic properties.

View details of Dry Batch Digestion (MSW)

FINANCIAL AND ECONOMIC PROPERTIES

Investments costs	in 2014 (€): 5000000	expected in 2020 (€):	expected in 2030 (€):	Labour needed	Operators (FTE): 1	Staff and engineering (FTE): 1

Same information and methodology are established for biomass logistical concepts.

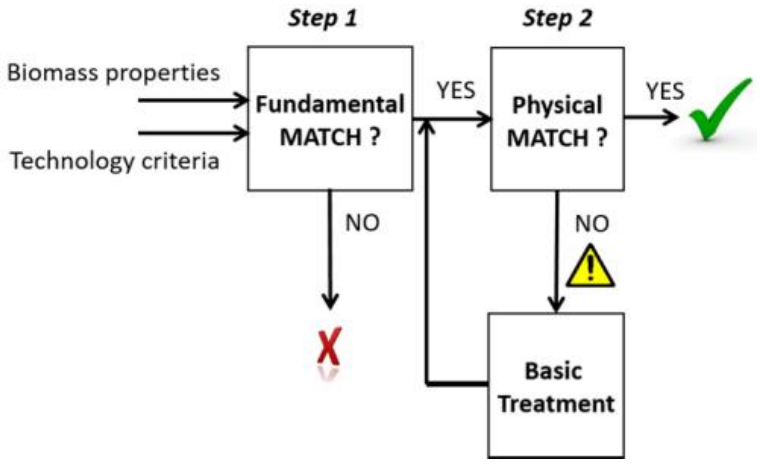
The Biomass and Technology Matching Tool ‘Bio2Match’.

Name of the tool	S2Biom

The tool can be used to find out:

- Which conversion pathways are appropriate for biomass in your region?
- Is there a need for biomass pre-treatment?

The methodology for the Bio2Match tool was defined on the basis of the classification system, with fundamental characteristics (which cannot easily be modified) and physical characteristics (which can easily be modified) for the biomass. The procedure that the tool utilizes for matching each biomass and each technology is schematically shown in the Figure below.



Depending on which type of technology is chosen (thermal, (bio-)chemical, anaerobic fermentation), the relevant fundamental properties of the biomass are first compared with the technology criteria (step 1). When each biomass property class has a lower or equal number than the technology criteria for those properties, there is a fundamental match, and the tool subsequently investigates the physical properties (step 2). When the values for the main physical properties also match, the tool generates the answer “there is a match”, indicated by a green traffic light symbol. When there is a fundamental match but no physical match, the tool generates the answer “there is a match, if the biomass receives basic treatment”, indicated by a yellow exclamation mark. When there is no fundamental match, the tool does not proceed to step 2, but generates the answer “there is no match”, indicated by a red traffic light symbol.

Full chain assessments:

1.BeWhere

The model BeWhere itself cannot be used by the end-users. Instead, the end-users can view & download the pre-run scenario results of BeWhere through

Name of the tool	S2Biom
	the S2BIOM toolset. The users can choose in the viewing tool the scenario specifications for which to view results in the underneath menu. In the left pane you can specify and download BeWhere solutions for heat and power installations and in the right pane for biofuel installations.

The users can choose the following scenario specifications:

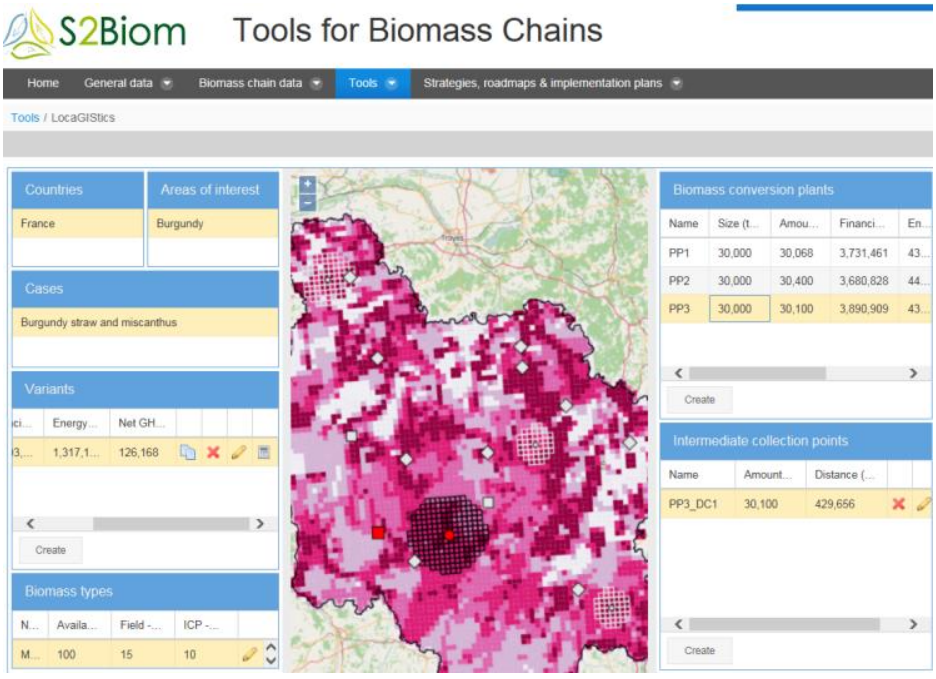
1) The type of biomass feedstock you're interested in (forest or agricultural (crops & residues) biomass)

2) The carbon cost level BeWhere needs to take into account (0, 50, 100, 150 EUR/tCO2). This refers to the carbon tax level.

