Delivery of sustainable supply of non-food biomass to support a "resource-efficient" Bioeconomy in Europe

Workshop
"Sustainable supply of ligno-cellulosic biomass in Europe: Outcomes and outlook for the future"

On the occasion of the 24th European Biomass Conference and Exhibition (EUBCE)

9 June 2016

WORKSHOP SUMMARY

Deliverable D10.12a




About S2Biom project

The S2Biom project - Delivery of sustainable supply of non-food biomass to support a "resource-efficient" Bioeconomy in Europe - supports the sustainable delivery of non-food biomass feedstock at local, regional and pan European level through developing strategies, and roadmaps that will be informed by a "computerized and easy to use" toolset (and respective databases) with updated harmonized datasets at local, regional, national and pan European level for EU-28, Western Balkans, Moldova, Turkey and Ukraine. Further information about the project and the partners involved are available under www.s2biom.eu.

Project coordinator

Scientific coordinator

Project partners

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Workshop Presentations

All presentations held at the workshop are available at the project website under: http://www.s2biom.eu/en/10-news-events/27-workshops.html.

Workshop Summary

The S2Biom Workshop in Amsterdam was opened by a short welcome by **Ilze Dzene** on behalf of the organizer WIP Renewable Energies and by **Ludger Wenzelides**, FNR who presented a brief overview of the aims and activities of the S2Biom project.

The objective of S2Biom is to support the sustainable delivery of non-food lignocellulosic biomass at local, regional and pan-European level through developing strategies and roadmaps that will be informed by a "computerized and easy to use" planning toolset (and respective databases) with up to date harmonized data for EU28, western Balkans, Turkey, Moldova and Ukraine.

S2Biom research work covers the whole biomass delivery chain from primary biomass to end-use of non-food products and from logistics, pre-treatment to conversion technologies. The spatial level of analysis both for the toolset and the databases will be NUTS1 (country), NUTS2 (regional) and NUTS3 (local level).

S2Biom is implemented along three dedicated themes. ***Theme 1 on "Data & Tools"*** investigates current and future sustainable lignocellulosic biomass costs and supply (domestic and from imports) in EU28; Western Balkans, Moldova, Ukraine and Turkey and elaborates common operating data, models, and tools representing the entire biomass supply chain. ***Theme 2 on "Strategies & Roadmaps"*** aims at developing a vision, strategies, implementation plans and an R&D roadmap for the sustainable delivery of non-food biomass feedstocks at pan-European level based upon data provided by theme 1 and a thorough assessment of policies and regulations for supplying the future bioeconomy. Finally, theme 3 on ***"Validation and Project outreach"*** is concerned with the implementation of case studies, stakeholder engagement and education and public awareness activities. Detailed information on the S2Biom project is available at: ***www.s2biom.eu***.

The overview about the Tool box and databases developed in the framework of S2Biom – Theme 1 was presented by **Berien Elbersen**, DLO-Alterra. The following specific tools are implemented within S2Biom:

- biomass ***cost supply*** tool
- tool for ***matching biomass and conversion technologies***
- tool for viewing ***market demand and policies*** for biomass for bioenergy and biobased products
- tools for optimal design and evaluation of ***biomass supply chain logistics*** and networks at local, national and European scale

These tools are embedded in a General User Interface (GUI) to facilitate easy and widespread use of S2Biom results by stakeholders (see in Figure 1). The current status of the GUI, biomass viewing and cost-supply tool as well as detailed user instructions, including how to access the tool box, were presented by Ms Elbersen. After the presentation, the participants were invited to test the presented tool using their laptops.

