



Recommendations for the use of existing tools when developing regional bioeconomy strategies

Deliverable 2.3

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Draft 4	05/04/2019	Quick characterisation of tools (+ Integration)	ALL
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Table 2: Document History



ABBREVIATIONS

BSAT: Bioregional Strategy Accelerator Toolkit

DEU: Domestic extraction used

DM: Dry matter content

DoA: Description of Action

EC: European Commission

GA: General Assembly

GDP: Gross domestic product

GHG: Greenhouse gas

GJ: Giga joule

K: Potassium

LCA: Life cycle assessment

N: Nitrogen

NGO: Non-governmental organisation

P: Phosphorus

R&D: Research and Development

ROC: Renewable Obligation Certificate

TJ: Tera joule

TRL: Technology readiness level

WP: Work package

PROJECT PARTNERS

CIRCE: Fundación CIRCE Centro de Investigación de Recursos y Consumos Energéticos

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NAK: MAGYAR AGRAR-, ELELMISZERGAZDASAGI ES VIDEKFEJLESZTESI KAMARA

EPC: EPC Project Corporation Climate. Sustainability. Communications. mbH

DRAXIS: DRAXIS ENVIRONMENTAL S.A.

BZN: Bay Zoltán Nonprofit Ltd. for Applied Research

UNFU: Ukrainian National Forestry University



CAGPYDS (former CAPDER): Junta de Andalucía – Consejería de Agricultura, Pesca y Desarrollo Rural

MAE: Mazovia Energy Agency

USB: University of South Bohemia

CCB: Chemie Cluster Bayern GMBH

SPRING: Sustainable Processes and Resources for Innovation and National Growth

EWI: VLAAMS GEWEST (Government of Flanders)

SUA: Slovak University of Agriculture in Nitra

ECRN: European Chemical Regions Network (ECRN) e.V.



PUBLISHABLE SUMMARY

This report presents the outcome of an inventory of most interesting existing tools for supporting the analysis of the different aspects of a regional bioeconomy. First, it is described how the tools were identified, subsequently the most relevant tools were selected and these were extensively evaluated and described. The results are presented in fact sheets included in the Annex A of this report. The evaluation of the tools focussed on the content (data) and the user interaction aspects. The report makes recommendations on further use of the tools by the regional stakeholders involved in this project.

From a list of 26 tools which were reviewed in a quick evaluation procedure, 10 tools were shortlisted and evaluated as relevant and attractive to be included as relevant tools which can support regions in developing their bioeconomy strategies. For these tools factsheets were developed which are included in this report and which will also become part of the BSAT tool to be developed in the Power4Bio task 2.4. The factsheet are meant to support users to guide them towards the right tools for their information needs and to facilitate the use of the tools.

Another 10 tools were selected for inspiration in the design of the BSAT tool in task 2.4. Also for these tools the main inspirational aspects were reported in this report and factsheet were written.



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1 INTRODUCTION

One of the aims of the Power4Bio project is to give an overview of existing tools that can support regional stakeholders in obtaining information, data, better understanding of the different aspects that need to be addressed when developing their regional bioeconomy and develop their bioeconomy strategies.

Therefore task 2.3 was specifically designed to:

- Do an inventory of most important existing tools for supporting the analysis of different aspects of a regional bioeconomy
- Evaluate the tools to identify gaps, opportunities, and synergies between the tools
- Evaluate and describe the content (data) and the usability of the tools in relation to feedback of users, applicability of the tools, objective, target group, the availability/accessibility of the required data, quantity and quality of the results
- Recommend the most adequate set of analytical tools for each region to be tested and validated on the participant regions (in Task 5.2) and to feed the Bioregional Strategy Accelerator toolkit (BSAT) (to be developed in task 2.4). The latter implies that the factsheets developed for the selected tools and presented in this report (Annex B) will be integrated in the BSAT

The approach followed for identifying and characterising relevant tools was as follows:

1. Selection of tools for long list
2. Quick characterization of the tools on the longlist according to a fixed format
3. Make sub-selection of tools for short list based on quick characterization.
4. Detailed characterization of sub-selection of tools placed on the short list. Content aspects (indicators) have been aligned with results from Task 2.2 on KPIs to evaluate regional bioeconomies.
5. Integrated evaluation to match with regional needs and make recommendations on use of tools and inspiration for design of Bioregional Strategy Accelerator toolkit (Task 2.4)

The report is divided in 6 chapters. The next chapter 2 presents the identification of the tools to be evaluated. This resulted in a long list of tools. These tools were assessed through a quick evaluation to identify the relevance of the tool supporting regional stakeholders in developing their bioeconomy. This then resulted in a sub-selection of most interesting tools which is described in Chapter 3. The tools placed on the short list are then extensively described and characterised. The descriptions are included in the Annex A of this report in the form of a fact sheet per tool. The integrated description of the tools according to the content and user interaction aspects is presented in Chapter 4 and is especially focusing on making recommendations on the most adequate set of tools both content wise and in terms of user-interaction for any regional stakeholder working on bioeconomy development.

In chapter 5 an integrated description is also presented of tools that were not shortlisted, but that contained elements that could be used for inspiration in the design of the Bioregional Strategy Accelerator toolkit (BSAT) (to be developed in task 2.4). The report finishes with Chapter 6 in which the most important conclusions and recommendations are presented. In this chapter a summary overview is given of the most interesting aspects the tools cover and also gaps in information and synergies between the tools. In addition, a special summary is presented of the most interesting aspects regarding content and user interaction aspects of all tools evaluated that can be used as inspiration for the design of the Accelerator toolkit to be developed in task 2.4 of this project.



2 INVENTORY, SELECTION AND QUICK EVALUATION OF TOOLS FOR LONGLIST

2.1 Approach

The identification of relevant tools in this project did not start from scratch. The partners involved in the project already work for a longer time on projects stimulating the European bioeconomy development. Several of the partners were already involved in the development of tools and/or had experience with working with tools with a bioeconomy relevance. So the selection of tools builded on this experience and was extended with a further internet search. Beside this it was agreed that the tools to be selected had to fulfil the following 5 requirements:

1. Tools should have content related to some aspect of bioeconomy activities (see underneath the definition of bioeconomy from the EC (2018) that was used as guidance.
2. Tools should be Interactive (action-response relation with user)
3. Tools make data/information accessible and usable to users in a specific context with a specific information need
4. Tools contain data, generated in a robust and quality checked procedure (e.g. national & EU projects) and metadata is available explaining the generation of information and source data used.
5. Tools are free of use/freely accessible

Figure 2.1: Definition of bioeconomy used as guidance to assess the relevance of the tools:

The circular, climate positive society covers all sectors and systems that rely on biological resources (animals, plants, micro-organisms and derived biomass, including organic waste), their functions and principles. It includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services. *To be successful, the European bioeconomy needs to have circularity at its heart and it is necessary to go beyond carbon neutrality.* This will drive the renewal of our industries, the modernisation of our primary production systems, the protection of the environment and will enhance biodiversity.

Source: adapted from European Commission, A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment, October 2018.

In more detail, the work carried out comprised the following steps (see also Figure 2.1):

- An initial draft long list of tools was prepared by the task leader to start the discussion with the other task partners.
- In a telcon meeting further extension of the list of potentially interesting tools was discussed among RTO partners. Partners added further tools and the long list of tools was integrated by WR.
- In a second telcon meeting the format for quick characterisation of the tools which was elaborated and distributed before the telcon was discussed, as well as criteria for selecting tools



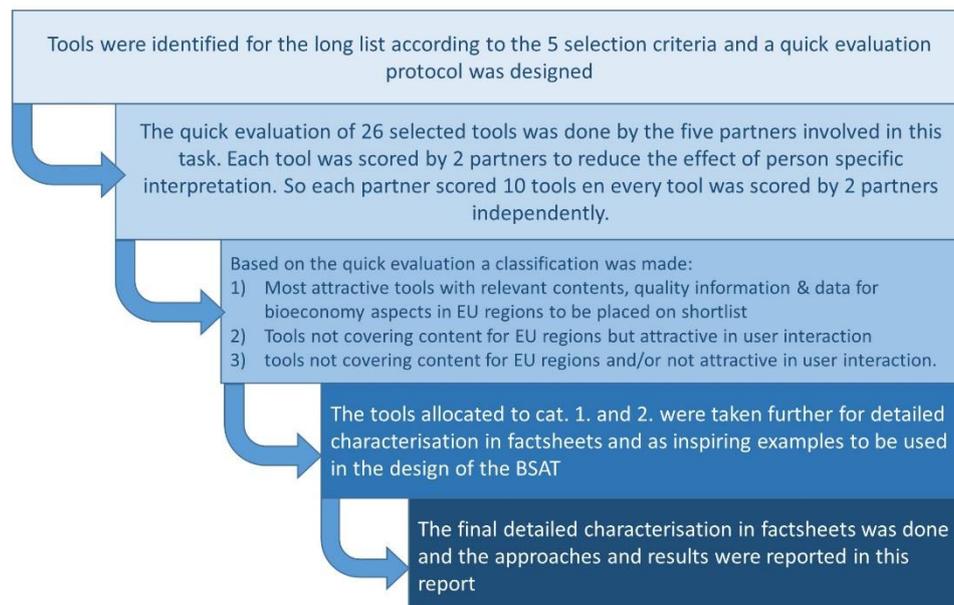
to be characterised. After further email exchanges both the format for quick characterisation and the selection of tools to be characterised was improved.

- Subsequently the quick evaluation of 26 selected tools was done by the five partners involved in this task. Each tool was scored by 2 partners to reduce the effect of person specific interpretation. So each partner scored 10 tools en every tool was scored by 2 partners independently.
- Based on the scores from the quick evaluation a subselection of tools from the longlist was made distributing the tools in 3 groups:
 1. Attractive tool with relevant contents for bioeconomy aspects in EU regions to be placed on the shortlist of tools to be extensively characterised further in factsheets
 2. Tools not covering content for EU regions but attractive in terms of user interaction aspects and content-user presentation approaches.
 3. Tools not covering content for EU regions and/or not attractive in terms of user interaction.

The tools allocated to cat. 1. and 2. were taken further for detailed characterisation and as inspiring examples to be used in the design of the Bioeconomy Accelerator tool (BSAT) to be developed in Task 2.4 of this project. For the description of the approach towards the categorisation of the tools in these 3 categories see Chapter 3.

- The outcomes of the quick evaluation results were also presented and discussed between the partners at a joint workshop in Madrid (April 2019). The outcomes of the workshop were used to refine the categorisation of tools in the 3 categories presented above and to agree on the further detailed characterisation of the selected tools in **factsheets** as presented in chapters 4.
- After the final detailed characterisation in fact sheets the approaches and results were reported in this report.

Figure 2.1 Working steps from quick evaluation of tools to detailed characterisation





2.2 Overview of tools selected for the long list

As explained in Section 2.1 So the selection of tools for the long list builded on the experience of the five partners involved and was extended with a further internet search. The selection of tools to be selected had to fulfil the four requirements:

1. Tools should have content related to some aspect of bioeconomy activities (see underneath the definition of bioeconomy from the EC (2018) that was used as guidance.
2. Tools should be Interactive (action-response relation with user)
3. Tools make data/information accessible and usable to users in a specific context with a specific information need
4. Tools are free of use/freely accessible

Based on these four selection criteria in total 26 tools were placed on the longlist by the partners (see Table 2.1).

Table 2.1 Overview of tools selected for the longlist

	Tools
1	ESCSS-SAT: https://ec.europa.eu/growth/tools-databases/escss_en
2	S2BIOM: www.biomass-tool.eu
3	BERST: BioEconomy Regional Strategy Toolkit: https://berst.vito.be/about_berst
4	BioTrade2020+: https://biotrade2020.wenr.wur.nl/web/guest/home
5	BIORAISE-CE: http://bioraise.ciemat.es/Bioraise/home/main
6	Biomass yards: http://www.biomassawerven.nl/
7	The Bioeconomy Tool Shed: https://www.usda.gov/energy/maps/html/energytool.htm
8	AGRIFORVALOR Sidestream value tool : http://agriforvalor.eu/sidestreams
9	BioSAT: http://www.biosat.net/
10	DataM: http://datam.jrc.ec.europa.eu
11	FAO Food Balance Sheet database: http://www.fao.org/faostat/en/#data/FBS/visualize
12	Transparent supply chains for sustainable economies (TRASE): https://trase.earth/
13	SUMINISTRO – Sustainability monitoring Index for assessing regional bio-based industry networks
14	The “Woodfuel Integrated Supply/Demand Overview Mapping” (WISDOM): www.wisdomprojects.net/global/
15	WATER and GREET: https://greet.es.anl.gov/
16	BISCUIT (BioPAD project supply chain unique integrated tool): www.biopad.eu
17	BioSoil: https://www.wur.nl/en/Research-Results/Research-Institutes/Environmental-Research/...
18	BioGrace-II GHG : https://www.biograce.net/biograce2/
19	Biomass Geo-Wiki; biomass.geo-wiki.org
20	I-BIOREF – Modeling and Analysis for Technical, Economic, and Environmental Assessment of Biorefinery Pro,
21	LEAP (Long range Energy Alternatives Planning System): www.energycommunity.org/LEAP/
22	GYGA (Global Yield Gap Atlas): http://www.yieldgap.org/web/guest/home



Tools	
23	VALERIE : VALorising European Research for Innovation in agriculturE and forestry: http://www.valerie.eu/
24	Feed Assessment Tool (FEAST): https://www.ilri.org/feast
25	CFPAN tool and database FeedPrint: http://webapplicaties.wur.nl/software/feedprintNL/index.asp
26	BEAT2: https://www.forestresearch.gov.uk/tools-and-resources/biomass-energy-resources/reference-biomass/documents-downloads/beat/

2.3 Approach to quick characterisation of tools

For the quick characterisation of the tools on the longlist, a protocol was designed. This protocol prescribed a three steps approach to the characterisation.

Firstly a general description was made of the tools following the outline in the underneath table:

General characterisation of	
1. Tool name	
2. URL address of tool	
3. Main objective/scope/ short description of tool (max 150 words)	
4. Type of end-users targeted (<i>Biomass producers (farmers, foresters, waste managers) , advisors, researchers, public agency, industry, lobby, other</i>)	
5. Type of tool (<i>Data/information mobilisation, Design of chains, assessment tool, other</i>)	
6. What is the geographic coverage of the tool?	
7. What year was the tool produced?	
8. Focus on certain biomass (<i>agricultural residues, forest residues, dedicated crops, waste streams</i>) ?	
9. Focus on certain end products (<i>e.g. to food, materials, energy, chemical building blocks</i>) ?	

Secondly, the contents of the tools was scanned in order to score these aspects as follows:

A score of 0 or 1 to 5 could be given per aspect where:

1= No information on the aspect content in the tool

5= Yes highly detailed & extensive information contained in the tool)

0 = If it could not be determined whether the information was contained in the tool.

There were 8 content aspects on which the tools were scored and these are presented in the following table:



Score 1 -5 (1= No 5= Yes highly detailed & extensive information). If not known score with '0'.	
A. Content tools	
1. Biomass availability	
<p><i>Biomass supply information:</i></p> <ul style="list-style-type: none"> - are many biomass types covered (e.g. agricultural residues, forest residues, amount of collected waste, sewage sludge etc.) - does it provide quantitative information on biomass availability - does it specify different biomass potential figures - is supply data provided for many regions at high spatial resolution level - etc. 	
<p><i>Biomass cost information (is cost or price information given, if yes is it given per type and are the cost specified in different cost categories etc.)</i></p>	
<p><i>Metadata available on biomass cost-supply data</i></p>	
<p><i>Biomass quality & composition data: e.g. - is information given on biomass characteristics such as ash content, N, P, K content, % lignocellulose, % proteins, % sugars etc.</i></p>	
2. Logistics options	
<p><i>Information on collection and pre-treatment options: e.g. machinery used, machinery performance efficiency, type of pretreatments (chipping, milling, drying, ...)?</i></p>	
<p><i>Spatially specific assessment option for logistics? (so can the user identify the collection area from where biomass can be sourced and does the tool help the user to understand what collection cost/collection activities are needed, or how much biomass can be sourced to a point?)</i></p>	
3. Biomass demand	
<p><i>Information on local market demand for & uses of biomass</i></p>	
<p><i>Biomass market information: e.g. how much biomass is already used by existing biobased activities, how much biomass is needed for planned biobased activities?</i></p>	
<p><i>Is there information about cascading uses of biomass and/or indicators for circularity.</i></p>	
4. Biobased activities	
<p><i>Good practice examples of biomass conversion technologies</i></p>	
<p><i>Information on biobased industries present</i></p>	
<p><i>Information on biobased production already present</i></p>	
5. Policy & regulation	
<p><i>Is the information provided on policies/regulations/stimulation measures? Is this information specifying policies at EU/National and regional levels? If many policy levels covered score high with 4/5</i></p>	
<p><i>Information on visions, strategies & roadmaps</i></p>	
6. Financial environment	
<p><i>Info on options for finances/investors/subsidies</i></p>	
<p><i>Info on investment cost</i></p>	
<p><i>Info on return on investment</i></p>	
7. Bioeconomy/circular economy (monitoring) indicators	
<p><i>Size of bioeconomy indicators: e.g. revenues obtained from the bioeconomy sectors expressed for example in contribution to GDP & number of jobs etc.</i></p>	
<p><i>Does the tool provide information on indicators that express the share of bioeconomy products in the total (regional/national) economy?</i></p>	
<p><i>Does the tool contain information on biomass flows?</i></p>	
8. Sustainability aspects	
<p><i>GHG emissions/LCAs</i></p>	
<p><i>Land use change impacts</i></p>	
<p><i>Impacts on biodiversity & ecosystems</i></p>	
<p><i>Other impacts on environment (water, soil, air)</i></p>	
<p><i>Socio-economic impacts (is there (indicator) information on impacts on local labour, income etc.)</i></p>	
<p><i>Is there information on certification schemes ?</i></p>	

The last group of aspects on which the tools were scored relates to the way the tools interact with the users. The 5 different aspects scored are presented in the next table.



B. Usability of the tool/interaction with the user/user friendliness	
9. Clear description of scope of the tool	
<i>Are the end-users clear the tool targets?</i>	
<i>Are the objectives and scope of the tool made clear?</i>	
<i>Does the design of the tool match the expected end-users' needs and expertise</i>	
10. General interaction with user	
<i>Interface is consistent, well-ordered ?</i>	
<i>Is the use of the tool well explained and easy?</i>	
11. Data/information access, overview	
<i>How much interaction with data is possible? (e.g. possibility to change or add data, change default values) (score 1 when no interaction is possible and 5 when many interaction functionalities are available)</i>	
<i>Search functions present and how extensive/functional (score 1 if not search function and 5 when extensive search facilities)?</i>	
12. Functionalities	
<i>Advanced functionalities available: e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool</i>	
13. Context sensitive help	
<i>Advanced help functions available?</i>	
14. Recommend the tool for short list?	
<i>Yes/no/give arguments particularly related to the 13 scoring issues mentioned above.</i>	

The last scoring item (14 , see table above) was an open question and asked for an integrated perspective on whether the tool was recommended to be placed on the short list of tools and whether the tool would be inspiring for the design of the BSAT tool in Task 2.4.

In Annex A an example is placed of a quick evaluation of one tool.



3 SUB-SELECTION OF MOST RELEVANT TOOLS FOR DETAILED CHARACTERISATION AND TO BE USED AS INSPIRATION

3.1 Introduction

The quick evaluation of the tools was done by two partners independently, as described already in Chapter 2. This ensured that a wider perspective was taken in the scoring. The two quick evaluations were then combined in a final score per item per tool. Tools scoring high on several aspects were selected for the short list.

In addition to the tools shortlisted, there were also tools that were selected for inspiration for the design of the BSAT tool to be developed later in this project in task 2.4. These 'tools for inspiration' were not shortlisted because the content was not evaluated as relevant, for example because it related to territories outside of the EU, but they were scored high on several user interaction aspects and on attractive presentation of content results.

3.2 Results of quick characterisation of tools and selection of tools for detailed characterisation in factsheets

The results of the combined quick evaluation scores are presented presented in this section. As explained this lead to three groups of tools:

1. Attractive tools with relevant contents for bioeconomy aspects in EU regions to be placed on the shortlist to be extensively characterised further in factsheets (for this selection see Table 3.1)
2. Tools not covering content for EU regions but attractive in terms of user interaction aspects and content-user presentation approaches (for this selection see Table 3.2).
3. Tools not covering content for EU regions and/or not attractive in terms of user interaction (see Table 3.3).

The 'X' scores in Table 3.1 were given per item if the quick characterisation scores were rated between 4 and 5 points (see former Section 2.3). The tools that obtained several multiple scores (XX) for at least one or more of the 8 content items in the quick evaluation were selected for the short list. (see Table 3.1). Furthermore, in the total selection of tools for the short list it was ensured that every of the 8 content items (see Section 2.3 A items) was represented well by the final tool mix. This resulted in 10 tools shortlisted (see Table 3.1). The results of the combined scores are presented in Table 3.1. The tools on the short list were then characterised in detail and the approach and results of this detailed characterisation are presented in next Chapter 4.



Table 3.1 Scores for tools that were selected for the shortlist

Selected tools for shortlist that need description in fact sheet	1. Biomass availability	2. Logistics options	3. Biomass demand	4. Biobased activities	5. Policy & regulations	6. Financial environment	7. Bioeconomy/ circular economy indicators	8. Sustainability aspects	9. Clear description of scope of the tool	10. General interaction with user	11. Data/information access. overview	12. Functionalities	13. Context sensitive help
ESCSS-SAT	X	X	XX		X	X	X	X	XX	XX			
S2BIOM	XX	XX	XX	X	XX	XX		X	XX	XX	XX	XX	
BERST	X		X	X	XX	X			XX	XX	X	X	
BIORAISE	XX	X						X	X	X	XX	XX	X
AGRIFOR-VALOR				XX					X	XX	X		
DataM	XX						XX	X	XX	XX		X	
BioESoil	X							XX	XX	XX	XX	X	X
BioGrace-II GHG	X	X						XX	XX	XX	XX	XX	XX
CFPAN tool & FeedPrint								XX	XX	XX			
BEAT2	X	X	X	X				XX	XX	XX	X	X	XX

Table 3.2 Scores for tools that were selected as inspiration for design of the BSAT

Tools for inspiration	1. Biomass availability	2. Logistics options	3. Biomass demand	4. Biobased activities	5. Policy & regulations	6. Financial environment	7. Bioeconomy/ circular economy indicators	8. Sustainability aspects	9. Clear description of scope of the tool	10. General interaction with user	11. Data/information access. overview	12. Functionalities	13. Context sensitive help
BioTrade2020+	X				X					XX			
Biomass yards									X	X			
BioSAT	XX					X			XX	XX			
FAO Food Balance Sheet									XX	XX			
Bioeconomy Tool Shed	X	X		X		X			X	X	X		
TRASE			X				X	X	XX	X	XX	X	X
WATER and GREET								XX	XX	X	X	XX	X
Biomass Geo-Wiki									X	X	X	X	
GYGA									XX	XX	X	X	X
FEAST									XX	X	X		



The second category to tools that were selected for inspiration for the design of the BSAT tool to be developed later in this project. These ‘tools for inspiration’ were not shortlisted but they were scored high on several user interaction aspects and on attractive presentation of content results. The tools that were selected for inspiration are presented in Table 3.2. Characterisation of the user interaction aspects of these tools is further discussed in Chapter 5.

Finally in Table 3.3 the tools are presented that did not reach a high score on both content aspects and/or user interaction aspects.

Table 3.3 Tools with low scores in quick evaluation not shortlisted, nor selected for inspiration

	Tools
14	The “Woodfuel Integrated Supply/Demand Overview Mapping” (WISDOM): www.wisdomprojects.net/global/
16	BISCUIT (BioPAD project supply chain unique integrated tool): www.biopad.eu
20	I-BIOREF – Modeling and Analysis for Technical, Economic, and Environmental Assessment of Biorefinery Pro,
21	LEAP (Long range Energy Alternatives Planning System): www.energycommunity.org/LEAP/
23	VALERIE : VALorising European Research for Innovation in agriculturE and forestry: http://www.valerie.eu/



4 DETAILED CHARACTERISATION OF TOOLS ON SHORT LIST

4.1 Approach: Design of factsheets

In total 10 tools were selected for detailed characterisation as became clear in the former chapter 3. These tools are recommended to be used by the regions. An extensive description of these tools will be provided in this chapter and in the factsheets presented in Annex B and these factsheets will be included in the BSAT tool once it is developed later in the project.

The topics of the detailed characterisation were discussed with all project partners during the project meeting in Madrid (April, 2019). Subsequently the task leader prepared a draft protocol to guide the detailed characterisation in factsheets and to achieve standardised characterisations as much as possible. In order to allow comparable factsheet descriptions of the different tools, key topics (indicators) to be addressed for each content field have been listed. These key topics have been aligned with those obtained in Task 2.2 on KPIs to evaluate regional bioeconomies. RTO partners have provided further feedback and the protocol for the factsheet was finalised (see below).

The 10 tools selected for detailed evaluation (chapter 3) were distributed over the 5 partners for detailed characterisation. Next, these characterisations were reviewed by an other partner. The resulting factsheets for the 10 shortlisted tools are included in Annex B.

In the factsheets elaborated the detailed description is structured according to 3 aspects (like for the quick evaluation/characterisation):

- A. General description of the tools
- B. Content of the tools
- C. Usability of the tool/interaction with the user/user friendliness

Ad. A The general description of the tools covers a list of 10 aspects that were described per tool as becomes clear from the underneath table:

A. General	
A1	Full name and acronym of the tool.
A2	Home page of tool and if relevant also subpages (URL)
A3	A summary description of the tool including the main objective(s).
A4	Most recent update of the information in the tool (year)?
A5-1	<p><i>The tool is <u>especially</u> suitable for (tick 2 main options)</i></p> <ul style="list-style-type: none"> ○ Biomass producers/harvesters/pre-processing companies/transport & logistics companies/farmers/foresters/land(scape)owners & managers; ○ policy makers, exploring options for a region new to bioeconomy; ○ consultants/scientist/advisors, searching for specific information on a wide number of issues e.g. availability, costs, regulations, and calculation tools; ○ industry, requiring detailed and reliable information for a wide number of operational issues possibly using calculations, adding own data. ○ Financers, requiring reliable information on cost, return on investments, security of the operations, good practice examples ○ Lobbying organisations, NGOs ○ <i>Other,</i>



A. General	
	<p>Explain your answer by describing features that you consider compatible and those incompatible with the level of knowledge of the user you indicate:</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>
A5-2	<p>The tool is especially suitable for (tick 1 or 2 options)</p> <ul style="list-style-type: none"><input type="radio"/> novice users<input type="radio"/> users with little knowledge of the topic and understanding of online tools<input type="radio"/> users with some knowledge of the topic and understanding of online tools<input type="radio"/> advanced users <p>Explain your answer by describing features that you consider compatible and those incompatible with the level of knowledge of the user you indicate:</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div>
A6	<p>Type of tool? Use one or more of the following types:</p> <ul style="list-style-type: none">- Data/information mobilisation- Design of chains- Assessment tool- Other, ...
A7	<p>Countries and/or regions that are covered by the tool.</p>
A8	<p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.</p>
A9	<p>Types of biomass covered? Use one or more of the following types:</p> <ul style="list-style-type: none">- Agricultural residues- Forest residues- Dedicated crops- Waste streams
A10	<p>Types of biomass conversion covered? Use one or more of the following types:</p> <ul style="list-style-type: none">- Food- Feed- Biochemicals- Biomaterials- Biofuels- Bioenergy

Much attention is given to identifying the type of user most interested in the tool both in terms of type of background (A5-1) and in terms of ability to interact with the tool (A5-2). The letter aspect indicates



whether the tool is suitable for beginners ('novice users') which have little experience with bioeconomy and using interactive tools, or for experienced users with large experience in bioeconomy and using interactive tools.

Ad B. includes a description according to 7 different contents fields which are presented and explained in the following Table. These content fields are a more extensive version of the items according to which the tools were scored in the quick evaluation (see Chapter 2). In addition these key topics have also been aligned with those obtained in Task 2.2 on KPIs to evaluate regional bioeconomy and this made the topics to be scored more complete.

B. Content of the tools	
B1	<p>Biomass supply information:</p> <ul style="list-style-type: none">- <i>Types of biomass covered</i>- <i>number of biomass types that are covered (1, 2-5, >5)</i>- <i>quantitative information on biomass availability that is provided (e.g. in totals per area, biomass density)</i>- <i>is biomass expressed in different types of potential figures (e.g. technical potential, sustainable potential, economic potential, currently exploited and unexploited potential, current and future potentials etc.)</i>- <i>supply data provided at high spatial resolution level (e.g. national, regional, grid (what size?))</i>- <i>Information provided on the long-term competitive and consistent availability of the biomass</i> <p>Biomass cost information:</p> <ul style="list-style-type: none">- <i>cost</i>- <i>price</i>- <i>per type</i>- <i>cost categories included (e.g. harvesting in field, collection up to road side/farmgate, pretreatment, transport, biomass storage, transport etc.)</i>- <i>metadata on biomass cost-supply input data and methodology given?.</i> <p>Biomass characteristics (quality & composition) information:</p> <ul style="list-style-type: none">- <i>ash content</i>- <i>N, P, K content</i>- <i>% lignocellulose</i>- <i>% proteins</i>- <i>% sugars</i>- <i>% starch</i>- <i>% oil</i>



B. Content of the tools	
B2	<p>Information on logistics:</p> <ul style="list-style-type: none"> - <i>harvesting</i> - <i>collection</i> - <i>transportation (road, rail, waterway)</i> - <i>pre-treatment (chipping, milling, drying)</i> - <i>storage</i> <p>Spatially specific assessment options for logistics available like:</p> <ul style="list-style-type: none"> - <i>how can the user identify the collection area from where biomass can be sourced?</i> - <i>how does the tool help the user to understand what collection cost/collection activities are needed?</i> - <i>how much biomass can be sourced to a point?</i>
B3	<p>MARKETS:</p> <p>Biomass market information:</p> <ul style="list-style-type: none"> - <i>Local market demand & uses of biomass</i> - <i>Local market demands for biomass for exports to other regions/countries</i> - <i>Demand of existing biobased activities</i> - <i>Demand for biomass of planned biobased activities</i> - <i>Information on biomass flows (including exports and imports of biomass and/or biobased products?).</i> <p>Biobased product market information:</p> <ul style="list-style-type: none"> - <i>Volume of biobased products produced in the region</i> - <i>Volume of biobased products purchased in the region</i>
B4	<p>Good practice examples of biomass conversion technologies/chains.</p> <ul style="list-style-type: none"> - <i>Information on number & type of biobased industries present.</i> - <i>Existence of demonstration (flagship) technologies/biorefineries projects</i> - <i>Examples of (part) of chains (including close to zero waste initiatives)</i>
B5	<p>Information on policies/regulations/stimulation measures?</p> <p><i>Information specifying policies at EU/National and regional levels? (e.g. energy and climate policies, circular economy support policies, policies stimulating innovation & technology development, policies focussing on rural development including biobased activities)</i></p> <ul style="list-style-type: none"> o <i>Energy and climate policies</i> <p>- Information on visions, strategies & roadmaps.</p> <ul style="list-style-type: none"> - <i>Existence of National Bioeconomy strategy (including the corresponding Action Plan)</i> <p>• Existence of regional development planning</p>



B. Content of the tools	
B6	<p>Information on options for finances/investors/subsidies:</p> <ul style="list-style-type: none"> - <i>Information on investment cost.</i> - <i>Information on return on investment.</i> - <i>Existent supportive bioeconomy policy framework</i> - <i>Existence/availability of funding programmes targeting bioeconomy at national and regional level (specially for the commercialisation of bio-based technologies and products) supported for instance by European Investment Bank/Fund</i> - <i>Establishment of mechanisms that enable feasible synergies and combination of difference sources of funding</i> - <i>Existent measures differentiating among regulations (imposed by law), financial support measures and soft measures (guidelines)</i> - <i>Support measures to promote industrial symbiosis</i> - <i>Support measures to support valorisation schemes</i> - <i>Support measures to local value chains implementation</i> - <i>Support for facilitating the cooperation between government, research institutions and industry (including agriculture, harvesting, transport, biomaterials, bioenergy, etc.) (for example collaboration agreements between industry-research institutions)</i> - <i>Support to optimise the innovation and knowledge transfer system (funding programmes targeting innovation and dissemination)</i>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <ul style="list-style-type: none"> - <i>Information on GHG emission/mitigation</i> - <i>Information on Land use change impacts.</i> - <i>Information on Impacts on biodiversity & ecosystems.</i> - <i>Information on other impacts on environment (water, soil, air, including resource depletion aspects).</i> - <i>Information on socio-economic impacts (e.g. information on e.g. number of employees in bioeconomy industries/sector, income derived from bioeconomy sector, turnover from bioeconomy etc.).</i> - <i>Information on certification schemes.</i>

Ad. C. As to the user interaction aspects the items described are presented in the following Table.

C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>Wat are the objectives of the tool, according to the tool developers?</p> <p>Who are the target users of the tool, according to the developers? (<i>Match with main user groups in this characterisation: 1. policy makers, looking for high level information and case studies; 2. consultants/scientists, requiring accurate and detailed information on several aspects of the biomass chain; 3. industry, same as the consultant/scientist plus calculations, adding own data).</i></p> <p>To what extent does the design of the tool match the expected needs and expertise of the end-user? (<i>For example, is the explanation of the tool easy to understand or complex, is the vocabulary simple/technical; is the information relevant and understandable for the user)</i></p>



C. Usability of the tool/interaction with the user/user friendliness	
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered, ...)</p> <p>How is the use of the tool explained ? (e.g. manual, course, context-sensitive help ...)</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>What kind of search or select functions are available ? (e.g., text search/select, pick-lists, geographic search/select)</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p>
C5	<p>What advanced help functions are available?</p>
C6	<p>The interaction with the tool (tick 1 or 2 options)</p> <ul style="list-style-type: none"><input type="radio"/> is intuitive and simple<input type="radio"/> is generally easy and well explained<input type="radio"/> <u>requires some effort but is easy to learn or well explained</u><input type="radio"/> requires effort and reading background (help) files<input type="radio"/> requires effort and is not explained <p><i>Explain your answer by describing features that enhance, and those that diminish, the ease of use of the interface:</i></p> <div style="border: 1px solid black; height: 100px; width: 100%;"></div>
C7	<p>The tool (tick 1 option)</p> <ul style="list-style-type: none"><input type="radio"/> is very simple and offers the user limited functions<input type="radio"/> offers the user some functions regarding e.g. search functions or data presentation<input type="radio"/> <u>is very extensive and offers the user many options for e.g. data input and presentation</u> <p><i>Explain your answer by describing features that you consider important or useful functionalities:</i></p> <div style="border: 1px solid black; height: 100px; width: 100%;"></div>



C. Usability of the tool/interaction with the user/user friendliness

C8

*Can you explain the most attractive feature of the tool that should be used for inspiration in the design of the BSAT tool?
Explain your answer by describing feature(s) that you consider inspiring.*

The individual factsheets of each of the 10 tools on the shortlist are included in this report in Annex B. The results of the detailed characterisation of tools per content aspect are described in section 4.2.1. The aspects in relation to user interaction are presented in section 4.2.2.

In addition to these 10 shortlisted tools, 10 tools were also selected which were not fitting to the EU context in terms of content, but which have attractive features that can be used for 'inspiration' for the development of the BSAT tool. The characterisation results for these tools are summarized in Chapter 5 and the fact sheets for these tools are included in Annex C. These tools were described according to the same protocol, with focus on the items scored with XX in table 3.2. For these tools focus is not so much on the content, but particularly on the user interaction items. Also these tools were distributed over the 5 partners for detailed characterisation. Reviewing was performed by the task leader.

4.2 Results: Characterisation of tools on short list

4.2.1 Content of the tools

4.2.1.1 Biomass supply, cost, characteristics information (B1)

The tools that contain relatively much and advanced information on biomass supply and/or biomass cost and characteristics are particularly the **S2BIOM**, **BIORAISE** and **DataM**. Several other tools do give attention to similar aspects but not in terms of providing real biomass cost-supply figures.

Biomass supply information

Biomass supply is extensively presented in the **S2BIOM** tool. In this tool biomass supply for a wide range of biomass types, years (2012, 2020 and 2030) and potentials (technical, baseline, sustainable potential etc.) is presented at national and regional levels (Nuts 0-3) for 37 European countries. The biomass types covered in this tool include the most important lignocellulosic biomass categories including primary, secondary and tertiary biomass sources from forests, grasslands, arable and permanent crops, dedicated biomass crops and waste streams (biowaste and post-consumer wood). The biomass potentials covered are particularly assessed in relation to use for bioenergy production and for other non-food applications. This tool enables the user to make selections of biomass types for which data can be displayed in a map in relation to amount of biomass available per year and potential type combination. In addition, the user can also choose the level entities in absolute levels (Kton in dry matter (dm or TJ), area weighted (Kton DM/km² or GJ/km²) and weighted average road side cost (€/ton DM).



Like the former, the **BIORAISE** tool is also far elaborated in providing biomass potential information for non-food uses. It covers similar biomass category potentials which are agricultural residues (from rainfed and irrigated crops, orchards, vineyards, olives), forest residues, including from agroforestry and shrub residues (Landscape). As regard to the last biomass category the BIORAISE tool is quite unique. The biomass availability per type of biomass is provided in this tool in a 1*1 km grid linked to the Corine land cover classes (e.g. rainfed crops, irrigated crops, forest, agroforestry, shrubs). The biomass potential figures are linked to a land cover class but the calculation of the biomass availability is based on statistical data on land use (crops) combined with a Residue-to-product-ratio specific per crop per country. The biomass availability is based on averages from statistics over a period of 2005-2014. No information provided on the long-term availability of the biomass as there is only one type of potential presented.

The *DataM* tool is also very advanced on presenting biomass supply information and covers all primary biomass categories for arable and permanent crops, forest, and waste from terrestrial and marine sources. As to the latter it is unique. The biomass potentials are presented in Kton DM and Joules and in totals and biomass flow diagrams are provided for different types of end uses including food and non food. The biomass potential data in DataM were produced in a study of 2015. (JRC & Nova, 2015). The indicators estimated are the harvested biomass, the amount of agricultural residues with a distinction between used and non-used residues, the domestic extraction used (DEU), the Harvested area and the Yield of the domestic extraction used. The domestic extraction used (DEU) refers to the sum of the harvested biomass and used residues. All indicators are expressed in tonnes of fresh and dry matter. The scope of this database is all agricultural commodities, for each of the 28 EU Member states. Data are available from 1991 to 2013.

Biomass cost information

Tools that provide detailed information on biomass cost are limited to **S2BIOM and BIORAISE**. In S2BIOM biomass cost information are displayed in two ways. Firstly through the biomass supply viewer enabling the user to obtain information on road side cost of biomass per ton DM or per GJ. Secondly through a biomass cost-supply viewer which enables the user to make selections of biomass types for which cost levels can be displayed in a cost-supply graph. The graph displays the total accumulated biomass (ordered from cheap to expensive) against the average road side cost level for the country/countries and scenario years selected. The amount of biomass is displayed on the y-axis and the road side cost level on the x-axis. The cost displayed here are limited to the road-side cost. Road side cost refer to all biomass production collection and pre-treatment cost up to the road where the biomass is located. The road side cost is a fraction of the total 'at-gate-cost.' So the cost from road side for transport and possible in-between treatment to the gate of the conversion installation or the pre-treatment installation are not included.

BIORAISE is more advanced in displaying the cost of biomass as it enables the collection and transport cost, which can be regarded as the 'at gate cost' of biomass. When the user designs a biomass delivery chain with the tool, the cost of transport of the biomass are also calculated and reported separately per type of biomass. Cost are build-up of harvesting & collection and transport cost. Further pre-treatment activities & cost are not addressed, as is the case with the cost data in the S2BIOM tool.



In **ESCSS-SAT** a wizard- based on a questionnaire is included which addresses eight key factors that are relevant to understand biomass feedstock availability for bioeconomy uses. The wizard guides the user to the main types of questions that need to be asked in relation to an inventory of Biomass in general and waste. The questions relate to the long term, stability and availability of feedstock. In this regard depending on the type of feedstock (waste or biomass) relevant questions are provided.

Biomass characteristics (quality & composition) information

Tools that provide information on biomass characteristics directly are **BIORAISE** and **S2BIOM**. **BIORAISE** takes into account moisture content (the user can choose the moisture level of the biomass for which cost of transport and collection are calculated), ash value and energetic contents. In **S2BIOM** a database is presented showing for all biomass types covered typical figures for aspects like moisture content when harvested, ash, ash melting behaviour, chlorine (Cl), sulphur (S), potassium (K), sodium (Na), calcium (Ca), magnesium (Mg), silicon (Si), nitrogen (N), phosphorus (P), energy content and bulk density. These typical characteristics are also used as input in the biomass conversion technology matching tool which is also part of the **S2BIOM** tool kit. This matching tool supports users in an interactive way to find the most suitable conversion technologies for different types of biomass. This match is determined by the biomass composition characteristics and the minimal biomass quality requirements every biomass conversion technology has. More emphasis is placed on biomass conversion technologies to energy and less to biochemical building blocks.