3) The fossil fuel cost level (0.25, 0.50, 0.75, 1.00, 1.25, 1.50 EUR/GJ): This refers to factor by which the fossil fuel cost is multiplied. The reference fossil fuel price used in BeWhere is from the year 2012.

2.LocaGIStics:

An interactive tool LocaGIStics which is running in the S2BIOM toolset. It enables the user to design and evaluate different biomass delivery chains in regions for which information and data is included in the database.

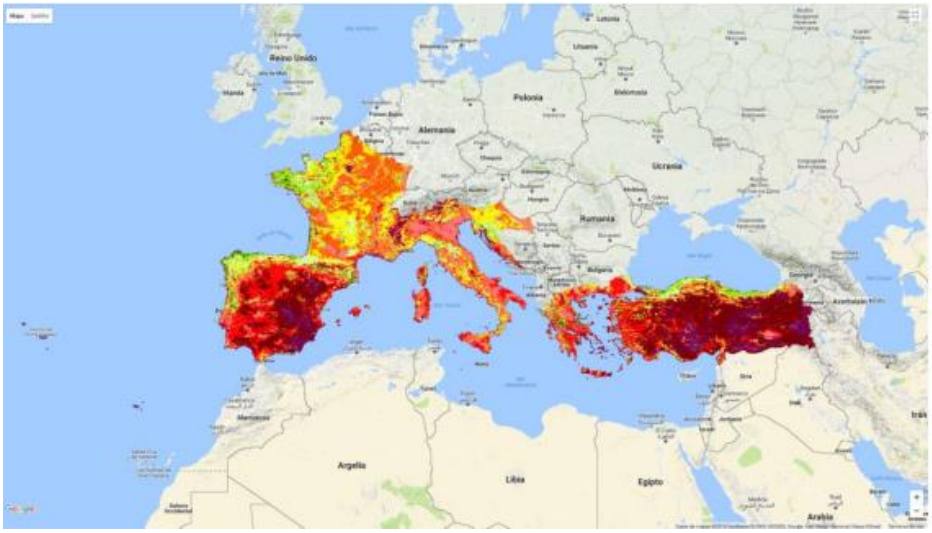


This tool is the most complicated tool developed in the S2BIOM toolset in terms of functionalities, data integration, calculation upon user specifications.

S2Biom Report Downloads: Downloadable deliverables during project execution of each WP

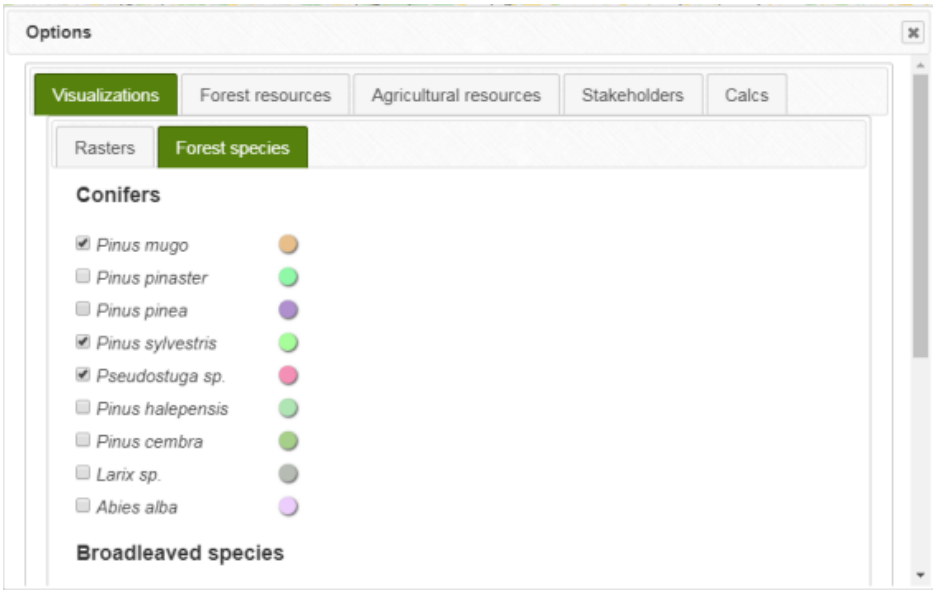
Data Downloads: Database Directory of files