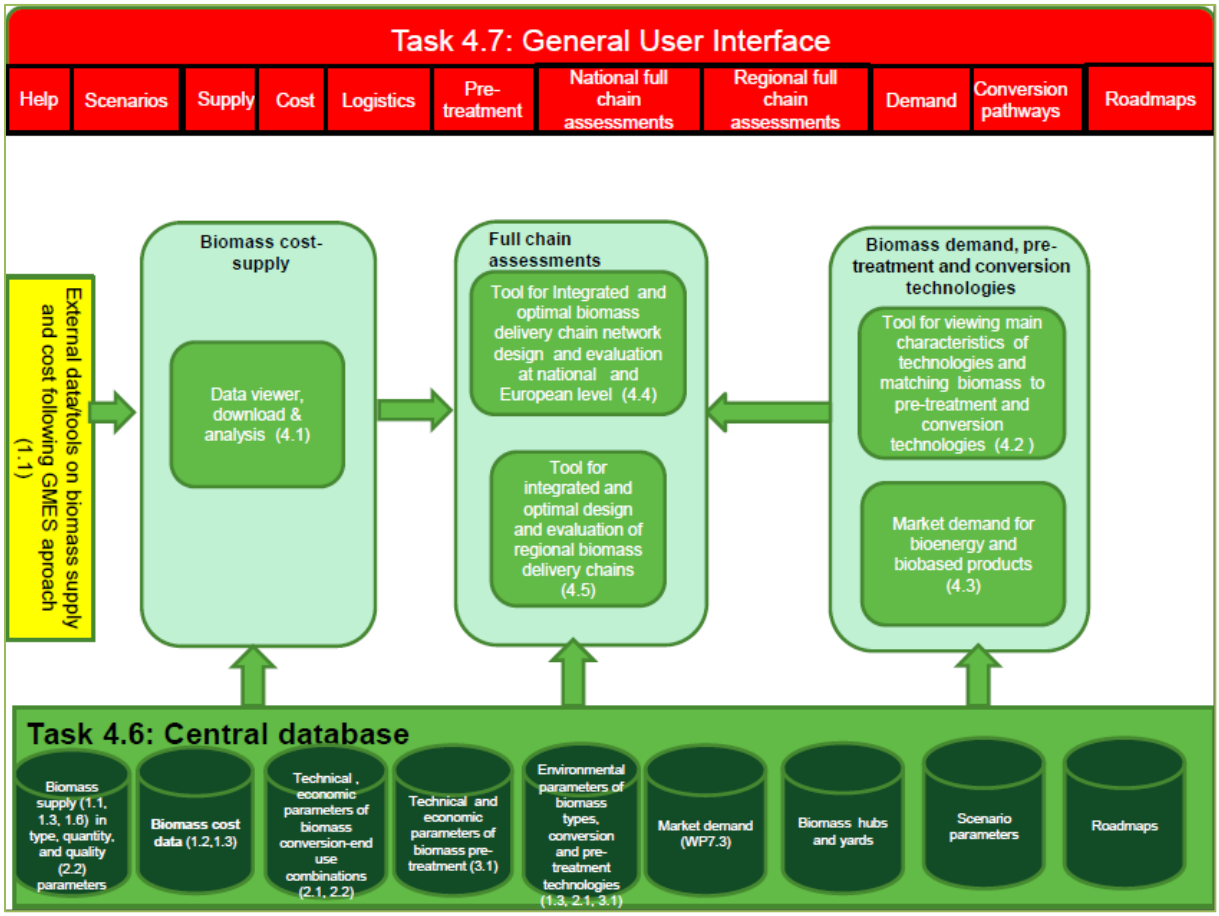
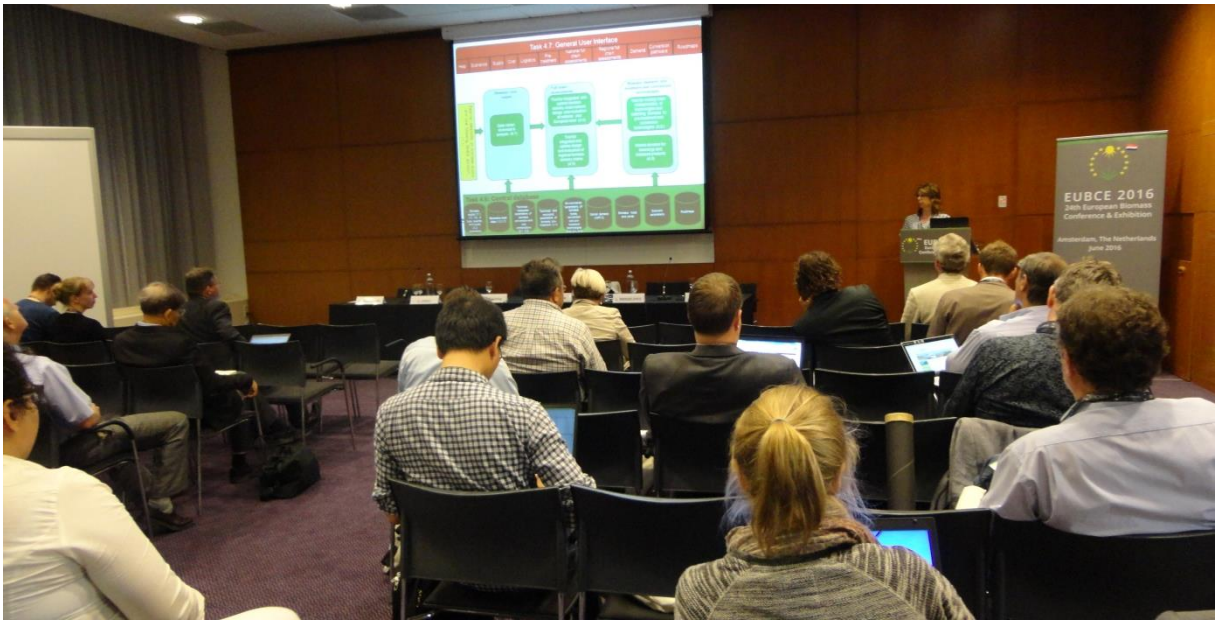