4.2.1.2 Information on logistics of biomass supply (B2)

Of all tools selected for the shortlist the **BIORAISE**, **S2BIOM**, **BioGrace-II** and **BEAT2** tools only cover biomass logistics aspects extensively, but all tools take different perspectives.

The key feature of the **BIORAISE** tool is letting the user design its own biomass delivery chain. Logistics are a key feature and logistics information is provided in a chain and spatially specific way. This tool enables a user to design a chain by taking account of the detailed spatial distribution of the biomass, by letting the user select (on a map) the biomass type, the biomass collection circle and the point where a conversion installation is to be placed and to where the biomass needs to be transported.

In **S2BIOM** the information provided on logistics is a different order information than in **BIORAISE**. It includes the logistical component database. Which contains information on logistical components. A logistical component is one of the links in the biomass value chain from biomass to (final) conversion, examples are pre-treatment, storage and transport technologies that are needed to deliver biomass feedstock of a specified quality at the correct moment to a processing technology. The database in **S2BIOM** is organised in categories and sub-categories according to the main functionalities of the logistical components which relate to aspects like size reduction, compaction/densification, drying, handling, harvesting/collection, storage, transportation. In addition to this database the **S2BIOM** tool box also contains spatially specific assessment results for Burgundy, Aragon and Finland cases assessed with tools like **LocaGIStics** and **BeWhere** tools. The tools support the design and evaluation of biomass delivery chains through formalised steps and evaluation indicators.



In **BioGrace-II** Information on logistics and pre-processing steps are included since the tool covers the entire biomass chain from biomass production to end use. In Figure 2 of the factsheet on BioGrace-II presented in Annex A an overview of a pathway in the tool is presented. It shows the processing and transportation steps involved and their respective GHG impacts. Several pre-processing techniques are modelled in the tool (chipping, pellet production, baling, anaerobic digestion, oil extraction). All modes of transport are considered (truck, freight train, bulk carrier oceanic transport). Default values on GHG emissions for these are provided which could be replaced with actual data to make calculations.

Like BioGrace-II, the **BEAT2** tool also provides whole support in understanding of impacts from biomass and biofuel plant development over the whole life cycle of the technology and fuel chain. This implies that logistics are also addressed in this tool, but in a non-spatial way. The logistics processes included in the BEAT2 encompasses shredding, milling, pelletisation, disposal, transportation. Also here default value emissions are provided but it is also possible to enter own parameters.

ESCSS-SAT includes questions that can guide the inventory of the presence of relevant infrastructure to handle biomass feedstock and production.

4.2.1.3 Markets information (B3)

Biomass and biobased product markets are most extensively covered in tools like **S2BIOM**, **BERST**, **DataM** and **AGRIFORVALOR**.

The way the tools address aspects of markets for biomass and Biobased products is very different.

In the toolkit of **S2BIOM** the information shared through the tools is more forward looking and has as an objective to understand how much biomass demand will come in the future making certain scenario expectations on technology developments. Users can access the different outcomes of these scenario assessments which include information on current (2015) and the future biomass demand and consumption patterns. The forward-looking analysis was done for different scenarios from the energy (heat, electricity and biofuels) and biomaterials sectors (lignin, sugar platforms, bio-methane, BTX, methanol, hydrogen, ethylene, and mixed alcohols) perspective and it was assessed using the ReSolve model.

In **BERST** the perspective on markets is focussing on financial instruments. In the 'Catalogue of Instruments & Measures tool' there is an option to choose "economic/financial instruments" from the dropdown list of the types of instrument and measures. Economic/financial instruments and measures can stimulate certain activities, behaviour or investments using financial support and price signals to influence the market. These include fiscal and financial policy instruments such as taxes, tax relief, grants or subsidies, feed-in tariffs, and loans for the purchase or installation of certain goods and services. They also include direct public funding and procurement rules, and market mechanisms such as tradable permits.

In **AGRIFORVALOR** market information is only included on the current use of side-streams for the three Biomass Innovation Design Hub locations of Spain (Andalusia), Hungary and Ireland.



ESCSS-SAT includes questions that can guide the collection of information on Strength and availability of regional markets.

4.2.1.4 Good practice examples of biomass conversion technologies & chains (B4)

Since best practice examples of bioeconomy chains are also elaborated in this project the tools identified in relation to this aspect also form inspiration for task 3.4 of the this project.

Tools that present already good practice examples are particularly **BERST**, **AGRIFORVALOR**, **S2BIOM**, **BioGrace-II**, **BEAT** and the **Bioeconomy Toolshed**.

Information on number & type of biobased industries present

Both **BERST** and **AGRIFORVALOR** cover all biobased industries yielding a range of products: Food, Feed, Biochemicals, Biomaterials, Biofuels and Bioenergy. **S2BIOM** considers heat, electricity, biofuels and biochemicals production.

Both **BioGrace-II** and **BEAT2** focus on energy application of biomass (heat, electricity and combined heat and power) including production of biogas for use in energy applications. **BioGrace-II** also includes plant oil production pathways for use in energy applications. Whereas **BEAT2** also provides biofuel (bioethanol, biodiesel) production. The **Bioeconomy Tool Shed** focuses on biofuels for transportation.

Existence of demonstration (flagship) technologies/biorefineries projects

S2BIOM provides a list of lignocellulosic biomass conversion technologies and their characteristics (including technology readiness level, type of biomass input, output capacity). For heat, power and fuels, several technologies are available in the database, while for other bio-based chemicals some but fewer conversion technologies are included.

Both **BioGrace-II** and **BEAT2** provide a set of pathways with default input values provided reflecting average production. However, these two tools focus on bioenergy application and no information on other biobased industries is present.

Both **BERST** and **AGRIFORVALOR** provide information on a range of biobased industry examples at mature stage. **BERST** provides information on a regional level providing overview of all the (large-scale) bioeconomy production in a specific region. Whereas, **AGRIFORVALOR** provides information on the technique level. More information on these two tools are provided below.

BERST provides Good Practices – that are examples of regions that contain one or more successful bioeconomy clusters at the mature production stage. Eight bioeconomy clusters were identified being: primary biomass, food and feed, construction, chemicals and polymers, pulp and paper, textile and clothing, energy, and R&D biotechnology.

Four Good Practices were selected: Ghent (Belgium), North Rhine Westfalia (Germany) Toulouse (France) Manchester (UK).



In the analysis of the BERST regions (regions of partners) it has been explored to which extent the key findings of the Good Practices also apply for these bioeconomy clusters and which barriers they face in developing the bioeconomy cluster.

AGRIFORVALOR identified good practices / success stories on the market valorising biomass side streams. They described example of good practices from around EU in a report and profile of each technique is provided in the Side stream Value Tool. The good practices were identified according to economic feasibility, environmental benefits, collaboration of multiple stakeholders and access to innovative funding. Out of the total 117 techniques present in the tool, 33 are Best practice and 21 at TRL 9 (proven in operational environment).

Examples of close to zero waste initiatives

There is no specific mention on close to zero waste initiatives in any of the tools. In **AGRIFORVALOR** all of the valorisation techniques are focused on valorising wastes and residues, so this forms examples for close to zero waste initiatives. Furthermore, in the profile of the technique there is a section where the impact of the technique is written which can include benefits to the environment such as reduction of waste.

4.2.1.5 Information on policies/regulations/stimulation measures (B5)

The tools that are most relevant to use in relation to finding information on policies, regulations and stimulation measures are **BERST**, **S2BIOM**, **BioGrace-II**, **BEAT2** and **ESCSS-SAT**.

Information on policies/regulations/stimulation measures

BERST provides very extensive and comprehensive collection of policies and regulations on national and EU level. In **S2BIOM** a comprehensive list of Instruments & Measures are provided that foster the development of regional bioeconomies covering the whole world. The policies included in this database refer to range of topics including agriculture, forestry, energy, mobility, environment, etc. The regulatory (binding) instruments are classified into categories: zoning, targets, substitution obligation, standards, restrictions, procurement rules, property rights, purchase obligation, permitting, grid access, requirements, classification. Both **BERST** and **S2BIOM** give access to the same tool to interact with the information on policies. The tool provides access with the following filters: Country/Region, Type of Instrument or Measure, Sector/Topic targeted, Feedstock type targeted, Product type targeted, Value Chain, Search Terms. In a secondary filtering feature the user can select between various alternatives including zoning, targets, substitution obligation, standards, restrictions, procurement rules, property rights, purchase obligation, permitting, grid access, requirements, classification.

Both **BioGrace-II** and **BEAT2** are linked with the EU Bioenergy related policies and stimulation measures. **ESCSS-SAT** is related to Public Support Policies. In this regard relevant questions on policies promoting biomass and waste utilisation as well as related to regional planning are provided.

Information on visions, strategies & roadmaps

This information is only available in **BERST** in terms of National bioeconomy strategies and the corresponding action plans in the EU.



Existence of regional development planning

Regional / rural development plans can be found in the **BERST** tool.

Regional / rural development plans can be found only in the BERST tool.

4.2.1.6 Information on options for finances/investors/subsidies (B6)

The tools that are most relevant to use in relation to finding information on financial aspects are **AGRIFORVALOR**, **BEAT2**, **BIORAISE BERST** and **S2BIOM**.

Information on investment costs and return on investment

Information on investment costs and return on investment can be attained from the **BIORAISE**, **AGRIFORVALOR** and **BEAT2** tools. **BIORAISE** only provides information on collection and transportation of biomass which can be used in setting up the whole biomass value chain. In **AGRIFORVALOR**, for the list of techniques for side stream valorisation an indicative information regarding investment costs and return on investment is provided with ranges. **BEAT2** includes a cost model with information on return rate and capital cost for the bioenergy pathways. In **S2BIOM** in datasheets on the conversion technologies available in the database, information on investment cost is provided.

Information on financial instruments

BERST provides the most comprehensive information among the tools in the short list. It contains the regulatory policy background related to financing and existing funding programmes targeting innovation which can be linked to bioeconomy initiatives.

S2BIOM a comprehensive list of Instruments & Measures are provided including Economic/financial instruments. They are classified into categories: premium, R&D funding, Subsidies, Tax Levels, penalty for non-compliance, loans, direct payments, feed in tariff, import tariff, investment subsidies, tax reductions, tradable certificates.

Tool Shed provides a collection of financing opportunities for biofuels in the USA. **BioGrace-II** and **BEAT2** are both linked to the EU bioenergy related policies. **BEAT2** considers the amount of support that the scheme receives as capital grants, Renewable Obligation Certificates (ROCs) or indirectly through mechanisms to support feedstock production. **AGRIFORVALOR** only provides information on the type of funding for the list of projects/techniques for side stream valorisation in terms of private, public or both. **ESCSS-SAT** includes questions regarding access to finance and the financial instruments available.

Information on investment cost and return on investment

Information on investment cost and return on investment can be attained from the **BIORAISE**, **AGRIFORVALOR** and **BEAT2** tools. **BIORAISE** only provides information on collection and transportation of biomass which can be used in setting up the whole biomass value chain. In **AGRIFORVALOR**, for the list of techniques for sidestream valorisation an indicative information regarding investment cost and return on investment is provided with ranges. **BEAT2** includes a cost model with information on return rate and capital cost for the bioenergy pathways.



Information on financial instruments

BERST provides the most comprehensive information among the tools in the short list. It contains the regulatory policy background related to financing and existing funding programmes targeting innovation which can be linked to bioeconomy initiatives. Tool Shed provides a collection of financing opportunities for biofuels in the USA. BioGrace-II and BEAT2 are both linked to the EU bioenergy related policies. BEAT2 considers the amount of support that the scheme receives as capital grants or Renewable Obligation Certificates (ROCs) or indirectly through mechanisms to support feedstock production. AGRIFORVALOR only provides information on the type of funding for the list of projects/techniques for sidestream valorisation in terms of private, public or both.

4.2.1.7 Information on GHG emissions/LCAs and other sustainability aspects (B7)

The tools that are most relevant to use in relation to finding information on sustainability aspects are **BIORAISE**, **BioGrace-II**, **BEAT2**, **CFPAN** and **S2BIOM**.

Information on GHG emission/mitigation

The tools **BIORAISE**, **BioGrace-II**, **BEAT2** and **CFPAN** provide GHG emission calculations along the value chain considered in the scope of the tool. In **BIORAISE**, for the chains designed, the tool calculates the direct GHG emissions from the collection of the biomass and its transportation. In both **BioGrace-II** and **BEAT2**, GHG emissions calculation is made across the complete lifecycle for bioenergy applications considering cultivation, processing, transportation and end use. Both of the tools include a full set of default input values for the bioenergy pathways allowing calculation of environmental performance of a typical process. They also provide comparison with fossil fuel. **BEAT2** applies only for the UK, whereas **BioGrace-II** is developed for the whole EU. Additionally, **BioGrace-II** includes calculation of N₂O field emissions in a separate sheet. The **CFPAN** tool and the database FeedPrint calculate the GHG emission of feed raw materials across crop production, via processing of crop and animal products, compound feed production to utilization by the animal, including transport and storage between all steps of the production chain. **Tool Shed** does not have a detailed GHG accounting but it provides estimate for greenhouse gas emission savings with bioethanol and biodiesel from the amount of petroleum displacement.

In **S2BIOM** project a sustainability framework was designed for criteria and indicators for biomass delivery chains. A subset of the S2BIOM sustainability indicators were also calculated for conversion technologies & biomass type combinations presented including direct life-cycles GHG emissions.

Information on Land use change impacts

Land use change impact is included in GHG accounting in **BioGrace-II**, **BEAT2** and **CFPAN**.

Information on other impacts on environment (water, soil, air, including resource depletion aspects)

BEAT2 includes information on other impacts on environment that are noise, odour, visual impact, water quality and use. Whereas **CFPAN** includes freshwater eutrophication, terrestrial acidification, land use, fossil fuel depletion, and air quality. **BIORAISE** considers environmental limitations in terms of soil type, terrain and water abstraction when determining biomass availability.



BioESoil provides information on soil quality by estimating the impact of bio-energy production on soil organic matter. The tool assesses the losses and recovery of nutrients and organic carbon through a mass balance approach. The quality of soil organic matter contents is calculated with the RothC organic carbon model.

S2BIOM provides also environmental indicators for air emissions, land and energy use efficiency.

Information on socio-economic impacts (e.g. information on e.g. number of employees in bioeconomy industries/sector, income derived from bioeconomy sector, turnover from bioeconomy etc.)

BERST includes information on demographics (population, GDP), quality of workforce, employment (total bioeconomy and per sector) and firm structures, and innovation (R&D expenditure, employment). One of the **S2BIOM** sustainability indicators is employment.

Information on certification schemes

BERST has a comprehensive list of certification schemes. **BioGrace-II** and **BEAT2** tools are intended for use to verify GHG calculations as part of sustainability criteria (European and national voluntary certification schemes). Voluntary schemes like NTA8080 and SBP refer to the **BioGrace-II** GHG calculation tool. **BioESoil** can be used to assist certification schemes ISO 13065, NTA8080, Round Table for Sustainable Palm Oil concerning sustainability criteria on soil quality.

Within **S2BIOM** project, benchmark and gap analysis of criteria and indicators was conducted of voluntary schemes at international and EU level.



4.2.2 User interaction of the tools

4.2.2.1 Objectives and target users of the tool (A5, C1)

Many tools are developed to make knowledge (e.g. on calculation methods) and data accessible to a broad audience beyond the research community; especially policy makers are often considered a target group. As a result, these tools require some effort from the user, to fully exploit the potential. When tools have a clear focus (e.g. CFPAN – Feedprint) their design is often more straightforward and matches the needs of specific user types and their knowledge.

Often, the use of the tool itself is not very difficult, but the content requires some background knowledge on the topic or of the project in which it was produced. This is generally well explained in the introduction to the tool or the accompanying help files.

The **Agriforvalor** tool has a specific goal which is clearly explained to the user. The target users are *biomass producers (farmers/foresters)*, gaining knowledge on possible ways to valorise their side-streams, becoming partners in new value chains; and *(bio)Industry*: raising awareness on the potential and opportunities of sidestream valorisation to produce variety of outputs, energy as well as high value outputs such as food, feed, chemicals and materials. It is relevant for a broader group, including *researchers, policy makers, advisors and technology transfer and innovation support organizations*. It is suitable for novice users and users with no or little prior knowledge of the topic and experience with online tools. The design matches the expected needs and expertise of the user regarding vocabulary and content.

BEAT2. The tool is described as an aid to assessing the likely environmental impact of a biomass energy project. The target users identified by the developer match the main user groups *policy makers, advisors, industry, researchers*. The design of the tool in MS Access format makes it more complicated in use. It is especially suitable for consultants/scientist/advisors, searching for specific information on several topics. Although the user guide is quite helpful most probably only *users with some knowledge of the topic and understanding of online tools and advanced users* will be able to exploit the full potential of the tool.

BERST intends to serve a broad audience, especially *biomass producers/harvesters/pre-processors, Industry, researchers, policy makers and NGOs*. The BERST project established a network of bioregions developed by the method of Community of Practice (CoP), in which policymakers, companies, cluster managers and researchers jointly explore and share experiences on the development of regional bio-economies in Europe.

The tool is mainly suited for *users with some knowledge of the topic and advanced users, such as policy makers and consultants/scientist/advisors*. The tool includes many data but using it effectively requires some effort and knowledge to interpret the data.

BioGrace-II's objective is to show and perform transparent GHG calculations using the methodology set by the European Commission. Target user groups are *somewhat experienced or advanced users*, mainly *industry* (companies that need to comply with sustainability criteria); and *verifiers* that audit or certify GHG calculations as part of sustainability criteria. *Bioenergy policy makers and their advisors* are also considered users, as these are responsible for putting sustainability criteria for biofuels and for solid and gaseous biomass into national legislation.



The tool matches the expected needs of the end-users, the information and calculations are relevant for the users. It is not intended to be used by the policy makers but rather by the *companies* to determine their own GHG emissions and savings and by the verifiers to check these calculations.

BioESoil helps to estimate the impact of bio-energy production on soil organic matter, and to raise awareness for nutrient recovery in bio-energy production. The tool is explicitly designed for *biomass producers and consultants or scientists* to evaluate the impact of bio-production on soil quality. BioE-Soil is a calculation tool that is most beneficial to those two target groups because they possess the input knowledge for the tool. The users should have previous knowledge of soil and crops characteristics, the information about organic residues and also nutrients input.

The objective of the **BIORAISE** tool is clearly stated and also which stakeholders it targets. Main target groups are: *biomass producers (farmers / foresters), pre-processors; (bio)Industry, and researchers*. It however is also very relevant for policy makers and advisors/researchers. The design of the tool matches with the expected needs and expertise of the end-users. However, the tool is not easy to use for the first time. The use of the tool could be better explained.

CFPAN – Feedprint is mainly useful for *livestock breeders* but can be beneficial to consider the environmental impact in industry (feed producers); and for a broader group such as *advisors, researchers, policy makers and NGOs*. The information given by the tool is simple and easily understandable but due to the content it is mainly useful for professionals with some understanding of the topics.

DataM contains modelling data and estimates about the economics of agriculture and of the sustainable resources, resulting from scientific activities performed by the European Commission and partners. These contents are provided in the form of dashboards or raw datasets. It is one of the “Knowledge centres and data portals” maintained by the EC, and the information is expected to be relevant for a broad spectrum of users.

The tool is especially suitable for users with *some knowledge of the topic and advanced users, such as policy makers and consultants/scientist/advisors*. The tool includes many data sets but using it effectively requires knowledge to interpret the data. Moreover, the functionalities are expected to be mainly relevant for more advanced users.

ECSCSS-SAT (Self-assessment tool): the goals and use of the tool are explained clearly on the website. Target users are *policy makers and advisors*, at regional, subregional level; but also *industry and financiers*. The tool matches the needs and expectations of these users. The tool is very easy to use so suitable for *novice users*. It is a wizard-like tool.

S2BIOM: the objective of the tool is clearly stated on the website. The tool includes many components and features that are described well. Many different user groups are expected to benefit from the tool. Overall the tool can be used by users with some knowledge of the topic and understanding of online tools; especially *biomass producers* and *policy makers*. The features: Biomass supply (Europe) and Bio2Match tool are targeting such kind of users. Some other features are easier to use i.e. the S2BIOM Database of Policy Measures & Instrument.



4.2.2.2 Quality of the interface (C2, C6 & 7)

The interface of most tools is relatively simple and clear; mostly, problems occur when knowledge and understanding of biomass and related subject matter is required for using the tool. If no context-sensitive help is available, users may be discouraged, make mistakes, or do not use the potential of the tool.

To support the user, many tools offer wizard-style interfaces, menus with picklists or context sensitive help. In general, background information is available, but often in separate documents which is an obstacle for some users who want to determine if the tool is useful for them. A step-by-step introduction to ease the learning curve is advisable.

The **Agriforvalor** tool is part of the EU project AGRIFORVALOR. It is not immediately visible in the project's website where to locate the tool. The tool itself is simple, the interface is clear and easy to use by any user from any background. The interface is a search page to select relevant articles; it is simple and many of the search options offer picklists guiding the users to the content of the tool.

However, the list of options the user can choose from on the search page is very confusing, as there are many overlapping options in most of the drop down lists. There is no manual with explanation of the tool.

BEAT2's interface is fairly consistent even though not very appealing. The tool is clearly explained in the User guide available. The interaction with the tool requires some effort but is easy to learn or well explained. The user guide is quite complete and help text is available to help the user even though the interface is not very friendly. Input data in many cases is displayed in excel file which is a format quite accessible for most of the users.

BERST consists of two different tools, one on the potential of a region, the other offering information on instruments and measures. The interfaces are well-organised; however, the **BERST** Catalogue of criteria and indicators offers no help function and therefore may not be employed effectively by novice users. The different search tabs for the Catalogue of instruments and measures are confusing because of an overlap and the slow response time of the application.

BioSoil has a user-friendly design that leads the users step by step through several sections in which they enter their data, often with default parameters that may be adapted. It is based on Excel. Although clear help functions are provided and **BioGrace-II** is consistent and well-organized, it is not easy to use. To understand what inputs are required and how the complex and extensive calculations are performed, background knowledge regarding bioenergy production processes involved and GHG accounting methodology is necessary, plus basic knowledge of Excel. It requires some effort to use.

The **BIORAISE** tool is developed for more advanced user and learning to use it effectively requires time. It is necessary to read the instructions before use.

CFPAN – Feedprint. The interface to use is very intuitive and simple but is very limited. There is little interaction besides the inclusion of the listed byproducts or roughage that will form the final feed. The presentation of the results it is very clear. The tool is explained on the project website and there is a "Help" button where some explanations are given.

DataM's interface is well ordered and consistent and provides a quick overview of the available content. The tool is easy to learn and the results given are very attractive. The "Jobs and Wealth" subtopic has a detailed user guide document.



ECSCSS-SAT: The interface is clear and easy to use. It is a wizard type including a questionnaire with closed-ended questions.

S2BIOM: The interface is clear and relatively easy to use. However, the tool contains many functionalities/features/components that require some effort before novice or less experienced users are able to use them effectively. These are explained in the interface itself and in separate user guidelines.

4.2.2.3 User interaction options (C3 & C6)

Many tools support data entry (e.g. for calculations) with picklists and default values. For selecting and searching in information and large data sets, search and filtering options are provided. These are very useful if implemented well. Moreover, they offer the user an overview of the available content and thereby prevent frustration by searching for information that is not even available in the tool.

In **Agriforvalor**, the main interaction consists of search and filtering options in 117 biomass sidestream valorisation techniques. No other interaction with the information is possible but registered users can add new biomass sidestream valorisation techniques.

In **BEAT2** the user enters own parameters or accepts default values.

The **BERST** tools are mainly search tools and support the user with dropdown lists. The Catalogue of criteria and indicators allows the content of the table as the outcome of the data search to be set and arranged by the user.

The Catalogue of instruments and measures supports the user in searching and filtering in a collection of detailed fact sheets, by a wide range of options as well as free text keywords. Besides the general search, the database of Instruments & Measures can be filtered by objective or by criteria on which they have a (in) direct impact.

In **BioESoil**, the user enters data, often with default parameters that may be adapted, or suggestions for input. It includes a geographic search for climate information and meteorological data. The calculated results are presented in tables and graphs.

The **BioGrace-II** tool requires input data to perform the calculations (such as thermal and electrical efficiency); this is aided by drop-down menus. It also allows users to calculate an actual value for existing pathways. It can also be used to set up new bioenergy production chains but the user support for this function is poor.

In **BIORAISE** only registered users can add a new biomass sidestream valorisation technique to the list. This tool enables a user to design a chain by taking account of the detailed spatial distribution of the biomass, by letting the user select (on a map) the biomass type, the biomass collection circle and the point where a conversion installation is to be placed and to where the biomass needs to be transported. Also in the outputs, the user can adapt parameters. Search options include a.o. keywords; and the available sidestream valorisation technique profiles can be filtered in many criteria.

CFPAN- Feedprint is a simple tool with limited functionality. It requires input data and allows selecting the feed compounds. Results can be exported.

DataM does not allow user input. The user can (in some of the data sets) adapt the outputs by selecting, filtering and sorting in specific parameters.



ECSCSS-SAT: The user is guided through a series of questions by selecting an answer, and he is then guided to another question. At the end the tool helps to summarize the information included by the user in a form of a spider diagram & report showing in which area the region is strong and which could use improvement.

S2BIOM supports the user in searching information on policy measures and biomass availability. The tool has three important features: the S2BIOM Database of Policy Measures & Instruments; Biomass supply (Europe), each with extensive functionalities for search or input.

4.2.2.4 Available advanced functionalities (C4)

Many tools offer simple export functions; some, like BERST, support the user with an online tool to tailor the outputs. Functionalities for saving, downloading, and creating reports are generally much appreciated by users.

Agriforvalor has no advanced functionalities.

BEAT2 includes an 'Excel Workbook Viewer' providing access to the Excel workbooks which drive the calculations of the emission figures. The reports section is used to produce printable summaries of the calculated outputs and contains various ways to access and export worksheets, impact sheets and data.

In the **BERST** Catalogue of criteria and indicators it is possible to save the data of the search results in a file in different formats. It contains an easy to use, attractive online tool, SWING, for creating regional bioeconomy profile documents using a wizard, allowing different views (map, table).

BioGrace-II allows the user to follow the calculations in the tool, set up new pathways and perform GHG calculations. The calculation rules document provides all the calculation rules that must be respected.

In **BIORAISE** calculations made for a chain can be downloaded.

DataM: data is presented in terms of raw datasets ready to download, and as interactive dashboards or infographics for the self-analysis of data.

CFPAN – Feedprint: results can be exported.

ECSCSS-SAT : The advanced functionalities are the preparation of a report with conclusions and recommendation on waste or biomass utilisation in a regional level, and also of the spider diagram based on the answers provided by the user.

S2BIOM supports the user in making calculations on costs, determining suitable conversion technologies and locations of new installations.



4.2.2.5 Available advanced help functions (C5)

Only some tools provide advanced help functions. Although the interface of many tools does not require advanced help functions, examples of how to maximize the effectiveness of the tool, with examples of questions and calculations, can be valuable additions. Context sensitive help is preferred.

Agriforvalor has no advanced help functions.

BEAT2: Help text is displayed for each parameter at the bottom of the screen. Additionally some parameters are labelled indicating that the parameter has a key influence on the emissions produced by the scheme.

The **BERST** Catalogue of instruments and measures includes a video explaining functionalities as well as some example questions and results. This would have been useful for the **BERST** Catalogue of criteria and indicators as well, especially regarding the SWING viewer.

The **BioESoil** tool is accompanied by a comprehensive manual follows and explains the data entry process.

Biograce -II: detailed context-sensitive help in the tool, a detailed manual and online videos.

CFPAN – Feedprint: no advanced functionalities (apart from exporting the results).

DataM offers no advanced help functions, although “Jobs and Wealth” subtopic has a detailed user guide document.



5 CHARACTERISATION OF TOOLS WITH ATTRACTIVE FEATURES THAT CAN BE USED FOR INSPIRATION IN THE DESIGN OF THE CENTRAL BSAT TOOL

5.1 Introduction

Nine online tools were not included in the shortlist but considered relevant because of specific features or components, that may be used as inspiration for the Power4Bio tool to be developed:

Biomass Geo-Wiki, Biomass yards, BioSAT, BioTrade2020+, BISCUIT (BioPAD project supply chain unique integrated tool) , FAO Food Balance Sheet database, FEAST, GYGA, TRASE: Transparent supply chains for sustainable economies, VALERIE, WATER and GREET, WISDOM: “Woodfuel Integrated Supply/Demand Overview Mapping” and the Bioeconomy Tool Shed.

The full descriptions are available in Annex C.

5.2 Characterisation of tools for inspiration

5.2.1 Content of tools

As already explained in Chapter 3, some tools were not selected for the short list, but were placed on the list for tools for ‘inspiration’ to design the Accelerator tool kit in this project. Several Tools were regarded as attractive in terms of the way they present data and facilitate the interaction of the tools. Tools that did not have content related to the EU territory or had limited link to bioeconomy issues were excluded from the short list, in spite of attractiveness of presentation and interaction with user. In The following a short overview of the type of tools selected for inspiration is given in terms of content and aspects that are attractive in meeting user information needs. In the section 5.2.2 the user interaction aspects are discussed, especially those that are attractive.

Table 5.1 Contents and most inspiring aspect in relation to meeting the information needs of users of the tools for inspiration

Tool	Type of content	Most inspiring aspect In terms of meeting the information needs of certain users.
Bio-Trade2020+	Tool within the <i>Geo-Wiki: Earth Observation and Citizen Science</i> which contains the comprehensive set of recent biomass data from around the globe, and makes it available for visualization.	To make an initial review of important biomass sources to be expected in certain regions.
Biomass yards	The tool shows the bio-waste processing facilities on a map and on click, a small popup window with basic information is shown (e.g. location, capacity, type of products etc).	The information presentation is clear and direct: The explanation is clear and complete; the vocabulary is simple.
BioSAT	BioSAT provides for the USA states a supply chain cost and logistics information for cellulosic biomass markets and products.	The tool is very intuitive and provides a continued flow information along the whole chain (guided



Tool	Type of content	Most inspiring aspect In terms of meeting the information needs of certain users.
		dashboard). Along BioSat tool, several pictures appear which illustrate some of the given options/answers.
FAO Food Balance Sheet	BioTrade2020+ provides web-based interactive maps that support end-users in identifying biomass potentials in a consistent methodology to arrive at sustainable biomass quantities and prices and greenhouse gas emissions. Results are therefore comparable between regions. It is now filled for 6 case regions, but can be developed further for many other regions. The maps provide objectively assessed insight in the biomass cost-supply, sustainability risks and relevant policies of influence at the level of main (potential) non EU sourcing countries.	BIOTRADE is an interesting example of a tool to present biomass in different potentials to users.
Bioeconomy Tool Shed	The “Biorefinery Stakeholder Information System” (BioSiS) includes a biomass availability map which presents biomass Resources by USA state. The “Biorefinery Stakeholder Information System” (BioSiS) includes different maps under its ‘Market’ section where the user can select ‘Biorefineries’ from the dropdown list and look for existing plants (ethanol, biodiesel, biofuel etc.) in the USA.	If the data provided by the tool would be up-to-date, the attractive features could be: -The market data on biomass - The connection between biomass demand and existing infrastructure.
TRASE	It is a tool to trace the supply chains of agricultural commodities associated with deforestation risk as well as their impacts on land and water use, biodiversity, greenhouse gas emissions and rural development. TRASE tool is presented in the form of online database (website) which maps the sustainability profile of a company or a region in relation to the commodities as soy, palm oil, timber, pulp, coffee, beef, etc.). There is an option to download the database from the TRASE website.	The visual construction of the supply chain with possibility to track at any point the traded volume of a commodity, financial flows and actors.
WATER and GREET	GREET is a life-cycle analysis (LCA) to assess energy and environmental effects of a wide range of transportation fuels and vehicle technologies in different transportation sectors (road, air, marine, and rail).	A useful and scientific tool for the transport industry to assess and compare the environmental impact of different transport fuels and technologies using a unified methodology.
Biomass Geo-Wiki	Biomass Geo-Wiki is a tool within the <i>Geo-Wiki: Earth Observation and Citizen Science</i> which contains the comprehensive set of recent biomass data from around the globe, and makes it available for visualization.	Users are provided with a quick overview of the data. They see the data in relation to a global context.



Tool	Type of content	Most inspiring aspect In terms of meeting the information needs of certain users.
		For example, the location of a specific forest or crop and its dimensions regarding the rest of the world.
GYGA	The Global Yield Gap and Water Productivity Atlas (GYGA) provides robust estimates of untapped crop production potential on existing farmland based on current climate and available soil and water resources.	The interactive map that offers the capability to the user to better visualize the outcome of their selections and by clicking on specific regions to view details about the areas of their interest.
FEAST	The Feed Assessment Tool (FEAST) is a systematic method to assess local feed resource availability and use. It helps in the design of intervention strategies aiming to optimize feed utilization and animal production.	The tool is simple but at the same time allows introducing several projects and conditions in different regions.
Bio-Trade2020+	Provides web-based interactive maps for very different biomass from primary residues in agriculture and forestry to tertiary processing residues. A consistent methodology was used to arrive at sustainable biomass quantities and prices and greenhouse gas emissions. Results are therefore comparable between regions. It is now filled for 6 case regions, but can be developed further for many other regions	The tool is attractive in that it shows very different potential types for the same biomass beside each other.
Biomass tool shed	The tool encompasses information on land use for producing biomass and energy crops, cost to produce them, competition for biomass, blending terminals, fuel stations, state and federal policy, USDA guidelines for and financial assistance, and state and federal office locations for agriculture, energy, environmental protection, and conservation. The Bio-refinery Stakeholder Information System” (BioSiS) includes a biomass availability map which presents total Biomass Resources by grid and state. It includes crop residues, forest and primary mill residues, secondary mill and urban wood waste, methane emissions from landfills, domestic wastewater treatment, and animal manure.	The data contained is rather old but the way it is presented is attractive and clear.



5.2.2 User interaction of tools

As already explained, some tools were not selected for the short list, but were placed on the list for tools for ‘inspiration’ to design the Accelerator tool kit in this project. In the following a short overview of the type of tools selected for inspiration is given in terms of the user interaction aspects, especially those that are inspiring in terms of usability and interface. These are summarized in Table 5.2.

Table 5.2 User interaction characteristics and most inspiring features of tools chosen for inspiration in the design of the BSAT

Tool	User interaction	Most inspiring aspect In terms of usability and interface
Biomass Geo-Wiki	Biomass Geo-Wiki is a tool within the Geo-Wiki: Earth Observation and Citizen Science which contains the comprehensive set of recent biomass data from around the globe and makes it available for visualization. With the visualised data it is possible to assess changes in land cover and biomass availability over time. In general, the online tool is self-explanatory and easy to use. The tool is a good entrance point for novice users or those with little knowledge because it contains the overview of the land cover and forestry data around the globe. It is easy to navigate (the users select which data to visualise from already given dataset options). However, the tool is not very suitable for the three main user groups – policy makers, scientists/consultants or industry – due to the fact that it provides only an visualisation option based on default and limited data.	Inspiring things about the tool: the users are provided with a quick overview of the data they are interested in. In addition, they see the data in relation to a global context. For example, the location of a specific forest or crop and its dimensions regarding the rest of the world.
Biomass yards	Biomass Yards (Biomassawerven): The tool is intended for biomass producers and companies, and policy makers (governments) looking for suitable locations for the intake of biomass flows. On the other hand, it offers addresses for buyers of various biobased products. The information presentation is simple and direct. The explanation is clear and complete; the vocabulary is simple. Therefore it is appropriate for users with little knowledge of the topic and understanding of online tools. Features that support this:	The map is intuitive and appropriate when the (geographic) location is an important feature of the information represented.



Tool	User interaction	Most inspiring aspect In terms of usability and interface
	<p>all information necessary to understand and use the information in the application is presented in one screen (a map) and one help text.</p> <p>the tool has a single focus, showing locations and basic information of biomass yards in the Netherlands</p>	
BioSAT	<p>BioSAT: The integrated suite of site assessment tools is very intuitive and easy to use and is supported by a manual. It supports the user by a guided dashboard (step by step process in a series of questions with picklists in a simple vocabulary). It can be used by users with little or some understanding of the content and tools. BioSAT aims at facilitating the decision process to biomass producers, harvesters, pre-processing companies and transport and logistics companies through the whole biomass value chain. The input options for the users are multiple, with a great variety of feedstock to be chosen among the given root categories: forest and agricultural.</p>	<p>Although the focus of this tool is on the USA territory, it introduces some interesting aspects derived from the marginal costs calculation and the broad spectrum of feedstocks (84 cellulosic feedstock) that can form an example for incorporation of comparable information in the POWER4BIO BSAT.</p>
BioTrade2020+	<p>BioTrade2020+ : End-users targeted by the tool are industries, biomass traders, NGOs and policy makers. These users are expected to have some knowledge and understanding of biomass chains. The vocabulary and information match their level of expertise. The supply viewer shows a map to support easy recognition and selection of a region; and it offers picklists of available options which helps users making selections in information. The use of picklists, and showing all options in one screen, guide the user and prevent frustration. Because the output of a search action cannot be saved, it is difficult to compare between regions. The tool does not provide explanation on the methodology used, but the user has to read separate reports.</p>	<p>The supply viewer shows a map to support easy recognition and selection of a region; and it offers picklists of available options which helps users making selections of available information. The use of picklists and showing all options in one screen guide the user, supports effectiveness of search actions, and prevents frustration.</p>



Tool	User interaction	Most inspiring aspect In terms of usability and interface
FAO Food Balance Sheet database	FAO Food Balance Sheet database. According to the developer’s definition of the tool and the final users targeted (public institutions, researchers and advisors), the data provided can be considered as adequate for public entities but most probably not for researchers that might need a higher level of detail. The information is easy to understand and search (just need to select among the criteria given to visualize the data) but no explanation is provided and the information display is sometimes confusing. The interface is easy to use. The tool seems mainly useful for policy makers and consultants/scientists with some knowledge of the topic.	Extensive database and possibility to download the information (the downloaded excel file should be improved though). Maps to display the results (production, imports, etc) are quite useful and appealing. The handbook clearly highlights the possible inaccuracies and inconsistencies of the results which should be avoided as much as possible in the tool to be developed and reference the input data and default values used.
FEAST	FEAST (FEed ASsessment Tool). The Feed Assessment Tool (FEAST) is mostly relevant for farmers and communities interested in livestock feed resources. The tool requires some knowledge of the topic but is intuitive in use.	FEAST could be included in the farmer profile of the POWER4BIO BSAT since is very “livestock” oriented tool and allows the evaluation of feed resources and the using optimization.
GYGA	GYGA Global Yield Gap Atlas. The tool does not provide a clear description of its objectives, nor explanation of the functionalities. As a result, novice users will not easily understand the functionalities. However, the tool has a well-defined and useful focus (yield gaps) and the tool is mainly targeted to researchers with understanding of the domain. The map-based interface allows the user to select different layers and parameters, resulting in calculations of yield gaps. The detailed data can also be downloaded in excel format.	The most attractive feature of the tool is the interactive map that offers the capability to the user to better visualize the outcome of their selections and by clicking on specific regions to view details about the areas of their interest.
TRASE	TRASE: Transparent supply chains for sustainable economies. TRASE is an online tool which is relatively easy to use.. However, it is most suitable for users with good or advanced knowledge of	The visual construction of the supply chain with possibility to track at any point the traded volume of a commodity, financial flows and actors.