Name of the tool	S2Biom
Who is this tool destined to (potential users)	To every economic actor such as households, companies, public or private organizations and corporations, as long as they have impact or participate at any point of the whole biomass delivery chain: from primary biomass to end-use of non-food products and from logistics, pre-treatment to conversion technologies. Stakeholders interested to integrate, design or evaluate optimal biomass delivery chains and networks at European, national, regional or local scale in order to support the development of best strategies for setting up a bio-based economy.
How can this tool affect/benefit or help a relevant stakeholder?	This tool will build up a concise knowledge base both for the sustainable supply and logistics of non-food biomass (quantities, costs, technological pathway options for 2020 and beyond), and for the development of technology and market strategies in order to support the development of a "resource efficient" bio-economy for Europe.
Additional information of the tool	For additional supports on S2Biom online tool system, please refer to Loomio User Manual and Training Material page: • User guidelines: https://s2biom.wenr.wur.nl/doc/S2Biom_D4_11_User%20guide%20toolset_Ver%201_FINAL.pdf • Technical description: https://s2biom.wenr.wur.nl/doc/S2Biom_D4_10_technical%20description%20toolset_Ver%202_FINAL.pdf For further information about the project visit the S2BIOM website
Organisation/project that developed/manages the tool	S2Biom has received funding from the European Union's 7th Framework Programme for research, technological development and demonstration under grant agreement No FP7-608622. It was coordinated by FNR (Fachagentur Nachwachsende Rohstoffe e.V.), and the consortium included 31 partners from EU28, western Balkans, Ukraine and Turkey.
Responsible for the study of the tool and organisation	Fundación CIRCE

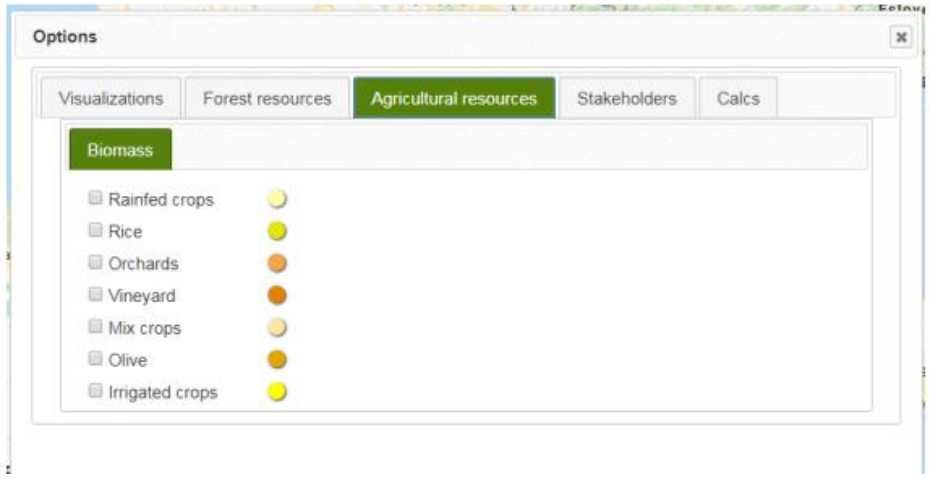
Name of the tool	BIORAISE
Logo	No logo.
Link	http://bioraise.ciemat.es/Bioraise/home/main
Brief Description	The application **BIORAISE** is a tool that offers information regarding agricultural and forest field biomass resources with potential energy use in Croatia, France, Greece, Italy, Portugal, Slovenia, Spain and Turkey, and the existing raw biomass producers from agri-food and wood industries as well as bioenergy market stakeholders. The platform allows the calculation of the mentioned biomass resources and its harvest and transport costs.
Type of tool	Supply chain
Subtype	Map / GIS (Geographic Information System)
Related to	Business model
Most valuable information that can be obtained	BIORAISE platform, integrates the biomass resources layers, environmental risks and stakeholders' data. The service evaluates the biomass field resources available from agriculture and forestry, including shrublands. From user selected locations, the platform provides, on the fly, the following information: biomass resources, harvesting and transport costs and energy content. The application includes diverse stakeholders related to solid bioenergy sector.
How does the tool work / manual of the tool	The terrain page displays several tabs, from which Google base maps, either map or satellite, options and legend can be chosen. The Visualisations tab shows environmental maps of the risk layers related to the soil facets: Soil Erosion Risk, Bedrock immediately underlying the soil layers 0-100% of the R horizon, Absolute Depth to Bedrock, Volumetric Coarse Fragments in % at 0.05 m of topsoil, RUSLE Equation R factor and Soil Organic Carbon at 30 cm depth. In addition, the Net Primary Productivity layer is also shown in an analogous gradient from areas of high productivity (green) to areas of lower productivity (red/purple shades). The layers are displayed in categorised values showing a gradient of risk from green (lower risk) to red/purple (higher risk). 

Name of the tool	BIORAISE

A sub-tab shows specific maps of selected dominant stands of trees from the JOINT RESEARCH CENTRE in case the user wants a more refined view of specific forest data.