Figure 1: S2Biom General User Interface



The next presentation was given by **Tijs Lammens**, BTG, who presented the biomass and technology matching tool 'Bio2Match' and demonstrated, how it works.

'Bio2Match' guides the user in an interactive and attractive manner to 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 pre-treatment. The matching tool uses extensive information from the S2Biom databases 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.

Mr. Lammens provided access information to the matching tool and participants were able to test the tool themselves. The developers of the tool answered any questions that were asked and were glad to receive a feedback about the tool.

The next presentation was given by **Sylvain Leduc**, IIASA who presented the tool **'*BeWhere*'**. The tool supports the development of EU-wide and national strategies to develop an optimal network of biomass delivery chains. 'BeWhere' provides as output a network of existing and suggestions for new to be developed biomass conversion chains according to optimal selection of technologies, their location and capacity, the costs of each segment of the supply chain, the total bio-energy and biomaterial demand (depending on which technologies can be feasibly included in the tool), avoided emissions at different geographical levels (regional, national and European level). Solutions from 'BeWhere' on new to be developed biomass conversion chains can be used as input to the

'LocaGIStics' tool (explained in details by the next presenter) for further design and evaluation of biomass delivery chains at local level.

'BeWhere' aims to provide optimal solutions for matching the total bioenergy demand at national or regional scale to a total bioenergy supply at lowest total cost and GHG emissions. 'LocaGIStics' then provides support for refining the 'BeWhere' solution while reaching optimal economic and environmental performance per installation and full biomass delivery chain, taking account of more sophisticated logistical concepts and looking at the wider suit of environmental emissions including detailed land based emissions and changes in Carbon stock.

The application of 'BeWhere' model has been presented on the S2Biom case study example of Burgundy (France).

The presentation part of the workshop has been concluded by demonstration of the ***´LocaGIStics'*** tool. The presentation was given by **Bert Annevelink**, DLO-Food and Biobased Research.

'LocaGIStics' (Local Assessment tool for design and loGistics of biomass delivery chains) tool allows to design optimal biomass delivery chains, particularly taking account of different logistical organizations of the chain at regional level and analyze in a comparative way (for different biomass delivery chains) the spatial implications and the environmental and economic performance. It takes account of the biomass cost-supply information, the conversion and pre-treatment technology options and especially the (novel) logistical concepts of biomass hubs and yards. In relation to environmental impacts it takes account of the indicators and guidelines for assessing the overall sustainability performance for bioeconomy value chains.