Tool	User interaction	Most inspiring aspect In terms of usability and interface
	<p>supply chains because they would fully understand the impact of the commodity on the market. It has a limited database and the use of the online tool, in particular the use of maps, depends on the quality of the internet. The picklists and the selection of parameters is easy to find. The results are presented in maps and tables as well as Sankey diagrams for commodity material flows. TRASE is also being designed to integrate with other platforms that provide complementary information on everything from regional economic benefits of agricultural production. The TRASE database can be downloaded. The interface and data visualization are modern and dynamic and invite the user to explore options and content of the tool.</p>	
<p>WATER and GREET</p>	<p>Water and GREET: The Greenhouse gases, Regulated Emissions, and Energy use in Transportation Model.</p> <p>The tool is a methodology on how to assess the impacts of fuels and of transport technologies. It contains zip file with excel sheets - for fuel and for transport technologies - with extensive explanation on how to conduct assessment and input datasets for different types of fuels and technologies. An advance knowledge of life cycle assessment and of the topic is required to be able to conduct the assessment. The scientific community, environmental consultants and the industry specialists are the stakeholders with the required advanced knowledge (LCA, and sector-related knowledge) to use the tool. Other groups – policy-makers, financiers or NGOs could be confused by the complexity of the methodology.</p>	<p>Inspiring feature: this is a useful tool for the transport industry to assess and compare the environmental impact of different transport fuels and technologies using an unified methodology.</p>
<p>Bioeconomy Tool Shed.</p>	<p>The tool is most useful for the policy-makers and the industry. Using the tool, both groups could spot gaps and possibilities for development of bioeconomy in a particular State or region. In addition, the tool is useful</p>	<p>If the data provided by the tool would be up-to-date, the attractive features could be:</p> <p>the market data on biomass and the connection between biomass</p>



Tool	User interaction	Most inspiring aspect In terms of usability and interface
	for the consultants or scientific community to conduct specific case-studies (for example, modelling scenarios of the regional development).	demand and existing infrastructure.



6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Why using the tools on the shortlist?

The tools on the shortlist were selected as they provide support to regions in developing their bioeconomy through providing information of a diverse nature. What main type of information is provided by the 10 shortlisted tools is summarized in the Table 6.1 underneath. No one tool is similar in the type of information it provides and even less in the way it presents the information to the user of the tool.

Table 6.1 Overview of most interesting types of information covered by every tool on the shortlist

Tool on short list	Interesting tool for the following main aspects:
ESCSS-SAT	This ‘Self-Assessment Tool’ is helpful for regional policy makers & consultants that are in the process of developing a bioeconomy development strategy for their region. Although the users need to collect and input all data required in the online questionnaire, (amounting to 60 to 70 questions) the user gets a good overview of: the information needs and aspects to be covered in such a strategy. The tool is also helpful in creating informative presentations of the results in a form of a spider diagram showing in which area the region is strong and which could use improvement. Results can be also obtained in a document with the main conclusions and recommendations.
S2BIOM	S2BIOM is a compilation of all tools and provides access to all data and reports generated in the S2BIOM project which covered 37 European countries and an understanding of all aspects to be covered in a biomass delivery chain from biomass availability, logistics, conversion technologies, policies, markets and sustainability. The most interesting components in S2BIOM are: (A) S2BIOM Database of Policy Measures & Instruments: Here the user can: (i) search the Catalogue by Filtering the Policy Measures & Instruments using the descriptive criteria of his preference (e.g. the type of measure, the targeted region, the type of feedstock or the sector targeted by the Measures & Instrument (ii) add new Measures & Instruments to the database (iii) update/review existing Measures & Instruments in the database and (iv) comment on existing Measures & Instruments in the database. (B) Biomass supply (Europe): Here the user can: make selections of biomass types for which data can be displayed in a map in relation to amount of biomass available per year and potential type combination. The user can select the regional level, the year and the different types of potentials. In addition, the user can also choose the level entities in absolute levels (Kton dm or TJ), area weighted (Kton dm/km ² or GJ/km ²) and weighted average road side cost (€/ton dm). (C) Bio2Match tool: Here the user can make the optimal match between biomass resources and conversion technologies. Each conversion technology has specific biomass input requirements, while the composition and characteristics of biomass at roadside varies widely. Some biomass types can be used in many different



Tool on short list	Interesting tool for the following main aspects:
	<p>technology options, while others are hard to process or will need extensive pretreatment. The matching tool uses extensive information from the S2Biom databases (on conversion technologies and on biomass properties) to show the user which types of biomass can be processed by which technologies</p>
BERST	<p>BERST toolkit supports getting an understanding of the bioeconomy potential and strategies of a range of different regions in Europe, and therefore to gain understanding of the possibilities and challenges related to the enhancement of biobased economies. The elements of the toolkit (as listed at A2) are:</p> <ul style="list-style-type: none"> - database with criteria and indicators describing the regional bioeconomy potential, in order to facilitate the quantitative analysis of the state of the regional bioeconomy, using criteria to describe the regions in terms of their bioeconomy potential (e.g. based on geographical location, climate, predominance of bioeconomy sectors, existing skills, resources and technologies, etc.). - catalogue of instruments and measures correlated against the bioeconomy criteria enabling regional bioeconomy development, allowing stakeholders to search in a targeted way for measures and instruments to support the development of the regional bioeconomy - catalogue of good practices and case studies from existing EU bioregions based on the criteria and the instruments and measures, which can be used as inspiration for the development of regional smart specialisation strategies
BIORAISE	<p>The tool provides information on biomass potentials and the key asset is that it supports the user to design a biomass chain at a detailed spatial scale (google maps scale). For the chain design it provides detailed cost and GHG emissions for different components of the chain. The tool covers Croatia, France, Greece, Italy, Portugal, Slovenia, Spain and Turkey.</p>
AGRIFOR-VALOR	<p>This tool provides good practice examples for valorisation possibilities of agricultural and forestry industry sidestreams into a range of products. The tool allows filtering on country, subsector, process, technology readiness level (TRL), biomass sidestream or output (fuel, food, feed, fertiliser, fine chemical, functional material) and offers networking and marketing opportunities.</p>
DataM:	<p>Data of this portal consists of model outcomes and estimates which can be outlooks about future scenarios as well as calculations concerning the past to overcome the lack of official statistical data. Information mostly relates to the economics of agriculture and sustainable resources, resulting from scientific activities performed by the European Commission (in most cases by the Joint Research Centre - JRC) and partners. These contents are provided in the form of dashboards or raw datasets. The content of the main page is grouped in topics, one of these is Bioeconomy, which contains the following subtopics:</p> <ul style="list-style-type: none"> • Biomass uses and flows: This dataset mirrors the interactive Sankey biomass diagram that represents the flows of biomass for each sector of the bioeconomy, from supply to uses including trade. The diagram enables deeper analysis and comparison of the different countries and sectors across a defined time series. • BioSAMs EU Member States – 2010: EU Member States' Social Accounting Matrices 2010, with a detailed disaggregation of the bio-economy. Estimated by JRC (2018) • Jobs and wealth in the EU bioeconomy / JRC- Bioeconomics: Dataset that quantifies employment, value added, and turnover in the EU bioeconomy. This database quantifies employment, value added and turnover in the Bioeconomy and in



Tool on short list	Interesting tool for the following main aspects:
	<p>bioeconomy sectors. The geographical scope of this database is the EU and the 28 EU Member states. Data are available from 2008 to 2015.</p> <ul style="list-style-type: none"> • Biomass estimates: The database estimates for production and residues of agricultural biomass in EU. Dataset produced in a study of 2015. The indicators estimated are the harvested biomass, the amount of agricultural residues with a distinction between used and non-used residues, the domestic extraction used (DEU), the Harvested area and the Yield of the domestic extraction used. The domestic extraction used (DEU) refers to the sum of the harvested biomass and used residues. All indicators are expressed in tonnes of fresh and dry matter. The scope of this database is all agricultural commodities, for each of the 28 EU Member states. Data are available from 1991 to 2013.
BioESoil	<p>BioESoil is the assessment tool with two main objective</p> <ul style="list-style-type: none"> - to estimate the impact of bio-energy production on soil organic matter, - and to raise awareness for nutrient recovery in bio-energy production. <p>The results of the tool include the amount and type of energy produced, percentage of the nutrients in feedstocks and residues recovered, the potential nutrient return to the field in comparison with to nutrient inputs from fertilisation. Finally, the tool presents the predicted development of the soil organic matter content.</p>
BioGrace-II GHG	<p>This is an Excel-based calculation tool and allows for operators to perform their own GHG calculations for bioenergy (electricity, heat and cooling), verifiers to check the calculations and Member States to monitor the greenhouse gas performance of subsidised plants. By following the same methodology of the European Commission, users are sure to apply a sound and accepted way when performing greenhouse gas calculations.</p>
CFPAN tool and database FeedPrint	<p>The CFPAN tool and database FeedPrint calculates the carbon footprint of feed raw materials during their complete life cycle. This ranges from crop production, via processing of crop and animal products, compound feed production to utilization by the animal, including transport and storage between all steps of the production chain.</p>
BEAT2	<p>The tool is designed to assist staff in the understanding of impacts from biomass bio-energy plant development over the whole life cycle of the technology and fuel chain, and to identify significant impacts that may occur from local proposals. Technologies covered are electricity (power plant), combined heat and power (CHP), heat only – (dedicated boilers burning biomass fuels to produce heat), cofiring, production of biodiesel and bioethanol and anaerobic digestion of animal and food waste to produce biogas which is then burnt to produce electricity and/or heat. BEAT2 is a UK-based tool and cannot be used to assess bioenergy options outside the UK. BEAT2 contains a simple model of the cost of producing heat, electricity or transport fuels from biomass feedstocks. The main aim is to allow the estimation of the value of support mechanisms (e.g. grants) on a per MWh or per litre basis, and to combine this with the relevant GHG saving to obtain an estimate of the effectiveness of these support mechanisms in reducing GHG emissions. Impacts fields covered include food risk, noise, odour, visual impact, water quality and water resources and employment.</p>



6.2 Main users targeted by the shortlist tools and complexity of interaction with the tools

Although it is clear that all short listed tools provide relevant information the can support stakeholders in EU regions in developing EU bioeconomy strategies and activities, the main users targeted by the tools is diverse. This becomes clear from Table 6.2.

Table 6.2 Main users targeted by the shortlisted tools

Tools	Biomass producers/ harvesters/ pre-processing companies/ transport & logistics companies/ farmers/ foresters/ land(scape)owners & managers;	Policy makers, exploring options for a region new to bioeconomy;	Consultants/scientist/advisors, searching for specific information on a wide number of issues e.g. availability, costs, regulations, and calculation tools;	Industry, requiring detailed and reliable information for a wide number of operational issues possibly using calculations, adding own data.	Financers, requiring reliable information on cost, return on investments, security of the operations, good practice examples	Lobbying organisations, NGOs	Other,
ESCSS-SAT		O		o	o		O: clusters
S2BIOM:	O	O	o	o	o	o	
BERST	O	o	O	o		o	
BIORAISE	O	o	o	O	o		
AGRIFOR-VALOR	O	o	O	O	o		
DataM	o	O	O	o	o	o	
BioESoil	O		O				
BioGrace-II	o		O	O			O: Audit/certification companies
CFPAN-FeedPrint	O	o	o			o	
BEAT2	O	o	o	o		o	
O o	:Main users targeted :Users targeted						



We also looked at how easy it is to interact with the tools. For this different categories of users were defined in terms of knowledge available in relation to the bioeconomy and experience with using tools. From the Table 6.3 it becomes clear which tools are not easy to use and which ones are more challenging and require more prior experience and knowledge.

Table 6.3: Type of users most suited to use the tools

Tools	novice users	Users with little knowledge of the topic and understanding of online tools	users with some knowledge of the topic and understanding of online tools	Advanced users
ESCSS-SAT	0	0	0	0
S2BIOM:		0	0	0
BERST			0	0
BIORAISE			0	0
AGRIFORVALOR	0	0	0	0
DataM			0	0
BioESoil			0	0
BioGrace-II			0	0
CFPAN- FeedPrint			0	0
BEAT2		0	0	0

6.3 Most attractive features of tools to be used as inspiration for BSAT

In this section we summarize which features are most inspiring of the tools that were not selected for relevant content, but only for attractive user interaction features. The most inspiring aspects are summarized in Table 6.3.



Table 6.3 Most inspiring features of the tool to potentially use as inspiration for the design of the accelerator toolkit in this project

Tools only for inspiration	User interaction
Biomass Geo-Wiki	the users are provided with a quick overview of the data they are interested in. In addition, they see the data in relation to a global context. For example, the location of a specific forest or crop and its dimensions regarding the rest of the world.
Biomass yards	The map is intuitive and appropriate when the (geographic) location is an important feature of the information represented.
BioSAT	Although the focus of this tool is on the USA territory, it introduces some interesting aspects derived from the marginal costs calculation and the broad spectrum of feedstocks (84 cellulosic feedstock) that can be included in POWER4BIO BSAT.
BioTrade2020+	The supply viewer shows a map to support easy recognition and selection of a region; and it offers picklists of available options which helps users making selections of available information. The use of picklists and showing all options in one screen guide the user, supports effectiveness of search actions, and prevents frustration.
FAO Food Balance Sheet database	Extensive database and possibility to download the information (although the downloaded excel file should be improved). Maps to display the results (production, imports, etc) are quite useful and appealing. The handbook clearly highlights the possible inaccuracies and inconsistencies of the results and reference the input data and default values used.
FEAST	The interface is quite simple and intuitive and thus easy to use. It's attractive that one can import and export data from/to excel files. It is possible to edit and to select project data and to add GPS data.
GYGA	The most attractive feature of the tool is the interactive map that offers the capability to the user to better visualize the outcome of their selections and by clicking on specific regions to view details about the areas of their interest.
TRASE	The visual construction of the supply chain with possibility to track at any point the traded volume of a commodity, financial flows and actors.
WATER and GREET	this is a useful tool for the transport industry to assess and compare the environmental impact of different transport fuels and technologies using a unified methodology.
Bioeconomy Tool Shed.	If the data provided by the tool would be up-to-date, the attractive features could be: <ul style="list-style-type: none"> - The market data on biomass - The connection between biomass demand and existing infrastructure.



6.4 Further steps

The selected tools will be promoted among the P4B regions in the development of the bioeconomy strategies (WP5) and the cross-fertilization activities (WP6). In both cases, those tools will be disseminated so as to facilitate their use as useful complementary elements in the rest of the activities of the Power4Bio project.

Lastly, the tools selected and the factsheets will be integrated in the BSAT as a core part of the toolkit (T2.4) so as to promote those tools beyond the Power4Bio regions.





7 ANNEXES



Annex A Example of quick evaluation result for the S2BIOM tool

1. Tool name	S2BIOM integrated tool
2. URL address of tool	https://s2biom.wenr.wur.nl/web/guest/home
3. Main objective/scope/ short description of tool (max 150 words)	The S2BIOM toolset contains all data, tools, documents and reports of S2BIOM project which supports the sustainable delivery of non-food biomass feedstock at local, regional and pan European level. Through different tabs in the main menu the user can access to these tools, data, documents and reports. S2Biom provides data on lignocellulosic biomass i.e. forest biomass from forestry production, forest industry residues, agricultural biomass from primary field activities, agricultural residues, biowaste and post-consumer wood, and dedicated perennial crops. The tools enable the user to interact with the results by making sub-selections for data; or to design his biomass delivery chain and evaluate performance; or to obtain information on specific issues of relevance for developing a biomass delivery chains such as 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
4. Type of end-users targeted (Biomass producers (farmers, foresters, waste managers), advisors, researchers, public agency, industry, lobby, other)	Researchers Policy makers Regional and development planners Investors and biomass project developers
5. Type of tool (Data/information mobilisation, Design of chains, assessment tool, other)	Data/information mobilisation Design of chains Biomass supply and cost tool Biomass & Technology matching tool 'Bio2Match' The Biomass Policy tool BeWhere: used to identify optimal locations of biomass conversion plants in any particular region. LocaGIStics: used to develop optimal biomass logistic chains at a local level
6. What is the geographic coverage of the tool?	S2Biom covers data for EU28, Western Balkans, Moldova, Turkey and Ukraine
7. What year was the tool produced?	2017
8. Focus on certain biomass (agricultural residues, forest residues, dedicated crops, waste streams) ?	S2Biom provides data on lignocellulosic biomass i.e. forest biomass from forestry production, forest industry residues, agricultural biomass from primary field activities, agricultural residues, biowaste and post-consumer wood, and dedicated perennial crops.
9. Focus on certain end products (e.g. to food, materials, energy, chemical building blocks) ?	energy, chemical building blocks



Score 1 -5 (1= No 5= Yes highly detailed & extensive information). <u>If not known score with '0'.</u>	
A. Content tools	
1. Biomass availability	
<i>Biomass supply information:</i> - are many biomass types covered (e.g. agricultural residues, forest residues, amount of collected waste, sewage sludge etc.) - does it provide quantitative information on biomass availability - does it specify different biomass potential figures - is supply data provided for many regions at high spatial resolution level -etc.	5
<i>Biomass cost information (is cost or price information given, if yes is it given per type and are the cost specified in different cost categories etc.)</i>	4
<i>Metadata available on biomass cost-supply data</i>	4
<i>Biomass quality & composition data: e.g. - is information given on biomass characteristics such as ash content, N, P, K content, % lignocellulose, % proteins, % sugars etc.</i>	4
2. Logistics options	
<i>Information on collection and pre-treatment options: e.g. machinery used, machinery performance efficiency, type of pretreatments (chipping, milling, drying, ...)?</i>	4
<i>Spatially specific assessment option for logistics? (so can the user identify the collection area from where biomass can be sourced and does the tool help the user to understand what collection cost/collection activities are needed, or how much biomass can be sourced to a point?)</i>	4
3. Biomass demand	
<i>Information on local market demand for & uses of biomass</i>	5
<i>Biomass market information: e.g. how much biomass is already used by existing biobased activities, how much biomass is needed for planned biobased activities?</i>	2
<i>Is there information about cascading uses of biomass and/or indicators for circularity.</i>	4
4. Biobased activities	
<i>Good practice examples of biomass conversion technologies</i>	4



<i>Information on biobased industries present</i>	3
<i>Information on biobased production already present</i>	3
5. Policy & regulation	
<i>Is the information provided on policies/regulations/stimulation measures? Is this information specifying policies at EU/National and regional levels? If many policy levels covered score high with 4/5</i>	4
<i>Information on visions, strategies & roadmaps</i>	4
6. Financial environment	
<i>Info on options for finances/investors/subsidies</i>	4
<i>Info on investment cost</i>	4
<i>Info on return on investment</i>	4
7. Bioeconomy/circular economy (monitoring) indicators	
<i>Size of bioeconomy indicators: e.g. revenues obtained from the bioeconomy sectors expressed for example in contribution to GDP & number of jobs etc.</i>	1
<i>Does the tool provide information on indicators that express the share of bioeconomy products in the total (regional/national) economy?</i>	1
<i>Does the tool contain information on biomass flows?</i>	3
8. Sustainability aspects	
<i>GHG emissions/LCAs</i>	3
<i>Land use change impacts</i>	2
<i>Impacts on biodiversity & ecosystems</i>	2
<i>Other impacts on environment (water, soil, air)</i>	2
<i>Socio-economic impacts (is there (indicator) information on impacts on local labour, income etc.)</i>	2
<i>Is there information on certification schemes ?</i>	2



B. Usability of the tool/interaction with the user/user friendliness	
9. Clear description of scope of the tool	
<i>Are the end-users clear the tool targets?</i>	3/4
<i>Are the objectives and scope of the tool made clear?</i>	4
<i>Does the design of the tool match the expected end-users' needs and expertise</i>	3
10. General interaction with user	
<i>Interface is consistent, well-ordered ?</i>	3/4
<i>Is the use of the tool well explained and easy?</i>	4
11. Data/information access, overview	
<i>How much interaction with data is possible? (e.g. possibility to change or add data, change default values) (score 1 when no interaction is possible and 5 when many interaction functionalities are available)</i>	4
<i>Search functions present and how extensive/functional (score 1 if not search function and 5 when extensive search facilities)?</i>	4
12. Functionalities	
<i>Advanced functionalities available: e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool</i>	4
13. Context sensitive help	
<i>Advanced help functions available?</i>	3/4
14. Recommend the tool for short list?	
<i>Yes/no/give arguments particularly related to the 13 scoring issues mentioned above.</i>	Yes, this set of tools is really relevant to POWER4BIO. It can shed light to various different aspects of application of bioeconomy.



Annex B: Factsheets of shortlisted tools



1. ESCSS-SAT

A. General	
A1	Full name and acronym of the tool.
	Self-Assessment Tool (SAT)
A2	Home page of tool and if relevant also subpages (URL)
	https://ec.europa.eu/growth/tools-databases/escss_en
A3	A summary description of the tool including the main objective.
	The 'Self-Assessment Tool' of the European Commission implements a first assessment of the investment readiness level in a region concerning sustainable chemical production through alternative materials i.e. biomass from agriculture and forestry, biowaste, and effluent gases. The assessment is based on eight key factors i.e. 1) long term, stability and availability of feedstock, 2) infrastructure to handle feedstocks and production, 3) access to finance, 4) skilled workforce, technical expertise and training, 5) existence of support institutions, 6) strength and availability of regional markets, 7) entrepreneurship, and 8) public support policies. The process is guided through an online questionnaire for each type of feedstock amounting to 60 to 70 questions (around 8 per key factor). The results are provided in a form of a spider diagram showing in which area the region is strong and which could use improvement. Results can be also obtained in a document with the main conclusions and recommendations.
A4	Most recent update of the information in the tool (year)?
	This information is not directly available. It seems to be year 2017.
A5-1	Main type of users targeted?
	The toolkit targets especially o policy makers, exploring options for a region new to bioeconomy; It can also be used by Industry & Financers The tool offers the capability to the user to implement a first assessment of the investment readiness level in a region concerning sustainable chemical production through alternative materials i.e. biomass from agriculture and forestry, biowaste, and effluent gases.
	Experience of users most suitable to use the tool
	o is intuitive and simple o is generally easy and well explained
A6	Type of tool?
	It is an evaluation (assessment tool)
A7	Countries and/or regions that are covered by the tool.
	EU28



A8	<p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.</p> <p>The tool was developed by the Research Centre for Energy Resources and Consumption (CIRCE) within the project “6 Model Demonstrator Regions for Sustainable Chemical Production” and it was first presented to the public during the European Sustainable Chemicals Support Service (ESCSS) final conference – an Initiative of the European Commission and ECRN.</p>
A9	<p>Types of biomass covered?</p> <p>The tool covers the following types:</p> <ul style="list-style-type: none"> - Waste (specifically agri-food waste, manure, pulp and paper industry waste, sewage sludge, municipal solid waste and plastic) - Biomass.
A10	<p>Types of biomass conversion covered?</p> <p>The tool covers mainly biochemicals but other molecules are also considered for bioenergy applications</p>
<p>B. Content of the tools</p>	
B1	<p>Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information</p> <p>Biomass supply information:</p> <ul style="list-style-type: none"> - The basic types of feedstock are two: waste and biomass. - The tool does not provide information to the users on this topic, but the user is requested to add its own information on this topic by answering several questions. At the end the tool helps to summarize the information included by the user in a form of a spider diagram & report showing in which area the region is strong and which could use improvement. - This tool is a wizard-like based on a questionnaire which addresses eight key factors (KF). KF1 is the long term, stability and availability of feedstock. In this regard depending on the type of feedstock (waste or biomass) relevant questions are provided. <p>BIOMASS</p> <p>For example, regarding biomass two indicative questions are:</p> <p>Q1 - Amount of forest land to supply woody products: 0 to 10 %, 10 to 20 %, 20 to 30 %, more than 40 % of the territory. <u>The total forest area available for providing woody products:</u> < 100,000 ha and not concentrated in a specific area, 50,000 - 100,000 ha and concentrated, > 100,000 ha and not concentrated, > 100,000 ha and concentrated.</p> <p>Q2 - Amount of utilised agricultural area: 0 to 10 %, 10 to 20 %, 20 to 30 %, 30 to 50 %, more than 50 % of the territory. The total utilised agricultural area is: < 300,000ha and not concentrated in a specific area, 200,000 - 300,000 ha and concentrated, > 300,000ha and not concentrated, > 300,000ha and concentrated.</p> <p>The rest of the questions related to biomass supply are:</p>



Q3 -Has a specific assessment of the amount of biomass potentially available as an alternative feedstock (different uses than the traditional ones, for example, woody residues for furniture, agricultural residues for cattle feeding and bedding, etc.) already been carried out in your region?

Q4 - Which of the following options best describes the biomass situation in your region?

Q5 - Is there any information in the region about the format in which the biomass products would be available or are being supplied?

Q6 - Is there any large-scale biomass plant in your region (liquid bio-fuels, thermal power plant, electric power plant, district heating, co-generation, etc.) using more than 10,000 tonnes of biomass feedstocks per year that is already utilising local biomass feedstocks?

Q7 - Is there any chemical company or installation in your region close to applying biorefinery concepts with biomass resources or that could use biomass?

Q8 - Is there any company or installation in your region using or producing algae or microalgae for biorefinery concepts?

WASTE

Q1 - Define the level of availability and detail of waste generation (specifically agri-food waste, manure, pulp and paper industry waste, sewage sludge, municipal solid waste and plastic) in your region:

Q2 - The agri-food sector is a very important source of waste potentially used for chemicals production, with a diverse range of applications. Regarding the contribution of the sector to the regional GDP, how big is the agri-food sector in your region?

Q3 - As well as the agri-food sector, manure from different animals can be used for different applications. In terms of heads, how big is the farming sector in your region?

Q4 - The EU pulp and paper sector offers opportunities for new business taking advantage of the potential of wood and wood fibres to produce chemicals. Are there paper and pulp companies in your region?

Q5 - How is the population distributed across the region?

Q6 - Concerning the urban waste water treatment plants (UWWTP) in your region:

Q7 - Regarding the sewage sludge produced in the UWWTP in your region:

Q8- Does the region have a source-separation disposal system for each of the waste streams: packaging (metal and plastic), glass, cardboard and biodegradable fraction source separation?

Q9 - The Waste Framework Directive requires EU countries to establish an appropriate level of disposal and recovery of waste. EU countries are required to meet the following deadlines: 2015 for the introduction of selective waste collection and 2020 for reuse and recycling of at least 50% of paper, metal, plastic and glass and 70% of non-hazardous waste from construction. Regarding plastic waste, please choose the most accurate option to describe the status in your region:

Q10 - A common application of organic waste is biogas/biofuels production. It is a more mature option, but regions that already have



	<p><i>these kinds of installations might have difficulties in terms of the supply market for sustainable chemicals. Are there large biofuel installations in your region?</i></p> <p>Biomass cost information: No relevant information provided.</p> <p>Biomass characteristics (quality & composition) information: There are some questions indirectly related to type of biomass but this is very limited.</p>
B2	<p>Information on logistics: Spatially specific assessment options for logistics</p> <p>Information on logistics: - The tool does not provide information to the users on this topic, but the user is requested to add its own information on this topic by answering several questions. At the end the tool helps to summarize the information included by the user in a form of a spider diagram & report showing in which area the region is strong and which could use improvement. KF2 is relevant to Infrastructure to handle feedstocks and production. In this regard relevant questions to logistics are provided for each feedstock separately.</p> <p>BIOMASS</p> <p>Q1 - <i>Is the region well connected by road with biomass feedstocks producers?</i></p> <p>Q2 - <i>Is the region well connected by rail with biomass feedstocks producers?</i></p> <p>Q3 - <i>Does the region have ports that could be used to transport (even import) biomass feedstocks from productive areas to industrial destinations by ship?</i></p> <p>Q4 - <i>Is there a logistics centre working with biomass feedstocks in your region or close to it?</i></p> <p>Q5 - <i>Is there any interesting location close to biomass resources production and to possible users (distance between the collection point and end users less than 30-50 km and also well connected national or regional roads, with transport through forest-agricultural roads not exceeding 10-20 km, etc.) available in the region to set up a biomass logistics centre?</i></p> <p>Q6 - <i>Is there any industrial park or industrial site providing supply of utilities (water, electricity, natural gas network, industrial truck weighing, etc.) which could be used to set up a biomass logistics centre?</i></p> <p>Q7 - <i>Are there transport companies in the region that currently transport biomass or that would be interested in transporting these materials?</i></p> <p>Q8 - <i>Is there any old industrial installation (wood production plant, agro-industries, paper mills, biogas plants, waste water treatment plants, etc.) ready or nearly ready to host a biorefinery?</i></p>



Q9 - Regarding electricity grid quality: what was the total duration of unforeseen system interruptions (system average interruption duration index - SAIDI)?

Q10 - Does your region have any bottleneck related to water supply?

WASTE

Q1 - Is there any logistic centre operating with waste feedstock within your region or nearby?

Q2 - Please select the type of logistic centre available in your region, related to waste

Q3 - Which kind of operation is developed in the logistics centre?

Q4 - Is the region well connected by road with its own or other waste feedstock generators?

Q5 - Is the region well connected by rail with its own or other waste feedstock producers?

Q6 - Regarding electricity grid quality: what was the total duration of unforeseen system interruptions (system average interruption duration index - SAIDI)?

Q7 - Does your region have any bottleneck related to water supply?

Q8 - What is the % of industrial parks network connected to the natural gas grid?

Spatially specific assessment options for logistics available like:

Not relevant

B3

IMARKETS:

Biomass market information:

Biobased product market information:

MARKETS:

Biomass market information
Biobased product market information

MARKETS:

- The tool does not provide information to the users on this topic, but the user is requested to add its own information on this topic by answering several questions. At the end the tool helps to summarize the information included by the user in a form of a spider diagram & report showing in which area the region is strong and which could use improvement.

KF6 is related to Strength and availability of regional markets. In this regard relevant questions to market are provided. These are given below:

BIOMASS

Q1 - Does your region have a well-established biomass resources market?

Q2 - Does your region have any potential biomass suppliers for biorefineries or bio-based industries?

Q3 - Does the region have information about companies interested in investing in the establishment of a biomass resources market?

Q4 - Does your region have any information (published scientific articles/research programs/conferences/technical journal/carried out projects) about potential markets or clients for biorefineries products?

Q5 - What are the most important market sectors and products for (traditional and bio) chemical industry in your region?



	<p>Q6 - Has your region implemented (or does it plan to implement) procurement policies for green products?</p> <p>Q7 - Is the chemical industry strong in your region?</p> <p>WASTE</p> <p>Q1 - How big is the chemical manufacturing sector in your region (in terms of manufacturing added value)?</p> <p>Q2 - What is the level of maturity of your region's main sectors where waste feedstock is used?</p> <p>Q3 - What are the most important market sectors and products for (traditional and bio) chemical industry in your region?</p> <p>Q4 - Are green procurement policies implemented or planned in your region?</p> <p>Q5 - Has the region conducted any assessment of the demanding market sectors of new products, coming from waste feedstock to be used for the production of chemical products?</p> <p>Q6 - What is the destination of the current products manufactured in your region's chemistry industry*?</p> <p>Q7 - Does the region have information about companies interested in investing in the use of waste feedstock?</p> <p>Q8 - Please describe the secondary plastic market in your region by choosing from the following options:</p> <p>Q9- Which is the status of the industrial parks network in your region?</p>
<p>B4</p>	<p>Good practice examples of biomass conversion technologies.</p> <hr/> <p>Good practice examples of biomass conversion technologies: Not included.</p>
<p>B5</p>	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p> <hr/> <p>Information on policies/regulations/stimulation measures? - Information on visions, strategies & roadmaps. •Existence of regional development planning - The tool does not provide information to the users on this topic, but the user is requested to add its own information on this topic by answering several questions. At the end the tool helps to summarize the information included by the user in a form of a spider diagram & report showing in which area the region is strong and which could use improvement. KF8 is related to Public Support Policies. In this regard relevant questions to policies promoting biomass and waste utilisation as well as related to regional planning are provided. These are given below: BIOMASS Q1 – What is the R+D (research and development) planning in your region? Q2 - Are there public incentives to stimulate business R+D? Q3 - Is there a special taxation for products from alternative biochemicals in your country?</p>



	<p>Q4 - Has the regional government set a policy that supports a strategy or agenda targeting the transition to alternative raw materials use, circular economy, biobased economy or sustainable processes?</p> <p>Q5 - Does the regional authority have power related to licensing new industrial installations?</p> <p>Q6 - Does the regional authority have regular contacts with advanced developed regions in the field of sustainable chemicals?</p> <p>Q7 - Are there any long term and politically stable regional policies designed in the biorefineries or bio-based industries fields?</p> <p>Q8 - Is there any controversy regarding industrial installations like biomass logistics centres or biorefineries in your region?</p> <p>Q9 - Does the region have specific regulations regarding biomass production that might support biorefineries or bio-based industries installations?</p> <p>WASTE</p> <p>Q1 – Regarding waste regulation how is this conceived by the regional government?</p> <p>Q2 – Regarding innovation planning in your region how is this done?</p> <p>Q3 – Are there public incentives to stimulate business innovation?</p> <p>Q4 – Has the regional Government set a policy, strategy or agenda to support the transition to alternative raw materials use, circular economy, biobased economy or sustainable processes?</p> <p>Q5 – Has the regional Government introduced special taxation for products from alternative raw materials?</p> <p>Q6 – Does the regional authority have power to license new industrial installations?</p> <p>Q7 – Is there any controversy regarding industrial installations like waste logistics centres or biorefineries in your region?</p> <p>Q8 – Is the end-of-waste criteria already being applied in your region, according to the Waste Framework Directive 208/98/CE?</p> <p>Q9 – Does the regional authority have regular contact with advanced developed regions in the field of sustainable chemicals?</p>
B6	<p>Information on options for finances/investors/subsidies:</p> <p>Information on options for finances/investors/subsidies:</p> <p>- The tool does not provide information to the users on this topic, but the user is requested to add its own information on this topic by answering several questions. At the end the tool helps to summarize the information included by the user in a form of a spider diagram & report showing in which area the region is strong and which could use improvement.</p> <p>KF3 is related to Access to finance. In this regard relevant questions to options for finance are provided. These are given below.</p> <p>BIOMASS</p> <p>Q1 - What do you see as the most important limiting factor to get financing for the industry in your region?</p> <p>Q2 - What is the public financial situation of your region?</p> <p>Q3 - Are there public financing entities in your region with specific financing lines for direct or intermediated investment in sustainable industry?</p>



	<p>Q4 - Are there financial intermediaries of the EIB (European Investment Bank) and the EIF (European Investment Fund) established in your region?</p> <p>Q5 - Are there financial intermediaries of the EIB (European Investment Bank) and the EIF (European Investment Fund) established in your region?</p> <p>Q6 - Are there private investment/equity funds with a specific focus on sustainable industry active in your region?</p> <p>Q7 - Is there a consolidated network between private sector, public sector and financing institutions to create an investment framework with incentives for sustainable industrial projects?</p> <p>Q8 – How much foreign investment is there in your region?</p> <p>Q9 – Do you know if alternative financing instruments for new sustainable projects such as venture capital, investment equity funds or microfinancing are available in your region?</p> <p>Q10 – Are there any subsidies or grants related to the biomass use for energy/transport purposes that the region has implemented or can take advantage of?</p> <p>WASTE</p> <p>Q1 – Q7 as above</p> <p>Q8 - What is the current situation of the private banking sector in your region/country?</p> <p>Q9- In addition to the previous instruments, are you aware of any other financial instrument available in your region that might complement the portfolio of traditional financial schemes for new sustainable projects (such as venture capital, investment equity funds or microfinancing) that are available in your region?</p>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <p>Not relevant</p>
C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>What are the objectives of the tool, according to the tool developers?</p> <p>Who are the target users of the tool, according to the developers?</p> <p>The objective of the toolkit is clearly stated and also which stakeholders it targets. The targeted groups are listed in Part A. The design of the tool matches with the expected needs and expertise of the end-users.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,)</p> <p>How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use The interface is clear and easy to use. It is a wizard type including a questionnaire with close ended questions. The questionnaire distinguishes between two feedstocks. The user after selecting the answers</p>



	<p>to all the questions receives a report with Conclusions & Recommendations and also with a spider diagram showing the score in each key factor.</p> <p>How is the use of the tool explained? No specific instructions are provided. The tool is very easy to use.</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>There are not such functionalities provided.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>The possibility to download the calculations made for a chain The advanced functionalities are the preparation of a report with conclusions and recommendation on waste or biomass utilisation in a regional level, and also of the spider diagram based on the answers provided by the user.</p>
C5	<p>What advanced help functions are available?</p> <p>Not available</p>
C6	<p><i>The interaction with the tool</i></p> <ul style="list-style-type: none"> ○ is intuitive and simple ○ is generally easy and well explained
C7	<p><i>How simple or expensive is the tool in user functionalities</i></p> <ul style="list-style-type: none"> ○ is very simple and offers the user limited functions <p>he tool is very easy to use. The user replies questions through a wizard-like interface. The user is guided through a series of questions by selecting an answer, and he is then guided to another question. At the end the tool helps to summarize the information included by the user in a form of a spider diagram & report showing in which area the region is strong and which could use improvement.</p>



2. S2BIOM

A. General	
A1	Full name and acronym of the tool.
	S2Biom integrated toolset
A2	Home page of tool and if relevant also subpages (URL)
	https://s2biom.wenr.wur.nl/
A3	A summary description of the tool including the main objective.
	<p>The S2Biom toolset contains all data, tools, documents and reports of S2BIOM project which supports the sustainable delivery of non-food biomass feedstock at local, regional and pan European level. S2Biom covers data for EU28, Western Balkans, Moldova, Turkey and Ukraine (37 countries in total). Through different tabs in the main menu the user can access these tools, data, documents and reports. S2Biom provides data on lignocellulosic biomass i.e. forest biomass from forestry production, forest industry residues, agricultural biomass from primary field activities, agricultural residues, bio-waste and post-consumer wood, and dedicated perennial crops. The tools enable the user to interact with the results by making sub-selections for data; or to design his biomass delivery chain and evaluate performance; or to obtain information on specific issues of relevance for developing a biomass delivery chains such as 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. Among the important features of this toolset are the: the biomass policy tool, the database for biomass conversion technologies, the database for logistical concepts, the Bio2Match tool, the BeWhere model output viewing tool, the LocaGISTics tool, the biomass supply viewer, and the biomass cost-supply viewer.</p>
A4	Most recent update of the information in the tool (year)?
	The tool and content of the tool was developed during the S2BIOM project (2014- 2016). No update seems to be planned.
A5-1	Main type of users targeted?
	<p>The toolkit targets the following types of end-users:</p> <ul style="list-style-type: none">- Researchers- Policy makers- Biomass producers/harvesters/pre-processors- Advisors <p>It can also be used by the following end-users:</p> <ul style="list-style-type: none">- Industry- Financers <p>Policy makers to obtain input to develop a bioeconomy strategy and to benchmark their country or region against other countries or regions.</p>



A5-1	<p>Experience of users most suitable to use the tool</p> <ul style="list-style-type: none"> ○ users with some knowledge of the topic and understanding of online tools <p>Overall the tool can be used by users with some knowledge of the topic and understanding of online tools. The features: Biomass supply (Europe) and Bio2Match tool are targeting such kind of users. Some other features are easier to use i.e. the S2BIOM Database of Policy Measures & Instrument.</p>
A6	<p>Type of tool?</p> <p>The tool provides with a variety of potential functionalities. In particular it covers the following:</p> <ul style="list-style-type: none"> - Data/information mobilisation (all reports and data generated in the project are downloadable from the tool) - Design of chains - Biomass supply and cost tool - Biomass & Technology matching tool 'Bio2Match' - The Biomass Policy tool - BeWhere: used to identify optimal locations of biomass conversion plants in any particular region. - LocaGISTICS: used to develop optimal biomass logistic chains at a local level
A7	<p>Countries and/or regions that are covered by the tool.</p> <p>S2Biom covers data for EU28, Western Balkans, Moldova, Turkey and Ukraine. In total 37 countries.</p>
A8	<p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.</p> <p>The toolkit has been produced under S2Biom project. S2Biom is co-funded by the European Commission in the 7th Framework Programme (Project No. FP7-608622). It is coordinated by FNR (Fachagentur Nachwachsende Rohstoffe e.V.), and the consortium includes 31 partners from EU28, western Balkans, Ukraine and Turkey.</p>
A9	<p>Types of biomass covered?</p> <p>The tool covers the following types of biomass:</p> <ul style="list-style-type: none"> - Production from forest - Grassland - Agricultural residues - Forest residues - Dedicated crops (perennial crops) - Waste streams (biowaste and post-consumer wood)
A10	<p>Types of biomass conversion covered?</p> <p>The tool covers the following types of biomass conversion:</p> <ul style="list-style-type: none"> - Biochemicals - Biofuels - Bioenergy