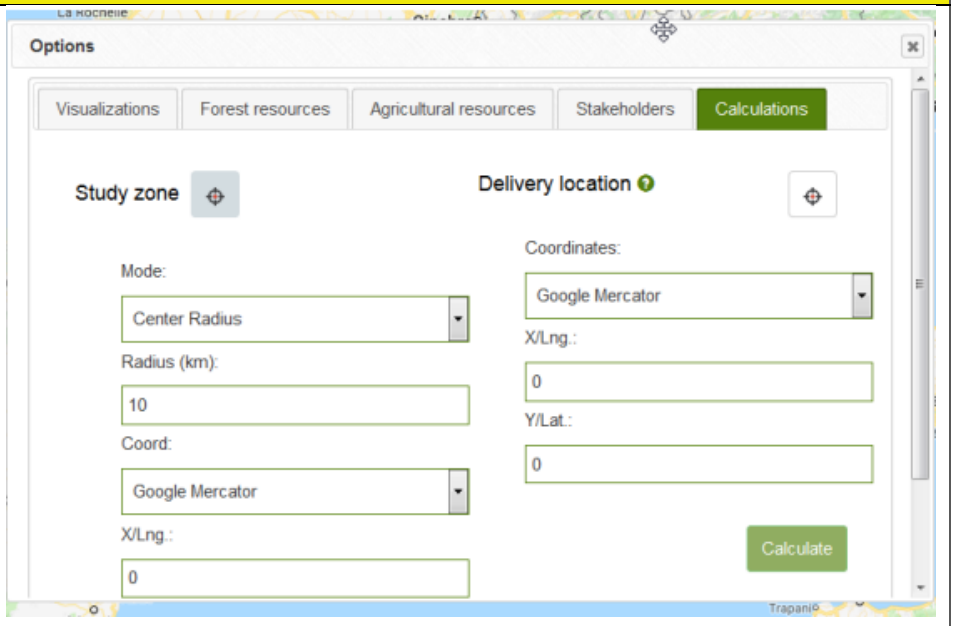


The Forest Resources and Agricultural Resources tabs allow the user to select between agriculture, forestry and scrubland use from CORINE LAND COVER. Agriculture contains field resources of arable crops (rainfed crops, rice and irrigated crops), orchards, vineyards, olive trees and mixed crops (agroforestry arable crops). Forestry categories include coniferous, broadleaved, mixed stands, agroforestry systems (e.g. pasture) and scrub.



The Calculations tab allows the user to choose a location for the area of interest and the collection point. For calculations, a circular radius (from 1 to 100 km) or administrative boundaries (NUT3 regions - e.g. province in the Spanish administrative divisions - or sub-region - e.g. municipality boundary) are required.

Name of the tool	BIORAISE

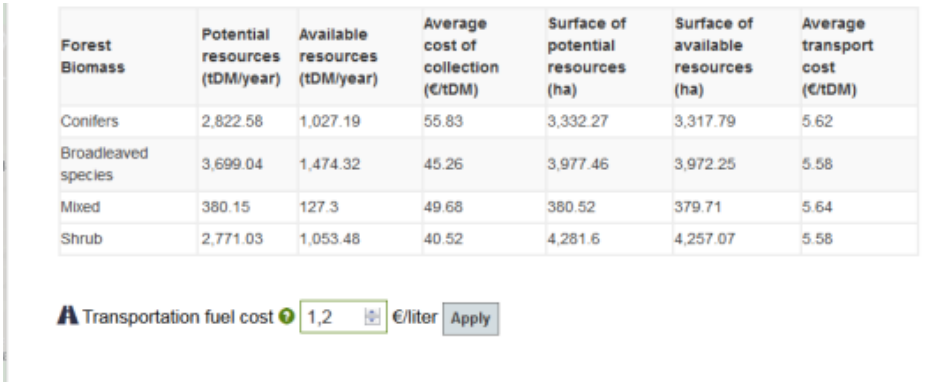


Once "calculate" has been clicked, a dialogue window displays the results. Potential biomass is given in tonnes of dry matter per year (t DM year-1), areas are given in hectares and average harvesting and transport costs in EUR/tonne. Due to the efficiency actually achievable in the harvesting processes, not all resources from the field reach the biomass production chain: therefore, a more realistic available biomass is also calculated.

Agricultural Biomass	Potential resources (tDM/year)	Available resources (tDM/year)	Average cost of collection (€/tDM)	Resources surface (ha)	Average transport cost (€/tDM)
Rainfed crops	5,550.03	2,775.01	41.67	2,087.54	5.69
Irrigated crops	338.36	169.18	21	30.67	5.59

In the case of agricultural field resources, due to the actually achievable efficiency in harvesting processes, not all field resources reach the biomass production chain: therefore, a more realistic available biomass is also calculated. In the case of forest resources, the risk of soil erosion and organic carbon deeper than 30 cm limit the potential resources. In addition, technical constraints are applied by taking into account a threshold of 20% slope increase in the cost calculations.

Forest Biomass	Potential resources (tDM/year)	Available resources (tDM/year)	Average cost of collection (€/tDM)	Surface of potential resources (ha)	Surface of available resources (ha)	Average transport cost (€/tDM)
Conifers	2,822.58	1,027.19	55.83	3,332.27	3,317.79	5.62
Broadleaved species	3,699.04	1,474.32	45.26	3,977.46	3,972.25	5.58
Mixed	380.15	127.3	49.68	380.52	379.71	5.64
Shrub	2,771.03	1,053.48	40.52	4,281.6	4,257.07	5.58



Regarding transportation costs, the user can select the "Transportation fuel cost", which is highly variable over time and across regions. The default option

Name of the tool	BIORAISE

is 1.2 €/l. Transportation costs do not include VAT considerations (variable between countries).