The tool has been presented on the example of Burgundy, where potential locations of biomass conversion plants provided by 'BeWhere' analysis were further refined in 'LocaGIStics' to find the optimal location of the plant in the Burgundy region.

The workshop was concluded by the **questions and answers session**. The following issues have been discussed:

What are the potential end-users of the toolset?

Policy makers, scientists

Will the mathematics under the tool publicly available?

Yes, in the reports of S2Biom it will be described and published

Did you consider and had a look at other similar tools on the market?

Yes, S2Biom toolset has been developed based on the review of existing tools.

Who will manage and take care of the tool after the project ends?

There are currently on-going negotiations with JRC. Probably they will take over the tool after the project is finished.

When the final data will be available?

It is planned the toolset will be completely functional by the end of the summer, 2016.

In 'Bio2Match' tool - have you any reference to the ISO specification for the biomass properties?

Yes, properties are selected based on ISO specification.

Is the 'Bio2Match' tool more technology or resource driven model? What are the outcomes of the tool for business?

It is a good tool for technology developer to see what kind of biomass the technology can handle. Or, if I need to target specific type of biomass, what do I need to optimize in my technology. It gives the first indication; however, if you are interested in certain technology or biomass, you should dig deeper. The tool gives only the overview, but not the exact answer. It gives a good idea.

Will there be a link to reference plants of technologies in the model?

Yes, the number in brackets indicates the number of the technology entry in the database – the description of each technology is available there, including references.

So, it will be like a big WiKi?

It is a good platform for exchange of information on technologies. It is very much appreciated. Yes, but we also have to be careful, if the information provided by technology producers, shall be evaluated by experts regarding claimed TRL classes.

Is it possible to add typical ranges of capacities for technologies?

Yes, but it is not planned.

Are market conditions considered in the tool?

No, not exactly. But there are limited place for variation, for example, you can unselect electricity as a product if there is no support for the electricity. However, the S2Biom provides also a policy database, which can be used and several case studies, where it is captured.

Is it possible to export data?

For now you can only see it on the screen, but by the end of the project, it will be downloadable.

Is it planned to indicate typical inputs and outputs for the technologies (how much biomass is needed)?

We are thinking about linking it to biomass availability in the regions. But for now it is too complicate and user should scale up and scale down by him/her-self. This problem is addressed in LocaGIStics tool.

Can you assess mixed fuels by the tool?

No, it is too complicate, but user has to decide, what the main biomass is or the most similar to.

Are you going to monitor the use of the 'Bio2Match' tool?

It would be interesting to see, what people are clicking on. No, but it is a good idea.

What are the components of the price what you are accessing with the 'BeWhere' model?

The model is based on cost (not price) minimization. Details on the supply side are input in the model (not built-in). It is more tackled in LocaGIStic model. That's why they are complementary. The user is still making rough assumption (estimate) of costs with many uncertainties, but in the project each separate model covers a certain part of the supply chain and 'BeWhere' is used to refine the results.

It is a tool for policy makers and less for investors. In depth risks for the growers shall be assessed (what is the mechanization rate on farm level, interim storages and work forces). On the costs we are doing more on the biomass supply, collecting cost information on technologies, but to really build a business case, the model is not providing enough information. It just gives an idea, where un-used resources are, and where the demands for bioenergy are. The investor has to do the work himself in the region and to prepare the business plan.

Tools don't do anything else what has been programmed. It is only a hint, but will never replace the interpretation of reality.

To which extent are the policy makers involved in the development of the tool (how the information with those authorities will be shared, input from them provided, work between energy and agriculture policy makers coordinated)?

At the moment they are not directly involved, but JRC is the partner and we are in contact with DG Energy.

When you make a site selection, if you are close to an administrative border of the region, does the model include surrounding regions in the analysis?