B. Content of the tools

B1	<p>Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information</p> <p>Biomass supply information:</p> <ul style="list-style-type: none">- Several types of biomass covered (>5) - see above for the list- The tool provides with the biomass supply viewer. You can visit here.- This tool enables the user to make selections of biomass types for which data can be displayed in a map in relation to amount of biomass available per year and potential type combination.- Data have been assessed for 2012, 2020 and 2030. They are provided for several 'potentials' including: a technical potential; a base potential considering currently applied sustainability practises; and further potential levels that are determined considering changing sustainability restrictions, mobilisation measures and different constraints to account for competing use.- The user can select the regional level, the year and the different types of potentials. In addition, the user can also choose the level entities in absolute levels (Kton in dry matter (DM) dm or TJ), area weighted (Kton DM/km² or GJ/km²) and weighted average road side cost (€/ton DM). <p>Biomass cost information:</p> <ul style="list-style-type: none">- The tool provides with the biomass cost-supply viewer. You can visit here. This tool enables the user to make selections of biomass types for which cost levels can be displayed in a cost-supply graph.- The graph displays the total accumulated biomass (ordered from cheap to expensive) against the average road side cost level for the country/countries and scenario years selected. The amount of biomass is displayed on the y-axis and the road side cost level on the x-axis.- The cost displayed here are limited to the road-side cost. Road side cost refer to all biomass production collection and pre-treatment cost up to the road where the biomass is located. The road side cost is a fraction of the total 'at-gate-cost.' So the cost from road side for transport and possible in-between treatment to the gate of the conversion installation or the pre-treatment installation are NOT included. <p>Biomass characteristics (quality & composition) information:</p>
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	<p>The toolkit includes information on biomass characteristics per type of biomass. The following types of biomass are covered: Forestry, Primary production of lignocellulosic biomass crops, Agricultural residues, Grassland, Other Land use, Secondary residues from wood industries, Secondary residues of industry utilising agricultural products, and Waste.</p> <p>In terms of physicochemical characteristics, the following were recorded at the biomass characteristics database:</p> <ul style="list-style-type: none">- Moisture content- Ash- Ash melting behaviour- Chlorine (Cl)- Sulphur (S)- Potassium (K)- Sodium (Na)- Calcium (Ca)- Magnesium (Mg)- Silicon (Si)- Nitrogen (N)- Phosphorus (P)- Energy content of biomass- Bulk density and particle size distribution of biomass
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B2	Information on logistics: Spatially specific assessment options for logistics
	Information on logistics: The toolkit includes the logistical component database. You can visit here . It is related to the following information regarding logistics: <ul style="list-style-type: none">- Size reduction- Compaction/densification- Drying- Handling- Harvesting/collection- Storage- Transportation- This tool enables the user to Spatially specific assessment options for logistics available like: There is some relevant information i.e. The LocaGISTics and BeWhere tools were developed and implemented in a step-wise approach for the regions of Burgundy and Aragon.
B3	IMARKETS: Biomass market information: Biobased product market information:
	MARKETS: The toolkit includes information on current (2015) and the future biomass demand and consumption patterns. The forward-looking analysis was done from the energy (heat, electricity and biofuels) and biomaterials sectors (lignin, sugar



	platforms, biomethane, BTX, methanol, hydrogen, ethylene, and mixed alcohols) perspective and it was assessed using the ReSolve model.
B4	Good practice examples of biomass conversion technologies. Good practice examples of biomass conversion technologies: The toolkit includes examples of biomass conversion technologies. You can visit here . The following information is provided for each case study: Category, Subcategory, Name, Output capacity, Common biomass input, Technology readiness level, and also a number referring to each specific case study.
B5	Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps. The toolkit includes a Database of Policy Measures & Instruments as an integral part of the European project S2BIOM. The S2Biom policy database is available at: Regulatory viewing tool available here . The policies included in this database refer to agriculture, forestry, nature protection, waste policies, licensing, emission limits, requirements for storage and conversion installations in terms of emissions, efficiency, safety, biofuels and bio-energy policies (demand side), support and labelling of biobased products, public procurement, R&D and innovation (conversion technologies, but also research towards new or improved biomass types), as well as sustainability requirements on specific parts or the entire supply chain. The tool provides with the following filters: Country/Region, Type of Instrument or Measure, Sector/Topic targeted, Feedstock type targeted, Product type targeted, Value Chain, Search Terms. The policy related information can be found when selecting “Types of Instrument or Measure” → Regulatory (binding) instruments. Then a secondary filtering feature is provided and the user can select between various alternatives including zoning, targets, substitution obligation, standards, restrictions, procurement rules, property rights, purchase obligation, permitting, grid access, requirements, classification.
B6	Information on options for finances/investors/subsidies:



	<p>Information on options for finances/investors/subsidies:</p> <p>Again as above, the toolkit includes a Database of Policy Measures & Instruments as an integral part of the European project S2BIOM. The S2Biom policy database is available at: Regulatory viewing tool available here.</p> <p>The Instruments related information can be found when selecting “Types of Instrument or Measure” → Economic/financial instruments. Then a secondary filtering feature is provided and the user can select between various alternatives including premium, R&D, Subsidies, Tax Levels, penalty for non-compliances, loans, direct payments, feed in tariff, import tariff, investment subsidies, tax reductions, tradable certificates</p> <p>zoning, targets, substitution obligation, standards, restrictions, procurement rules, property rights, purchase obligation, permitting, grid access, requirements, classification.</p>
<p>B7</p>	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <p>The toolkit includes information on value chain sustainability. It includes information regarding a benchmark analysis of existing sustainability schemes, an inventory of how sustainability issues are currently addressed in bioeconomy value chains in a selected number of countries, a sustainability framework for Criteria and indicators for biomass delivery chains. A subset of the S2BIOM sustainability indicators were also calculated for conversion technologies & biomass type combinations and these can be viewed in an excel database. The environmental indicators calculated include energy efficiency (MJprim/MJout), direct life-cycles GHG emissions (g CO2/MJout), air emissions (SO2eq g/MJout and PM10 g/MJout), land use efficiency (m2/GJout) and employment (pers/TJout) for the average EU situations in 2020 and 2030 (based on PRIMES REF). These indicators were calculated with the GEMIS system updated with the conversion technologies data from the S2BIOM database (GEMIS 4.95).</p>
<p>C. Usability of the tool/interaction with the user/user friendliness</p>	
<p>C1</p>	<p>What are the objectives of the tool, according to the tool developers?</p> <p>Who are the target users of the tool, according to the developers?</p>



	<p>The objective of the toolkit is clearly stated and also which stakeholders it targets. The targeted groups are listed in Part A. The design of the tool matches with the expected needs and expertise of the end-users. There are many components and features of the tool and the product owners had provided with descriptive information on the use of each of them in a well-presented way.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered, ...)</p> <p>How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered, ...)</p> <p>How is the use of the tool explained ? (e.g. manual, course, context-sensitive help ...)</p> <p><i>Is the interface clear and easy to use?</i></p> <p>The interface is clear and relatively easy to use as there is a lot of information available to each functionality of the tool. In the text explaining each functionality/feature/component there are several links to deliverables that the user can read which address more analytic information on the development of each of them. This approach provides the user with a lot of new knowledge; however, it might seem complicated for less technical users.</p> <p><i>How is the use of the tool explained?</i></p> <p>The relevant information is provided to the first screen of the tool which is named 'Introduction to S2BIOM GUI' and it is available here. In particular the following information is provided:</p> <p><i>Welcome to the S2BIOM integrated tool set!</i></p> <p><i>The S2Biom project supports the sustainable delivery of non-food biomass feedstock at local, regional and pan European level through developing harmonised data sets, strategies, and roadmaps at local, regional, national and pan European level for EU28, Western Balkans, Ukraine, Moldova and Turkey that can be accessed via this S2BIOM tool set.</i></p> <p><i>You have just opened the S2BIOM toolset containing all data, tools, documents and reports generated in the S2BIOM project. Under the different tabs in the main menu above you can click to get access to these different tools, data, documents and reports. The tools enable you as user to interact with the results by making sub-selections for data you are interested in; or to design your own biomass delivery chain and evaluate the performance; or to obtain to the point information on specific issues of relevance for developing a biomass delivery chains. These can be key characteristics on logistical compo-</i></p>



	<p>nents, 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.</p> <p>Getting started: The first time you use the toolset you have to create your own user account by clicking on the top right menu 'Log in' and in the next menu on the tab 'Create Account'.</p> <p>When starting to use the toolset you can consult the User guidelines. A technical description of the toolset is also available.</p> <p>Please click on the tabs in the menu above to get a full overview of contents of the S2BIOM toolset.</p> <p>For further information about the project visit the S2BIOM website and open underneath documents: S2BIOM general project leaflet/S2BIOM project presentation/S2BIOM brochure / S2BIOM guidelines (2016).</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>How can the user interact with the data? What kind of search or select functions are available?</p> <p>The toolkit provides with the variety of functionalities. Each functionality provides with different functionalities to the user. In particular:</p> <ul style="list-style-type: none">- The user can read and download various information related directly or indirectly with biomass such as: <u>Scenarios for future biomass demand</u>, <u>Biomass demand</u>, <u>Biomass characteristics</u>, <u>Conversion technologies</u>, <u>Biomass cost-supply (Imports)</u>, <u>logistical components</u>, <u>Value chain sustainability</u>, S2BIOM Report downloads, and <u>Data downloads</u>.- S2BIOM Database of Policy Measures & Instruments: <u>Here</u> the user can: (i) search the Catalogue by Filtering the Policy Measures & Instruments using the descriptive criteria of his preference (e.g. the type of measure, the targeted region, the type of feedstock or the sector targeted by the Measures & Instrument (ii) add new Measures & Instruments to the database (iii) update/review existing Measures & Instruments in the database and (iv) comment on existing Measures & Instruments in the database. The tool provides with the following filters: Country/Region, Type of Instrument or Measure, Sector/Topic targeted, Feedstock type targeted, Product type targeted, Value Chain, Search Terms.- Biomass supply (Europe): <u>Here</u> the user can: make selections of biomass types for which data can be displayed in a map in relation to amount of biomass available per year and potential type combination. The user can select the regional



	<p>level, the year and the different types of potentials. In addition, the user can also choose the level entities in absolute levels (Kton dm or TJ), area weighted (Kton dm/km² or GJ/km²) and weighted average road side cost (€/ton dm).</p> <p>- Cost-supply viewer: Here the user can make selections of biomass types for which cost levels can be displayed in a cost-supply graph. The graph displays the total accumulated biomass (ordered from cheap to expensive) against the average road side cost level for the country/countries and scenario years selected. The amount of biomass is displayed on the y-axis and the road side cost level on the x-axis. <i>I wasn't able to see the described features of this tool.</i></p> <p>- Bio2Match tool: Here the user can make the optimal match between biomass resources and conversion technologies. Each conversion technology has specific biomass input requirements, while the composition and characteristics of biomass at roadside varies widely. Some biomass types can be used in many different technology options, while others are hard to process or will need extensive pretreatment. The matching tool uses extensive information from the S2Biom databases (on conversion technologies and on biomass properties) to show the user which types of biomass can be processed by which technologies to certain end-products, and thereby helps the user to find an optimal supply chain.</p> <p>- BeWhere model output viewing tool: Here the user can determine where new biomass conversion installations can best be established in the EU-28, Western Balkans, Ukraine, Turkey and Moldova. BeWhere provides optimal selections of technology, location and capacity of bio-energy production plants, based on the minimization of the costs and emissions of the whole supply chain, in order to meet a pre-defined energy demand competing against the actual fossil fuel energy commodities. <i>I wasn't able to see the described features of this tool.</i></p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p>
	<p>They are provided under C3</p>
C5	<p>What advanced help functions are available?</p>
	<p>Not available</p>
C6	<p><i>The interaction with the tool</i></p> <ul style="list-style-type: none"> ○ requires some effort but is easy to learn or well explained <p>The interface of the tool is well conceived and helps the user to go through the different capabilities of the tool. In the beginning it requires some effort but is easy to learn as it is well explained.</p>



C7

How simple or expensive is the tool in user functionalities

- **offers the user some functions regarding e.g. search functions or data presentation**

The tool has three important features. Those are:

- (A) **S2BIOM Database of Policy Measures & Instruments:** Here the user can: (i) search the Catalogue by Filtering the Policy Measures & Instruments using the descriptive criteria of his preference (e.g. the type of measure, the targeted region, the type of feedstock or the sector targeted by the Measures & Instrument (ii) add new Measures & Instruments to the database (iii) update/review existing Measures & Instruments in the database and (iv) comment on existing Measures & Instruments in the database.
- (B) **Biomass supply (Europe):** Here the user can: make selections of biomass types for which data can be displayed in a map in relation to amount of biomass available per year and potential type combination. The user can select the regional level, the year and the different types of potentials. In addition, the user can also choose the level entities in absolute levels (Kton dm or TJ), area weighted (Kton dm/km² or GJ/km²) and weighted average road side cost (€/ton dm).

Bio2Match tool: Here the user can make the optimal match between biomass resources and conversion technologies. Each conversion technology has specific biomass input requirements, while the composition and characteristics of biomass at roadside varies widely. Some biomass types can be used in many different technology options, while others are hard to process or will need extensive pretreatment. The matching tool uses extensive information from the S2Biom databases (on conversion technologies and on biomass properties) to show the user which types of biomass can be processed by which technologies



3. BERST

A. General	
A1	Full name and acronym of the tool.
	BERST BioEconomy Regional Strategy Toolkit for benchmarking and developing bioeconomy strategies
A2	Home page of tool and if relevant also subpages (URL)
	Starting page: www.berst.eu On this starting page the user can choose from 3 tools (which lead to the following webpages): <ul style="list-style-type: none">- Catalogue of Criteria and Indicators metabase tool (https://berst.databank.nl/)- Catalogue of Instruments & Measures tool (https://berst.vito.be/)- Catalogue of Good Practices and Case Studies metabase tool (link points to the same page as the first option) <p>This means that the BERST includes two tools (Catalogue of Criteria, Indicators, Good Practices and Case Studies - hereinafter T1; Catalogue of Instruments & Measures tool - hereinafter T2), these will be described separately in the points below if it is relevant.</p>
A3	A summary description of the tool including the main objective.
	A summary description of the tool including the main objective BERST catalogues listed at A2 intends to help EU regions in their trajectory of bioeconomy development and to promote smart specialisation strategies of regional development based on bioeconomic potential. The aim of the development of BERST toolkit was to take into account the bioeconomy potential and strategies of a range of different regions in Europe, and therefore to gain understanding of the possibilities and challenges related to the enhancement of biobased economies. The elements of the toolkit (as listed at A2): <ul style="list-style-type: none">- database with criteria and indicators describing the regional bioeconomy potential, in order to facilitate the quantitative analysis of the state of the regional bioeconomy, using criteria to describe the regions in terms of their bioeconomy potential (e.g. based on geographical location, climate, predominance of bioeconomy sectors, existing skills, resources and technologies, etc.).- catalogue of instruments and measures correlated against the bioeconomy criteria enabling regional bioeconomy development, allowing stakeholders to search in a targeted way for measures and instruments to support the development of the regional bioeconomy- catalogue of good practices and case studies from existing EU bioregions based on the criteria and the instruments and measures, which can be used as inspiration



	<p>for the development of regional smart specialisation strategies</p> <p>Brochure is available on the link below: https://www.berst.eu/EN_BERST%20Brochure%20No%201%20-%20May14.pdf</p>
A4	Most recent update of the information in the tool (year)?
	<p>2016 (BERST project ended in November 2015.)</p>
A5-1	Main type of users targeted?
	<p>Type of users targeted? (users targeted are underlined)</p> <ul style="list-style-type: none"> - <u>Biomass producers/harvesters/pre-processors</u> - <u>Industry</u> - <u>Researchers</u> - <u>Policy makers</u> - <u>NGOs</u> - <u>Other</u> <p>BERST project established a network of bioregions developed by the method of Community of Practice (CoP), in which policymakers, companies, cluster managers and researchers jointly explore and share experiences on the development of regional bioeconomies in Europe.</p>
A5-1	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> o <u>users with some knowledge of the topic and understanding of online tools</u> o <u>advanced users</u> <p>many data collected in one system</p> <p>not easy to find the relevant document in the Catalogue of Instruments & Measures, even by using filters</p> <p>no basic explanations are available here, especially at "Swing Viewer"-based page</p>
A6	Type of tool?
	<ul style="list-style-type: none"> - Data/information mobilisation: science-based evidence and online available information for bioeconomy and bioregions; collecting of applied instruments and measures enabling regional bioeconomy development - Design of chains: - - Assessment tool: facilitating the quantitative analysis of the current state of the bioeconomy in a region and its potential - Other: demonstrating how a (sub) region can utilize the bioeconomy criteria; online tool for creating dynamic regional bioeconomy profile factsheets
A7	Countries and/or regions that are covered by the tool.
	Countries and/or regions that are covered by the tool:



	<p>T1: countries involved in BERST project: Belgium, Germany, Estonia, Greece, Spain, Finland, Latvia, Netherlands, Norway, Poland, Slovenia, UK (data in the tool are available also for NUTS1, NUTS2 and NUTS3 regions within these countries)</p> <p>T2: This tool covers Instruments & Measures collected not only from Europe but worldwide (South East Asia, East Africa, North America (Canada, USA), two countries in South America). The search can be set to EU or non-EU European countries.</p>
A8	<p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.</p> <p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool:</p> <p>BERST project (financed under FP7) was coordinated by: STICHTING WAGENINGEN RESEARCH, Netherlands Email: berst@wur.nl (no other email address is shown at the webpage) Administrative Contact: Vivian Luttikhuisen (Mrs.)</p> <p>The name of the tool developer/manager and organisations involved in the development are not listed on the webpage of the project or the tools.</p> <p>Contact person for T2: biobased@vito.be (Ruben Guisson - VITO)</p>
A9	<p>Types of biomass covered?</p> <ul style="list-style-type: none">- <u>Agricultural residues</u>- <u>Forest residues</u>- <u>Dedicated crops</u>- <u>Waste streams</u> <p>T2 covers all types of biomass listed above:</p> <div data-bbox="411 1317 1015 1809"><p>Sector/Topic targeted</p><p>- Any -</p><p>Feedstock type targeted</p><p>- Any -</p><ul style="list-style-type: none">Agriculture/HorticultureAqua/Marine/Fishing (including algae)ForestryIndustry byproductsLandscape careWaste</div> <p>T1 has different categories:</p>

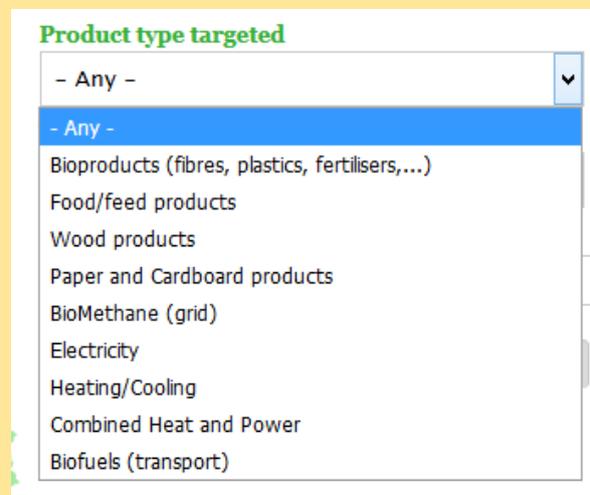


- ▼ Biomass availability and Land use
 - ▼ Biomass availability ✓
 - ⊗ Forestry land density (% of total land)
 - ⊗ Agricultural & horticultural land density (% of total land)
 - ⊗ Agricultural biomass production (kg/cap)
 - ⊗ Blue biomass production (kg/cap)
 - ⊗ Forestry biomass production (kg/cap)
 - ⊗ Waste production (kg/cap)

A10 Types of biomass conversion covered?

T1 does not have categories for conversion types.
 T2 covers all types of products listed in the evaluation factsheet:

- Food: mentioned in one category with feed
- Feed: mentioned in one category with food
- Biochemicals: fertilisers
- Biomaterials: wood products, fibres, plastics, paper and cardboard products
- Biofuels
- Bioenergy: electricity, biomethane, heating/cooling, combined heat and power



B. Content of the tools

B1 Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information



Biomass supply information:

- Types of biomass covered: see A9
- number of biomass types that are covered: see A9
- quantitative information on biomass availability that is provided (e.g. in totals per area, biomass density): only T1 contains data on this but not so detailed
- is biomass expressed in different types of potential figures (e.g. technical potential, sustainable potential, economic potential, currently exploited and unexploited potential, current and future potentials etc.): maybe a part of the factsheets in the collection of T2 contains this kind of information but these factsheets cannot be selected
- supply data provided at high spatial resolution level (e.g. national, regional, grid (what size?)):
- Information provided on the long-term competitive and consistent availability of the biomass-etc.: -

In T2, factsheets included in the tool can be filtered by Criteria (see C3 for search functions), and if “Biomass availability” is selected from the dropdown list of the criteria, the result is a list of factsheets linked to biomass availability, but this list or the factsheets themselves does not provide direct information on biomass supply.

The tools do not provide direct information on biomass cost, **biomass characteristics (quality & composition) or metadata** on biomass cost-supply input data.

B2

Information on logistics:

Spatially specific assessment options for logistics

Information on logistics:

T2 contains many European and national Instruments & Measures related to logistics (transportation, harvesting etc.) but it can be difficult to find the relevant documents amongst these. The topics of pre-treatment and storage are not covered by the tools.

Spatially specific assessment options for logistics available like:

- how can the user identify the collection area from where biomass can be sourced?
- how does the tool help the user to understand what collection cost/collection activities are needed?
- how much biomass can be sourced to a point?

T1 can provide information related to these assessment options, but only for the countries which were involved in the BERST project:



B3

IMARKETS:
Biomass market information:
Biobased product market information:

MARKETS:

T1 provides no information about the market related topics. In T2, there is an option to choose “economic/financial instruments” from the dropdown list of the types of instrument and measures.

Economic/financial instruments and measures can stimulate certain activities, behaviour or investments using financial support and price signals to influence the market. These include fiscal and financial policy instruments such as taxes, tax relief, grants or subsidies, feed-in tariffs, and loans for the purchase or installation of certain goods and services. They also include direct public funding and procurement rules, and market mechanisms such as tradable permits.

Biomass availability 2016 - NUTS-3 regions				
	Agricultural biomass production (kg/cap)	Blue biomass production (kg/cap)	Forestry biomass production (kg/cap)	Waste production (kg/cap)
Vidzeme	14,625.5	89.0	17,587.9	2,620.8
Latgale	13,700.4	93.3	10,436.5	1,805.3
Zemgale	13,333.6	46.7	6,318.9	1,985.8
Kurzeme	11,079.5	65.1	7,448.0	2,068.7
Central Estonia	9,789.7	0.2	21,398.1	14,743.8
West Estonia	9,662.9	62.6	17,982.7	10,796.8
South Estonia	6,464.5	7.7	18,785.5	7,175.4
Pieriga	5,394.3	38.0	5,315.8	1,273.9
Delft en Westland	5,028.4	3.2	9.1	1,339.3
Spodnjeposavska	4,793.1	0.0	1,998.0	144.9
Etela-Pohjanmaa	4,121.8	0.0	27,624.3	22,890.7
Pomurska	4,082.5	0.0	934.6	137.9
Jugovzhodna Slovenija	3,950.7	0.8	2,076.3	128.5
Straubing-Bogen	3,946.2	0.0	15,412.6	339.1
Nord-Trøndelag	3,638.6	926.9	3,211.2	9,238.1
Shetland Islands	3,599.2	3,007.9	0.0	689.1
Noord-Limburg	3,567.8	4.2	168.4	986.0
Hedmark	3,563.7	0.0	14,706.5	10,312.4
Cheshire East	3,543.8	0.5	86.5	46.0
Koroška	3,288.8	0.0	3,225.8	112.8
Savinjska	3,251.6	0.1	1,889.0	101.6
Oppland	3,091.0	0.0	7,700.3	8,308.8
Kop van Noord-Holland	2,960.4	163.2	35.8	783.5
Goriska	2,871.8	0.1	1,814.7	102.6



Country/Region

- Any -

Type of Instrument or Measure

Economic/financial instruments

- Any -

- Any -

Premium
R&D Funding
Subsidies
Tax Levels
Penalty For Non-Compliance
Loans
Direct Payments
Feed-In Tariff
Import Tariff
Investment Subsidies
Tax Reduction
Tradable Certificates

B4

Good practice examples of biomass conversion technologies.

Good practice examples of biomass conversion technologies

None of the BERST tools provides direct information on number & type of biobased industries present or demonstration (flagship) technologies/biorefineries or examples of close to zero waste initiatives. However, there is a small collection of seven case studies (<https://berst.vito.be/case-studies>) and four good practices (<https://berst.vito.be/good-practices>) at the page of T2. By clicking on the name of a case study/good practice, a new page opens with a factsheet presenting the case study/good practice in details (Key Information, Logo, Important Instruments & Measures, Major lessons learned).

As mentioned at A2, the link of the “Catalogue of Good Practices and Case Studies” on the main page points to the same page (T1) as the “Catalogue of Criteria and Indicators” so theoretically T1 contains the collection of Good Practices and Case Studies too, but the dropdown list does not have a related option at T1:



	<p>Content 6</p> <p>Search in indicators</p> <ul style="list-style-type: none">▶ Biomass availability and Land use▶ Demographics and quality of workforce▶ Employment and firms structures▼ Innovation ✓<ul style="list-style-type: none">⊗ SME birth rate (% of total firms)⊗ R&D expenditure (Index)⊗ R&D employment (% of total employment)⊗ Total Bioeconomy employment (% of total employment)✓ ⊗ Micro Agricultural & forestry firms (%)⊗ Micro Food & Feed firms (%)⊗ Micro Textile firms (%)⊗ Micro Paper & Pulp firms (%)⊗ Micro Construction firms (%)✓ ⊗ Micro Chemical firms (%)⊗ Micro Energy firms (%)⊗ Micro Biotechnology firms (%)
B5	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p> <p>Information on policies/regulations/stimulation measures</p> <p>T2 contains a very extensive and comprehensive collection of policies and regulations valid on national level (not only for the countries involved in the BERST project!) and also on the level of E28 countries:</p>



Type of Instrument or Measure

Regulatory (binding) instruments

- Any -

- Any -

Zoning

Targets

Substitution Obligation

Standards (Binding)

Restrictions

Procurement Rules

Property Rights

Purchase Obligation

Permitting

Grid Access

Requirements

Classification

Short name of Instrument or Measure	ISO	Country/Region	Type of Instrument & Measure	Sector/Topic targeted
CAP: Hungarian Rural Development Programmes	HU	HUNGARY (MAGYARORSZÁG)	Requirements, Investment Subsidies	Agriculture
Classification of forests	HU	HUNGARY (MAGYARORSZÁG)	Classification	Forestry
Decree on forest fire protection	HU	HUNGARY (MAGYARORSZÁG)	Standards (Binding), Requirements	Forestry
Decree on forestry planting materials	HU	HUNGARY (MAGYARORSZÁG)	Requirements	Forestry
Decree on plant genetic materials	HU	HUNGARY (MAGYARORSZÁG)	Requirements	Agriculture, Forestry
Environmental protection act	HU	HUNGARY (MAGYARORSZÁG)	Requirements	Environment (soil, water, air, nature, biodiversity,...)
Forest act	HU	HUNGARY (MAGYARORSZÁG)	Requirements	Forestry
National land fund	HU	HUNGARY (MAGYARORSZÁG)	Requirements	Agriculture, Forestry
Nitrate	HU	HUNGARY (MAGYARORSZÁG)	Requirements, Restrictions	Agriculture, Environment (soil, water, air, nature, biodiversity,...)
Water management act	HU	HUNGARY (MAGYARORSZÁG)	Requirements	Environment (soil, water, air, nature, biodiversity,...)

Short name of Instrument or Measure	ISO	Country/Region	Type of Instrument & Measure
Birds directive (Dir. 2009/147/EC)	EU	EU28	Requirements
CAP 2014-2020 - Direct Payments (Reg. 1307/2013)	EU	EU28	Requirements, Direct Payments
CAP 2014-2020 - Rural development (Reg. 1305/2013)	EU	EU28	Requirements, Subsidies
EU Timber Regulation (Reg. 995/2010)	EU	EU28	Requirements
Habitat directive (Dir. 92/43/EEC)	EU	EU28	Requirements
iLUC Directive (EU) 2015/1513	EU	EU28	Restrictions
Natura2000	EU	EU28	Requirements, Guidelines, Subsidies
Nitrates (Dir. 91/676/EEC)	EU	EU28	Restrictions
Plant Health directive (Dir. 2000/29/EC)	EU	EU28	Requirements
Renewable energy directive (Dir. 2009/EC/28)	EU	EU28	Targets, Requirements

1 2 next > last »



By clicking on the short name of an instrument/measure, a new page opens showing a factsheet presenting the instrument/measure in details (Key Information, Impact on regional bioeconomy objectives, Contact References, Advanced Information, Comments). These factsheets include a direct link to the instrument/measure. The aspects under “Impact on regional bioeconomy objectives” are often considered as “not relevant”. The search can be narrowed down for targeted topic/sector within the regulatory instruments:

The screenshot shows a search filter interface with three sections:

- Country/Region:** A dropdown menu with "European Union" selected and "- Any -" as an option below it.
- Type of Instrument or Measure:** A dropdown menu with "Regulatory (binding) instruments" selected and "- Any -" as an option below it.
- Sector/Topic targeted:** A dropdown menu with "- Any -" selected. A list of sectors is visible below the dropdown, including: Agriculture, Biotechnology, Climate, Clustering, co-operation and networking, Communication and information, Consumer and societal affairs, Development (regional, rural, urban,...), Economy, Education, training and human resource development, Employment, Energy, Environment (soil, water, air, nature, biodiversity,...), Finance, Fisheries, Forestry, Health & public safety, Industry, enterprise and commerce, Infrastructure, and Legal.

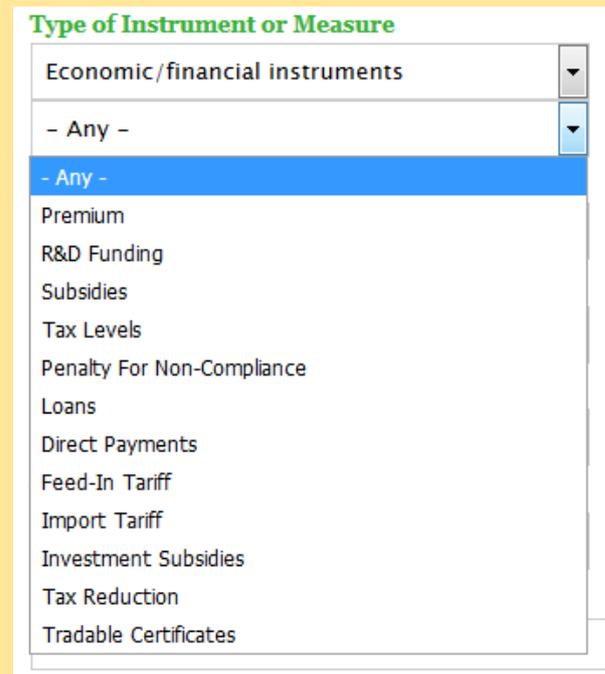
Existence of National Bioeconomy strategies (including the corresponding Action Plans) can be checked (according to the situation at the time of the latest update) using general search of T2, by selecting the relevant country from “Country/Region” list, then “Voluntary (non-binding) initiatives” and “Action plans” / “Strategies” from “Type of Instrument or Measure” list. Regional / rural development plans can be found also this way, as they are categorised as strategies in the tool. There are no option in the dropdown list



for roadmaps or visions but these words can be typed in the free text type “Search Terms” box and the relevant documents can be found by checking the items on the results’ list one by one.

B6 Information on options for finances/investors/subsidies:

Information on options for finances/investors/subsidies:
T2 can be used to find information related to these aspects. Using general search and Selecting “Economic/financial instruments” in the dropdown list, the following subtopics are available:



The other alternative is to type keywords in the free text type “Search Terms” box at General search and screening the relevant documents by checking the items on the results’ list one by one.

The result of this search is a list of instruments & measures but no technology descriptions or case studies including financial assessments will be listed here. These factsheets provide only general descriptions about the aspects of B6 section (eg. the regulatory policy background related to financing, existing funding programmes targeting innovation which can be linked to bioeconomy initiatives) but do not give information on investment costs required by bio-based solutions, return on investment, etc.

No detailed information could be found for the following specific topics:

- Establishment of mechanisms that enable feasible synergies and combination of different sources of funding
- Existing measures differentiating among regulations (imposed by law), financial support measures and soft measures (guidelines)
- Support measures to promote industrial symbiosis



- Support measures to support valorisation schemes
- Support measures to local value chains implementation
- Support for facilitating the cooperation between government, research institutions and industry (including agriculture, harvesting, transport, biomaterials, bioenergy, etc.) (for example collaboration agreements between industry-research institutions)

B7

Information on GHG emissions/LCAs and other sustainability aspects:

Information on GHG emissions/LCAs and other sustainability aspects:

- Information on GHG emission/mitigation
- Information on Land use change impacts.
- Information on Impacts on biodiversity & ecosystems.
- Information on other impacts on environment (water, soil, air, including resource depletion aspects).

T2 can be used to find information related to these aspects:

- typing keywords in the free text type “Search Terms” box at General search and screening the relevant documents by checking the items on the results’ list one by one
- using General search, selecting the relevant option (eg. “Environment” or “Climate” etc.) from “Sector/Topic targeted” dropdown list (this option can be combined with the first one)
- using “Search by objective” and selecting the relevant option from “Sector/Topic” dropdown list

It has to be noted that these searches result in a long list of documents and it is time-consuming to check all the items on them so it is useful to set more options also from the other lists (a country of interest for example), but this can be done only using general search.

- Information on certification schemes: using General search, selecting “Voluntary (non-binding) initiatives” and “Standards” from “Type of Instrument or Measure” dropdown list

T1 also contains data concerning the employment in different sectors related to bioeconomy, for the countries/regions involved in BETST project, for years 2015 and 2016:



Content	
<input type="text" value="Search in indicators"/>	
▶	Biomass availability and Land use
▶	Demographics and quality of workforce
▼	Employment and firms structures
▼	Employment ✓
<input checked="" type="checkbox"/>	Primary biomass employment (% of total employment)
<input checked="" type="checkbox"/>	Food & Feed employment (% of total employment)
<input checked="" type="checkbox"/>	Textile employment (% of total employment)
<input checked="" type="checkbox"/>	Paper & Pulp employment (% of total employment)
<input checked="" type="checkbox"/>	Construction employment (% of total employment)
<input checked="" type="checkbox"/>	Chemical employment (% of total employment)
<input checked="" type="checkbox"/>	Energy employment (% of total employment)
<input checked="" type="checkbox"/>	Biotechnology employment (% of total employment)
<input checked="" type="checkbox"/>	Total Bioeconomy employment (% of total employment)
<input checked="" type="checkbox"/>	R&D employment (% of total employment)

The tools do not provide information on economic impacts (e.g. income derived from bioeconomy sector, turnover from bioeconomy etc.).

C. Usability of the tool/interaction with the user/user friendliness

C1	<p>What are the objectives of the tool, according to the tool developers?</p> <p>Who are the target users of the tool, according to the developers?</p> <p>Wat are the objectives of the tool, according to the tool developers?</p> <p>(See A3)</p> <p>Who are the target users of the tool, according to the developers?</p> <p><i>Match with main user groups in this characterisation: <u>1. policy makers, looking for high level information and case studies</u>; <u>2. consultants/scientists, requiring accurate and detailed information on several aspects of the biomass chain</u>; <u>3. industry, same as the consultant/scientist plus calculations, adding own data.</u></i></p>
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	<p>To what extent does the design of the tool match the expected needs and expertise of the end-user?</p> <p>The explanation of the tool easy to understand. Search functions could be improved.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered, ...) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered, ...)</p> <p>The tools are not so difficult to use. The different options of T2 (general search, search by objective, etc.) and the links/overlaps/differences/interlinkages between these options are not clear.</p> <p>How is the use of the tool explained? (e.g. manual, course, context-sensitive help ...)</p> <p>T1 has no explanation or help functions. The functions of T2 are explained by examples (https://berst.vito.be/policies/examples).</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>In T1, the content of the table as the outcome of the data search can be set and arranged by the user.</p> <p>What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>T1: selecting options from dropdown lists</p> <p>T2: Many options can be selected in dropdown lists using the general search. Moreover, also keywords can be added in the free text type "Search Terms" box. The different searching categories can also be clicked in the tables received as a result of a general search, starting a new search by the category which was clicked (but this second search is not performed only in the results of the first search but in the entire database again, like the first one). There are different search options in T2: besides the general search, the database of Instruments & Measures can be filtered by objective or by criteria on which they have a (in) direct impact. For</p>



	<p>example, if the Criterion 'Availability of funding' is selected using the "search by criteria", the result will be a list of all Instruments & Measures being deployed by regions throughout Europe that have an (in)direct effect on the Criterion 'Availability of funding'.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>In T1 it is possible to save the data of the search results in a file and different formats can be chosen for this.</p> <p>T1 contains an online tool for creating regional bioeconomy profile documents in pdf format. The regional profile provides an overview of the current state of the bioeconomy in a region, suggests lessons for developing a bioeconomy cluster, and gives recommendations for instruments and measures. These ingredients can be helpful in drafting a smart development strategy for establishing or strengthening a bioeconomy cluster in the region. The online tool can dynamically create a bioeconomy profile fact sheet. This dynamic report approach on the "Swing Viewer"-based page of BERST presenting the regional bioeconomy profiles seems to be very useful.</p>
C5	<p>What advanced help functions are available?</p> <p>Not available</p>
C6	<p>The interaction with the tool</p> <ul style="list-style-type: none"> o <u>requires some effort but is easy to learn or well explained</u>
C7	<p>How simple or expensive is the tool in user functionalities</p> <ul style="list-style-type: none"> - <u>offers the user some functions regarding e.g. search functions or data presentation</u>



4. BIORAISE

A. General	
A1	Full name and acronym of the tool.
	BIORAISE
A2	Home page of tool and if relevant also subpages (URL)
	http://bioraise.ciemat.es/Bioraise/home/main
A3	A summary description of the tool including the main objective.
	<p>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. The current platform supports the visualization of vulnerable areas in base of environmental variables, such as soil erosion risk, edaphic depth, slope, stoniness or net primary productivity, assisting the sustainable management of the resources. The key purpose of the BIORAISE tool is to enable reliable estimations of biomass resources and costs for energy use. Therefore, interactive options have been designed to provide biomass quantities, energy content and distribution maps. Provides overview of biomass availability and enables sub selection of biomass types, collection circles. For the collection to a point it assesses cost (road side+ collection cost), emissions, it also allocates crops in competition with other land uses.</p>
A4	Most recent update of the information in the tool (year)?
	2012 & 2018
A5-1	Main type of users targeted?
	Biomass producers: to understand how much biomass there is in their own region and whether collaboration and upscale options exist
	Policy makers: For understanding how much and what type of biomass is available in their region as input into strategy development
	Consultants/scientist/advisors: attractive information can be derived from the tool which goes further than only getting information on biomass potentials. It provides further understanding of mobilisation options, cost and also related GHG emissions
	(Bio)Industry: raising awareness on the potential and opportunities of mobilising sidestreams in different regions to feed possible biomass chain development
Financers: Gives a good idea of certain cost types in a full biomass chain particularly the collection and transport cost.	
A5-2	Experience of users most suitable to use the tool



	<ul style="list-style-type: none"> o users with some knowledge of the topic and understanding of online tools o advanced users <p>The tool is not so simple and easy to use it the beginning. Users that have good knowledge of biomass collection chains have an advantage when starting to use the tool. In the help function it is explained how to use the tool, but still it is not directly that straight forward.</p>
A6	<p>Type of tool?</p> <p>The tool provides information on biomass potentials and the key asset is that it supports the user to design a biomass chain at a detailed spatial scale (google maps scale). For the chain design it provides detailed cost and GHG emissions for different components of the chain.</p>
A7	<p>Countries and/or regions that are covered by the tool.</p> <p>Croatia, France, Greece, Italy, Portugal, Slovenia, Spain and Turkey.</p>
A8	<p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.</p> <p>The direction and coordination of the development of the BIORAISE application has been carried out by the Centre for Environmental and Technological Energy Research (CIEMAT), through its Biomass Unit of the CEDER-CIEMAT. The property of BIORAISE corresponds to CIEMAT. The first version of the tool was developed in the framework of the UE 6th FW Project CHRISGAS (1st version 2009). In January 2012, it was then further extended to the other countries as part of the Biomass Plus project (H2020 project 'Developing the Sustainable Market of Residential Mediterranean Solid Biofuels' No. 691763).</p> <p>Entities that together with CIEMAT have collaborated in providing the basic data for this application in BIOMA are: 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 Co-operative (ZEZ - Croatia), The Spanish Bioenergy Association (AVEBIOM- Spain).</p>
A9	<p>Types of biomass covered?</p> <p>Types of biomass covered by the tool:</p> <ul style="list-style-type: none"> - Agricultural residues (from rainfed and irrigated crops, orchards, vineyards, olives) - Forest residues, including from agroforestry - Shrub residues (Landscape)
A10	<p>Types of biomass conversion covered?</p> <p>The biomass chain designs are aimed at energetic uses, but the conversion processes are not covered in the tool.</p>
B. Content of the tools	
B1	<p>Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information</p>



Biomass supply information:

- Many biomass types are covered (>5) - see above for the list
- The biomass availability per type of biomass is provided in a 1*1 km grid linked to the Corine land cover classes (e.g. rainfed crops, irrigated crops, forest, agroforestry, shrubs)
- The biomass potential figures are linked to a land cover class but the calculation of the biomass availability is based on statistical data on land use (crops) combined with a Residue to product ratio specific per crop per country.
- No information provided on the long-term availability of the biomass. The biomass availability is based on averages from statistics over a period of 2005-2014.