Energy contents are also calculated: the user can apply different moisture contents by moving the % wet basis bar.

Calculation results

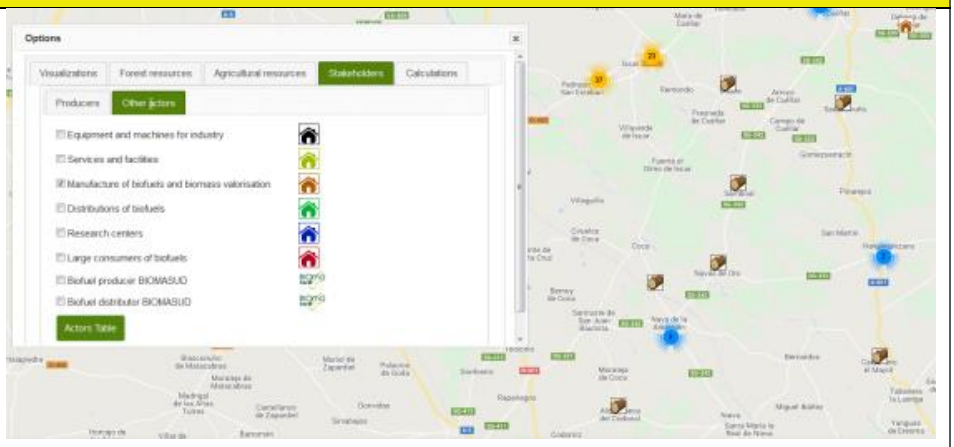
Energetic content

Agricultural Biomass	Available resources (tDM/year)	% wet base	Available resources (tWM/year)	Ash value mean reference (% d.b.)	Energetic content (GJ/year)	Average cost of collection (€/GJ)	Average transport cost (€/GJ)
Rainfed crops	2,775.01	35	4,269.25	6.1	43,744.03	2.64	0.36
Irrigated crops	169.18	35	260.28	7.8	2,630.36	1.35	0.36

Forest Biomass	Available resources (tDM/year)	% wet base	Available resources (tWM/year)	Ash value mean reference (% d.b.)	Energetic content (GJ/year)	Average cost of collection (€/GJ)	Average transport cost (€/GJ)
Conifers	1,027.19	35	1,580.29	2.7	18,124.23	3.16	0.32
Broadleaved species	1,474.32	35	2,268.18	3.7	24,069.05	2.77	0.34
Mixed	127.3	35	195.85	3.2	2,162.19	2.93	0.33
Shrub	1,053.48	35	1,620.74	3.1	18,277.4	2.34	0.32

The STAKEHOLDERS tab collects data locations and details of solid raw biomass producers: wood industry, olive oil industries, nut shelling and wine sector - distilleries, and other actors: industry equipment and machines, services and facilities, biofuel producers, biofuel distributors, research centres, large consumers and BIOMASUD PLUS certified biofuel producers and distributors.

Name of the tool	BIORAISE



At the end of the results window, the user can click on the "Download results" button and a zip file containing a CSV and a shapefile are provided. The corresponding attributes in the shapefile are:

	A	B	C	D	E	F	G	H	I	J	K	L
1	Centro: Lat. 41,9461 Lng. -3,6021	Radio: 5,00 Km	Punto recogida: Lat. 41,7659 Lng. -2,4922	Fuel price: 1.3 €/L								
2												
3	Type of biomass	Surface of potential resources (ha)	Surface of available resources (ha)	Potential resources (tDM/year)	Available resources (tDM/year)	Average cost of collection (€/tDM)	Average transport cost (€/tDM)	% wet base	Ash value mean reference (% d.b.)	Energetic content (GJ/year)	Average cost of collection (€/GJ)	Average transport cost (€/GJ)
4	Secano	813.16	813.16	2,161.89	1,080.95	41.67	20.00	35	6.10	17,039.52	2.64	1.27
5	Frondosas	1,662.50	1,646.28	1,075.64	424.22	45.33	19.88	35	3.70	6,925.67	2.78	1.22
6	Forestal mix	634.69	633.76	440.84	175.97	46.69	20.18	35	3.20	2,988.73	2.75	1.19

- Origin: land use category (i.e., Agriculture or Forestry).

- Biomass: resource type in accordance with the Agriculture or Forestry Corine Land Cover subcategories (e.g., Rainfed Crops, Conifers, etc.)

- SurAgrAvl: surface of available agricultural categories (ha).

- SurAgrPot: surface of potential agricultural categories (ha).

- SurForAvl: surface of available forestry categories (ha).

- SurForPot: surface of potential forestry categories (ha)

- BiomassPot: potential biomass (t DM/year).

- BiomassAvl: available biomass (t DM/year).