No, it is in the borders of the region, but should be extended.

Are the data of vehicle cost per driven km [Euro/km] given in LocaGIStics presentation correct or only a dummy data (example)?

You should check in the database.

Suggestions for the LocaGIStics tool:

Make calculation button more visible! If possible, indicate how intensive the traffic on the streets around the power plants is!

Do you have any plans to develop similar database for another regions (Africa, South-Asia) outside Europe?

With LocaGIStics model you could actually do it everywhere, where data on biomass and technologies are available. The model is flexible and adaptable to other regions. But you need to make it as an extra project.

Annex I – Workshop Agenda

09:00 *Registration*

09:20 **Welcome to the Workshop**

RAINER JANSSEN AND ILZE DZENE, WIP RENEWABLE ENERGIES, GERMANY

09:30 **The S2Biom project – Introduction**

LUDGER WENZELIDES, FNR, GERMANY

CALLIOPE PANOUTSOU, IMPERIAL COLLEGE, UNITED KINGDOM

10:00 *Coffee Break*

10:30 **Overview of S2BIOM Tool Box**

IGOR STARITSKY & BERIEN ELBERSEN, DLO, THE NETHERLANDS

11:00 **Testing of S2BIOM Tool Box**

MODERATED BY: IGOR STARITSKY, DLO, THE NETHERLANDS

11:30 **Testing of Biomass & Technology Matching Tool**

TIJS LAMMENS, BTG, NETHERLANDS

12:30 *Lunch Break*

13:30 **Testing BeWhere Tool for Optimal Technology, Location and Capacity of Bio-energy Production Plants and Evaluation**

SYLVAIN LEDUC, IIASA, AUSTRIA

14:15 **Testing LocaGIStics Tool for Biomass Chain Design and Evaluation**

BERT ANNEVELINK, DLO, THE NETHERLANDS

15:00 **Summary and Conclusions**

LUDGER WENZELIDES, FNR, GERMANY

CALLIOPE PANOUTSOU, IMPERIAL COLLEGE, UNITED KINGDOM

Annex II – List of Workshop Participants

No	Name	Family name	Country	Organisation
1	Daniel	Schweitzer	Germany	University of Stuttgart
2	Patrick		Belgium	
3	Dragoslava	Stojiljkovic	Serbia	University of Belgrade, Faculty of Mechanical Engineering
4	Vladimir	Ivanovic	Serbia	University of Belgrade, Faculty of Mechanical Engineering
5	Nebojša	Manic	Serbia	University of Belgrade, Faculty of Mechanical Engineering
6	Mahrokh	Samavati	Sweden	KTH, Royal Institute of Technology
7	Anouk	Mertens	Belgium	ILVO/ Ghent University
8	Pedro-V.	Mauri	Spain	IMIDRA
9	Wil Fred	Mutsaerts	the Netherlands	Mac presse Europe
10	Hyung Sik	Choi	Germany	University of hehnheim
11	Roberto	Mussi	Italy	Yanmar R&D Europe
12	Hans	Langeveld	the Netherlands	Biomass Research
13	Wolker	Elbersen	the Netherlands	WUR
14	Annette	Weidtmann	Germany	Bioeconomy Baden-Wurttemberg
15	Serge	Biollaz	Switzerland	Paul Scheres Institut (PSI)
16	Dominik	Rutz	Germany	WIP Renewable Energies
17	Bert	Annevelink	the Netherlands	WUR
18	Naksitte	Coova Hanacha	Thailand	STI, Ministry of Science and Technology
19	Juan Manuel	Ugalde	Germany	WIP Renewable Energies
20	Klaus	Lenz	Germany	Syncom GmbH
21	Athanasios	Rentizelas	Scotland/UK	University of Strathclyde
22	Luigi	Pari	Italy	CREA-ING
23	Ilze	Dzene	Germany	WIP Renewable Energies
24	Ruben	Guisson	Belgium	VITO
25	Miet	Van Dael	Belgium	VITO
26	Lucio	De Fusco	Belgium	UCL
27	Eija	Alakangas	Finland	VTT
28	Fabian	Schipfer	Austria	TU Wien
29	Tijs	Lammens	the Netherlands	BTG
30	Sylvain	Leduc	Austria	IIASA
31	Ludger	Wenzelides	Germany	FNR
32	Nikita	Pavlenko	USA	FCCT
33	Peter	Canciani	Italy	CEI
34	Luc	Pelkmans	Belgium	VITO
35	Claus	Soerensen	Denmark	AU
36	Jurgen	Krail	Austria	Foschung Burgenland GmbH
37	Stefan	Ruyters	Belgium	Ghent Bio-economy Valley
38	Bob	McQuillan	France	Lafarge Holcim