Biomass cost information:

Biomass cost information is available in the tool for all biomass types expressed in €/ton d.m and €/GJ. These refer to collection cost at road side. When the user designs a biomass delivery chain with the tool, the biomass transport cost are also calculated and reported separately per type of biomass.

Metadata is available on biomass cost-supply data through the project report: *For further details see D2.4 Task 2.3 report from the Biomassud project downloadable under 'files' tab in the tool.*

Biomass characteristics (quality & composition) information:

The tool contains and displays information on biomass characteristics: moisture content (user can choose the moisture level of the biomass for which transportation and collection cost are calculated), ash value and energetic contents.

<p>B2</p>	<p>Information on logistics: Spatially specific assessment options for logistics</p> <hr/> <p>Information on logistics: The key feature of the tool is letting the user design its own biomass delivery chain. Logistics are a key feature. This tool enables a user to design a chain by taking account of the detailed spatial distribution of the biomass, by letting the user select (on a map) the biomass type, the biomass collection circle and the point where a conversion installation is to be placed and to where the biomass needs to be transported. Costs for harvesting & collection, and transport are calculated. Further pre-treatment activities & costs are not addressed.</p>
<p>B3</p>	<p>IMARKETS: Biomass market information: Biobased product market information:</p> <hr/> <p>Market information is not available in the tool. However, the tool does provide information on the locations of forest and agro-food-processing industries: e.g. wood industries, olive oil industries, nut hulling industries and wine sector distillery industries. Every industry location is a point in the map. Company name, address, and phone number is provided for each industry. The validity of the information cannot be determined.</p>



<p>B4</p>	<p>Good practice examples of biomass conversion technologies.</p> <p>No information provided</p>
<p>B5</p>	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p> <p>No information on policies, regulations, visions is provided in the tool. This is not an objective of the tool</p>
<p>B6</p>	<p>Information on options for finances/investors/subsidies:</p> <p>No information on finances, investors, subsidies given. This is not an objective of the tool. The tool does give information on cost of biomass collection and transport. So this is an initial information to obtain an understanding of the cost-structure of setting up a biomass delivery chain. For investors it is relevant information.</p> <p>In the tool it is explained:</p> <p><i>To estimate the cost of transporting the biomass from the selected area to the chosen point, it is necessary to enter the value of the fuel price (diesel) in the 'Cost of transport fuel' box. The application returns an estimate of the average cost of transport for each of the biomass categories evaluated in the selected area.</i></p>
<p>B7</p>	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <p>For the chains designed the tool calculates the direct GHG emissions from the collection of the biomass and the transport. The tool is also interactive in that it recalculates the GHG emissions when the moisture content of the biomass is lowered or increased by the user.</p> <p>The biomass availability does take account with environmental limitations in terms of soil type, terrain that determine how much (residual) biomass can be harvested and where.</p> <p>Other sustainability aspects are not addressed in the tool.</p> <p>However, in the Spanish version of the tool (only covering Spain) more sustainability aspects are addressed such as additional water abstraction when choosing to include additional cropped biomass in the biomass chain.</p> <p>It is explained in the tool:</p> <p><i>The application allows calculating the resources in dry matter tons per year (t MS / year) and potentially suitable areas (SAPCE) as well as the different average economic and energy costs (€/ t MS, MJ / t MS respectively) and, GHG emissions (t CO2 eq / t MS). Also included is the energy balance (%) expressed as the ratio of the energy consumed with respect to that contained in the biomass based on its lower calorific value and, in the case of irrigated crops, the percentage of water consumed compared to the available for agricultural uses in the sub-basin or sub-basins to which the selected area belongs. €/ t MS, but it will be necessary</i></p>



	to take into account the most probable moisture value of the different types of biomass.
C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>The objective of the tool is clearly stated and also which stakeholders it targets. The design of the tool matches with the expected needs and expertise of the end-users. However, the tool is not easy to use the first time. The use of the tool could be better explained.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use Not very easy to use. The instructions about its use are available and it is recommended to read these clearly before starting to use the tool. However, once the user understands how to set-up a chain, the tool delivers what it promises. The tool is developed for a more advanced user, so the use is a bit complex, but it also delivers advanced interaction options for the user.</p> <p>How is the use of the tool explained ? There is an explanation and state the following: <i>The application has a web viewer that allows you to visualize the geographical environment of the different areas that constitute the scope of BIORAISE-CE with its basic elements of the background. These change as the scale is increased or decreased with dynamic zoom and can be activated or deactivated in the tab on the upper left. In the lower part of the screen of the viewer you can find several tabs with its legend, on maps for the different crops (triticale, thistle, sorghum and poplar) either in dry or irrigated land, base maps and calculations. The individualized information available for each actor, can be obtained by clicking on the corresponding icon.</i></p> <p><i>The calculation of resources can be started by selecting the calculations tab with the mouse. The calculation can be by circle, which allows selecting a point on the map by 'clicking' on it, or entering the coordinates of the desired point. Subsequently the cell corresponding to the calculation radius is filled in, which in BIORAISE-CE is not limited as in BIORAISE CLÁSICO (radio up to 100 km) and press on the 'Calculate' button. The calculation icon by polygons performs the same function as calculation by circle but in this case the calculation polygon that can be selected is the province or municipal term.</i></p> <p><i>All the options call for the introduction of a collection point, which is necessary in order to subsequently calculate the costs of transporting the biomass. This point can be entered by coordinates in the projection of different systems such as ETRS89, WGS84, Mercator, etc., or by</i></p>



	<p>clicking on the desired point in the viewer. If no collection point is indicated, the application defaults to the center of the selected circle or the centroid of the province or municipality. After choosing the mentioned criteria, pressing the 'calculate' button, a window appears with evaluation of resources, economic, energy and environmental costs of the crop and, transport of the biomass.</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>How can the user interact with the data ? This tool enables a user to design a chain by taking account of the detailed spatial distribution of the biomass, by letting the user select (on a map) the biomass type, the biomass collection circle and the point where a conversion installation is to be placed and to where the biomass needs to be transported. Costs for harvesting & collection, and transport are calculated. Further pre-treatment activities & costs are not addressed.</p> <p>In the results the user can interact with the results by shifting the amount per type to be included in the chain (see example view underneath). The user can also change the energy cost level and the calculations are adapted accordingly.</p> <p>What kind of search or select functions are available ? The user can select the biomass types to be presented in the maps and to be included in the chain design. After the calculations are made the user can interact with the results as described above. No new data can be added.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>The possibility to download the calculations made for a chain</p>
C5	<p>What advanced help functions are available?</p> <p>Not available</p>
C6	<p>The interaction with the tool</p> <ul style="list-style-type: none"> o requires effort and reading background (help) files <p>The tool provides valuable information but initial use is rather difficult. Although it offers a friendly user interface it does not provide the necessary guidance for the user. As the review states it, reading the user guide before using the tool is advised and this help is somewhere hidden behind the 'about' tab. Another general remark (about the tool) is when multiple layers are selected for visualization the site takes long to respond, and due to time outs, the browser prompts a "Close this window" message. This is due to system architecture overall.</p>
C7	<p>How simple or expensive is the tool in user functionalities</p>



- offers the user some functions regarding e.g. search functions or data presentatio

The can user select (on a map) the biomass type, the biomass collection circle and the point where a conversion installation is to be placed and to where the biomass needs to be transported. In the calculation results the user can interact with the results by shifting the amount per type to be included in the chain (see example view underneath). The user can also change the energy cost level and the calculations are adapted accordingly. But no real search function support available.

The screenshot shows the Bioraise web application interface. On the left, there is a map with a 'Layers legend' showing 'Forest' (Broadleaved species, Conifers, Agro-Forestry areas) and 'Agriculture'. The main area displays 'Calculation results' for 'Agricultural Biomass'. A 'Transportation fuel cost' of 1.2 €/liter is set. The results table is as follows:

Agricultural Biomass	Available resources (tDM/year)	Moisture content (% w.b.)	Available resources (tWM/year)	Ash value mean reference (% d.b.)	Energetic content (GJ/year)	Average cost of collection (€/GJ)	Average transp. cost (€/GJ)
Rainfed crops	131.46	35	202.25	6.1	2,072.27	2.64	0.48
Conifers	4,274.59	35	6,576.3	2.7	75,423.21	3.08	0.48

The screenshot shows the Bioraise web application interface with 'Forest Biomass' selected. The 'Transportation fuel cost' is 1.2 €/liter. The results table is as follows:

Forest Biomass	Available resources (tDM/year)	Moisture content (% w.b.)	Available resources (tWM/year)	Ash value mean reference (% d.b.)	Energetic content (GJ/year)	Average cost of collection (€/GJ)	Average transp. cost (€/GJ)
Rainfed crops	131.46	29	185.15	6.1	2,114.02	2.59	
Conifers	4,274.59	35	6,576.3	2.7	75,423.21	3.08	
Broadleaved species	552.79	35	850.44	3.7	9,024.56	2.95	
Mixed	300.55	35	462.38	3.2	5,104.68	2.73	
Agro-Forestry areas	11.41	20	14.26	4.3	191.57	2.73	
Shrub	357.86	80	1,789.3	3.1	3,182.45	4.35	

A 'Download results' button is visible at the bottom of the table.



5. AGRIFORVALOR

A. General	
A1	Full name and acronym of the tool.
	AGRIFORVALOR Sidestream Value Tool
A2	Home page of tool and if relevant also subpages (URL)
	http://www.agriforvalor.eu/sidestreams
	http://www.agriforvalor.eu/innovations http://www.agriforvalor.eu/downloads/
A3	A summary description of the tool including the main objective.
	AGRIFORVALOR is a HORIZON2020 Project supported by the European Commission (01.03.2016-31.08.2018). The project aims to bridge the research and innovation divide by connecting practitioners from agriculture and forestry with research, (bio-) industry, policy makers, business support organisations, innovation agencies and technology transfer intermediaries in order to valorise and exploit sidestream biomass resources from agriculture and forestry in a sustainable way. The project's findings were fed into an web tool that can be used to browse the techniques and good practices online. The tool allows filtering on country, subsector, process, technology readiness level (TRL), biomass sidestream or output (fuel, food, feed, fertiliser, fine chemical, functional material) and offers networking and marketing opportunities. See Figure 1 for screenshot of the homepage of the tool.
A4	Most recent update of the information in the tool (year)?
	2018
A5-1	Main type of users targeted?
	Biomass producers: gaining knowledge on possible ways to valorise their sidestreams, becoming partners in new value chains (Bio)Industry: raising awareness on the potential and opportunities of sidestream valorisation to produce variety of outputs, energy as well as high value outputs such as food, feed, chemicals and materials.
A5-1	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> ○ novice users ○ users with little knowledge of the topic and understanding of online tools <p>The tool is simple and easy to use. Doesn't require any prior knowledge or experience in using online tools</p>
A6	Type of tool?
	The tool provides information on techniques to valorise biomass sidestreams. This information can be used to match available sidestreams with technologies and design new value chains. For each technique, the biomass sidestream(s) used as input, the country/company in which the technique is applied/developed, the processes involved and outputs are described. Sidestreams include primary and secondary sidestreams (by-products, residues, wastes), e.g. crop residues, manure, corn stalks, straw, wood chips, saw dust, black liquor. 5 output types have been defined as 5Fs which are Fuel,



	Fertilizer, Functional materials and chemicals, Food and Feed. Furthermore, information on the the technology readiness level (TRL), capital investment, business model, profitability and type of financing are provided.
A7	Countries and/or regions that are covered by the tool.
	The tool mostly covers techniques from the EU, however there are few techniques included from outside EU (less than 4%, e.g. Japan, India).
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	The tool is developed part of the AGRIFORVALOR project with 16 partners from 6 European countries: Steinbeis 2i GmbH (DE), Institute of Technology Tralee (IE), University of Ghent (BE), Wageningen University & Research (NL), Agencia Andaluza del Conocimiento (ES), Bay Zoltan Nonprofit Ltd. for Applied Research (HU), GrowAbric (BE), Agrifood cooperatives of Andalusia (ES), Association of Enterprises of Forest and Landscape in Andalusia (ES), Gabinete de Iniciativas Europeas (ES), Agriculture and food development authority (IE), Irish Farmers Association (IE), Irish Business and Enterprise Confederation (IE), National Agricultural Research and Innovation Centre (HU), Lavina Foundation for agricultural innovation (HU) and Pilze – Nagy (HU).
A9	Types of biomass covered?
	Types of biomass covered by the tool: - Agricultural residues - Forest residues - Waste streams (e.g. manure, sewage sludge, bio-waste, paper sludge, animal waste from slaughterhouse, agro-food industry wastes, forestry industry wastes)
A10	Types of biomass conversion covered?
	All output types are covered: Food, Feed, Biochemicals, Biomaterials, Biofuels, Bioenergy and Fertilisers
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information
	<p>Biomass supply information:</p> <ul style="list-style-type: none"> - Many biomass types are covered (>5) - see above for the list - No quantitate information on biomass availability is provided - No biomass potential figures are provided - No supply data is provided - No information provided on the long-term availability of the biomass <p>Within the AGRIFORVALOR project reports brief information is provided on the current availability of sidestreams for the three Biomass Innovation Design Hub locations of Spain (Andalusia), Hungary and Ireland.</p> <p>Biomass cost information:</p> <ul style="list-style-type: none"> - No biomass cost information is available - No metadata is available on biomass cost-supply data <p>Biomass characteristics (quality & composition) information:</p> <ul style="list-style-type: none"> - No biomass quality & composition data is provided



B2	Information on logistics: Spatially specific assessment options for logistics
	Information on logistics: No information on harvesting, collection and storage. For some technologies the type of pretreatment is indicated. Spatially specific assessment options for logistics: No spatially specific assessment options for logistics are available
B3	IMARKETS: Biomass market information: Biobased product market information:
	Market information is not available in the tool. Within the AGRIFORVALOR project reports brief information is provided on the current use of sidestreams for the three Biomass Innovation Design Hub locations of Spain (Andalusia), Hungary and Ireland.
B4	Good practice examples of biomass conversion technologies. Good practice examples / success stories are provided within the AGRIFORVALOR project. They were identified according to economic feasibility, environmental benefits, collaboration of multiple stakeholders and access to innovative funding. All biobased industries yielding range of outputs is considered: Food, Feed, Biochemicals, Biomaterials, Biofuels, Bioenergy and Fertilisers. The tool covers range of techniques at different TRL levels ranging from TRL 3 (Experimental proof of concept) to Best practice. Out of the total 117 techniques present in the tool, 33 are Best practice and 21 at TRL 9 (proven in operational environment). All of the valorisation techniques are focused on valorising wastes and residues, so form examples for close to zero waste initiatives.
B5	Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.
	Not available
B6	Information on options for finances/investors/subsidies: An indicative information is provided for the investment cost of the techniques with the following ranges: < 0.5 million EUR, 0.5-1 million Eur, 1-5 million Eur and >5 million Eur. An indicative information is provided for the return on investment. Whether the techniques have perspectives to be profitable in the future is indicated with the following in the tool: Yes, No, Break-even or Unknown. Furthermore, information can be provided on the most important factors determining the profitability of the technique. The type of funding for the project is also indicated with the following in the tool: Private, Public or Both. No information provided regarding funding programmes or support measures.
B7	Information on GHG emissions/LCAs and other sustainability aspects:



	No sustainability assessment of the techniques is provided. There is a section where the impact of the technique is written which can include benefits to the environment such as reduction of GHG emissions, reduction of waste, reduction of water use, soil improvement, substitution of fossil sources, etc. But no quantitative information is provided.
C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>The objective of the tool according to the tool developers is to facilitate sidestream valorisation, achieve new value chains, stimulate conversion into value-added products, learn from good practice cases to reach higher TRL and overcome valley of death. According to the developers the target users of the tool are:</p> <ol style="list-style-type: none"> 1. Farmers/Foresters: gaining knowledge on possible ways to valorise their sidestreams, becoming partners in new value chains 2. (Bio)Industry: raising awareness on the potential and opportunities of sidestream valorisation to produce variety of outputs, energy as well as high value outputs such as food, feed, chemicals and materials. 3. Researchers: gain information in order to better direct research and development and close the divide between research and practice. <p>The design of the tool match completely with the expected needs and expertise of the end-users. The tool is easy to use, simple and provides relevant information for the users. The users can browse through the techniques online.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use ? The tool is part of a EU project AGRIFORVALOR. It is not immediately visible in the project's website where to locate the tool. It is indicated with "Sidestreams" on the website, but would be better to write it as "Sidestream Value Tool" to easily recognize that it refers to the tool. The tool itself is simple, the interface is clear and easy to use by any user from any background.</p> <p>How is the use of the tool explained ? I have not seen any document explaining how to use the tool. But it is a simple, easy to use tool probably not necessary to have a manual.</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>How can the user interact with the data ? No possibility to change or add to existing information on a technique profile (see Figure 2). For registered users (registration is free of charge), it is possible to add a new biomass sidestream valorisation technique to the list. This</p>



	<p>is done with the Add Sidestream button. The sheet to fill in the necessary information is shown in Figure 3. For each tab information is provided by moving the mouse on the “i” icon to what should be entered there.</p> <p>What kind of search or select functions are available ? Search functions are available (see Figure 1). It is possible to search keywords in the title of the profiles. It is also possible to filter the 117 biomass sidestream valorisation technique profiles based on: Country, Type of Sidestream, Type of Subsector (Agriculture, Forestry, Agroforestry), Type of Process, Type of Output (Food, Feed, Fuel, Fertilizer, Fine chemical, Functional material) and TRL.</p>
C4	<p>What advanced functionalities are available? (<i>e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool</i>)</p> <p>Not available</p>
C5	<p>What advanced help functions are available?</p> <p>Not available</p>
C6	<p><i>The interaction with the tool</i></p> <ul style="list-style-type: none"> o is intuitive and simple <p>Disadvantage: No manual providing explanation to the tool. The list of options the user can choose from on the search page is very confusing, as there is many overlapping options in most of the drop down lists</p> <p>Enhance: Very simple to use by anyone</p>
C7	<p><i>How simple or expensive is the tool in user functionalities</i></p> <ul style="list-style-type: none"> - offers the user some functions regarding e.g. search functions or data presentation <p>It is possible to filter the biomass sidestream valorisation technique profiles based on: Country, Type of Sidestream, Type of Subsector (Agriculture, Forestry, Agroforestry), Type of Process, Type of Output (Food, Feed, Fuel, Fertilizer, Fine chemical, Functional material) and TRL.</p>



AGRI FOR VALOR

Sidestreams

High potential waste, by-products and residues from primary and secondary agriculture and forestry biomass resources

Filter

Search Add Sidestream

Search function is limited to keywords in the title of the profiles

Country: Any Country | Sidestreams: Any Input | Subsector: Any Subsector

Process: Any Process | Outputs: Any output | TRL: TRL 1 - Best Practice

Total 117 sidestreams found

- Biochar from ag...**
TRL: ★★★★★★ (TRL 7)
Subsector: Agriculture
Sidestreams: Rushes, Rhododendron, brash.
Ireland
- Engineered Wood...**
TRL: ★★★ (TRL 4)
Subsector: Forestry
Sidestreams: C16 timber
Ireland
- Ecological Bui...**
TRL: ★★★★★★ (TRL 8)
Subsector: Agroforestry
Sidestreams: Materials used include wood pulp, hemp fibres, sheeps wool, etc...etc...
Ireland
- MEDITE TRICOYA**
TRL: ★★★★★★ (TRL 9)
Subsector: Forestry
Sidestreams: Woodchip, pulpwood
Ireland

Figure 1. Screenshot of the homepage AGRIFORVALOR Sidestream Value Tool, <http://www.agriforvalor.eu/sidestreams>





Biochar from agricultural sidestreams



- About
- Partners
- Contact
- News
- Events
- Sidestreams
- Innovation Design
- Downloads
- Videos

Select Language ▼
 Powered by Google Translate

Welcome Iris

- Settings
- Users
- Users Map
- Messages
- Documents
- Logout

LATEST TWEET
[Join the Conversation](#)

LET'S BE FRIENDS!
 For weekly finds, community recommendations, and more, like us on Facebook.
[Join the Community](#)

Subsector: Agriculture	Academia: UCD
Company: Irish BioChar Co-Operative	Contact Person: Bernard Carey
Operational Status: ★★★★★ (TRL 7)	Country: Ireland
Into Service: 2018	Budget: 0,5 to 1 Million EUR
Website Link: www.pluschar.ie	Publications Link:

Extra Information: The Irish BioChar Co-Operative has successfully been awarded EIP funding by the Department of Agriculture to produce biochar from rushes and other materials of little agricultural use.

Sidestreams: Rushes, Rhododendron, brash.

Business Model: Collection of low value material and conversion into biochar	Return on Investment: Yes
Financing: Public	Return on Investment: N/A

Processes

Step	Process	Characteristics	Impact
1	Amalgamation of Biomass feedstock	Low value material of sufficient quantities	Utilisation of undervalued resource.
2	Process into biochar	High temperature treatment in anaerobic conditions	Excess heat can be used for alternative uses.
3	Usage	Biochar can be used for a variety of applications including land remediation, filtration and animal feed	Increased utilisation of farm nutrients.

Outputs

Step	Output	Quantities
1	Biochar	The resulting material can be used for land improvement, carbon sequestering into soil, filtration of water or as an animal feed supplement.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 696394.

Imprint

Powered by : [GrowAbric](#)

Figure 2. Screenshot of one of the 117 biomass sidestream valorisation research techniques within the AGRI-FORVALOR Sidestream Value Tool (Biochar from agricultural sidestreams)



AGRI FOR VALOR

Add SideStream

Name **R&D / Academia**

Company name **Contact Person**

Operational Status **Country** **Into Service Since**

Image **Budget/Investment** **Subsector**

Website Link **Publications Link**

Extra Information

Sidestreams

Business Model

Return on Investment

Financing

Return on Investment

Add Process Steps

Step #	Process	Characteristics	Impact
1	<input type="text"/>	<input type="text"/>	<input type="text"/>

Add Outputs

No.	Output	Quantities
1	<input type="text"/>	<input type="text"/>

Add SideStream

Welcome Iris

- Settings
- Users
- Users Map
- Messages
- Documents
- Logout

LATEST TWEET

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Figure 3. Screenshot of the Add SideStream option of the AGRIFORVALOR Sidestream Value Tool



2. ESCSS-SAT

A. General	
A1	Full name and acronym of the tool.
A2	Home page of tool and if relevant also subpages (URL)
A3	A summary description of the tool including the main objective.
A4	Most recent update of the information in the tool (year)?
A5-1	Main type of users targeted?
A5-1	Experience of users most suitable to use the tool
A6	Type of tool?
A7	Countries and/or regions that are covered by the tool.
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
A9	Types of biomass covered?
	Types of biomass covered by the tool: - Agricultural residues - Forest residues - Waste streams (e.g. manure, sewage sludge, bio-waste, paper sludge, animal waste from slaughterhouse, agro-food industry wastes, forestry industry wastes)
A10	Types of biomass conversion covered?
	All output types are covered: Food, Feed, Biochemicals, Biomaterials, Biofuels, Bioenergy and Fertilisers
B. Content of the tools	



B1	Biomass supply information/Biomass cost information/Metadata given?/ omass characteristics (quality & composition) information	Bi-
	<p>Biomass supply information:</p> <ul style="list-style-type: none"> - Many biomass types are covered (>5) - see above for the list - No quantitate information on biomass availability is provided - No biomass potential figures are provided - No supply data is provided - No information provided on the long-term availability of the biomass <p>Within the AGRIFORVALOR project reports brief information is provided on the current availability of sidestreams for the three Biomass Innovation Design Hub locations of Spain (Andalusia), Hungary and Ireland.</p> <p>Biomass cost information:</p> <ul style="list-style-type: none"> - No biomass cost information is available - No metadata is available on biomass cost-supply data <p>Biomass characteristics (quality & composition) information:</p> <ul style="list-style-type: none"> - No biomass quality & composition data is provided 	
B2	Information on logistics: Spatially specific assessment options for logistics	
	<p>Information on logistics:</p> <p>No information on harvesting, collection and storage. For some technologies the type of pretreatment is indicated.</p> <p>Spatially specific assessment options for logistics:</p> <p>No spatially specific assessment options for logistics are available</p>	
B3	IMARKETS: Biomass market information: Biobased product market information:	
	<p>Market information is not available in the tool.</p> <p>Within the AGRIFORVALOR project reports brief information is provided on the current use of sidestreams for the three Biomass Innovation Design Hub locations of Spain (Andalusia), Hungary and Ireland.</p>	
B4	Good practice examples of biomass conversion technologies.	
	<p>Good practice examples / success stories are provided within the AGRIFORVALOR project. They were identified according to economic feasibility, environmental benefits, collaboration of multiple stakeholders and access to innovative funding. All biobased industries yielding range of outputs is considered: Food, Feed, Biochemicals, Biomaterials, Biofuels, Bioenergy and Fertilisers. The tool covers range of techniques at different TRL levels ranging from TRL 3 (Experimental proof of concept) to Best practice. Out of the total 117 techniques present in the tool, 33 are Best practice and 21 at TRL 9 (proven in operational environment). All of the valorisation techniques are focused on valorising wastes and residues, so form examples for close to zero waste initiatives.</p>	
B5	Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.	
	Not available	



B6	<p>Information on options for finances/investors/subsidies:</p> <p>An indicative information is provided for the investment cost of the techniques with the following ranges: < 0.5 million EUR, 0.5-1 million Eur, 1-5 million Eur and >5 million Eur.</p> <p>An indicative information is provided for the return on investment. Whether the techniques have perspectives to be profitable in the future is indicated with the following in the tool: Yes, No, Break-even or Unknown. Furthermore, information can be provided on the most important factors determining the profitability of the technique.</p> <p>The type of funding for the project is also indicated with the following in the tool: Private, Public or Both.</p> <p>No information provided regarding funding programmes or support measures.</p>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <p>No sustainability assessment of the techniques is provided. There is a section where the impact of the technique is written which can include benefits to the environment such as reduction of GHG emissions, reduction of waste, reduction of water use, soil improvement, substitution of fossil sources, etc. But no quantitative information is provided.</p>
<p>C. Usability of the tool/interaction with the user/user friendliness</p>	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>The objective of the tool according to the tool developers is to facilitate sidestream valorisation, achieve new value chains, stimulate conversion into value-added products, learn from good practice cases to reach higher TRL and overcome valley of death. According to the developers the target users of the tool are:</p> <ol style="list-style-type: none"> 4. Farmers/Foresters: gaining knowledge on possible ways to valorise their sidestreams, becoming partners in new value chains 5. (Bio)Industry: raising awareness on the potential and opportunities of sidestream valorisation to produce variety of outputs, energy as well as high value outputs such as food, feed, chemicals and materials. 6. Researchers: gain information in order to better direct research and development and close the divide between research and practice. <p>The design of the tool match completely with the expected needs and expertise of the end-users. The tool is easy to use, simple and provides relevant information for the users. The users can browse through the techniques online.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use ? The tool is part of a EU project AGRIFORVALOR. It is not immediately visible in the project's website where to locate the tool. It is indicated with "Sidestreams" on the website, but would be better to write it as "Sidestream Value Tool" to easily</p>



	<p>recognize that it refers to the tool. The tool itself is simple, the interface is clear and easy to use by any user from any background.</p> <p>How is the use of the tool explained ? I have not seen any document explaining how to use the tool. But it is a simple, easy to use tool probably not necessary to have a manual.</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>How can the user interact with the data ? No possibility to change or add to existing information on a technique profile (see Figure 2). For registered users (registration is free of charge), it is possible to add a new biomass sidestream valorisation technique to the list. This is done with the Add Sidestream button. The sheet to fill in the necessary information is shown in Figure 3. For each tab information is provided by moving the mouse on the “i” icon to what should be entered there.</p> <p>What kind of search or select functions are available ? Search functions are available (see Figure 1). It is possible to search keywords in the title of the profiles. It is also possible to filter the 117 biomass sidestream valorisation technique profiles based on: Country, Type of Sidestream, Type of Subsector (Agriculture, Forestry, Agroforestry), Type of Process, Type of Output (Food, Feed, Fuel, Fertilizer, Fine chemical, Functional material) and TRL.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>Not available</p>
C5	<p>What advanced help functions are available?</p> <p>Not available</p>
C6	<p>The interaction with the tool</p> <ul style="list-style-type: none"> o is intuitive and simple <p>Disadvantage: No manual providing explanation to the tool. The list of options the user can choose from on the search page is very confusing, as there is many overlapping options in most of the drop down lists</p> <p>Enhance: Very simple to use by anyone</p>
C7	<p>How simple or expensive is the tool in user functionalities</p> <ul style="list-style-type: none"> - offers the user some functions regarding e.g. search functions or data presentation <p>It is possible to filter the biomass sidestream valorisation technique profiles based on: Country, Type of Sidestream, Type of Subsector (Agriculture, Forestry, Agroforestry), Type of Process, Type of Output (Food, Feed, Fuel, Fertilizer, Fine chemical, Functional material) and TRL.</p>





6. DataM

A. General	
A1	Full name and acronym of the tool.
	Data portal of agro-economics research – DataM Estimates on the economic analysis of agriculture and sustainable resources
A2	Home page of tool and if relevant also subpages (URL)
	http://datam.jrc.ec.europa.eu In 'Bioeconomy' section: <ul style="list-style-type: none"> • Biomass uses and flows: https://datam.jrc.ec.europa.eu/datam/mashup/BIOMASS_FLOWS/index.html • BioSAMs EU Member States – 2010: https://datam.jrc.ec.europa.eu/datam/mashup/BIOSAMS_EU_2010/index.html • Jobs and wealth in the EU bioeconomy / JRC- Bioeconomics: https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html • Biomass estimates: https://datam.jrc.ec.europa.eu/datam/public/pages/previousFilters.xhtml?dataset=jrc-datam-biomass-estimates
A3	A summary description of the tool including the main objective.
	<p>This tool provides access to the data underlying the scientific production of the European Commission and partners about the economics aspects of agriculture, bioeconomy, climate change, food and nutrition security and related sustainability. Data of this portal consists mainly in models' outcomes and estimates. These can be outlooks about future scenarios as well as calculations concerning the past to overcome the lack of official statistical data. The general recommendation for future data is to look to differences between different scenarios rather than to the absolute value as such.</p> <p>DataM is not a site of official statistical data, it contains modelling data and estimates about the economics of agriculture and of the sustainable resources, resulting from scientific activities performed by the European Commission (in most cases by the Joint Research Centre - JRC) and partners. These contents are provided in the form of dashboards or raw datasets.</p> <p>The content of the main page is grouped in topics, one of these is Bioeconomy, which contains the following subtopics:</p> <ul style="list-style-type: none"> • Biomass uses and flows: Harmonised data and interactive Sankey diagram on biomass supply, uses and flows in the EU, compiled by the JRC. (The dataset stores harmonised data on biomass supply, uses and flows in the EU compiled by the JRC Units contributing to the Biomass assessment study. This dataset mirrors the interactive Sankey biomass diagram that represents the flows of biomass for each sector of the bioeconomy,



	<p>from supply to uses including trade. The diagram enables deeper analysis and comparison of the different countries and sectors across a defined time series.)</p> <ul style="list-style-type: none"> • BioSAMs EU Member States – 2010: EU Member States' Social Accounting Matrices 2010, with a detailed disaggregation of the bio-economy. Estimated by JRC (2018) • Jobs and wealth in the EU bioeconomy / JRC- Bioeconomics: Dataset that quantifies employment, value added, and turnover in the EU bioeconomy. (The JRC - Bioeconomics dataset has been elaborated jointly by JRC and the Nova-Institute. This database quantifies employment, value added and turnover in the Bioeconomy and in bioeconomy sectors. The geographical scope of this database is the EU and the 28 EU Member states. Data are available from 2008 to 2015.) • Biomass estimates: The database estimates for production and residues of agricultural biomass in EU. Dataset produced in a study of 2015. (It has been elaborated jointly by JRC and the Nova-Institute. The indicators estimated are the harvested biomass, the amount of agricultural residues with a distinction between used and non-used residues, the domestic extraction used (DEU), the Harvested area and the Yield of the domestic extraction used. The domestic extraction used (DEU) refers to the sum of the harvested biomass and used residues. All indicators are expressed in tonnes of fresh and dry matter. The scope of this database is all agricultural commodities, for each of the 28 EU Member states. Data are available from 1991 to 2013.) <p>Note: This is not the type of tool Power4Bio T2.3 is looking for but more like a database, however, the biomass flow diagrams can be useful.</p>
A4	Most recent update of the information in the tool (year)?
	in the “Biomass uses and flows” subtopic: 15/02/2019; other subtopics: 2018
A5-1	Main type of users targeted?
	<ul style="list-style-type: none"> ○ policy makers, exploring options for a region new to bioeconomy; ○ consultants/scientist/advisors, searching for specific information on a wide number of issues e.g. availability, costs, regulations, and calculation tools; <p>Other users might not have enough knowledge to interpret the data provided by the tool.</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> ○ users with some knowledge of the topic and understanding of online tools ○ advanced users <p>many data collected in one system</p> <p>no basic explanations are available here</p>



	functionalities listed at C4 are useful but not intended for beginners
A6	Type of tool?
	- <u>Data/information mobilisation</u> - <u>Other</u> : models' outcomes and estimates, data flows
A7	Countries and/or regions that are covered by the tool.
	EU Member States
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	By clicking "Info" button under the subtopics on the main page (see A2), a new window is opened where all relevant information about the subtopic is shown (general info, temporal coverage, spatial coverage, contact point etc.), so is Contributors' list. DataM contains modelling data and estimates about the economics of agriculture and of the sustainable resources, resulting from scientific activities performed by the European Commission (in most cases by the Joint Research Centre - JRC) and partners
A9	Types of biomass covered?
	- Agricultural residues - Forest residues - Dedicated crops - Waste streams
A10	Types of biomass conversion covered?
	- Food - Feed - Biochemicals - Biomaterials - Biofuels - Bioenergy All these biomass uses are covered by "Biomass uses and flows" (see figure underneath). The "Jobs and wealth" database quantifies employment, value added and turnover in the Bioeconomy and in bioeconomy sectors, namely agriculture, forestry, fishing, the manufacture of food, beverage and tobacco, the manufacture of bio-based textile, the manufacture of wood and wood products, the manufacture of paper, the manufacture of bio-based chemicals, the manufacture of bio-based pharmaceuticals, the manufacture of bioplastics, the manufacture of liquid biofuels and the production of bioelectricity.



B. Content of the tools

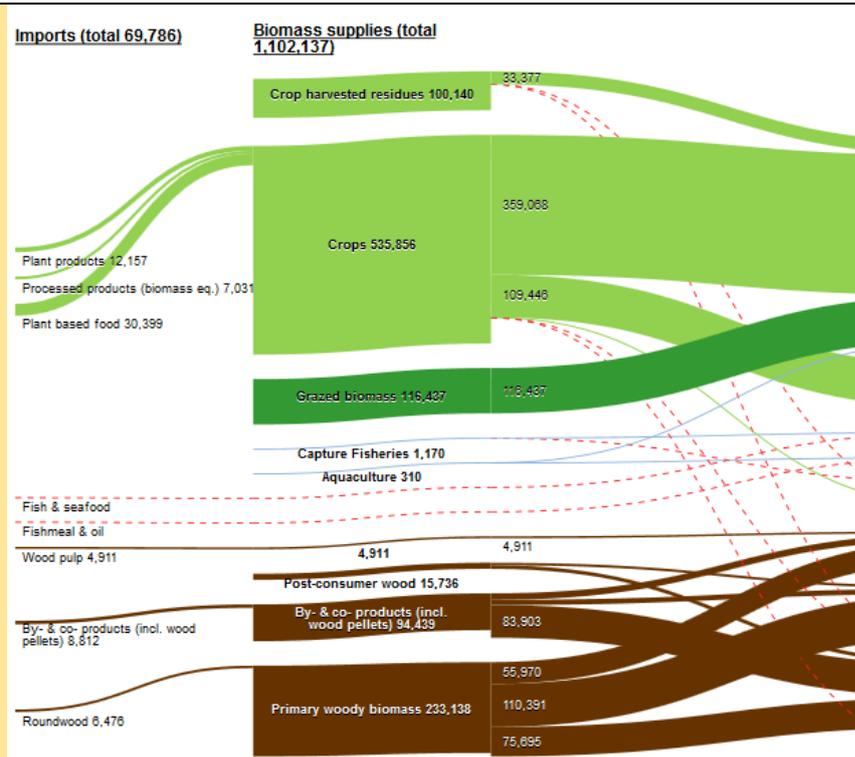
B1 Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information

Biomass supply information:

Both “Biomass uses and flows” and “Biomass estimates” subtopics provide detailed information on the types of biomass covered by the database.

At “Biomass estimates”, agricultural commodities can be set to check their productions on country or EU 13/15/27/28 level.

On the diagrams of “Biomass uses and flows”, the amount of biomass supplies/uses/exports/imports are depicted for all types of biomass:



Biomass cost information:

(The tool does not provide information on this.)

Metadata given?

Links to reports and studies that have sourced the data to be displayed in the tool.

Biomass characteristics (quality & composition) information:

The tool does not provide information on this.

B2

Information on logistics:

Spatially specific assessment options for logistics

Information on logistics:

(The tool does not provide information on this.)

Spatially specific assessment options for logistics available like:

(The tool does not provide information on this.)

B3

IMARKETS:

Biomass market information:

Biobased product market information:

MARKETS:

Biomass market information:

In the tool access is provided to several types of information and data related to markets.

- 1) A simplified balance sheet to estimate apparent consumption of meat, crops and dairy products at Member State level. It combines trade data from Eurostat COMEXT database and DG AGRI's short-term outlook for EU agricultural markets to provide historic data on agricultural production, trade and an estimate of apparent use. DG AGRI, in the Short-term outlook,



	<p>prepares regularly EU balance sheets for the main agricultural commodities, as well as production, area and yield figures at Member State level, but an estimate of Member States annual consumption was missing, since Eurostat stopped collecting and publishing balance sheets. This dataset fills partially the gap with a rough estimate of apparent use, without detailing the different uses (food, feed, processing), losses or changes in stocks. This apparent use cannot be taken at face value as the consumption level, also because the calculation relies on trade statistics between EU Member States which are less reliable than extra-EU trade figures. The dataset is updated 3 times per year, at every new release of the DG AGRI Short-term outlook. The dataset is accompanied by an interactive dashboard, which allows a wide exploration of data. A set of graphs and charts is displayed according to countries, years and products selected by the user. The tool is not only thought to provide average trends, but also to answer specific ad hoc questions on a particular Member State.</p> <p>2) Also in the flow (sankey) diagrams information is presented on biomass uses and these represent indirectly the markets uses. For example in the tool agricultural commodities can be set to check their productions on country or EU 13/15/27/28 level.</p> <p>Biobased product market information: biobased products are only identified in the flow charts</p> <p>However throuh DataM there is a relevant link to the Knowledge Centra for Bioeconomy. On this site many relevant links are given to new research outcomes and databases. Also LCAs for different bioeconomy chains.</p>
B4	<p>Good practice examples of biomass conversion technologies.</p> <p>No information provided</p>
B5	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p> <p>No information on policies, regulations, visions is provided in the tool.</p>
B6	<p>Information on options for finances/investors/subsidies:</p> <p>No information on finances, investors, subsidies given.</p>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <p>No information on this in DataM. However throuh DataM there is a relevant link to the Knowledge Centra for Bioeconomy. On this site many relevant links are given to new research outcomes and databases. Also LCAs for different bioeconomy chains.</p>



C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers? (Match with main user groups in this characterisation: 1. policy makers, looking for high level information and case studies; 2. consultants/scientists, requiring accurate and detailed information on several aspects of the biomass chain; 3. industry, same as the consultant/scientist plus calculations, adding own data). To what extent does the design of the tool match the expected needs and expertise of the end-user? (For example, is the explanation of the tool easy to understand or complex, is the vocabulary simple/technical; is the information relevant and understandable for the user)</p> <p>see A3 and A5</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use? (e.g. intuitive, consistent, well-ordered, ...) How is the use of the tool explained? (e.g. manual, course, context-sensitive help ...)</p> <p>The tool is easy to use (attractive dashboard) and the results given are very attractive. “Jobs and Wealth” subtopic has a detailed user guide document: https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/resources/pdf/User%20guide_Bioeconomy.pdf There other subtopics have no manual but the brief explanations make it very clear.</p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p style="margin: 0;">Dimensions</p> <p style="margin: 0; text-align: center;"> ▼ Country - (1 element selected) </p> <p style="font-size: 0.8em; margin: 5px 0 0 0;">If you have a file with a list of elements, you can directly select all of them through this tool. This functionality is very useful if the list of elements is long. You can also filter the list on the element names as well as on other properties of the element (e.g. code).</p> <p style="font-size: 0.8em; margin: 0 0 0 20px;">Hold the Ctrl key to select additional elements. Hold the Shift key to select adjacent elements. If you have the list...</p> </div>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>How can the user interact with the data? (e.g. possibility to change or add data, change default values)</p>



(There is no possibility to add or change the data in the database.)