- CostCollec: harvesting cost (€/t DM).

- CostTrans: transport cost to from the tile centroid to destination point (€/t DM).

- distX: euclidean distance from the tile centroid to the closest road (m).

- distY: distance by road to destination point. The CSV provides the summarized results for the area of interest.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Centro: Lat. 41,9461 Lng. -3,6021	Radio: 5,00 Km	Punto recogida: Lat. 41,7659 Lng. -2,4922	Fuel price: 1.3 €/L								
2												
3	Type of biomass	Surface of potential resources (ha)	Surface of available resources (ha)	Potential resources (tDM/year)	Available resources (tDM/year)	Average cost of collection (€/tDM)	Average transport cost (€/tDM)	% wet base	Ash value mean reference (% d.b.)	Energetic content (GJ/year)	Average cost of collection (€/GJ)	Average transport cost (€/GJ)
4	Secano	813.16	813.16	2,161.89	1,080.95	41.67	20.00	35	6.10	17,039.52	2.64	1.27
5	Frondosas	1,662.50	1,646.28	1,075.64	424.22	45.33	19.88	35	3.70	6,925.67	2.78	1.22
6	Forestal mix	634.69	633.76	440.84	175.97	46.69	20.18	35	3.20	2,988.73	2.75	1.19

Following the European directive of INSPIRE (INfrastructure for Spatial InfoRmation in Europe), the BIORAISE tool offers WMS services of the

Name of the tool	BIORAISE
	bioenergy Stakeholders. The WMS service can be accessed through the following address: http://bioraise.grupotercerafase.com/WMS The HELP section is to contain a brief method report and main references. Contact with the authors is possible and user feedback encouraged as a way to increase the testing of the tool, understand the limitations of the methods and enhance the functionalities to better meet user requirements unaccounted for in this version that would be addressed in further updates. CIEMAT has been verifying the consistency of results and would like to still improve some of the computations in the geospatial layers of BIORAISE[4]
Who is this tool destined to (potential users)	Local authorities, local economic players, biomass owners, biomass management companies, RESCoops/Energy Communities, Associations, ESCOs, Research centers / Universities.
How can this tool affect/benefit or help a relevant stakeholder?	It can help allocate nearby biomass in order to stablish a technically and economically feasible supply chain, based in regional and sustainable fuels. Additionally, it can help estimate the biomass potential, heating values, harvesting and collection costs, and the distance by road to the destination point. All of this summarised in a simple Excel spreadsheet that agglutinates all these information.
Additional information of the tool	As a calculation tool, the application can query by a circle from 1 to 100 km radius around the selected site, or alternatively, by province or municipality polygons. The requested site can be defined in the application by clicking on it on a displayed map or by introducing its geographical co-ordinates. When a query is launched, the application shows a window with two tabs: one allows to assess the resources and collection costs of agricultural and forest field biomass in the whole five countries, and the other can perform the same function for the agro-industrial biomass by-products in the SUDOE region. BIORAISE allows to calculate the resources in tons of dry matter per year (o.d.t./year) and their average collection costs in Euro per o.d.t.. By entering the most probable moisture values of the different types of biomasses, the energy content in GJ/year (Net Calorific Value) and the average reference value of ash content dry mater are also calculated. BIORAISE allows to calculate the biomass transport cost from the selected circle or polygon to the chosen delivery site. For this purpose, the fuel price (diesel) must be introduced in the cell “Fuel price” and then the “Issue transport cost” button must be clicked. The tool then provides an estimation of the average transport cost by road for each biomass category.
Organisation/project that developed/manages the tool	This tool has been updated and improved within the scope of the project funded by the European Union through the European Framework Program for financing R+D+I Horizon 2020 'Developing the Sustainable Market of Residential Mediterranean Solid Biofuels (Biomasud Plus)' No. 691763. The direction and coordination of the development of the BIORAISE application has been carried out by the Center for Environmental

[4] D2.4 BIORAISE GIS platform with actualized information of sustainable biomass resources available and costs and stakeholders relevant data for residential heating solid biofuels production, logistics and use in each participating country - Developing the sustainable market of residential Mediterranean solid biofuels – BIOMADUS PLUS

Name of the tool	BIORAISE
	and Technological Energy Research (CIEMAT), through its Biomass Unit of the CEDER-CIEMAT. The property of BIORAISE corresponds to CIEMAT. Entities that together with CIEMAT have collaborated in providing the basic data for this application: • Italian Agroforenergy Association (AIEL - Italy) • Tübitak Marmara Research Center (TÜBITAK MAN - Turkey) • Biomass Centre for Energy (CBE - Portugal) • Centre for Research and Technology Hellas (CERTH - Greece) • Slovenian Forestry Institute (SFI - Slovenia) • Green Energy Cooperative (ZEZ - Croatia) • The Spanish Bioenergy Association (AVEBIOM- Spain)
Responsible for the study of the tool and organisation	Fundación CIRCE