No	Name	Family name	Country	Organisation
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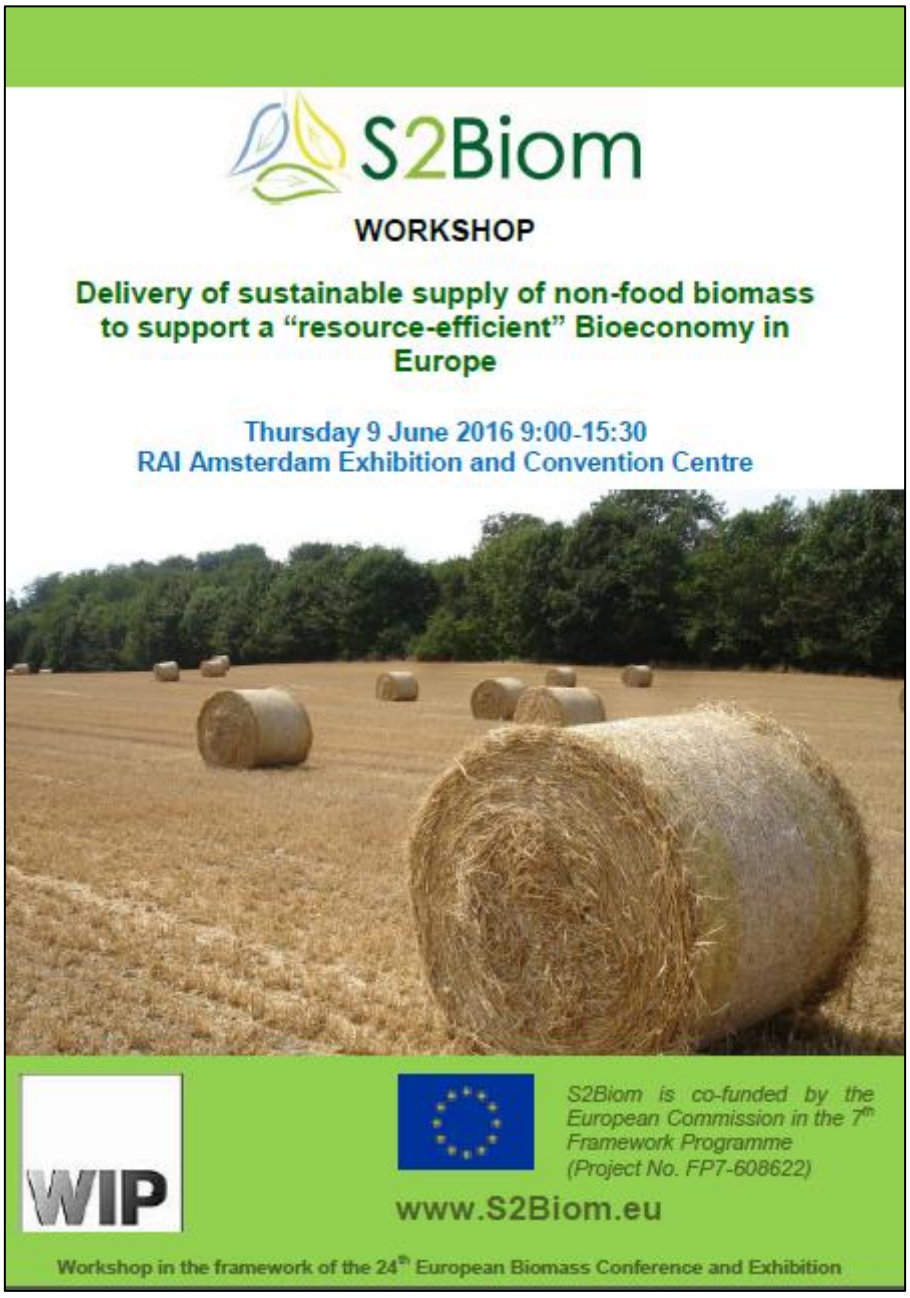
40	Judith	Cano-Ruiz	Spain	IMIDRA
41	Helmer	Belbo	Norway	NIBIO
42	Douwe	van den Berg	the Netherlands	BTG
43	Jesus A.	Garcia	Columbia	Cenipalma
44	Ankit	Pate	India	ISTAR
45	Victor	Hartig	Australia	Manulink
46	Volodymyr	Lyashchenko	Ukraine	UNDP
47	Hamid	Mozaffarian	the Netherlands	ECN
48	Krystian	Butlewski	Poland	Institute of Technology and life sciences
49	Kees	Kwant	the Netherlands	RVO
50	Jeff	Skeer	Germany (Bonn)	IRENA
51	Kamil	Kwiatkowski	Poland	University of Warsaw
52	Daniel	Garcia-Galindo	Spain	CIRCE
53	Berien	Elbersen	the Netherlands	Alterra