What kind of search or select functions are available? (e.g., text search/select, picklists, geographic search/select)

“Biomass uses and flows”: The following options can be set to make the diagram specific to the relevant parameters:

Biomass flows

Country: Year: Measure:

Biomass balances in European Un
1000 T of dry matt

“Biomass estimates”: Different types of filters can be established for the different dimensions and time series. On the page where the data are shown according to the dimensions set, the user can navigate through the pages, sort and filter data by column. The columns can be added or hidden.

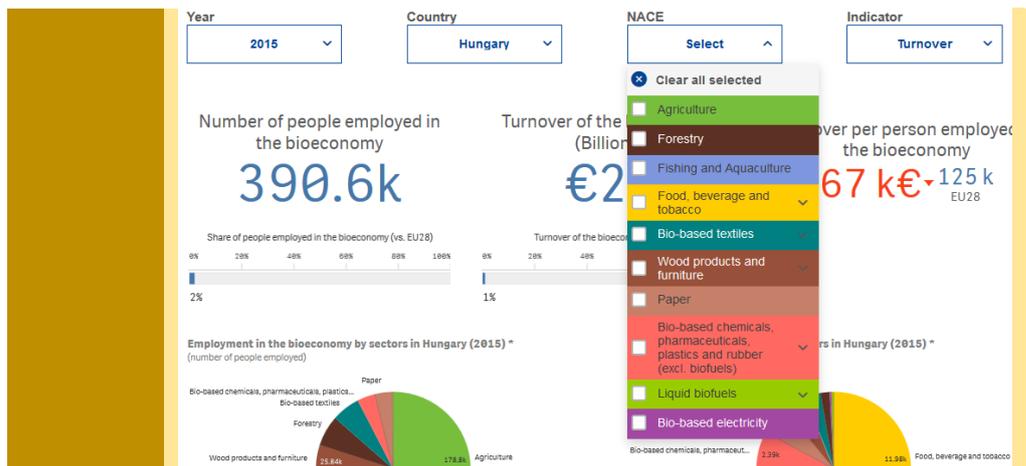
JRC - Biomass estimates — Query

Filters
Please establish the filters for the different dimensions and time series. It is

Dimensions

- Country - (1 element selected)
- Commodity - (1 element selected)
- Attribute - (1 element selected)
- Version - (All elements selected)
- Unit - (All elements selected)
- Year - (All years selected)

“Jobs and wealth”: The following options can be set to make the data sets specific to the relevant parameters:



The final user can select from the database criteria to obtain a more adjusted results to its needs. The tool provides a Query possibility in the most of the sections.

C4	What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)
	<p>Data is presented in terms of raw datasets ready to download, and as interactive dashboards or infographics for the self-analysis of data.</p> <p>“Biomass uses and flows”: interactive Sankey diagrams which can be saved in PNG format</p> <p>“Biomass estimates”: The user can navigate through the pages, sort and filter data by column, and download data in a CSV (Comma-Separated Values) file, which is a very simple format to be used with any spreadsheet software.</p>
C5	What advanced help functions are available?
	Not available
C6	The interaction with the tool
	<ul style="list-style-type: none"> ○ requires some effort but is easy to learn or well explained
C7	How simple or expensive is the tool in user functionalities
	<ul style="list-style-type: none"> ○ is very extensive and offers the user many options for e.g. data input and presentation



7. BioEsoil

A. General	
A1	Full name and acronym of the tool.
	BionEsoil
A2	Home page of tool and if relevant also subpages (URL)
	https://www.wur.nl/en/Research-Results/Research-Institutes/Environmental-Research/Facilities-Products/Software-and-models/BioE-Soil.htm
A3	A summary description of the tool including the main objective.
	<p>The removal of biomass from soil has an impact on soil organic matter content.</p> <p>The more biomass is produced the less can be returned to the soil to maintain the previous soil quality levels. The BioESoil is the assessment tool with two main objective</p> <ul style="list-style-type: none">- to estimate the impact of bio-energy production on soil organic matter,- and to raise awareness for nutrient recovery in bio-energy production. <p>The tool can be used with Microsoft Excel and contains default parameters for soil type, crops, cropping system and conversion technologies. Additionally, there is a user add-in option for new parameters or characteristics.</p> <p>The estimation of nutrient losses and recovery is based on default or user-given values using a nutrient mass balance approach. The quality of soil organic matter contents is calculated with the RothC organic carbon model.</p> <p>The results of the tool include the amount and type of energy produced, percentage of the nutrients in feedstocks and residues recovered, the potential nutrient return to the field in comparison with to nutrient inputs from fertilisation. Finally, the tool presents the predicted development of the soil organic matter content.</p> <p>An adequate soil organic matter content will improve the water holding capacity of the soil, increase the nutrient retention and prevent nutrient leaching, and it can stabilise soils to prevent losses through erosion. Use residues from bio-energy production, like digestate, can help to maintain soil organic contents while the use of cropping residues for bio-energy prevents return of organic material to the soil.</p>
A4	Most recent update of the information in the tool (year)?
	2014
A5-1	Main type of users targeted?



	<ol style="list-style-type: none"> 1. farmers and biomass producers; 2. consultants and scientists requiring accurate and detailed information on impact of bio-energy production on soil quality and soil organic matter; 3. 3. NGOs, searching to raise awareness about nutrients recovery in bio-production process; 4. Policy-makers. <p>The tool is explicitly designed for biomass producers and consultants or scientists to evaluate the impact of bio-production on soil quality. BioE-Soil is a calculation tool that is most beneficial to those two target groups because they possess the input knowledge for the tool.</p>
A5-2	<p>Experience of users most suitable to use the tool</p> <ul style="list-style-type: none"> o users with some knowledge of the topic and understanding of online tools o advanced users <p>The users should have a previous knowledge of soil and crops characteristics, the information about organic residues and also nutrients input. All this information is filled up by the users.</p>
A6	<p>Type of tool?</p> <p>Assessment tool</p>
A7	<p>Countries and/or regions that are covered by the tool.</p> <p>Not specified by country, but the default values in the tool relate to NL situation</p>
A8	<p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.</p> <p>Wageningen Environmental Research and CLM</p>
A9	<p>Types of biomass covered?</p> <ul style="list-style-type: none"> - Agricultural residues - Dedicated crops
A10	<p>Types of biomass conversion covered?</p> <ul style="list-style-type: none"> - Bioenergy. BioEsoil estimates the impact of various bioenergy production systems, such as anaerobic digestion, bioethanol, vegetable oil, gasification and combustion.
B. Content of the tools	
B1	<p>Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information</p> <p>Biomass supply information:</p> <ul style="list-style-type: none"> - Types of biomass covered: not specified - number of biomass types: not specified - biomass is expressed in GJ/ton



	<p>Biomass cost information: - Not specified</p> <p>Metadata given? - metadata on biomass cost-supply input is not given</p> <p>Biomass characteristics (quality & composition) information: - N, P, K content</p>
B2	<p>Information on logistics: Spatially specific assessment options for logistics</p>
	<p>Information on logistics: - None</p> <p>Spatially specific assessment options for logistics available like: - how can the user identify the collection area from where biomass can be sourced? - how does the tool help the user to understand what collection cost/collection activities are needed? - how much biomass can be sourced to a point?</p>
B3	<p>IMARKETS: Biomass market information: Biobased product market information:</p>
	<p>Biomass market information: - Local market demand & uses of biomass - Local market demands for biomass for exports to other regions/countries - Demand of existing biobased activities - Demand for biomass of planned biobased activities - Information on biomass flows (including exports and imports of biomass and/or biobased products?). Biobased product market information: - Volume of biobased products produced and purchased in the region</p>
B4	<p>Good practice examples of biomass conversion technologies.</p>
	<p>- Information on number & type of biobased industries present. - Existence of demonstration (flagship) technologies/biorefineries projects - Examples of close to zero waste initiatives</p>
B5	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p>
	<p>The certification schemes as ISO 13065, NTA8080, Round Table for Sustainable Palm Oil are based on sustainability criteria which also includes soil quality. Therefore, the BioESoil can assist these certification schemes.</p>
B6	<p>Information on options for finances/investors/subsidies:</p>
	<p>No information on finances, investors, subsidies given.</p>



B7	Information on GHG emissions/LCAs and other sustainability aspects: Each feedstock or residue is assigned nutrient and organic carbon contents. The tool assesses the losses and recovery of nutrients and organic carbon through mass balance approach. The changes in soil organic matter is calculated using the RothC model and expressed in C/ha.
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers? What are the objectives of the tool, according to the tool developers? <ul style="list-style-type: none">- to estimate the impact of bio-energy production on soil organic matter,- and to raise awareness for nutrient recovery in bio-energy production. Who are the target users of the tool, according to the developers? <ol style="list-style-type: none">5. farmers and biomass producers;6. consultants and scientists requiring accurate and detailed information on impact of bio-energy production on soil quality and soil organic matter;7. 3. NGOs, searching to raise awareness about nutrients recovery in bio-production process;8. Policy-makers. <p>The tool has a user-friendly design together with a comprehensive manual to implement it. BioESoil can serve as an aid for certification of biomass and bio-energy within the framework of sustainability criteria. Therefore, it can assist the policy-maker, bio-producers and NGOs in both nutrient and soil assessment within bio-energy production system.</p>
C2	Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help) The tool is to be used with Microsoft Excel 2007 and later versions. The interface is clear and user-friendly although it takes a bit of time and previous knowledge to understand the tool but then, the interface is not difficult to navigate. There are two possible problems: 1) it's only for computers with Windows OS, which is inconvenient for other users. 2) Even if the interface is easy, the users should have a previous knowledge to make use of the tool. The manuel contains four sections: <ul style="list-style-type: none">• General Information: users contact details, etc• Field and Crop section: soil location and properties, selection of crops or crop residual products, cropping systems, fertilizer



	<p>application, rotation system for crops as well as meteorological data of the location.</p> <ul style="list-style-type: none"> • Bio Energy section: information related to the conversion of feedstocks and residues to bio-energy, selection of conversion technologies, number of residues, total energy production in GJ/ton, composition of feedstock, composition of conversion residues, return of conversion residues to the field, etc. • Results: based on the data from the previous sections, the tool estimates the losses and potential nutrient return, as well as the development of the soil organic matter content. The results are presented in tables and graphs. <p>How is the use of the tool explained? Manual https://www.wur.nl/upload_mm/5/c/e/0b7fdda3-1deb-4eed-9e67-dc2aace480de_BioESoil-Manual.pdf</p>
C3	<p>How can the user interact with the data ? <i>(e.g. possibility to change or add data, change default values)</i> What kind of search or select functions are available ? <i>(e.g., text search/select, picklists, geographic search/select)</i></p> <p>How can the user interact with the data? The tool contains default parameters for soil, crops and conversion technologies. Yet, the user can change or add his/her own parameters. The nutrient losses and potential recovery are calculated from the default or user-defined values.</p> <p>What kind of search or select functions are available? <i>(e.g., text search/select, picklists, geographic search/select)</i></p> <p>The selection of functions:</p> <ul style="list-style-type: none"> - geographic search for climate information and meteorological data <p>The selection of parameters:</p> <ul style="list-style-type: none"> - Soil characteristics - Crops - cropping system (permanent crops, annual crops (rotation), permanent crop with intercropping of annual crops) - conversion technologies
C4	<p>What advanced functionalities are available? <i>(e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</i></p> <p>Not available</p>
C5	<p>What advanced help functions are available?</p> <p>Not available</p>



C6	<i>The interaction with the tool</i> <ul style="list-style-type: none">○ requires some effort but is easy to learn or well explained It takes time to install it, especially for non-Windows OS users. Once installed, it is quite self-explanatory.
C7	<i>How simple or expensive is the tool in user functionalities</i> <ul style="list-style-type: none">○ is very extensive and offers the user many options for e.g. data input and presentation The users can choose the variety of data (crops or residues selection from drop-down lists, natural conditions in the area, conversion processes, etc.) or can also input their own data (new crop names, amounts, etc). There is a room for manoeuvre for a specific case-study and the results are visualised.



8. BioGrace-II GHG

A. General	
A1	Full name and acronym of the tool.
	BioGrace-II (<i>Biofuel Greenhouse gas emissions: Align Calculations in Europe</i>)
A2	Home page of tool and if relevant also subpages (URL)
	https://www.biograce.net/biograce2/ https://www.biograce.net/app/webroot/biograce2/content/ghgcalculationtool_electricityheatingcooling/overview
A3	A summary description of the tool including the main objective.
	<p>Main objective of the BioGrace-II project (2012-2015) is European harmonisation of GHG emission calculations for bioenergy (electricity, heat and cooling) using the methodology laid down in the European Commission reports. BioGrace-II builds upon an earlier project, equally named BioGrace (2010-2012), which created a GHG calculation tool for liquid biofuels according to the requirements of the Renewable Energy Directive. This tool has been recognised as a voluntary scheme by the European Commission in June 2013.</p> <p>BioGrace-II GHG calculation tool is an Excel-based calculation tool. This tool allows for operators to perform their own GHG calculations, verifiers to check the calculations and Member States to monitor the greenhouse gas performance of subsidised plants. By following the same methodology of the European Commission, users are sure to apply a sound and accepted way when performing greenhouse gas calculations.</p>
A4	Most recent update of the information in the tool (year)?
	May 2015 (v.3)
A5-1	Main type of users targeted?
	<p>Main target groups are:</p> <ul style="list-style-type: none"> - Industry - Verifiers (audit or certification) - Bioenergy policy makers and their advisors <p>Also relevant for:</p> <ul style="list-style-type: none"> - Biomass producers/harvesters/pre-processors - Transportation companies <p>as they are part of the biomass chain assessed in the tool. It can also be used by researchers to test the GHG performance of processes with proposed inputs.</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> o users with some knowledge of the topic and understanding of online tools o advanced users



	In order to understand the tool, understand what inputs are required and how the calculations are performed, the user should have at least some prior background knowledge regarding bioenergy production processes involved and GHG accounting methodology.
A6	Type of tool?
	Data/information on the pathways (default input data for the pathways and list of standard values to make the GHG calculations). Assessment tool (for GHG calculation for electricity and heating in the EU).
A7	Countries and/or regions that are covered by the tool.
	EU
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	The tool is developed part of the BioGrace-II project with 8 partners: <ul style="list-style-type: none"> - Netherlands Enterprise Agency (RVO), Netherlands (coordinator) - European Biomass Association (AEBIOM), Belgium - Bioenergy 2020+ GmbH (BE2020), Austria - BIO by Deloitte (BIO IS), France - Institute for Energy and Environmental Research (IFEU), Germany - Swedish Energy Agency (STEM), Sweden - Flemish Regulator of the Electricity and Gas Market (VREG), Belgium - Flemish Energy Agency (VEA), Belgium
A9	Types of biomass covered?
	Many feedstock types are covered: <ul style="list-style-type: none"> - Solid biomass (Forest residues, short rotation coppice (Eucalyptus and Poplar), stemwood, wood industry residues, agricultural residues, straw, bagasse, palm kernel meal) - Biogas from wet manure, maize or biowaste - Pure plant oil from rapeseed, sunflower seed, soybean, Jatropha seed, palm oil, waste cooking oil) <p>There are 27 pathways modelled in the tool for GHG calculation. The list can be seen in the screenshot of the directory of the tool provided in Figure 4 (underneath).</p>
A10	Types of biomass conversion covered?
	Bioenergy only (heat, electricity, cooling, or CHP (combined heat and power))
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information



	<p>Biomass supply information:</p> <ul style="list-style-type: none"> - Many biomass types are covered (>5) – see above for the list - No quantitative information on biomass availability is provided - No biomass potential figures is provided - No supply data is provided - No information provided on the long-term availability of the biomass <p>Biomass cost information:</p> <p>No biomass cost information is available No metadata is available on biomass cost-supply data</p> <p>Biomass characteristics (quality & composition) information:</p> <p>Limited information available: lower heating value (LHV), moisture content, for some of them also bulk density. No information on composition.</p>
B2	<p>Information on logistics:</p> <p>Spatially specific assessment options for logistics</p> <p>Information on logistics:</p> <p>Information on logistics and pre-processing steps are included since the tool covers the entire biomass chain from biomass production to end use. Figure 5 shows an overview of a pathway in the tool. It shows the processing and transportation steps involved and their respective GHG impacts. Several pre-processing techniques are modelled in the tool (chipping, pellet production, bailing, anaerobic digestion, oil extraction). All modes of transport are considered (truck, freight train, bulk carrier oceanic transport). Default values for them are provided which could be replaced with actual data to make calculations.</p> <p>Spatially specific assessment options for logistics:</p> <p>No spatially specific assessment options for logistics are available</p>
B3	<p>IMARKETS:</p> <p>Biomass market information:</p> <p>Biobased product market information:</p> <p>Not available, outside the scope of this tool.</p>
B4	<p>Good practice examples of biomass conversion technologies.</p> <p>Yes, but only for production of electricity and/or heat from various biomass feedstocks. No information on other biobased industries.</p>
B5	<p>Information on policies/regulations/stimulation measures?</p> <p>Information on visions, strategies & roadmaps.</p> <p>The policy background of the BioGrace-II project are the Renewable Energy Directive (RED) that sets a common framework for the promotion of energy from renewable sources, and in particular the European Commission report COM(2010)11 on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling. The methodology is based on the updated Commission report (SWD/2014/259) – State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling, together with a</p>



	<p>scientific report of the Joint Research Centre [Report EUR 27215] on default and input values for GHG emissions of biomass.</p> <p>The project ended before the release of RED-II but the same methodology is used with the GHG accounting methodology given in this directive.</p>
B6	<p>Information on options for finances/investors/subsidies:</p> <p>This tool is linked to the Bioenergy related policies.</p> <p>No information on investment cost, or return on investment is provided.</p>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <ul style="list-style-type: none"> - Information on GHG emission/mitigation. Yes the tool is designed for GHG emission calculation. It also includes calculation of N₂O field emissions in a separate sheet. - Information on Land use change impacts. Yes direct land use change is considered and separate sheet is provided for calculation of its impact. - Information on Impacts on biodiversity & ecosystems. Not available - Information on other impacts on environment (water, soil, air, including resource depletion aspects). Not available - Information on socio-economic impacts (e.g. information on e.g. number of employees in bioeconomy industries/sector, income derived from bioeconomy sector, turnover from bioeconomy etc.). Not available - Information on certification schemes. Not available within the tool, but the tool is intended for use to verify GHG calculations as part of sustainability criteria (European and national voluntary certification schemes). Voluntary schemes like NTA8080 and SBP refer to the Bio-Grace-II GHG calculation tool.
C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>The main objective of the tool is to show and perform transparent GHG calculations using the methodology set by the European Commission. BioGrace-II addressed three target groups. These were:</p> <ol style="list-style-type: none"> 1. Bioenergy policy makers and their advisors within the national governments of the EU member states and within the European Commission. These are responsible for putting sustainability criteria for biofuels and for solid and gaseous biomass into national legislation. 2. Companies that use biomass for energy but also biomass producers and companies that convert feedstock into for example into pallets and chips. They need to comply with sustainability criteria



3. Verifiers that audit or certify GHG calculations as part of sustainability criteria, plus their trainers (European and national certification schemes)

The tool matches the expected needs of the end-users, the information and calculations are relevant for the users. It is not intended to be used by the policy makers but rather by the companies to determine their own GHG emissions and savings and by the verifiers to check these calculations. It is in the interest of the policy makers that a harmonised methodology is used in the calculations. The tool to be used by the companies is complex because of the vast amount of sheets and information and calculations performed on each sheet. However, it is well designed and organized and clear explanations and helps are provided.

C2

Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,)
How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)

From the website a zip file can be downloaded which includes, together with the Excel-based tool, user manual, methodological background document, calculation rules and an Excel file with additional standard values (see Figure 6).

Is the interface clear and easy to use ? Although a lot of help functions are provided and the tool is consistent and well-organized, it is not directly clear and easy to use. In order to understand the tool, understand what inputs are required and how the calculations are performed, the user should have at least a basic prior background knowledge regarding bioenergy production processes involved and GHG accounting methodology. Also a bit of experience in performing calculations in Excel is required. The excel-based tool has a lot of sheets. Lots of information in a specific pathway sheet is called from other sheets to make the GHG calculations. It can require some expertise to follow these calculations made by the tool.

How is the use of the tool explained ? A manual and a series of 25 online video instructions provide explanation for the tool, GHG calculation methodology and calculation rules. The manual is very detailed and well explained with presence of explanatory figures referring to the tool. It could be best that the user has at least a first glance of the manual before starting with the tool.

During the course of the project (2012-2015) public workshops and verifier training sessions were held. Since no further sessions could be held, online video instructions were created that are available to everyone and are self-explaining. They can be reached from the links provided in this document: https://www.biograce.net/app/webroot/biograce2/img/files/BioGrace-II_video_instructions.pdf



<p>C3</p>	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p>
	<p>How can the user interact with the data ? BioGrace-II tool requires some input data to perform the calculations (such as thermal and electrical efficiency). It also allow users to calculate an actual value for existing pathways. This adaptation can be performed by changing the default input values in the appropriate calculation sheet (indicated with white cells, can be seen in Figure 5). The tool has a “track changes” mode that allows to keep track of changes made to the default input values. The BioGrace-II tool can also be used to set up new bioenergy production chains – a new pathway as a separate sheet in the tool. However, the tool does not offer user-friendly functionalities for this function. The user should first have obtained a thorough understanding of the tool before creating a new pathway.</p> <p>What kind of search or select functions are available ? There are drop-down lists available in General Settings for the pathways where the user can select which option best reflects their process, transportation demand or feedstock properties to configure the pathway accordingly. No specific search function available, but Ctrl+F can be used to search something in Excel.</p>
<p>C4</p>	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>It is possible to follow the calculations made by the tool. The calculation rules document provides all the calculation rules that must be respected when using the tool to calculate pathways with new inputs, processes or pathways in the tool. As explained above it is also possible to set up new pathways and perform GHG calculation of these.</p>
<p>C5</p>	<p>What advanced help functions are available?</p> <p>The tool is equipped with many comment and help boxes. When you click on such a cell a popup box called “Help for the cell that is selected” appears (see Figure 7). This box gives you all needed information to understand and manage the comments included in the cells of the tool.</p>
<p>C6</p>	<p>The interaction with the tool</p> <ul style="list-style-type: none"> ○ requires some effort but is easy to learn or well explained ○ requires effort and reading background (help) files <p>The tool is complex because of the vast amount of sheets and vast amount of calculations performed on each sheet. Lots of information in a specific pathway sheet is called from other sheets to make the GHG calculations. It can require some expertise to follow these calculations made by the tool.</p>



	Enhance: The tool is well designed and organized. Clear explanations and helps are provided
C7	<i>How simple or expensive is the tool in user functionalities</i> <ul style="list-style-type: none">o is very extensive and offers the user many options for e.g. data input and presentation BioGrace-II tool allows users to calculate an actual value for existing pathways. This adaptation can be performed by changing the default input values in the appropriate calculation sheet. The tool can also be used to set up new bioenergy production chains – a new pathway as a separate sheet in the tool. However, the tool does not offer user-friendly functionalities for this function. The user should first have obtained a thorough understanding of the tool before creating a new pathway.

BIOGRACE II
Harmonised Greenhouse Gas Calculations
for Electricity, Heating and Cooling from Biomass

www.biograce.net

Co-funded by the Intelligent Energy Europe
Programme of the European Union

About | Directory

Directory of pathways

Version 3 - for

- 1 [Wood chips from forest residues](#)
- 2 [Wood chips from short rotation coppice \(Eucalyptus\)](#)
- 3 [Wood chips from short rotation coppice \(Poplar\)](#)
- 4 [Wood chips from stemwood](#)
- 5 [Wood chips from industry residues](#)
- 6 [Wood briquettes or pellets from forest residues](#)
- 7 [Wood briquettes or pellets from short rotation coppice \(Eucalyptus\)](#)
- 8 [Wood briquettes or pellets from short rotation coppice \(Poplar\)](#)
- 9 [Wood briquettes or pellets from stemwood](#)
- 10 [Wood briquettes or pellets from wood industry residues](#)
- 11 [Agricultural residues](#)
- 12 [Pellets from straw](#)
- 13 [Pellets from bagasse](#)
- 14 [Palm kernel meal](#)
- 15 [Pure plant oil from rapeseed](#)
- 16 [Pure plant oil from sunflower seed](#)
- 17 [Pure plant oil from soybean](#)
- 18 [Pure plant oil from jatropha seed](#)
- 19 [Pure plant oil from palm oil](#)
- 20 [Waste cooking oil](#)
- 21 [Animal fats from animal waste](#)
- 22 [Biogas from wet manure](#)
- 23 [Biogas from maize](#)
- 24 [Biogas from biowaste](#)
- 25 [Biomethane from wet manure](#)
- 26 [Biomethane from maize](#)
- 27 [Biomethane from biowaste](#)

[Calculation of direct land use change \(LUC\)](#)
[Calculation of Improved Agricultural Management](#)
[Calculation of N₂O field emissions according to IPCC Tier 1](#)
[Calculation of N₂O field emissions with GNOG](#)
[Calculation of net heat and electricity efficiencies](#)
[Calculation of default values for co-digestion](#)
[Calculation of actual values for co-digestion \(biogas\)](#)
[Calculation of actual values for co-digestion \(biomethane\)](#)
[Final conversion only](#)
[Final conversion only \(with heat at different temperatue levels\)](#)

[About](#)

[Standard values](#)
[User defined standard values](#)
[User specific calculations](#)

Figure 4. Screenshot of the Directory of BioGrace-II tool

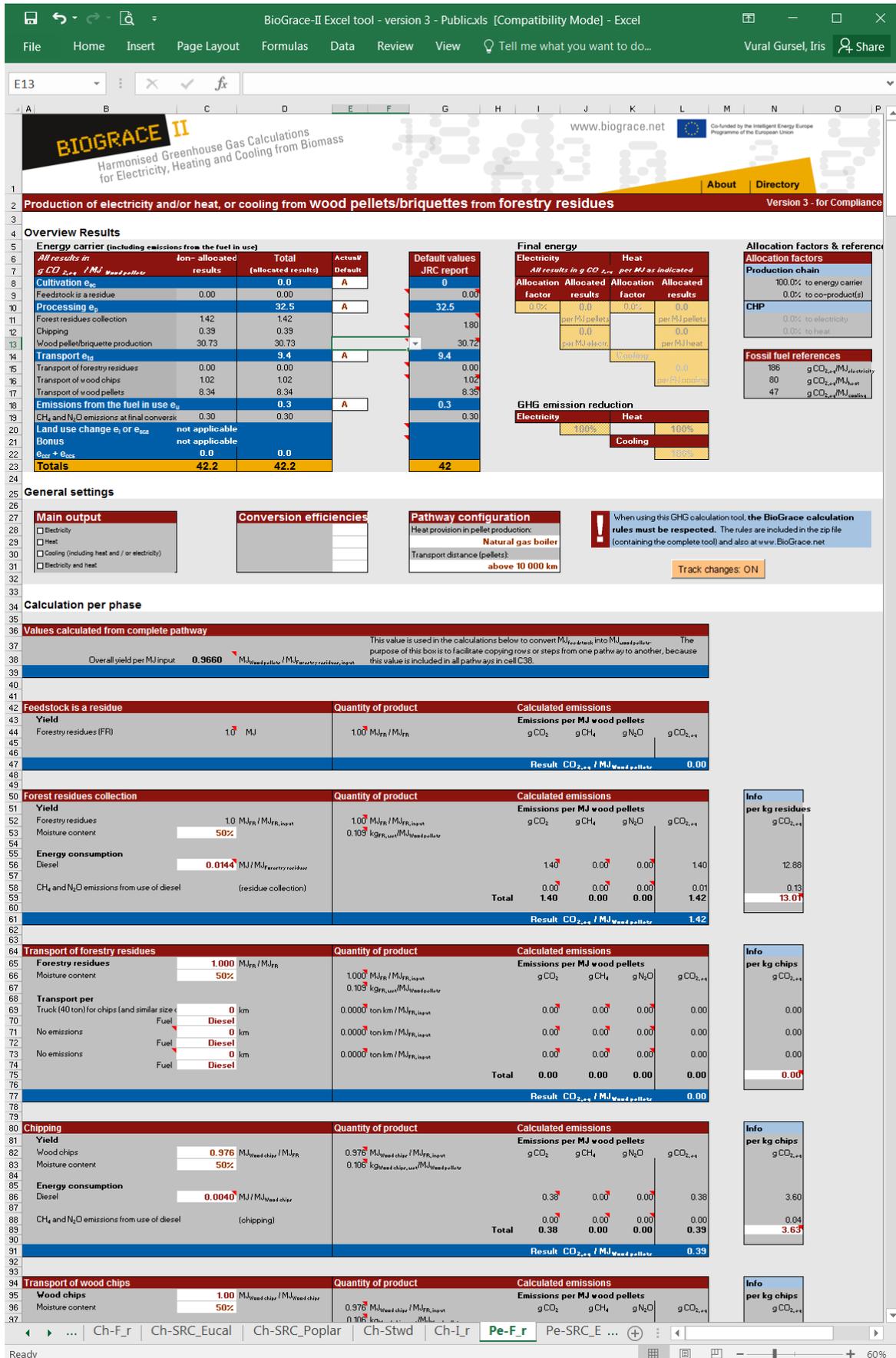


Figure 5. Screenshot of one of the pathways in the BioGrace-II tool (wood briquettes/pellets from forest residues)

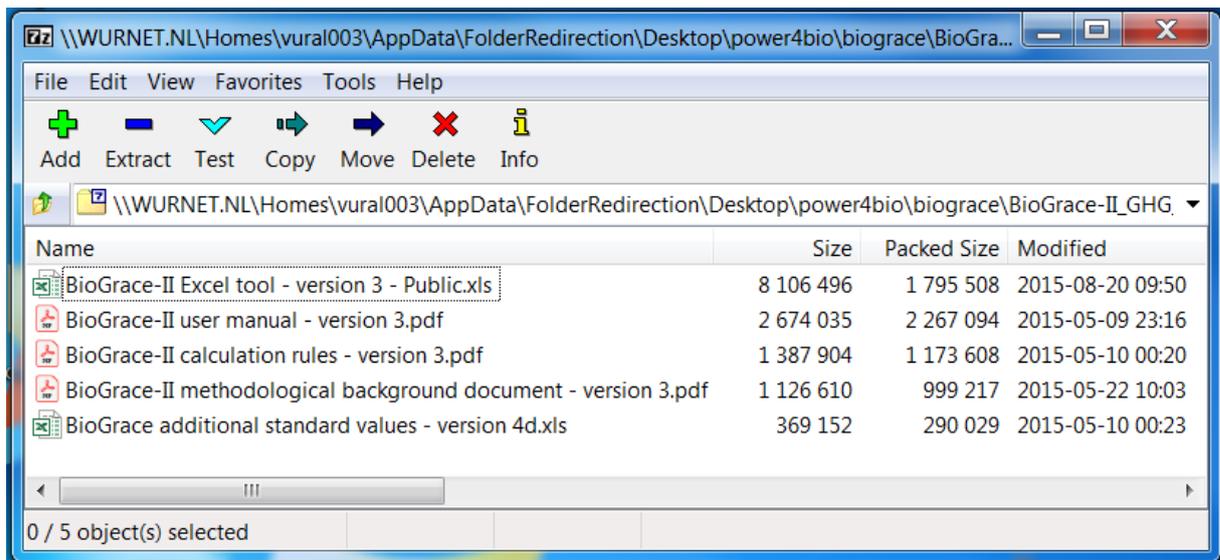


Figure 6. Screenshot of the BioGrace-II zip file and the documents within

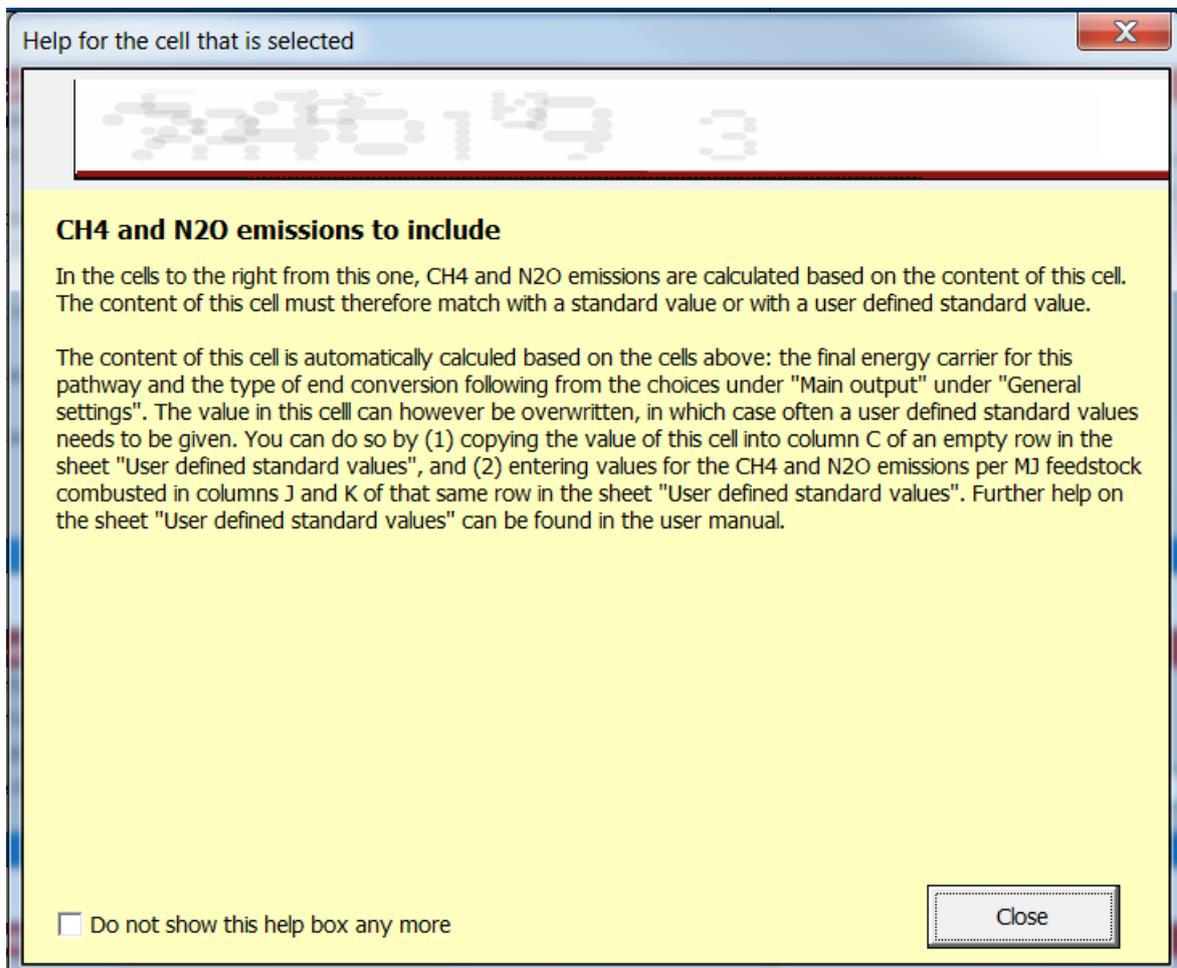


Figure 7. Screenshot of an example help box



9. CFPAN

A. General	
A1	Full name and acronym of the tool.
	CFPAN -FeedPrint
A2	Home page of tool and if relevant also subpages (URL)
	http://webapplicaties.wur.nl/software/feedprintNL/index.asp
A3	A summary description of the tool including the main objective.
	<p>The CFPAN tool and database FeedPrint calculates the carbon footprint of feed raw materials during their complete life cycle. This ranges from crop production, via processing of crop and animal products, compound feed production to utilization by the animal, including transport and storage between all steps of the production chain.</p> <p>The CFPAN tool has been developed to gain insight in greenhouse gas emissions during the production and utilization chain of feed and to identify mitigation options.</p>
A4	Most recent update of the information in the tool (year)?
	In March 2019 was launched a new tool update
A5-1	Main type of users targeted?
	<p>This tool is basically focused on livestock breeders since it gives economic, environmental and energy solutions to obtain feed according to the byproducts and roughage included in the list.</p> <p>Mainly Stockbreeders but the tool can be beneficial to consider the environmental impact in different industries:</p> <ul style="list-style-type: none"> - Industry (Feed productors) - Advisors - Researchers - Policy makers - NGOs
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> ○ users with some knowledge of the topic and understanding of online tools <p>The categories and profiles to enter in the tool are the following ones: Dairy (dairy cattle), pigs (fattening pigs and breeding sows), poultry and veal calves</p> <p>The tool allows showing the economic results, the mass balance or the gross energy to the chosen feed combination.</p>
A6	Type of tool?
	Assessment tool



A7	Countries and/or regions that are covered by the tool.
	Not focussed on specific country, but the default values were included from NL
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	Wageningen Livestock Research and Blonk Milieu Advies
A9	Types of biomass covered?
	Crops and residues
A10	Types of biomass conversion covered?
	Feed
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information
	<p>Biomass supply information:</p> <ul style="list-style-type: none"> - Types of biomass covered Agricultural feedstock and agricultural waste. <ul style="list-style-type: none"> - number of biomass types that are covered (1, 2-5, >5) 2 → agricultural and agroindustry products - quantitative information on biomass availability that is provided (e.g. in totals per area, biomass density) None - is biomass expressed in different types of potential figures (e.g. technical potential, sustainable potential, economic potential, currently exploited and unexploited potential, current and future potentials etc.) None - supply data provided at high spatial resolution level (e.g. national, regional, grid (what size?)) None - Information provided on the long-term competitive and consistent availability of the biomass None <p>Biomass cost information: Only given the g CO₂ eq/kg</p> <p>Metadata given?</p> <ul style="list-style-type: none"> - metadata on biomass cost-supply input data and methodology



	<p>given?.</p> <p>No</p> <p>Biomass characteristics (quality & composition) information:</p> <ul style="list-style-type: none"> - CO₂, CH₄, N₂O per kg product (g CO₂-eq) - CO₂, CH₄, N₂O per kg feed (g CO₂-eq) - Marine eutrophication per kg product (g N-eq) - Freshwater eutrophication per kg product (g P-eq) - Terrestrial acidification per kg product
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B2	Information on logistics: Spatially specific assessment options for logistics
	<p>Information on logistics:</p> <p>No information</p>
B3	IMARKETS: Biomass market information: Biobased product market information:
	No information given
B4	Good practice examples of biomass conversion technologies.
	No information provided
B5	Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.
	No information on policies, regulations, visions is provided in the tool. This is not an objective of the tool
B6	Information on options for finances/investors/subsidies:
	No information given
B7	Information on GHG emissions/LCAs and other sustainability aspects:
	<p>F Information on GHG emission and on land use change impacts.</p> <p>Information on other impacts on environment:</p> <ul style="list-style-type: none"> • Water: freshwater eutrophication • Soil: terrestrial acidification, land use • Fossil fuel depletion • Energy use, air, including resource depletion aspects).
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?
	The information given by the tool is simple and easily understandable the tool could give interesting information to the breeders and the policy makers (control of emissions)



C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,)</p> <p>How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p>
	<p>Is the interface clear and easy to use</p> <p>The tool needs to be downloaded and installed before it can be used. But once installed it is relatively easy to use and self-explanative.</p> <p>The interface is very intuitive and simple but is very limited and not very user friendly.</p> <p>How is the use of the tool explained?</p> <p>The tool is explained in the web and there is a "Help" button where some explanations are given</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p>
	<p>How can the user interact with the data?</p> <p>There's no interaction, besides choosing the compounds of the feed</p> <p>What kind of search or select functions are available?</p> <p>It exists an option of exporting the results obtained</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p>
	<p>Exporting the results obtained</p>
C5	<p>What advanced help functions are available?</p>
	<p>Not available</p>
C6	<p>The interaction with the tool</p>
	<ul style="list-style-type: none"> ○ requires effort and reading background (help) files <p>The tool provides valuable information but initial use is rather difficult. Although it offers a friendly user interface it does not provide the necessary guidance for the user. As the review states it, reading the user guide before using the tool is advised and this help is somewhere hidden behind the 'about' tab. Another general remark (about the tool) is when multiple layers are selected for visualization the site takes long to respond, and due to time outs, the browser prompts a "Close this window" message. This is due to system architecture overall.</p>
C7	<p>How simple or expensive is the tool in user functionalities</p>
	<ul style="list-style-type: none"> ○ is very simple and offers the user limited functions <p>The tool enables the characterization of four types of feed according the type of livestock production: Dairy (dairy cattle), pigs</p>



(fattening pigs and breeding sows), poultry and veal calves. Once you have selected the type of livestock you can add ingredients according to two main resources: byproducts or roughage.