Name of the tool	BioEnergy Association: Best practice guideline for life cycle analysis of heat supply projects
Logo	
Link	https://www.bioenergy.org.nz/resource/tg14-evaluation-of-heat-plant-opportunities
Brief Description	Best practice guideline, along with the associated Excel Levelised Cost Of Energy (LCOE) model, is intended to provide a standardized methodology for assessing options for commercial and industrial-scale heat supply, especially for the group of advisers or decision-makers considering the options for the supply of heat to commercial and industrial users. This tool contains the methodology for: • evaluation of the costs and benefits of the available options for heat supply over the life of a facility, and for the selection of the best option; • assessment of the comparative lifetime costs of heat from plants fuelled by electricity, gas, oil, coal, and biomass over the project lifetime; • the basis for the preparation of the financial business case for the heat project and obtaining project approvals. This tool captures the collective technical knowledge of a range of leading bioenergy industry personnel. In addition, it benefits from the collective experience of the Members of the Bioenergy Association Wood Energy Interest Group.
Type of tool	Economic tool
Subtype	Tool
Related to	Business model
Most valuable information that can be obtained	The process detailed in this Guide involves assessment and clarification of project objectives, analysis of potential heat supply options, and then in detail of the financial parameters of the selected solution, followed by the preparation of the business case for the project. It is structured under (indicatively) the following eight steps: **Step 1.** Identify and quantify the site heat requirements, assessment criteria, analysis assumptions, financial parameters, and economic life for analysis **Step 2**. Assess fuel options: availability, cost, and reliability of supply over the economic life of the facility **Step 3.** Assess comparative costs of heat from fuel options based on capital, risk, operational and fuel costs and any quantifiable project benefits **Step 4.** Assess non-monetary and less tangible benefits and quantify where possible in business terms

Name of the tool	BioEnergy Association: Best practice guideline for life cycle analysis of heat supply projects
	Step 5. Select a preferred option on the basis of Steps 4 and 5 and refine costs and benefits to complete the financial assessment **Step 6.** Consider risks, potential upsides, and sensitivities **Step 7.** Confirm project timescale and critical milestones and monitoring mechanisms **Step 8.** Prepare the business case, submit and gain project approvals Detailed LCOE model overview: **Sheet 0: Introduction to model.** **Sheet 1: Capital costs.** This sheet comprises a checklist of capital cost components for installing a heating plant and associated systems and services, against which estimated or quoted costs can be entered, with the sum being the capital cost transferred to the DCF calculation of heat costs. It is noted that all cost items will not be required for each heat supply option. **Sheet 2: Operating and maintenance costs.** This provides a checklist of cost categories against which estimated or quoted costs can be entered, with their sum being the operation and maintenance cost transferred to the DCF calculation of heat costs. **Sheet 3: Fuel cost calculation sheet.** This sheet calculates the fuel cost, by fuel type, for inclusion in the financial model and the associated carbon cost. It is noted that the preferred basis for the calculation of fuel use is the specific fuel consumption for the boiler being considered, this figure being obtained from the heat plant supplier. **Sheet 4: Modelling inputs**. This is a master input sheet into which the project and business-specific economic parameters are entered. The inputs to Sheet 4 are as follows: • Fuel inflation rate Fuels will escalate in cost at different rates. The model assumes that the fuel costs will increase annually at the same rate as all other costs. The inserted figure is the estimated fuel cost inflation figure for that fuel in excess of the figure for general inflation. • Residual value. This is a nominated figure intended as a proxy for the value of the cash flows from the energy plant after the modelling term, based on the fact that such facilities generally have a much longer life if well maintained and if demand for their heat remains. For a well-maintained heat plant with an ongoing application at the site, a residual value in the range of 25 to 40% of the initial cost is seen as appropriate. • Additional benefits or costs. Such benefits might include: - Savings on wood residue disposal - Heat sales to third parties - In the case of a decision on heat plant replacement, the avoided costs of running the heat plant/system that is being replaced - Other quantifiable financial benefits associated with the project

Name of the tool	BioEnergy Association: Best practice guideline for life cycle analysis of heat supply projects
	• WACC (Weighted Average Cost of Capital). This is the discount rate that applies to the lifecycle analysis. It is usually the rate that a company is expected to pay on average to all its security holders to finance its assets (a weighted average of the cost of debt and equity) • Project life: The term over which the project is to be financially assessed. It is noted that: the shorter the modeling period, the higher the heating cost will be as the capital costs will be amortized over a shorter period, and that a shorter period tends to "favor" project options with a lower capital cost (i.e., gas rather than wood fuel). Heat plants have long lives, certainly in excess of 20-years, if well maintained, but business requirements may change over time, leading to changing demand for heat. It is suggested that a term of 20-years be used as a default ; in cases of heightened project uncertainty, a term of 15-years is used. **Sheet 5: Modelling outputs:** This summary/report sheet is fed by the DCF models in sheets 6 to 12 to provide numerical and graphical figures covering heat supply costs. The following are reported on this sheet for up to seven fuel or equipment scenarios: • The annual costs of heat in year 1, excluding any consideration of capital costs • The pre-tax NPV of the project costs and benefits if applicable, including the capital, over the modelled period • The levelised costs of heat supply from the scenarios considered, in USD/GJ and $/kWh, in both table and graphical form • The sensitivity, considered in USD/GWh, of the options to changes in input parameters **Sheet 6 - 12: A scenario analysis.** These sheets contain seven DCF models, covering different fuel or technology options, each input with data from Sheet 4. They calculate the annual heat cost of each option and the financial sensitivity to parameter changes. Proposed conditions for sensitivity analysis of heat plant project: The following sensitivities are assessed for each of the heat plant options modelled: • Capital cost: plus 20%, minus 10% against modelled base-case costs • Fuel: costs: +20%, -10% • O&M costs: +20%, -10% • Heat demand: +/-20%