Annex III – Flyer of the Workshop



Agenda

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09:20	**Welcome to the Workshop** Rainer Janssen and Ilze Dzene, WIP Renewable Energies, Germany
09:30	**The S2Biom project – Introduction** Ludger Wenzelides, FNR, Germany Calliope Panoutsou, Imperial College, United Kingdom
10:00	*Coffee Break*
10:30	**Overview of S2BIOM Tool Box** Igor Staritsky & Berien Elbersen, DLO, The netherlands
11:00	**Testing of S2BIOM Tool Box** Moderated by: Igor Staritsky, DLO, The netherlands
11:30	**Testing of Biomass & Technology Matching Tool** Tijs Lammens, BTG, Netherlands
12:30	*Lunch Break*
13:30	**Testing BeWhere Tool for Optimal Technology, Location and Capacity of Bio-energy Production Plants and Evaluation** *Sylvain Leduc, IIASA, Austria*
14:15	**Testing LocaGIStics Tool for Biomass Chain Design and Evaluation** *Bert Annevelink, DLO, The Netherlands*
15:00	**Summary and Conclusions** Ludger Wenzelides, FNR, Germany Calliope Panoutsou, Imperial College, United Kingdom

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4CP.1.2	C. Panoutsou	Vision for 1 Billion Tonnes Lignocellulosic Biomass in Europe by 2030
4CO.14.1	L. Wenzelides	S2Biom Project: Evidence based Information for the Sustainable Non-food Biomass Supply for the Biobased Economy by 2030 in Europe
4CO.14.4	T. Lammens	A Tool for Optimizing the Match between Lignocellulosic Biomass and Conversion Technologies
4BO.13.2	U. R. Fritsche	Approach to Evaluating Sustainability of Lignocellulosic Biomass Delivery Pathways within the S2BIOM Project
1BO.9.3	B. Annevelink	S2Biom Survey of Logistical Concepts
5AO.9.5	H. Mozaffarian	Lignocellulosic Biomass as Feedstock for Energy, Fuels, Biobased Chemicals and Materials In Europe; An Integrated Assessment on Using Biomass Resources Among Different Demand Sectors
1BV.4.36	M. Dees	A Data Base on Current and Future Sustainable Cost-Supply of Lignocellulosic Biomass in EU, Western-Balkan Neighbour Countries, Turkey and Ukraine - Challenges, Methods, Uncertainties, Results

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