Considering the different possibilities and choices the results regarding costs, emissions and energy will vary



10. BEAT

A. General	
A1	Full name and acronym of the tool.
	Biomass Environmental Assessment Tool (BEAT2)
A2	Home page of tool and if relevant also subpages (URL)
	<p>https://www.forestresearch.gov.uk/tools-and-resources/biomass-energy-resources/reference-biomass/documents-downloads/beat/</p> <p>https://www.dropbox.com/s/o4n0ex3pqjjiwry/BEATv2.1.exe</p>
A3	<p>A summary description of the tool including the main objective.</p> <p>This tool is intended to provide the user with the means for assessing the potential benefits, as well as associated environmental impacts, of bioenergy technologies. It considers the diverse nature of possible bioenergy feedstocks and conversion technologies and identifies a variety of potential environmental impacts.</p>
A4	<p>Most recent update of the information in the tool (year)?</p> <p>2010-2011</p>
A5-1	<p>Main type of users targeted?</p> <p>According to the guide, this Tool is designed to assist staff in the understanding of impacts from biomass and biofuel plant development over the whole life cycle of the technology and fuel chain, and to identify significant impacts that may occur from local proposals. Nevertheless, it should be noted that the data compiled has not been prepared to meet anyone's individual requirements.</p> <p>Advisors, researchers, policy makers and industry are most likely the more interested in the tool.</p>
A5-2	<p>Experience of users most suitable to use the tool</p> <ul style="list-style-type: none"> • users with little knowledge of the topic and understanding of online tools • users with some knowledge of the topic and understanding of online tools • advanced users <p>The tool can be used by users with little knowledge of the topic and understanding of online tools since the user guide is quite helpful but most probably only users with some knowledge of the topic and understanding of online tools and advanced users and advanced users will be able to fully exploit all the potential of the tool.</p> <p>Since the tool provides default values a user with little knowledge can run the tool with the user guide help. But in order to customize the input parameters some knowledge is required in order to determine for instance the size of the plant, overall thermal efficiency of CHP, Heat to power ratio,</p>



	weighting given to electrical energy compared to heat (for allocation of emissions), etc.
A6	Type of tool?
	Data/information mobilisation and assessment tool
A7	Countries and/or regions that are covered by the tool.
	BEAT2 is a UK-based tool and cannot be used to assess bioenergy options outside the UK
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	BEAT was developed by AEA Energy & Environment in association with North Energy Associates for DEFRA and the Environment Agency.
A9	Types of biomass covered?
	<p>The tool mainly focusses on:</p> <ul style="list-style-type: none"> • Agricultural residues • Forest residues <p>(see section B1 for more details)</p>
A10	Types of biomass conversion covered?
	<p>The conversion technologies that can be selected to build the scheme are:</p> <ul style="list-style-type: none"> • Electricity (power plant) – dedicated plant built to burn biomass fuels and produce electricity; • Combined heat and power (CHP) - dedicated plant built to burn biomass fuels and produce electricity and heat; • Heat only – dedicated boilers burning biomass fuels to produce heat; • Cofiring – combustion of biomass fuels in existing large power stations; • Liquid biofuels – production of biodiesel and bioethanol; • Anaerobic digestion – anaerobic digestion of animal and food waste to produce biogas which is then burnt to produce electricity and/or heat. <p>Tool focus on bioenergy.</p>
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information



	<p>Biomass supply information:</p> <ul style="list-style-type: none">• Types of biomass covered: short rotation coppice, forestry residues, logs, woodchips, wood pellets miscanthus (chips, pellets, bales), straw, chipboard waste, medium density fibreboard waste, typical furniture waste, glycerine from waste oil or rapeseed oil, animal manures, poultry waste, food waste, olive cake, palm kernel expeller, cereal milling residues, oilseed rape or waste oils to produce biodiesel, sugar beet or wheat to produce bioethanol, high biomass refuse derived fuel (refers to any potential fuel resulting from the processing of mixed waste streams to a fraction with a biomass content >90 % and a low fossil)• Number of biomass types covered: 13 fuel categories are differentiated in the tool• Quantitative information on biomass availability: NO• Biomass expressed in different types of potential figures: the rates used in the tool are, for instance, planting rate, average annual yield, fertiliser application, etc. and the potential calculated in the tool are related to the potential environmental impacts but not sustainable potential considering the availability.• Supply data provided at high spatial resolution level: No. Regarding the supply the tool considers three choices about the access to the plant site in order to determine the potential magnitude of transport impacts.• Long-term competitive and consistent availability: NO <p>Biomass cost information: The tool is not intended to provide accurate estimates of the cost of biomass based heat, electricity or fuels, but to give an indicative cost based on typical prices for feedstocks and capital and operating costs. Production costs reflect capital and operating costs of the scheme, including feedstock costs. The amount of support that the scheme receives, either directly e.g. as capital grants or Renewable Obligation Certificates (ROCs), or indirectly through mechanisms to support feedstock production are also shown. The estimated cost of producing electricity from the scheme is the sum of these costs and support mechanisms. This estimated cost does not include a profit element.</p> <p>Metadata given Access is provided to excel files including all the input data considered for different cases such as heat and electricity generated in a CHP plant by combustion of shredded chipboard case, electricity generated by combustion of wood chips derived from UK forest residues case, etc. Also access is granted to impact sheets and cost model.</p> <p>Biomass characteristics: Moisture content and ash content is provided for instance.</p>
	Reference costs provided (default values) for electricity and heat (feedstock cost, plant capital cost, O&M, etc.) and values regarding support mechanisms but no information on the biobased market.
B2	Information on logistics:



	<p>Spatially specific assessment options for logistics</p> <p>Information on logistics: Process included in the tool encompasses shredding, milling, pelletisation, disposal, transportation... Default values provided but it is also possible to enter own parameters</p> <p>Spatially specific assessment options for logistics available like: NO</p>
B3	<p>IMARKETS:</p> <p>Biomass market information:</p> <p>Biobased product market information:</p> <p>Reference costs provided (default values) for electricity and heat (feedstock cost, plant capital cost, O&M, etc.) and values regarding support mechanisms but no information on the biobased market.</p>
B4	<p>Good practice examples of biomass conversion technologies.</p> <p>No information provided</p>
B5	<p>Information on policies/regulations/stimulation measures?</p> <p>Information on visions, strategies & roadmaps.</p> <p>Information on policies/regulations/stimulation measures? The only information related to this issue is the amount of support that the scheme receives, either directly e.g. as capital grants or Renewable Obligation Certificates (ROCs), or indirectly through mechanisms to support feedstock production.</p> <p>Information on visions, strategies & roadmaps. NO</p> <p>Existence of regional development planning NO</p>
B6	<p>Information on options for finances/investors/subsidies:</p> <p>NO. The default values provided for the cost model include the return rate, plant lifetime, discount rate, capital cost, investment, insurance cost, etc. but not further information is provided regarding possible investor for instance. On the subsidies side, as mentioned in section B1 the tool considers the amount of support that the scheme receives as capital grants or Renewable Obligation Certificates (ROCs) or indirectly through mechanisms to support feedstock production.</p>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <ul style="list-style-type: none"> • Information on GHG emissions/mitigation: YES • Information on Land use change impacts: Soil quality impact category included • Information on Impacts on biodiversity & ecosystems: YES • Information on other impacts on environment (water, soil, air, including resource depletion aspects): YES. The impact categories included are: Food risk, noise, odour, visual impact, water quality and water resources.



	<ul style="list-style-type: none"> • Information on socio-economic impacts (e.g. information on e.g. number of employees in bioeconomy industries/sector, income derived from bioeconomy sector, turnover from bioeconomy etc.): YES <p>Information on certification schemes. As previously mention, BEAT2 contains a simple model of the cost of producing heat, electricity or transport fuels from biomass feedstocks. The main aim of this part of the tool is to allow the estimation of the value of support mechanisms (e.g. grants) on a per MWh or per litre basis, and to combine this with the relevant GHG saving to obtain an estimate of the effectiveness of these support mechanisms in reducing GHG emissions.</p>
C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>According to the developer, the tool provides a comparison of greenhouse gas emissions from the proposed plant and fossil fuel based plant but also information on key potential environmental impact, allow the identification of potential options for mitigating environmental impacts and additionally provide an estimate of production costs and of support mechanisms.</p> <p>The tool considers all stages of the fuel chain i.e. from cultivation through to the production of heat, electricity or liquid biofuels for transport. It provides a full set of default data (based on typical values for biomass yields, generating efficiencies), to enable easy examination of typical bioenergy schemes. In addition, all the parameters describing a scheme can be also changed by the user, allowing specific aspects of individual biomass schemes to be modelled.</p> <p>The target users identified by the developer match the main user groups identified as potential users.</p> <p>The design of the tool in access format makes it more complicated to access.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <ul style="list-style-type: none"> • Interface: Interface fairly consistent even though not very appealing. <p>Use of the tool explained: The tool is clearly explained in the User guide available.</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <ul style="list-style-type: none"> • Interaction of the user with the data: The final user can select 'Use Default Parameters' to accept the default values which are typical values provided for all parameters or enter a value in the 'user defined value'. • Search functions available:



	<p>The first step will be for the final user to select the relevant scheme from the displayed drop down box among the possibilities of the database. Other selections required include the technology, output and process selection, transport and definition of the feedstock.</p> <p>A number of parameters which describe fuel/feedstock, processing, transport and technology or production plant need to be customized by selecting 'Use Default Parameters' as mentioned in the previous paragraph.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>Clicking the 'Excel Workbook Viewer' provides access to the Excel workbooks which drive the calculations of the emission figures. There is a workbook associated with each feedstock chosen for the scheme.</p> <p>The reports section is used to produce printable summaries of the calculated outputs. It also contains various ways to access and export worksheets, impact sheets and data.</p>
C5	<p>What advanced help functions are available?</p> <p>Help text is displayed for each parameter at the bottom of the screen. When a parameter is clicked on help text will be brought up for guidance. Additionally, as a help to the final user, some parameters are labelled indicating that the parameter has a key influence on the emissions produced by the scheme.</p>
C6	<p><i>The interaction with the tool</i></p> <ul style="list-style-type: none">o requires effort and reading background (help) files <p>The interaction with the tool requires some effort but is easy to learn or well explained. As mentioned in the previous sections, the user guide is quite complete and help text is available to help the user even though the interface is not very friendly. Input data in many cases is displayed in excel file which is a format quite accessible for most of the users.</p>
C7	<p><i>How simple or expensive is the tool in user functionalities</i></p> <ul style="list-style-type: none">- offers the user some functions regarding e.g. search functions or data presentation <p>The tool offers the user some functions regarding e.g. search functions or data presentation. As mentioned in the section C4, the tool provides access to the Excel Workbook Viewer' provides access to the Excel workbooks which drive the calculations and the possibility to customize input data and printable reports.</p>



Annex C: Factsheets of tools selected for Inspiration

Note: Since these tools have been selected for inspiration particularly in relation to user interaction aspects, the content aspects (B aspects) are not described extensively.



1. BioTrade2020+

A. General	
A1	Full name and acronym of the tool.
	BioTrade 2020+ Interactive Tool
A2	Home page of tool and if relevant also subpages (URL)
	https://biotrade2020.wenr.wur.nl
A3	A summary description of the tool including the main objective.
	<p>The tool is one of the products of the BioTrade 2020+ project. It provides web-based interactive maps that support end-users in identifying the best compromise solutions taking into account the sustainability and competitiveness of exogenous biomass in their day-to-day actions.</p> <p>The main advantage here is that for very different feedstocks of biomass from primary residues in agriculture and forestry to tertiary processing residues, a consistent methodology was used to arrive at sustainable biomass quantities and prices and greenhouse gas emissions.</p> <p>Results are therefore comparable between regions. It is now filled for 6 case regions, but can be developed further for many other regions</p> <p>The maps provide objectively assessed insight in the biomass cost-supply, sustainability risks and relevant policies of influence at the level of main (potential) non EU sourcing countries.</p>
A4	Most recent update of the information in the tool (year)?
	2015
A5-1	Main type of users targeted?
	<p>End-users targeted by the tool: industries, biomass traders, NGOs and policy makers interested to safeguard access to sustainable solid biomass resources for energy and material conversions.</p> <p>The content of the tool is primarily useful for industries (including traders) and policy makers. The interface of the supply viewer is map based and easy to use but requires understanding of the topics. The tool does not offer save or download options of the selected options, which would seem a requirement for this category of users who want to explore and compare between for instance sources or regions. Some other components of the tool (e.g. cost supply curve) are basic and not well explained.</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> users with little knowledge of the topic and understanding of online tools



	<ul style="list-style-type: none"> • users with some knowledge of the topic and understanding of online tools • advanced users <p>Mainly users with some expertise: although the tool interface is well structured and clear, the information is only meaningful when the user has understanding of the topics and is looking for specific information.</p> <p>Background and related information is available in separate reports, not in the tool itself.</p>
A6	Type of tool?
	<ul style="list-style-type: none"> - Data/information mobilisation - Design of chains (support by information) - Assessment tool (comparison between countries and regions)
A7	Countries and/or regions that are covered by the tool.
	USA, Colombia, Brazil, Ukraine, Indonesia, Kenya; also on regional levels
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	<p>Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.</p> <p>Wageningen Environmental Research (formerly Alterra), The Netherlands; National Renewable Energy Centre (CENER), Imperial College London, Centre for Environmental Policy, United Kingdom; Flemish Institute for Technological Research (VITO), Belgium; Utrecht University, Faculty of Geosciences, Energy & Resources, Copernicus Institute of Sustainable Development, The Netherlands; WIP Renewable Energies, Germany</p>
A9	Types of biomass covered?
	<p>Country dependent:</p> <ul style="list-style-type: none"> - Agricultural residues - Forest residues - Dedicated crops
A10	Types of biomass conversion covered?
	Intermediates (pellets)
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?



	<p>Wat are the objectives of the tool, according to the tool developers?</p> <p>The main aim of BioTrade2020plus is to provide guidelines for the development of a European Bioenergy Trade Strategy for 2020 and beyond. It should ensure that imported biomass feedstock is sustainably sourced and used in an efficient way, while avoiding distortion of other markets. The tool provides web-based interactive maps that support end- users in identifying the best compromise solutions taking into account the sustainability and competitiveness of exogenous biomass in their day-to-day actions.</p> <p>Who are the target users of the tool, according to the developers?</p> <p>End-users targeted by the tool are industries, biomass traders, NGOs and policy makers interested to safeguard access to sustainable solid biomass resources for energy and material conversions. These users are expected to have knowledge and understanding of biomass chains. The vocabulary and information match their level of expertise. The tool provides information that is required in their decision process. The information is presented in a clear and straightforward manner and is structured according to topics such as supply, costs, and policies. The calculation methods are explained.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,)</p> <p>How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use ?</p> <p>The user has to create an account to login. Because the screen name is used to login later, and cannot be recovered if forgotten, this complicates the access.</p> <p>The interface offers a welcome page with an overview of the content of the tool and the regions covered. The explanation text is quite long; an improvement would be to add illustrations with screenshots of the components to introduce the functionality of the tool.</p> <p>The menu bar showing the countries covered and the submenus are clear, well-structured and consistent and provides a quick overview of the content of the tool.</p> <p>The main, interactive, component (the Supply Viewer) shows all selection and filtering options on one page. The other components present information and are not interactive.</p> <p>How is the use of the tool explained ?</p> <p>The tool is self-explanatory. The calculation methods are explained in a separate menu option.</p>



C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p>
	<p>How can the user interact with the data ? The user can select country, scenario, biomass category; the results are immediately presented on a map.</p> <p>What kind of search or select functions are available ? Select from menus, picklists; selection of country on map</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p>
	<p>No advanced functionalities; no download options for specific search and filter results in the Supply Viewer. However a full report on each country can be downloaded.</p>
C5	<p>What advanced help functions are available?</p>
	<p>Background information available through link to project website.</p>
C6	<p><i>The interaction with the tool</i></p>
	<ul style="list-style-type: none"> o requires effort and reading background (help) files <p>The supply viewer shows a map to support easy recognition and selection of a region; and it offers picklists of available options which helps users making selections of available information. The use of picklists, and showing all options in one screen, guide the user and prevent frustration.</p> <p>Because the output of a search action cannot be saved, it is difficult to compare between regions.</p> <p>The tool does not provide explanation on the methodology used, but the user has to read separate reports.</p>
C7	<p><i>How simple or expensive is the tool in user functionalities</i></p>
	<ul style="list-style-type: none"> - offers the user some functions regarding e.g. search functions or data presentatio <p>Searching is supported by menus and picklists.</p> <p>Data presentation options are offered for units of biomass (energy value, weight, weighted area, absolute)</p>



2. Biomass Yards

A. General	
A1	Full name and acronym of the tool.
	Map of Biomass Yards - Kaart biomassawerven (Dutch)
A2	Home page of tool and if relevant also subpages (URL)
	http://www.biomassawerven.nl/
A3	A summary description of the tool including the main objective.
	<p>The tool shows a map of the Netherlands with biomass yards. Biomass yards are establishments where a diversity of biomass flows, including organic residual flows, is collected and processed in a business and environment-friendly manner. Biomass yards are characterized by their economic scale and applied quality assurance systems (including certification). They are regulated by license conditions that prevent nuisance to the environment (e.g. smell).</p> <p>The tool is intended on the one hand for companies, governments and private individuals looking for suitable locations for the intake of biomass flows. On the other hand, it offers addresses and basic information for buyers of various biobased products.</p> <p>The map is updated every 3 months.</p>
A4	Most recent update of the information in the tool (year)?
	According to the website, the information is updated every three months. However, there is no way to check this.
A5-1	Main type of users targeted?
	<p>Very broad: companies, governments, citizens</p> <p>The tool offers recent but basic information useful for biomass producers, which is probably also interesting for e.g. policy makers exploring options in a region.</p> <p>It is however very simple and 'flat', so its usefulness in general is very limited</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> • users with little knowledge of the topic and understanding of online tools • users with some knowledge of the topic and understanding of online tools • advanced users <p>Mainly users with little knowledge of the topic and understanding of online tools. Features that support this:</p> <ul style="list-style-type: none"> • all information necessary to understand and use the information in the application is presented in one screen (a map) and one help text.



	<ul style="list-style-type: none"> the tool has a single focus, showing locations and basic information of biomass yards in the Netherlands
A6	Type of tool?
	<ul style="list-style-type: none"> (simple) Data/information mobilisation Design of chains
A7	Countries and/or regions that are covered by the tool.
	The Netherlands
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	BVOR – Dutch Association of Biowaste Processors
A9	Types of biomass covered? Use one or more of the following types:
	<ul style="list-style-type: none"> Agricultural residues Forest residues Dedicated crops (?) Waste streams
A10	Types of biomass conversion covered?
	<p>No part of the tool but biomass sources can be used for all conversions:</p> <ul style="list-style-type: none"> Biomaterials Biofuels Bioenergy <p>Products from a biomass yard included in the tool include biobased raw materials, fuels and compost products.</p>
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?
	<p>The tool is intended on the one hand for companies, governments and private individuals looking for suitable locations for the intake of biomass flows. On the other hand, it offers addresses for buyers of various biobased products.</p> <p>The information presentation is clear and direct: the bio-waste processing facilities are shown on a map and on click, a small popup window with basic information is shown (e.g. location, capacity, type of products etc). The explanation is clear and complete; the vocabulary is simple.</p>
C2	Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)
	<p>The interface is very straightforward and simple: it shows a map with facilities and a window with filtering options.</p> <p>How is the use of the tool explained ? A concise instruction page is available.</p>



C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p>
	<p>How can the user interact with the data ?</p> <p>Apart from selection and filtering, companies can submit their information and be included in the map.</p> <p>What kind of search or select functions are available</p> <p>The tool shows a map of the Netherlands on which professional bio-waste processing facilities are indicated with a symbol. The user can filter on licensed capacity, biomass types that can be processed, product types, certifications, facilities, region and membership of the branch organisation</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p>
	<p>Not relevant</p>
C5	<p>What advanced help functions are available?</p>
	<p>Not relevant</p>
C6	<p><i>The interaction with the tool</i></p>
	<ul style="list-style-type: none"> ○ X is intuitive and simple ○ X is generally easy and well explained <p>The information on the production facilities is represented <i>on a map</i>, which is relevant because the geographical location of the facilities is important.</p> <p>The filtering options of the facilities are limited but to the point and support easy overview.</p>
C7	<p><i>How simple or expensive is the tool in user functionalities</i></p>
	<ul style="list-style-type: none"> ○ is very simple and offers the user limited functions <p>The tool is very basic and offers only a simple overview of facilities, and a few filtering options. The user cannot input any information, nor save information, nor change the representation.</p>

3. BioSat

A. General



A1	Full name and acronym of the tool.
	BioSat
A2	Home page of tool and if relevant also subpages (URL)
	http://www.biosat.net/
A3	A summary description of the tool including the main objective.
	<p>BioSAT is a tool which aims to evaluate USA states to create a relational database for geographic-based economic cost assessment for woody and agricultural residue biomass collection or processing demand centres.</p> <p>The integrated suite of site assessment tools provides a web-based economic decision-making framework for agricultural and forestry biomass that appeals to a broad client base by providing supply chain cost and logistics for cellulosic biomass markets and products.</p> <p>BioSAT focuses on:</p> <ul style="list-style-type: none"> - Supply chain cost and logistics from farm/forest gate to collection or conversion facility - Maps and display up-to-date baseline data for public and business leaders - Assess the economic availability of woody and agricultural-derived biomass - Identifies local market conditions - Reduces screening time in locating favourable sites for full business case due diligence
A4	Most recent update of the information in the tool (year)?
	2011
A5-1	Main type of users targeted?
	<ul style="list-style-type: none"> ○ consultants/scientist/advisors, searching for specific information on a wide number of issues e.g. availability, costs, regulations, and calculation tools; <p>BioSAT aims at facilitating the decision process to biomass producers, harvesters, pre-processing companies and transport and logistics companies through the whole biomass value chain since is an analytical tool to estimate the average, total and marginal costs for mill residues, logging residues, agricultural residues, and merchantable wood (pulpwood and sawtimber) for 33 Eastern United States</p> <p>BioSat can be also consider as a very good tool for policy makers, public bodies and regional administrations since provides a mapping of different regions showing different biomass characteristics and availability.</p>
A5-2	Experience of users most suitable to use the tool



	<ul style="list-style-type: none"> - users with little knowledge of the topic and understanding of online tools - users with some knowledge of the topic and understanding of online tools T <p>BioSat -with the guided dashboard- enables a very intuitive navigation through the tool, as well as a detailed choice for the tool user.</p> <p>BioSat tool estimates the total costs, average total costs, and marginal cost of biomass at the mill gate. The cost of the resource, harvesting cost, and transportation cost are included in the estimate.</p>
A6	Type of tool?
	Assessment tool
A7	Countries and/or regions that are covered by the tool.
	USA
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	USDA Forest Service; The Southeastern Sun Grant Centre; The University of Tennessee; North Carolina State University; Oak Ridge National Laboratory; U.S. Department of Energy; U.S. Department of Transportation; and U.S. Endowment for Forestry and Communities.
A9	Types of biomass covered?
	<ul style="list-style-type: none"> - Agricultural residues - Forest residues - Dedicated crops
A10	Types of biomass conversion covered?
	<ul style="list-style-type: none"> - Food - Feed - Biofuels - Bioenergy
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information
	<p>Biomass supply information:</p> <p>The tool covers 84 different types of cellulosic feedstocks in all USA territory</p> <p>Costs of production, logistics, and transportation of cellulosic feedstocks.</p> <p>It is shown the potential of the selected biomass in Tn as well as the marginal cost. The data are shown using maps and GIS data..</p>
C. Usability of the tool/interaction with the user/user friendliness	



C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>The tool is very intuitive and easy to use. The tool does not allow to introduce your own data.</p> <p>It aims at providing a better insight of the underused biomass and the resources in specific zones.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,)</p> <p>How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Is the interface clear and easy to use?</p> <p>The interface is well ordered and very intuitive.</p> <p>How is the use of the tool explained?</p> <p>The tool is very easy to use but it does exist a manual with all explanations</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>How can the user interact with the data?</p> <p>There is no possibility to change, modify or including new data within the tool</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>None</p>
C5	<p>What advanced help functions are available?</p> <p>None</p>
C6	<p><i>The interaction with the tool</i></p> <ul style="list-style-type: none"> ○ is intuitive and simple ○ is generally easy and well explained <p>The tool is very intuitive and provides a continued accompaniment through the whole using process (guided dashboard). Along BioSat tool, several pictures appear which illustrate some of the given options/answers.</p>
C7	<p><i>How simple or expensive is the tool in user functionalities</i></p>



- **is very extensive and offers the user many options for e.g. data input and presentation**

The options for the users are multiple, with a great variety of feedstock to be chosen among the given root categories: forest and agricultural.

BioSat allows to show the biomass characteristics and availability of 33 states (USA).

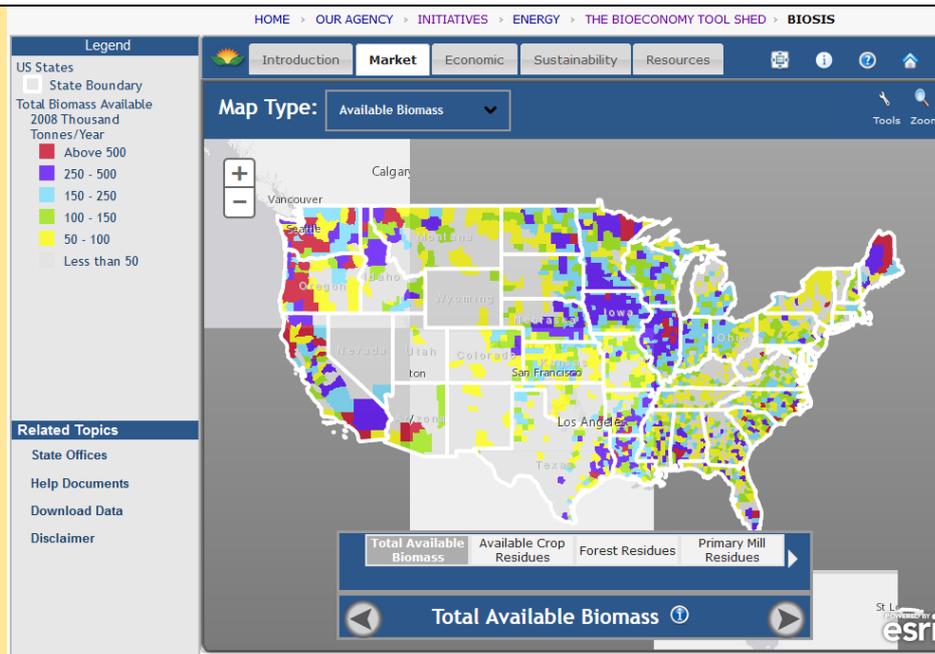


4. Bioeconomy Toolshed

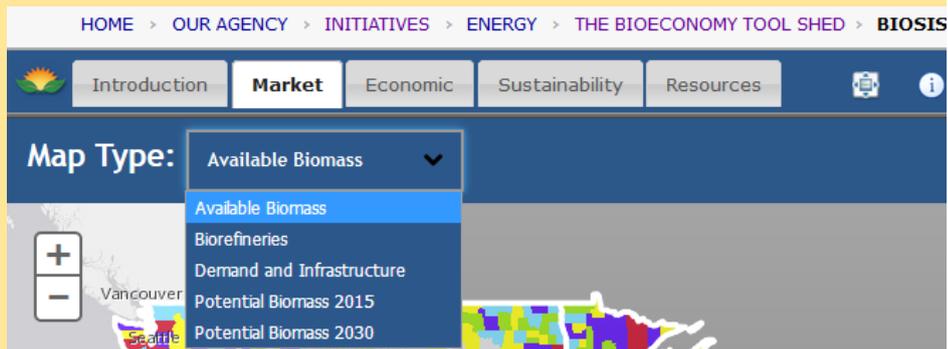
A. General	
A1	Full name and acronym of the tool.
	The Bioeconomy Tool Shed
A2	Home page of tool and if relevant also subpages (URL)
	https://www.usda.gov/energy/maps/html/energytool.htm
A3	A summary description of the tool including the main objective.
	<p>The Bioeconomy Tool Shed is an initiative of the U.S. Department of Agriculture, a web-based tool that is still in development progress. The main objective is to provide stakeholders the access to the agro-, economic, socio-, and technical data in order to enable them to identify renewable energy opportunities.</p> <p>The tool will encompass the information on land use for producing biomass and energy crops, cost to produce them, competition for biomass, blending terminals, fuel stations, state and federal policy, USDA guidelines for and financial assistance, and state and federal office locations for agriculture, energy, environmental protection, and conservation. The Tool Shed aims to focus mainly on biofuels for transportation.</p>
A4	Most recent update of the information in the tool (year)?
	Still in progress of development
A5-1	Main type of users targeted?
	<ul style="list-style-type: none"> ○ policy makers, exploring options for a region new to bioeconomy; ○ industry, requiring detailed and reliable information for a wide number of operational issues possibly using calculations, adding own data. <p>Biorefinery Stakeholder Information System (BioSIS): local, state or federal officials; investors or financial lenders; farmers, ranchers or private landowners (USA); Using this tool, stakeholders can perform market and economic analysis on the viability of a renewable fuels project, and on the potential benefits of selling your feedstocks to a refinery rather than in the traditional sales market.</p> <p>The tool is most useful for the policy-makers and the industry. Using the tool, both groups could spot gaps and possibilities for development of bioeconomy in a particular State or region. Both groups have the strongest direct impact on bioeconomy through policy instruments or business projects.</p> <p>In addition, the tool is useful for the consultants or scientific community to conduct specific case-studies (for example, modelling scenarios of the regional development</p>
A5-2	Experience of users most suitable to use the tool



	<ul style="list-style-type: none"> • users with some knowledge of the topic and understanding of online tools • advanced users <p>The tool contains specific data (crops market data, biorefineries capacity bio-gas information, etc) that is more suitable for stakeholders with previous knowledge of the topic in order to make best use of it</p>
A6	Type of tool?
	- Data/information mobilisation tool
A7	Countries and/or regions that are covered by the tool.
	The tool aims to cover the biomass development and renewable energy opportunities in the U.S
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	The U.S. Department of Agriculture.
A9	Types of biomass covered?
	It includes crop residues, forest and primary mill residues, secondary mill and urban wood waste, methane emissions from landfills, domestic wastewater treatment, and animal manure.
A10	Types of biomass conversion covered?
	<ul style="list-style-type: none"> • energy carriers only (biogas, biodiesel, bioethanol, biofuels)
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information
	<p>Biomass supply information:</p> <p>At the moment of this evaluation the tool provides information about biomass supply.</p> <p>The “Biorefinery Stakeholder Information System” (BioSiS) includes a biomass availability map which presents Total Biomass Resources by county. “These maps estimate the biomass resources currently available in the United States by county. They include the following feedstock categories: crop residues (5 year average: 2003-2007) forest and primary mill residues (2007), secondary mill and urban wood waste (2002), methane emissions from landfills (2008), domestic wastewater treatment (2007), and animal manure (2002).”</p>



Other types of maps can also be investigated (see the screenshot below) but the data are old and not updated.



Biomass cost information:
Not yet specified.

Metadata given?

In the section BioSIS, the Crop Production Value Calculator includes reference to the original source (USDA Economic Research Service) from where the values were taken.

In the section of USDA Biogas Information System, the references for biogas infrastructure, fueling stations and pipelines are provided.

Biomass characteristics (quality & composition) information:
Not yet specified.

B2 Information on logistics:
Spatially specific assessment options for logistics



At the moment of this evaluation the tool does not provide much information about logistics.

B3

IMARKETS:

Biomass market information:

Biobased product market information:

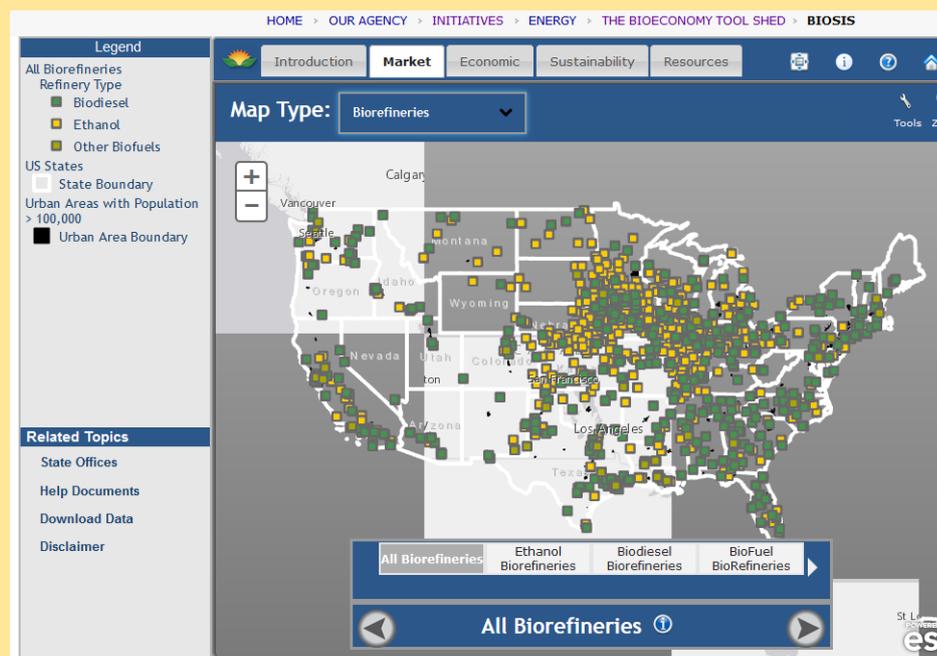
The “Biorefinery Stakeholder Information System” (BioSiS) includes two sections related to market information (however, as mentioned at B1, the data do not seem to be updated):

- ‘Market’ section: “A map application that presents a variety of information to assist the user in evaluating the feasibility and opportunities in locating a new biorefinery in the United States. The information is organized into different map types that allow the user to scroll through data layers relevant to that map type. The Investor or Financial Lender site contains Available Biomass, Biorefineries, Demand and Infrastructure, Potential Biomass 2015, and Potential Biomass 2030 map types. Tools allow the user to generate custom reports that compare or summarize information in the current map.”
- ‘Economic’ section: “Provides hypothetical calculated values based on input values and economic/market assumptions. The calculations are based on the BioFuels Digest BioFuels Venture Value Calculator.”

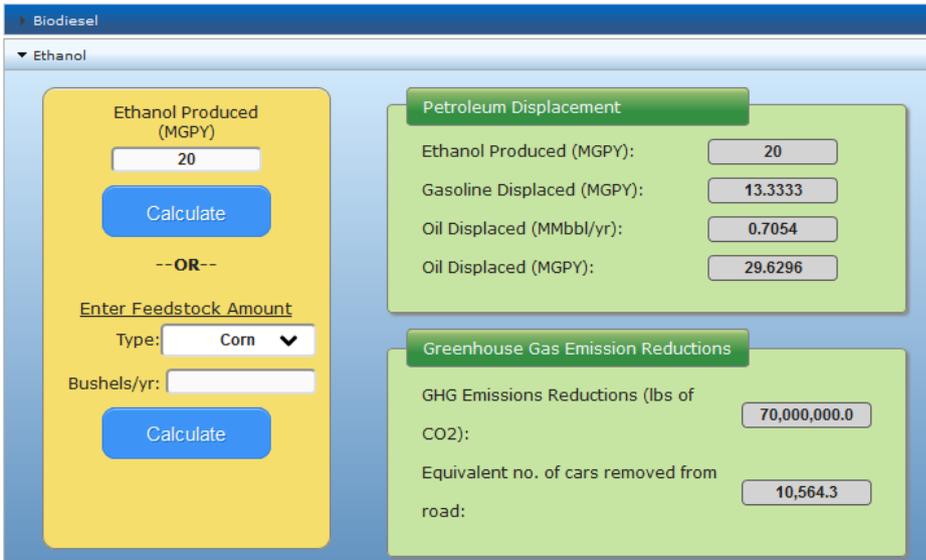
B4

Good practice examples of biomass conversion technologies.