Name of the tool	BioEnergy Association: Best practice guideline for life cycle analysis of heat supply projects
	Social Analysis based on Cost Benefit Analysis (CBA) tool that advises on estimating the dollar value impacts of policy changes, drawing from a common database of impact values - these intended for social investment) Moreover, require consideration of: • all impacts (including financial, social, and environmental) that can be identified, whether they can be quantified, being specific about which individuals or groups will be affected, how and when • secondary impacts such as opportunities to train individuals for employment that may increase their income, quantifying these impacts if and monetizing them by converting them into a dollar value, i.e., 'money saved from reduced social costs. Ranges may also be used, with more comprehensive ranges indicating more uncertainty. Benefits are to include Government benefits (costs) and broader societal benefits (costs). • the proposal's other positive and negative impacts compared to what would happen if the proposal does not go ahead (the counterfactual).
How does the tool work / manual of the tool	Technical Guide and associated financial model have been published on the Association administered website www.usewoodfuel.org.nz, and these are freely available, so the user can download, read and test it.
Who is this tool destined to (potential users)	Various stakeholders (e.g. advisers, decision makers)
How can this tool affect/benefit or help a relevant stakeholder?	The methodology includes recommendations on how to deal with assumptions of life cycle analysis of heat plants, and how to undertake a financial risk and sensitivity analysis and present the findings to decision makers.
Additional information of the tool	This Guide is intended to provide the basis for the analysis of options for the production of the low, medium, and high temperature and pressure process heat, or heat production for commercial scale-space heating, but not for use at the residential scale. No analysis of other biomass fuels apart from wood chips (e.g. agricultural biomass fuels)
Organisation/project that developed/manages the tool	BioEnergy Association: Australian New Zealand Biochar, Australian Pulp and Paper Industry Technical Association, Bioenergy Australia, Forest Industry Contractors Association, Heavy Engineering Research Association, NZBIO, New Zealand Forest Owners Association, New Zealand Home Heating Association, Sustainable Business Network, WasteMINZ, Women & Leadership New Zealand, World Bioenergy Association
Responsible for the study of the tool and organisation	Wroclaw University of Environmental and Life Sciences (WUELS)

Name of the tool	Handbook on Investment schemes for REScoop projects
Logo	
Link	https://www.rescoop.eu/uploads/rescoop/downloads/Financial-Handbook-for-REScoops-English_2020-10-19-171323.pdf
Brief Description	The first part of the handbook focuses on the description of the types of investment schemes. The second section of the handbook is dedicated to the description of practical cases of REScoop investment schemes. It focuses on four key examples from the REScoop movement in Europe, which have been identified as best practices based on different criteria, among which the technical and economic sustainability of the project and the financing schemes and participation of citizens as shareholders. The final section of the handbook depicts new investment schemes that are either very punctually used or not yet set up to finance REScoops.
Type of tool	Bioenergy relevant tool, business model
Subtype	Tool
Related to	Business model
Most valuable information that can be obtained	Ways of REScoop financing, Methodology of choosing the suitable investment scheme, Best practices' investment schemes as practical examples, innovative and new financial schemes for the early start-up phase of a REScoop
How does the tool work / manual of the tool	Getting acquainted with the content of the handbook and using the obtained information in practice
Who is this tool destined to (potential users)	Citizens, local authorities, local economic players
How can this tool affect/benefit or help a relevant stakeholder?	The first section - methodology set up by the partners of the REScoop 20-20-20 project to help in pinpointing an investment scheme that corresponds to the main characteristics of the given REScoop project. The second section - replicable examples are detailed to give a more precise idea of setting up an investment scheme for a specific electricity production project.

Name of the tool	Handbook on Investment schemes for REScoop projects
	The final section - this part of the handbook is to overview the potential of several tools, methods, and ideas that could be supported and exploited by the citizen-based projects in the renewable energy sector in the future.
Additional information of the tool	The handbook presents many ways of financing energy communities. The methodology of choosing the right form is presented in an accessible way. Based on the use of the matrix, we can choose the appropriate form of financing. This handbook is a bit outdated (year of publication: 2014). Perhaps new ways of financing investments worth mentioning have already been developed. In the handbook, there are no examples of REScoops producing heat. Only those that generate electricity are presented.
Organisation/project that developed/manages the tool	REScoop 20-20-20
Responsible for the study of the tool and organisation	Wroclaw University of Environmental and Life Sciences (WUELS)