The “Biorefinery Stakeholder Information System” (BioSiS) includes different maps (see B1) under its ‘Market’ section where the user can select ‘Biorefineries’ from the dropdown list and look for existing plants (ethanol, biodiesel, biofuel etc.) in the USA:





<p>B5</p>	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p> <p>The Tool Shed plans to incorporate the data on state and federal policy and USDA guidelines for and financial assistance. It also expects to assist the users with information regarding state and federal office locations for agriculture, energy, environmental protection, and conservation.</p> <p>In the 'Resources' section of the BioSiS there is a collection of Incentive Programs.</p>
<p>B6</p>	<p>Information on options for finances/investors/subsidies:</p> <p>In the 'Resources' section of the BioSiS there is a collection of financing opportunities.</p>
<p>B7</p>	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <p>The "Biorefinery Stakeholder Information System" (BioSiS) includes a section related to sustainability, which provides a sustainability calculator "to determine the amount petroleum displaced and the amount of greenhouse gas savings from different renewable fuels and feedstock."</p>  <p>"This calculator estimates the amount of petroleum displacement and greenhouse gas emission savings from the production of ethanol and biodiesel. To use the calculator expand either the Ethanol section or the Biodiesel section below. Enter the amount of fuel produced (ethanol or biodiesel) or the amount of feedstock produced to calculate Petroleum Displacement and Greenhouse Gas Emission Savings."</p>
<p>C. Usability of the tool/interaction with the user/user friendliness</p>	
<p>C1</p>	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>To provide stakeholders the access to the agro-, economic, socio-, and technical data in order to enable them to identify renewable energy opportunities.</p> <p>Who are the target users of the tool, according to the developers?</p>



	<p>The tool can be used by the following main user groups:</p> <ol style="list-style-type: none"> 1. policy makers, looking for high level information and case studies; 2. consultants/scientists, requiring accurate and detailed information on several aspects of the biomass chain; 3. Industry, same as the consultant/scientist plus calculations, adding own data). <p>It is still unclear to what extent the tool can match the expected users' needs because it is still under development.</p> <p>BioSIS provides market overview of biomass: crops production costs and returns per planted acre, demand and availability of biomass as well as existing biorefineries in the U.S. Yet, this information does not completely match the needs of the policy-makers or consultants/scientists because it is outdated. The large amount of data is from 2000 – 2013.</p>
C2	<p>Is the interface clear and easy to use ? <i>(e.g. intuitive, consistent, well-ordered,)</i></p> <p>How is the use of the tool explained ? <i>(e.g. manual, course, context-sensitive help)</i></p> <hr/> <p>Is the interface clear and easy to use ? <i>(e.g. intuitive, consistent, well-ordered, ...)</i></p> <p>How is the use of the tool explained ? <i>(e.g. manual, course, context-sensitive help ...)</i></p> <p>The objectives of the tool and its parts are stated clearly. The use of the tool is explained in the Help document and useful information can be read by clicking on the 'About BioSIS' button.</p> <p>Help document: https://www.usda.gov/energy/maps/html/biosis_help_document.htm</p> <p>Map layer descriptions: https://www.usda.gov/energy/maps/resources/BioSISMap_Documents/\$file/BioSISMapLayerDescriptions.pdf</p>
C3	<p>How can the user interact with the data ? <i>(e.g. possibility to change or add data, change default values)</i></p> <p>What kind of search or select functions are available ? <i>(e.g., text search/select, picklists, geographic search/select)</i></p> <hr/> <p>How can the user interact with the data? <i>(e.g. possibility to change or add data, change default values)</i></p> <p>'Market' and 'Sustainability' sections of the "Biorefinery Stakeholder Information System" (see descriptions in B3 and B7) are calculators where custom data can be set by the users.</p> <p>What kind of search or select functions are available ? <i>(e.g., text search/select, picklists, geographic search/select)</i></p>



	maps with changeable content calculators
C4	What advanced functionalities are available? (<i>e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool</i>)
	Data can be downloaded according to the “Application Data Downloads” guide: https://www.usda.gov/energy/maps/html/re_download_documents.htm
C5	What advanced help functions are available?
	Not available
C6	<i>The interaction with the tool</i>
	<ul style="list-style-type: none">○ requires some effort but is easy to learn or well explained <p>The Bioeconomy Tool Shed could be easier to navigate and more comprehensive if the BioSIS and Biogas Information System would be combined in one.</p> <p>Additionally, when opening the BioSIS or Biogas Information System, they appear on the left side window not under the Bioeconomy Tool Shed section, but under the Energy section, which can be confusing. Yet, once these confusions are overcome, the tools are easy to use.</p>
C7	<i>How simple or expensive is the tool in user functionalities</i>
	<ul style="list-style-type: none">- offers the user some functions regarding e.g. search functions or data presentation <p>There is no option to input the users’ data. The users can choose from different sub-sections and drop-down lists which information to display.</p>



5. FAO Food Balance Sheet database

A. General	
A1	Full name and acronym of the tool.
	FAO Food Balance Sheet database
A2	Home page of tool and if relevant also subpages (URL)
	http://www.fao.org/faostat/en/#data/FBS/visualize Handbook: http://www.fao.org/3/x9892e/x9892e00.pdf
A3	A summary description of the tool including the main objective. Food Balance Sheet presents a comprehensive picture of the pattern of a country's food supply during a specified reference period. The food balance sheet shows for each food item - i.e. each primary commodity and a number of processed commodities potentially available for human consumption - the sources of supply and its utilization.
A4	Most recent update of the information in the tool (year)?
	Time coverage 1961-2013. Food Balance Sheets (FBS) are compiled every year by FAO, mainly with country-level data on the production and trade of food commodities. Data are uploaded for dissemination once a year. Last update December 12, 2017.
A5-1	Main type of users targeted?
	<p>The tool established that the main users are FAO analysts, other international organizations, ministries and government agencies, agro-industry, trade and professional associations, research institutes and universities, journalists and general public. The objectives of these users vary, but agriculture production statistics are especially useful for market management/monitoring, production forecasts and policy-making in agriculture and food.</p> <p>Based on the type of data obtained the most suitable users are policy makers, NGO and other organisations and consultants/scientist/advisors. BUT I would not say policy makers exploring options for bioeconomy (the tool will not be very useful to explore such options) more to assess potential feedstock for bioeconomy applications. NEITHER consultants nor scientist searching for specific information but instead looking for general information regarding resources at country level.</p> <p>As mentioned in section A5, the tool established that the main users are FAO analysts, other international organizations, ministries and government agencies, agro-industry, trade and professional associations, research institutes and universities, journalists and general public</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> • users with little knowledge of the topic and understanding of online tools



	It is especially suitable for users with little knowledge of the topic and understanding of online tools but really all possible users listed can work with the tool. The tool allows to search for information on the topic by selecting among options, this process does not required high level skills but to be familiar with the figures provided to be able to efficiency carry out the search/selection. For instance, selecting the country and year/period is not complicated but to select the item (crop or product derived) and the element (for example food supply quantity (kg/capita/year)) would be easier and more efficient with a background working with such figures.
A6	Type of tool? Mainly data/information mobilisation
A7	Countries and/or regions that are covered by the tool. All countries of the world and geographical aggregates according to the United Nations M-49 list.
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool. FAO (Food and Agriculture organization of the united Nations)
A9	Types of biomass covered? Most crop and livestock products, including processed products under agricultural activity. The list also includes residues
A10	Types of biomass conversion covered? The conversion technologies that can be selected to build the scheme are: <ul style="list-style-type: none"> • Food • Feed • Biofuels
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information Main groups: cereal and products, roots/tubers and products, sugar and syrups, pulses, oil crops, vegetables and products, tree nuts, fruit and products, meat, fish and fisheries products, milk and cheese, stimulants, alcoholic beverages, spices, eggs, oils and fats, miscellaneous <ul style="list-style-type: none"> • Number of biomass types covered: 99 categories considered • Quantitative information on biomass availability: The total quantity of foodstuffs produced in a country added to the total quantity imported and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period. On the utilization side a distinction is made between the quantities exported, fed to livestock, used for seed, put to manufacture for food use and non-food uses, losses during storage and transportation, and food supplies available for human consumption. The per caput supply of each such food item available for human consumption is then obtained by dividing the



	<p>respective quantity by the related data on the population actually partaking of it. Data on per caput food supplies are expressed in terms of quantity and - by applying appropriate food composition factors for all primary and processed products - also in terms of caloric value and protein and fat content.</p> <ul style="list-style-type: none"> • Biomass expressed in different types of potential figures: see previous paragraph • Supply data provided at high spatial resolution level: No, country level not geographically located. • Long-term competitive and consistent availability: The food component of the commodity account, which is usually derived as a balancing item, refers to the total amount of the commodity available for human consumption during the year. Besides commodity-by-commodity information, the FAO FBS also provide total food availability estimates by aggregating the food component of all commodities including fishery products. From these values and the available population estimates, the per person dietary energy and protein and fat supplies are derived and expressed on a daily basis. In the FBS production data refer only to primary products while data for all other elements also include processed products derived there from, expressed in primary commodity equivalent. (See also paragraph referring to the Quantitative information on biomass availability) <p>Biomass cost information: NO</p> <p>Metadata given: one of the tabs of the tool allows the user to access the metadata</p> <p>Biomass characteristics: NO</p>
B2	<p>Information on logistics: Spatially specific assessment options for logistics</p> <p>Only display some results in maps.</p>
B3	<p>IMARKETS: Biomass market information: Biobased product market information:</p> <p>No information</p>
B4	<p>Good practice examples of biomass conversion technologies.</p> <p>No information provided</p>
B5	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p> <p>Information on policies/regulations/stimulation measures?</p> <p>No</p>



	<p>Information on visions, strategies & roadmaps. NO</p> <p>Existence of regional development planning NO</p>
B6	<p>Information on options for finances/investors/subsidies:</p> <p>NO</p>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <ul style="list-style-type: none"> • Information on GHG emissions/mitigation: NO • Information on Land use change impacts: NO • Information on Impacts on biodiversity & ecosystems: NO • Information on other impacts on environment (water, soil, air, including resource depletion aspects): NO • Information on socio-economic impacts (e.g. information on e.g. number of employees in bioeconomy industries/sector, income derived from bioeconomy sector, turnover from bioeconomy etc.): NO <p>Information on certification schemes: NO</p>
C. Usability of the tool/interaction with the user/user friendliness	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>According to the developer's definition of the tool (see section A3) and the final users targeted (public institutions, researchers and advisors), the data provided can be consider as adequate for public entities but most probably not for researcher that might need a higher level of detail. The information is easy to understand and search (just need to select among the criteria given to visualize the data) but no explanation is provided and the information display can create doubts.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>Interface easy: Yes</p> <p>Use of the tool explained: Online link to metadata documents provide some explanation, otherwise the tool is based on the selection and download or visualization of data. Handbook available to download but does not provide specific information regarding the tool browsing.</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p>



	<p>Interaction of the user with the data: NO</p> <p>Search functions available: Yes, quite basic but can select among countries, elements (production quantity, import, stock, export, domestic supply, etc.) items (cereal, rye, fruits, etc.) and years.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>Download data and select the criteria for consultation of data is possible as mentioned in the previous section but not to access the calculation (calculation to obtain the import, exports, etc for instance)</p>
C5	<p>What advanced help functions are available?</p> <p>No advanced help</p>
C6	<p>The interaction with the tool</p> <ul style="list-style-type: none"> o requires effort and reading background (help) files <p>In my opinion is generally easy BUT NOT WELL EXPLAINED. The number of possible interactions is quite limited, mainly focus on the search in the database according to a certain number of parameters. Nevertheless, it is not well explained, and the user needs to dig in to get an overview of the potential information available. The search even if not well explained is quite intuitive. The more familiar the user is with these figures the easier the selection/search. The handbook does not provide useful indications on how to navigate in the Food balance sheet and carry out the search or download of the information, it does not provide indication on how to use the tool but focus on explaining the information contained.</p>
C7	<p>How simple or expensive is the tool in user functionalities</p> <ul style="list-style-type: none"> - is very simple and offers the user limited functions <p>As mentioned in the previous section and sections C3 and C4 the tool allows to visualize, make consultation by selecting among different parameters (such as country/regions, special groups, elements (population, production quantity, import quantity...), items (population, wheat and products, rice, barley...) and years) but it is not possible access the calculation (for instance calculation to obtain the import, exports, etc.</p>



6. TRASE

A. General	
A1	Full name and acronym of the tool.
	TRASE: Transparent supply chains for sustainable economies
A2	Home page of tool and if relevant also subpages (URL)
	<p>https://trase.earth/? https://trase.earth/about?</p> <p>TRASE Vision 2020 http://resources.trase.earth/documents/Trase-vision-for-2020.pdf</p> <p>SEI-PCS supply chain assessment method http://resources.trase.earth/documents/SEI-PCS_2_3_Factsheet.pdf</p>
A3	A summary description of the tool including the main objective.
	<p>It is a tool to trace the supply chains of agricultural commodities associated with deforestation risk as well as their impacts on land and water use, biodiversity, greenhouse gas emissions and rural development. It serves to identify sourcing regions, supply chain risks and opportunities for sustainable production of forest-risk agricultural commodities. TRASE tool is presented in the form of online database (website) which maps the sustainability profile of a company or a region in relation to the commodities as soy, palm oil, timber, pulp, coffee, beef, etc.). There is an option to download the database from the TRASE website.</p> <p>The main objectives of the tool are:</p> <ul style="list-style-type: none">- Increase transparency, reveal links to environmental and social risks as well as create opportunities for supply chain improvement for forest-risk agricultural goods.- Raise awareness about the role that traders, governments and consumers play in the sustainable supply chains. <p>The supply chain mapping is conducted by researchers at the Stockholm Environment Institute using the Spatially-Explicit Information of Producer to Consumer Systems (SEI-PCS) approach. Currently, TRASE encompasses several countries in Latin America and Indonesia but expects to extend the supply chain database to cover over 70% of the total traded volume of major forest-risks commodities by 2020. Additionally, the TRASE plan to incorporate an annual sustainability performance assessment of regions and actors that drive the production and trade in major forest-risk commodities.</p> <p>Such measures should drive down the costs of sustainable production by gathering efforts of multiple actors who share a connection to the same production landscapes.</p>



	<p>The possible flows of the TRASE tool: The tool maps export commodity supply chains to the first country of import. It does not show the further steps that the commodity may undergo before it reaches the consumer.</p>
A4	<p>Most recent update of the information in the tool (year)?</p> <p>2017</p>
A5-1	<p>Main type of users targeted?</p> <ul style="list-style-type: none"> o policy makers, exploring options for a region new to bioeconomy; o consultants/scientist/advisors, searching for specific information on a wide number of issues e.g. availability, costs, regulations, and calculation tools; <p>Since the main objective of the tool is to increase transparency in the commodity value chain regarding its possible environmental and social risks, the tool is specifically useful for environmental consultants, scientists and policy-makers. For these stakeholders it is relevant to see the whole value chain of the commodity to assess where the improvements are possible. Environmental consultants and scientists have the capacity to advise the policy makers, the policy makers have the capacity to influence the value chain. For the financiers, industry and commodity producers this tool is also relevant (some of them may also want to improve transparency of the value chain and eliminate the risks). Yet, by the nature of their activity, they already possess – partly or fully - the information in the TRASE tool. In fact, it is up to them, to disclose the information about their supply chains.</p>
A5-2	<p>Experience of users most suitable to use the tool</p> <ul style="list-style-type: none"> o users with some knowledge of the topic and understanding of online tools o advanced users <p>The tool complies important and complicate information about supply chains of a commodity, including trade volume, financial flows and actors involved. This data can be confusing and unclear to novice users or those with little knowledge of the topic. Yet, it is most suitable for users with good or advanced knowledge of supply chains because they would fully understand the impact of the commodity on the market.</p>
A6	<p>Type of tool?</p> <p>- It can be considered both data/information mobilisation tool as well as design of chains instrument.</p> <p>Online free-of-charge geospatial database on supply chains for key forest-risk agricultural commodities and sustainability impacts associated with their production: deforestation, GHG emissions, biodiversity impacts, workers' conditions and human rights.</p>



A7	Countries and/or regions that are covered by the tool.
	Initially TRASE was developed for soy production in Latin American countries. Later, it expanded to beef production in Argentina, Brazil and Paraguay, palm oil production in Indonesia and Colombia and coffee production in Colombia. The tool expects to embrace more regions and commodities as the platform develops.
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	Stockholm Environment Institute and Global Canopy are main developers of the tool, in close cooperation with Vizuality, the European Forest Institute.
A9	Types of biomass covered?
	- Forest-risk agricultural commodities such as soya, palm oil, beef, etc.
A10	Types of biomass conversion covered?
	- Food and consumers' goods associated with negative environmental impact on forest.
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information
	<p>Biomass supply information:</p> <ul style="list-style-type: none"> - Types of biomass covered: forest-risk agricultural products. TRASE provides contextual information on companies and geographies of production, corporate and governmental sustainability commitments and sectoral market share of agricultural goods with impact on forest. <p>- Number of biomass types covered More than 5: soy, crude palm oil, palm kernel, sugarcane, coffee, cocoa, shrimp, cotton, chicken, beef, corn, wood pulp.</p> <p>- Quantitative information on biomass availability that is provided (e.g. in totals per area, biomass density) Production of a good in million tonnes and traded volume of a good in million tonnes.</p> <p>- Is biomass expressed in different types of potential figures (e.g. technical potential, sustainable potential, economic potential, currently exploited and unexploited potential, current and future potentials etc.).</p> <p>The biomass is expressed by:</p> <ul style="list-style-type: none"> - area of cultivation (ha) - agricultural land use for commodity (% of total land) - commodity yield (t/ha) - amount of production (t) - traded volume (t) and export by countries (% of total volume) - deforestation risks related to a commodity (ha) - land based CO2 emissions related to a commodity (t)



	<ul style="list-style-type: none">- domestic and foreign consumption of a commodity (%) <p>-Supply data provided at high spatial resolution level (e.g. national, regional, grid (what size?)) Both national and regional mapping of supply chains and environmental impacts is available.</p> <p>- Information sources. TRASE data is based on datasets such as the National Registry of Legal Entities (CNPJ), Individual Taxpayer Registry (CPF) and the cadastre of agricultural exporters (SICASQ).</p> <p>Biomass cost information: - The cost per unit of biomass is not mentioned.</p> <p>Metadata given? - Metadata on biomass cost-supply input is not explicitly referenced, but claimed to be taken from companies websites and national registers.</p> <p>Biomass characteristics (quality & composition) information: - Not specified.</p>
B2	<p>Information on logistics: Spatially specific assessment options for logistics</p> <ul style="list-style-type: none">- TRASE uses existing data, such as customs records and trade contracts, tax registration data, and production data to construct a supply chain. The users can use the supply chain mapping approach (SEI-PCS) to add their own datasets on material flows. <p>The SEI-PCS approach constructs a supply chain of a commodity using the export data at the national-level and creating links between country of production, commodity traders and countries of import. The national level serves as a first step for a more detailed material flow trace on regional and local levels. Additionally, users can obtain information about environmental and socio-economic indicators related to the production of a commodity on each level.</p> <p>Spatially specific assessment options for logistics available:</p> <p>Users can observe the geospatial information and identify the source, yield, production volume and trade volume of a commodity on different levels: national, regional and local.</p>
B3	<p>IMARKETS: Biomass market information: Biobased product market information:</p> <p>Biomass market information:</p> <ul style="list-style-type: none">- The users can track the volume of a commodity produced and purchased in the country/region as well as observe the changes over time.- Information about the commodity traders, their share in a commodity export.



B4	<p>Good practice examples of biomass conversion technologies.</p> <p>- Brazilian soy report contains a comprehensive socio-economic and environmental information and can be considered TRASE flagship achievement.</p>
B5	<p>Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.</p> <p>TRASE Yearbook 2018 (https://yearbook2018.trase.earth/chapter6/) contains information regarding policies and regulation measures of soya in Brazil, such as Amazon Soy Moratorium, <u>LAPIG alert system</u> to monitor deforestation, Brazil's Forest Code, etc.</p>
B6	<p>Information on options for finances/investors/subsidies:</p> <p>No information on investment costs or bio-economy support programmes from Banks or Funds.</p>
B7	<p>Information on GHG emissions/LCAs and other sustainability aspects:</p> <p>Assessment of deforestation risks, CO2 emissions risks, water scarcity and land conflicts in tropical regions due to the production of certain agricultural goods.</p>
<p>C. Usability of the tool/interaction with the user/user friendliness</p>	
C1	<p>What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?</p> <p>Mainly two:</p> <ul style="list-style-type: none"> - Increase transparency, reveal links to environmental and social risks as well as create opportunities for supply chain improvement for forest-risk agricultural goods. - Raise awareness about the role that trades, governments and consumers play in the sustainable supply chain. <p>Who are the target users of the tool, according to the developers? The main users can be linked to the main user groups:</p> <ul style="list-style-type: none"> - policy makers, looking for high level information and case studies; - consultants/scientists, requiring accurate and detailed information on several aspects of the biomass chain; - industry, same as the consultant/scientist plus calculations, adding own data). <p>The objectives of the tool match the needs mainly of scientific community and stakeholders. In general, the tool and its instructions is easy to understand.</p>



C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>TRASE is an online tool which is relatively easy to use. It has a limited database and the use of the online tool, in particular the use of maps, depends on the quality of the internet. The picklists and the selection of parameters is easy to find. The results are presented in maps and tables as well as Sankey diagrams for commodity material flows.</p> <p>TRASE is also being designed to integrate with other platforms that provide complementary information on everything from regional economic benefits of agricultural production. The TRASE database can be downloaded.</p> <p>How is the use of the tool explained? The information about the tool can be found on its website. Additionally, there is a manual for the TRASE supply chain method. http://resources.trase.earth/documents/Trase_supply_chain_mapping_manual.pdf</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p> <p>The users select the set of parameters which give them information about the desired commodity and its supply chain. There is no possibility for entering users' data on the website. Therefore, it is not clear how to integrate and/or complement the individual data with TRASE database.</p> <p>What kind of search or select functions are available? (e.g., text search/select, picklists, geographic search/select)</p> <ul style="list-style-type: none"> - The software allows to create one's own database by selecting the countries of production, countries of consumption, companies and commodities of interest. Additionally, the user also selects the timeframe (years) and sustainability indicators.
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>Select and download the database by country, commodity, company, trade volumes and years https://trase.earth/data?</p>
C5	<p>What advanced help functions are available?</p> <p>none</p>
C6	The interaction with the tool



	<ul style="list-style-type: none">○ In generally easy and well explained <p>It is an online tool which is very easy to navigate. The possible problem of this online tools is the quality of in internet connection (takes time for the online maps to load).</p>
C7	<i>How simple or expensive is the tool in user functionalities</i>
	<ul style="list-style-type: none">- offers the user some functions regarding e.g. search functions or data presentation <p>It is not an extensive tool, there is no option of data input from the users. But it offers the users the possibility to choose which specific value chain to look for.</p>



7. Water and Greet

A. General	
A1	Full name and acronym of the tool.
	Water and GREET: The Greenhouse gases, Regulated Emissions, and Energy use in Transportation Model.
A2	Home page of tool and if relevant also subpages (URL)
	https://greet.es.anl.gov/
A3	A summary description of the tool including the main objective.
	<p>GREET is a life-cycle analysis (LCA) to assess energy and environmental effects of a wide range of transportation fuels and vehicle technologies in different transportation sectors (road, air, marine, and rail). Such assessment serves to analyze the possible pathways for fuel economy. There are two GREET modelling platforms; GREET Excel is a multidimensional spreadsheet model that provides a comprehensive LCA tool and GREET.Net provides an interactive graphical toolbox to perform LCA.</p> <p>Main objectives:</p> <ul style="list-style-type: none">- Simulation of energy use and CO2 output of various vehicles and fuel combinations; assessment of energy and environmental impact of technology.- Estimation of possible future scenarios for fuel economy. <p>GREET estimate the fuel economy taking as a baseline conventional gasoline vehicles for three vehicle types - cars, light-duty truck LDT1, and LDT2 - in miles-per-gallon gasoline equivalent (MPGGE). The other fuel economy estimation of other types of vehicles are estimated in relation to the baseline.</p> <p>GREET provide estimation for every 5-year interval from 1990 up to 2050 considering potential improvements in fuel economy over time.</p>
A4	Most recent update of the information in the tool (year)?
	2018
A5-1	Main type of users targeted?
	The scientific community, environmental consultants and the industry specialists are the stakeholders with the required advanced knowledge (LCA, and sector-related knowledge) to use the tool. Other groups – policy-makers, financiers or NGOs could be confused by the complexity of the methodology.
A5-2	Experience of users most suitable to use the tool



	<ul style="list-style-type: none"> Advanced users <p>The tool is a methodology on how to assess the impacts of fuels and of transport technologies. It contains zip file with excel sheets - for fuel and for transport technologies - with extensive explanation on how to conduct assessment and input datasets for different types of fuels and technologies. An advance knowledge of life cycle assessment and of the topic is required to be able to conduct the assessment</p>
A6	Type of tool?
	Assessment tool
A7	Countries and/or regions that are covered by the tool.
	The data which refers to vehicle technology is not restricted by the region or country. The data referring to the fuels distinguished between fuels from North America and other fuel sources due to the differences in fuel characteristics.
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	Argonne National Laboratory with the support of U.S. Department of Energy.
A9	Types of biomass covered?
	Farmed trees, herbaceous biomass, forest residue, corn stover soybean, palm, jatropha, rapeseed, and camelia, and canola for bio fuel production.
A10	Types of biomass conversion covered?
	<ul style="list-style-type: none"> - Biofuels - Bioenergy - Biochemicals
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information



	<p>Biomass supply information:</p> <p>Not mentioned.</p> <p>Biomass cost information:</p> <p>The GREET model relies on economic data from Autonomie Report (Moawad et al. 2016) to estimate the fuel economy for the various vehicle and fuel combinations by 2050. The tool includes information about market shares of fuel production options for given transportation fuels, including biomass feedstock shares.</p> <p>Metadata:</p> <p>The references are given in Chapter 3 of the Operational Manual and on the Argonne National Laboratory website https://greet.es.anl.gov/publications</p> <p>Biomass characteristics (quality & composition) information:</p> <p>Soya beans, palm oil, jatropha canola farming and oil extraction for biomass production are defined by:</p> <ul style="list-style-type: none"> - Farming Energy Unit (Btu/ton dry / MJ/MT dry/ or Btu/kg dry) - Lipid and moisture content - CO2e Emissions from LUC.
B2	<p>Information on logistics:</p> <p>Spatially specific assessment options for logistics</p> <p>Transportation of biomass: while setting parameters for LCA, the users define transportation distance from feedstock production sites to final destinations.</p>
B3	<p>IMARKETS:</p> <p>Biomass market information:</p> <p>Biobased product market information:</p> <p>GREET provides data on</p> <ul style="list-style-type: none"> - Electric Generation Mix of the United States, and 8 NERC Regions from 2016 until 2050. - Fuel Economy Time Series (every 5 years) for Passenger Cars LDT1 LDT2 since 1990 until 2050. <p>Biobased product market information:</p> <p>Crude Oil Share in the United States from 2017 by 2050.</p>
B4	<p>Good practice examples of biomass conversion technologies.</p> <p>No information provided</p>
B5	<p>Information on policies/regulations/stimulation measures?</p> <p>Information on visions, strategies & roadmaps.</p>



	To simulate the fuel economy by 2050, the GREET model takes into account developments in regulation and market, but they are not described in GREET manual, neither in Excel files.
B6	Information on options for finances/investors/subsidies:
	Not included
B7	Information on GHG emissions/LCAs and other sustainability aspects:
	GREET software separately calculates the following values for a vehicle with a given fuel: <ul style="list-style-type: none"> - Consumption of total resources (energy in non-renewable and renewable sources), fossil fuels (petroleum, natural gas, and coal together), petroleum, coal, natural gas and water. - Emissions of CO₂-equivalent greenhouse gases - primarily carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). - Emissions of seven criteria pollutants: volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxide (NO_x), particulate matter with size smaller than 10 micron (PM₁₀), particulate matter with size smaller than 2.5 micron (PM_{2.5}), black carbon (BC), and sulfur oxides (SO_x). - Emissions and the land-use change due to the production of crops for biofuel. <p>Additionally, among GREET tools there are:</p> <ul style="list-style-type: none"> - Travel Carbon Calculator which estimates travel carbon footprint and find ways to potentially reduce it. - Carbon Calculator for Land Use Change from Biofuels Production (CCLUB).
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers?
	Who are the target users of the tool, according to the developers?
	What are the objectives of the tool, according to the tool developers?
	There are two ways of using GREET tool: software program GREET.Net Model Platform which can be installed in the user's computer and GREET Excel Model Platform. The purpose of the developers was to provide an easy to use software with graphical toolbox to perform and visualise complicated LCA simulation of alternative transport fuels.
	Who are the target users of the tool, according to the developers?



	<p>Targeted users are not mentioned specifically but can be linked to all three main user groups:</p> <ul style="list-style-type: none">- policy makers, looking for high level information and case studies;- consultants/scientists, requiring accurate and detailed information on several aspects of the biomass chain;- Industry, as it is possible in the GREET tool to add once own data. <p>The tool contains a very detailed and comprehensive information which matches the user's needs, in particular the needs of the scientific community.</p>
C2	<p>Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)</p> <p>The users would have to install the GREET.Net or download Excel sheets on their computer in order to use the tool. In case of GREET.Net, it can only be installed in Windows OS with Microsoft net Framework 4.5 installed.</p> <p>Once installed, the tool includes 26 sheets, such as:</p> <ul style="list-style-type: none">- Input Sheet: selection of key variables for various well-to-pump (WTP) and pump-to-wheels (PTW) scenarios, and specifies key parametric assumptions for GREET simulations.- The EF_TS Sheet: presents time-series (TS) tables for emission factors.- The EF Sheet: emission factor for combustion technologies.- The Vehicle Sheet: energy use and emission rates associated with vehicle operations.- Results Sheet- Forecast Sheet: detailed information of defined forecast items for a particular stochastic simulation run. <p>How is the use of the tool explained?</p> <p>Operating manual for GREET tool Version 1.7 https://greet.es.anl.gov/index.php?content=download1x</p> <p>Manuals for different GREET tools https://greet.es.anl.gov/publications</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p>



	<p>The tool includes the default data supplied by the model and values defined by the user.</p> <p>It includes more than 300 processes related to fuel and vehicle combination which can form different fuel economy pathways. The users can combine processes to create an individual pathways for a given product.</p> <p>The GREET.Net data can be visualised graphically and graphical pathway editor allows the user to choose from a variety of default processes and drag and drop it in a pathway that the user creates.</p> <p>What kind of search or select functions are available? (e.g., text search/select, picklists, geographic search/select)</p> <p>Users can add/modify resources, technologies, processes, pathways and vehicles. They can also view and choose upstreams for each input, access technologies and emission factors, and examine process fuel shares.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <ul style="list-style-type: none"> - Units system: allows the user to interact with the data using their preferred measurement units. The same inputs can be defined using different units or quantities. Mass, Volume or Energy are automatically converted to perform the simulation. - Multiple levels of results: the well-to-product results by examining the last process in the fuel production pathway with upstream included;; the well-to-wheels results, including the vehicle operation; the comparison different vehicles and their performance results, etc. - All of the data and results are stored in a single file that is easy to share and archive.
C5	<p>What advanced help functions are available?</p> <p>None</p>
C6	<p>The interaction with the tool</p> <ul style="list-style-type: none"> o requires effort and reading background (help) files <p>The tool provides several publications/manuals/ video tutorials as well as contains explanation in excel sheets on how to use the existing</p>



	data, combine it with one's own specific data and conduct the assessment. It is a very complex tool with extensive data input that is not easy to use without a solid previous knowledge..
C7	<i>How simple or expensive is the tool in user functionalities</i> <ul style="list-style-type: none">- o is very extensive and offers the user many options for e.g. data input and presentation Extensive and confusing tool, split into different files (software which can be installed on the computer and zip file with excel sheets that contain datasets). The users can input their data, combine it with existing one. The visualisation is possible through the software tool.



8. Biomass GeoWIKI

A. General	
A1	Full name and acronym of the tool.
	Biomass Geo-Wiki
A2	Home page of tool and if relevant also subpages (URL)
	biomass.geo-wiki.org https://www.geo-wiki.org/pages/about
A3	A summary description of the tool including the main objective.
	Biomass Geo-Wiki is a tool within the <i>Geo-Wiki: Earth Observation and Citizen Science</i> which contains the comprehensive set of recent biomass data from around the globe, and makes it available for visualization.
A4	Most recent update of the information in the tool (year)?
A5-1	Main type of users targeted?
	<ul style="list-style-type: none"> - Consultants - Researchers - NGOs <p>The Biomass Geo-Wiki is not specifically suited for the advance users. Yet, the scientist community or NGOs could benefit from it by using the references provided with the tool. Although Biomass Geo-Wiki does not calculate the availability or costs of the biomass, it compiles wide range of useful references in itself</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> o novice users o users with little knowledge of the topic and understanding of online tools <p>The tool is more suitable for the novice users or users with little knowledge of the topic mainly for the following reasons:</p> <ul style="list-style-type: none"> - Biomass Geo-Wiki serves as a visualisation tool. The input data is already given and cannot be complemented by the users' data. Therefore, this tool would not be enough for the more advance users that seek to conduct their own case-studies. - The tool is a good entrance point for novice users or those with little knowledge because it contains the overview of the land cover and forestry data around the globe. It is easy to navigate (the users select which data to visualise from already given dataset options) and understand (as the data is



	<p>immediately visualised on the world map). With Biomass Geo-Wiki it is not possible to visualise one's own data or conduct a specific studies. Yet, the novice users are given the option to expand their knowledge following the references provided with datasets.</p>
A6	Type of tool?
	Visualition tool
A7	Countries and/or regions that are covered by the tool.
	Biomass data around the globe.
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	Biomass is part of Ecosystems Services and Management Program (ESM) at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria
A9	Types of biomass covered?
	<ul style="list-style-type: none"> - Above ground live biomass - Forest woody biomass Croplands by physical area and by yield
A10	Types of biomass conversion covered?
	Not covered
B. Content of the tools	
B1	Biomass supply information/Biomass cost information/Metadata given?/ Biomass characteristics (quality & composition) information
	<p>Biomass supply information: Forest biomass</p> <p>Biomass cost information: Not specified.</p> <p>Metadata given? Metadata is available only on biomass availability, not on its costs. Links to relevant background publications are given from where the source of the data displayed can be derived.</p> <p>Biomass characteristics (quality & composition) information: Not specified.</p>
B2	Information on logistics: Spatially specific assessment options for logistics
	None



B3	IMARKETS: Biomass market information: Biobased product market information:
	None
B4	Good practice examples of biomass conversion technologies.
	No information provided
B5	Information on policies/regulations/stimulation measures? Information on visions, strategies & roadmaps.
	None
B6	Information on options for finances/investors/subsidies:
	None
B7	Information on GHG emissions/LCAs and other sustainability aspects:
	With the visualised data of Biomass Geo-Wiki it is possible to assess the changes in land cover and biomass availability over time.
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?
	What are the objectives of the tool, according to the tool developers? Make the biomass data around the globe available and easy to visualise. Who are the target users of the tool, according to the developers? The tool is not very suitable for the three main users groups – policy makers, scientists/consultants or industry – due to the fact that it provides only the visualisation option based on default and limited data.
C2	Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)



	<p>Is the interface clear and easy to use?</p> <p>The users have to undergo a quick registration to use the Biomass Geo-Wiki tool. The interface is quite intuitive to navigate.</p> <p>How is the use of the tool explained?</p> <p>There is no user manual, only a separate explanation on how to use the tool to assess the human impact on tropical forest. In general, the online tool is self-explanatory.</p>
C3	<p>How can the user interact with the data ? (e.g. possibility to change or add data, change default values)</p> <p>What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)</p>
	<p>How can the user interact with the data?</p> <p>The users have no possibility to add their data, only the pictures of a certain location. The data visualisation is based on the default values.</p> <p>What kind of search or select functions are available?</p> <p>The data is presented in a form of picklist</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p>
	<p>It is not clear how to save the visualisation maps and the data for downloading is scarce.</p>
C5	<p>What advanced help functions are available?</p>
	<p>Help text is displayed for each parameter at the bottom of the screen. When a parameter is clicked on help text will be brought up for guidance.</p> <p>Additionally, as a help to the final user, some parameters are labelled indicating that the parameter has a key influence on the emissions produced by the scheme.</p>
C6	<p><i>The interaction with the tool</i></p>
	<ul style="list-style-type: none"> ○ is intuitive and simple <p>It is an online tool. To navigate it, the users first have to register using their email accounts which takes 2-3 minutes. Once registered, the datasets are displayed on the user's left and are easy to understand</p>
C7	<p><i>How simple or expensive is the tool in user functionalities</i></p>
	<ul style="list-style-type: none"> ○ is very simple and offers the user limited functions <p>The users cannot add their own data to produce the visualisation</p>



9. GYGA

A. General	
A1	Full name and acronym of the tool.
	Global Yield Gap and Water Productivity Atlas (GYGA)
A2	Home page of tool and if relevant also subpages (URL)
	http://www.yieldgap.org/gygamaps/app/index.html
A3	A summary description of the tool including the main objective. <p>The Global Yield Gap and Water Productivity Atlas (GYGA) provides robust estimates of untapped crop production potential on existing farmland based on current climate and available soil and water resources. Results from the atlas can serve for identifying regions with greatest potential for investment in agricultural development and technology transfer and to monitor impact over time. Likewise, the atlas provides essential information to assess the feasibility of a country to achieve food self-sufficiency through crop intensification and, if this cannot be achieved, for assessing how much extra land clearing or food import will be needed to meet future demand for food. The atlas is a foundation for studies aiming to explain and mitigate yield gaps and investigate impact of climate change, land use, and environmental footprint of agriculture.</p>
A4	Most recent update of the information in the tool (year)? <p>This information is not directly available. It seems to be year 2015.</p>
A5-1	Main type of users targeted?
	<p>The toolkit targets the following types of end-users: - Researchers, and professionals who need data on yields and yield gaps</p> <p>This tool provides calculations based on a model regarding the yield gap of crops per country but does not contain any financial information whatsoever. This information on yield and yield gaps could prove useful either to biomass producers/harvesters/farmers/land owners to help them on their decision making or to consultants and scientists that will use the data and model outputs in their research.</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none">○ users with some knowledge of the topic and understanding of online tools <p>There are almost no instructions in the tool for the users, so each user has to be familiar with the topic in order to understand the effect of his selected options in the produced outcome. What is more, there are no clear steps that the user has to follow in order to get the desired results, so they have to be familiar with online tools to figure out which options and buttons will lead to the right outcome.</p>



A6	Type of tool?
	The tool can be classified as data/information mobilization. It provides robust estimates of untapped crop production potential on existing farmland based on current climate and available soil and water resources.
A7	Countries and/or regions that are covered by the tool.
	All world, although not all countries are covered!
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	GYGA is an international project initiated by researchers from University of Nebraska-Lincoln (USA) and Wageningen University (The Netherlands) in 2011.
A9	Types of biomass covered?
	The tool covers all major crops. Major in terms of most important area coverage.
A10	Types of biomass conversion covered?
	Food
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?
	The objective of the tool is to provide robust estimates of the yield gap of crops per country. So it focusses on the untapped crop production potential on existing farmland based on current climate and available soil and water resources. The targeted groups are listed in Part A. The tool doesn't provide a clear description of its objectives. As a result, the user does not familiarise easily. However, since the tool is mainly targeted to researchers, after testing the different functionalities, the user's understanding on the capabilities of the tool increases.
C2	Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)
	Is the interface clear and easy to use? The interface seems nice; however, it is not intuitive for an inexperienced user. How is the use of the tool explained? No specific instructions are provided. This makes it difficult for the users to familiarise easily.
C3	How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)



	<p>The user can select to apply different base map layers such as ‘included countries’, ‘climate zones’ and ‘weather stations’. He can also select ‘crop distribution mask’ such as rainfed maize; irrigated maize; rainfed sorghum; rainfed barley, and ‘background’ for example climate zones, basic topography etc. When the user applies the ‘yield gap estimates’ functionality, he can then select among the following options: ‘crop’, ‘aggregation level’ such as countries; climate zones; weather stations, ‘yield indicators’ such as actual yield; potential water productivity; water limited yield; water limitation index, and final ‘variable’ for example mean value. He can then click on the map and see a more detailed table including the data selected which can be downloaded in excel format.</p>
C4	<p>What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)</p> <p>The tool provides the capability to the user to download data on yield gaps to an excel file based on aggregation level. The possibility to see the calculations is not provided but the user has information on the applied model for the simulation..</p>
C5	<p>What advanced help functions are available?</p> <p>There are no advanced help functions.</p>
C6	<p>The interaction with the tool</p> <ul style="list-style-type: none"> o requires effort and is not explained <p>There are no instructions provided to facilitate the user’s interaction with the tool, only basic map functions such as zoom in/zoom out. There are no explanations regarding the difference of the various selections in drop-down lists or regarding the outcome of these selections (the titles are not clear enough for an unfamiliar user).</p>
C7	<p>How simple or expensive is the tool in user functionalities</p> <ul style="list-style-type: none"> - offers the user some functions regarding e.g. search functions or data presentation <p>The functions that this tool provides are the following:</p> <p>Input of user’s selections via drop-down lists and tick buttons.</p> <p>Visualization of the results on an interactive map with 7 base-map layers (not related to the results), that the user can click on and see details.</p> <p>Visualization of the results on a simple table and download in excel.</p>



10. FEAST

A. General	
A1	Full name and acronym of the tool.
	FEED ASSESSMENT TOOL (FEAST)
A2	Home page of tool and if relevant also subpages (URL)
	https://www.ilri.org/feast
A3	A summary description of the tool including the main objective.
	<p>The Feed Assessment Tool (FEAST) is a systematic method to assess local feed resource availability and use. It helps in the design of intervention strategies aiming to optimize feed utilization and animal production. The tool comprises two main elements:</p> <ul style="list-style-type: none"> • A focused PRA exercise which provides an overview of the farming system with particular emphasis on livestock feed aspects. <p>A simple and brief quantitative questionnaire, designed to be completed by experts under the guidance of the Feast facilitator. Output from 'feast' consists of a short report in a defined format along with some quantitative information on overall feed availability, quality and seasonality which can be used to help inform intervention strategies</p>
A4	Most recent update of the information in the tool (year)?
	?
A5-1	Main type of users targeted?
	<ul style="list-style-type: none"> ○ policy makers, exploring options for a region new to bioeconomy; ○ Other: Farmers, livestock breeders and rural communities <p>This tool is mainly aimed at livestock breeders and rural communities where livestock is the core business since is too much focused on the feed utilisation and on the biomass mobilisation for feed purposes.</p>
A5-2	Experience of users most suitable to use the tool
	<ul style="list-style-type: none"> ○ users with some knowledge of the topic and understanding of online tools <p>This tool is designed for evaluating the resources availability and providing to the farmers and rural communities, a better use of feed and animal production.</p> <p>The outputs of the tool consist of a short report along with some quantitative information on overall feed availability, quality and seasonality. This information can be used to help inform intervention strategies and optimization of the resources uses.</p>
A6	Type of tool?
	- Data/information tool



A7	Countries and/or regions that are covered by the tool.
	World
A8	Name of the tool developer/administrator/manager and organisations involved in the development and project that developed the tool.
	Alan Duncan is the main contact
A9	Types of biomass covered? Use one or more of the following types:
	- Agricultural residues - Forest residues - Dedicated crops
A10	Types of biomass conversion covered?
	- Food - Feed - Bioenergy
C. Usability of the tool/interaction with the user/user friendliness	
C1	What are the objectives of the tool, according to the tool developers? Who are the target users of the tool, according to the developers?
	The main objective of this tool is the assessment the availability of local feed resources in order to optimize feed utilization and animal production. The tool comprises two main elements. This tool is aimed at farmers and communities interested in livestock feed resources
C2	Is the interface clear and easy to use ? (e.g. intuitive, consistent, well-ordered,) How is the use of the tool explained ? (e.g. manual, course, context-sensitive help)
	The interface is quite simple and intuitive and there is a manual available for downloading in ILRI web How is the use of the tool explained? The tool is very easy to use but it does exist a manual with all explanations
C3	How can the user interact with the data ? (e.g. possibility to change or add data, change default values) What kind of search or select functions are available ? (e.g., text search/select, picklists, geographic search/select)
	How can the user interact with the data? The user can import and export data from/to excel files What kind of search or select functions are available? (e.g., text search/select, picklists, geographic search/select)



	It is possible to edit and to select project data
C4	What advanced functionalities are available? (e.g. operations on data, store data sets, download data, process data & information requests, possibility to see/consult the calculations made by the tool)
	There is an option to add GPS data
C5	What advanced help functions are available?
	No advanced help available
C6	<i>The interaction with the tool</i>
	<ul style="list-style-type: none">○ is intuitive and simple○ is generally easy and well explained The tool is very intuitive and it should not suppose any kind of issue or challenge for end users and people who are not familiar with online tools.
C7	<i>How simple or expensive is the tool in user functionalities</i>
	offers the user some functions regarding e.g. search functions or data presentation The tool is simple but at the same time allows introducing several projects and conditions in different regions.